CITY OF SIGNAL HILL

2175 Cherry Avenue • Signal Hill, California 90755-3799

Transmittal Letter

June 26, 2013

To: losangeles@waterboards.ca.gov

Sam Unger, Executive Officer
Regional Water Quality Control Board, Los Angeles Region
320 4th Street Suite 200
Los Angeles, California 90013

Attention: Rene Purdy

Attached, please find the "Notice of Intent" for the cities and agencies comprising the Lower Los Angeles River Watershed. We look forward to working with your staff during the upcoming year in the development of the (Enhanced) Watershed Management Program and Coordinated Integrated Monitoring Program.

Please contact me at (562) 989-7356 if you have any questions.

Thank you.

Steve Myrter, P.E.
Chair - Lower Los Angeles River Watershed Committee

Notice of Intent

Lower Los Angeles River Watershed Management Plan (WMP)

City of Downey
City of Lakewood
City of Long Beach
City of Lynwood
City of Paramount
City of Pico Rivera
City of Signal Hill
City of South Gate
Caltrans
Los Angeles County Flood Control Districts

Notice of Intent

Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program

Lower Los Angeles River Watershed

SECTION 1

PROGRAM TYPE AND PERMITTEES

The Permittees (listed in Table 1) that are party to this Notice of Intent (NOI) hereby notify the Los Angeles Regional Water Quality Control Board (Regional Water Board) of their intent to develop a Watershed Management Plan (WMP) for the Lower Los Angeles River Watershed. This NOI is being submitted in accordance with Part VI.C.4.b.i of Order R4-2012-0175. Permittees meet the LID and Green Street conditions and will submit the Draft WMP within 18 months of the effective date of Order R4-2012-0175 (June 28, 2014).

The Permittees also hereby notify the Regional Water Board of their intent to develop a Coordinated Integrated Monitoring Program (CIMP).The Permittees intend to follow a CIMP approach for each of the required monitoring plan elements and will submit the CIMP within 18 months of the effective date of Order R4-2012-0175 (June 28, 2014).

While maintaining the 18 month WMP schedule, the Permittees intend to continue to consider the Enhanced-WMP (EWMP) compliance option. If the Permittees elect to develop an EWMP prior to the December 28, 2013, the Permittees will notify the Regional Board in writing.

Table 1. Watershed Management Program Permittees

1. City of Downey
2. City of Lakewood
3. City of Long Beach[1]
4. City of Lynwood
5. City of Paramount
6. City of Pico Rivera
7. City of Signal Hill
8. City of South Gate
9. Caltrans[2]
10. Los Angeles County Flood Control Districts

[1] City of Long Beach is not a party to this MS4 Permit but has their participation in the development of this WMP/ CIMP.

[2] Caltrans is not a party to this MS4 Permit but has indicated their participation in the development of this WMP/CIMP.

SECTION 2

TOTAL MAXIMUM DAILY LOADS ESTABLISHED WATER QUALITY BASED EFFLUENT LIMITATIONS

Table 2 lists applicable interim, final Water Quality Based Effluent Limitations (WQBELs) and all other receiving water limitations established by Total Maximum Daily Loads (TMDLs) identified by Section VI.C.4.b.ii of the Order.

Table 2. Applicable Interim and Final Trash WQBELs and all other Final WQBELs and Receiving Water Limitations occurring before Watershed Management Program Approval.

TMDL Order	WQBEL	Interim/Final	Compliance Date
Los Angeles River Trash TMDL 2007-012	80% of baseline	Interim	9/30/2013
	90% of baseline	Interim	9/30/2014
	96.7 of baseline	Interim	9/30/2015
	Final 0%	Final	9/30/2016
Los Angeles River Nutrients TMDL 2003-009	100% of MS4 drainage area complies with waste load allocations	Final	3/23/2004
Los Angeles River Metals TMDL 2007-014	Dry Weather 50% of drainage area	Interim	1/11/2012
	75% of drainage area	Interim	1/10/2020
	100% of drainage area	Interim	1/11/2024
	Wet Weather 25% of drainage area	Interim	1/11/2012
	50% of drainage area	Interim	1/11/2024
	100% of drainage area	Final	1/11/2028

NOTE:

Reach 1 Cities and lower Reach 2 Cities have joined to form the Lower Los Angeles River Watershed. These cities previously participated in the development of and have an existing Metals TMDL Implementation Plan which was submitted to the Regional Board on October 11, 2010.

SECTION 3

IDENTIFY TMDL CONTROL MEASURES:

The Permittees to this WMP are responsible for two TMDLs that have final WQBELs that occur prior to the anticipated approval of the Program. Table 3 identifies the control measures being implemented by each Permittee for each TMDL. The Permittees will continue to implement these measures during the development of the WMP.

Table 3. Control Measures that are and will be Implemented Concurrently with WMP Development for TMDLs

TMDL	Permittees	Implementation Plan and Control Measures	Status of Implementation
Los Angeles River Trash TMDL **2007-012**	Downey	Has installed 399 Full Capture systems.	Installed
	Lakewood	Has installed 4 Full Capture systems.	Installed
	Long Beach	Has installed Full Capture systems.	Installed
	Lynwood	Has installed Full Capture systems.	Installed
	Paramount	Has installed 230 full capture inserts.	Installed
	Pico Rivera	Has installed 56 Full Capture systems.	Installed
	Signal Hill	Has installed 138 Full Capture systems. Additionally, secondary Full Capture systems located in Hamilton Bowl cover a portion of the city's drainage area to the Los Angeles River.	Installed
	South Gate	Has installed 684 full capture inserts.	Installed

TMDL	Permittees	Implementation Plan and Control Measures	Status of Implementation
Los Angeles River Nutrients TMDL **2003-009**	Downey Lakewood Long Beach Lynwood Paramount Pico Rivera Signal Hill	Public Information & Public Participation Program • Provide Public Information related to control of nutrients Industrial/Commercial Facilities Program • Track critical sources of nutrients • Inspect critical industrial sources of metals • Notify industries identified as potential sources of nutrients of BMP requirements applicable to their sites Planning and Land Development Program • Implement New Development/ Redevelopment Project Performance Criteria Development Construction Program • Implement Construction Site Inventory Tracking • Implement Construction Plan Review and Approval Procedures • Conduct Construction Site Inspections Public Agency Activities Program • Implement Public Construction Management and Public Facility Inventory • Inventory Existing Development for Retrofitting Opportunities • Train Employees in Targeted Positions and Contractors	Continued Implementation of Permit Requirements

SECTION 4

DEMONSTRATION OF MEETING LID ORDINANCE AND GREEN STREET POLICY REQUIREMENTS

The Permittees that are party to this NOI have LID ordinances and Green Street policies in place, in draft format, or in development. Table 4 summarizes the status of the Permittees' LID ordinances and Table 5 summarizes the status of the Permittees' Green Streets policies. More than 50% of the MS4 watershed area that will be addressed by the WMP is covered by LID ordinances and Green Streets policies.

Table 4. Status of LID Ordinance Coverage of the MS4 Watershed Area Addressed by the WMP

Permittee	LID Ordinance Status	MS4 Watershed Area for which Permittee is Responsible [acres][1]	MS4 Watershed Area Covered by Permittee's LID Ordinance [acres]	Percentage of Watershed Area
Downey	Draft Ordinance	3,546	3,546	13%
Lakewood	Draft Ordinance	51	51	0.2%
Long Beach	In Place	12,301	12,301	44%
Lynwood	In Development	3,098	0	0%
Paramount	Draft Ordinance	1,997	1,997	7%
Pico Rivera	Draft Ordinance	1,510	1,510	5%
Signal Hill	In Place	774	774	3%
South Gate	Draft Ordinance	4,704	4,704	17%
LACFCD	N/A	-	-	-
Total MS4 Watershed Area		27,981	-	-
Total MS4 Watershed Area Covered by LID Ordinances			24,883	-
% of MS4 Watershed Area Covered by LID Ordinance				89%

Status Descriptions:

- In Place – Permittee has adopted or introduced an LID Ordinance that is in compliance with the requirements of Order R4-2012-0175 for its portion of the MS4 in the watershed.
- Draft Ordinance – Permittee has completed, or will complete by June 28, 2013, the development of a draft LID Ordinance that is in compliance with the requirements of Order R4-2012-0175 for its portion of the MS4 watershed.
- In Development – Permittee initiated development of an LID Ordinance that is in compliance with the requirements of Order R4-2012-0175 for its portion of the MS4 in the watershed within 60 days of the effective date of Order R4-2012-0175 and will have a draft ordinance.

[1] Watershed area acreage shown includes school districts and other state and federal owned lands that the permittees have no jurisdiction over.

Watershed-wide development of a draft LID ordinance for more than 50 percent of the area begin on or before February 26, 2012 with some permittees making individual efforts while others worked in conjunction with the Gateway Water Management Authority's effort.

Table 5. Status of Green Street Policy Coverage of the MS4 Watershed Area Addressed by the WMP

Permittee	Green Street Policy Status	MS4 Watershed Area for which Permittee is Responsible [acres]	MS4 Watershed Area Covered by Permittee's Green Streets Policy [acres]	Percentage of Watershed Area
Downey	Draft Policy	3,546	3,546	13%
Lakewood	Draft Policy	51	51	0.2%
Long Beach	In Place[2]	12,301	12,301	44%
Lynwood	In Development	3,098	0	0%
Paramount	In Place	1,997	1,997	7%
Pico Rivera	Draft Policy	1,510	1,510	5%
Signal Hill	In Place	774	774	3%
South Gate	Draft Policy	4,704	4,704	17%
LACFCD	N/A	-	-	-
Total MS4 Watershed Area		27,981	-	-
Total MS4 Watershed Area Covered by Green Street Policies			24,883	-
% of MS4 Watershed Area Covered by Green Street Policies				89%

Status Descriptions:

- In Place – Permittee has adopted a Green Street Policy that is in compliance with the requirements of Order R4-2012-0175 for its portion of the MS4 in the watershed.
- Draft Policy – Permittee has completed, or will complete by June 28, 2013, the development of a draft Green Street Policy that is in compliance with the requirements of Order R4-2012-0175 for its portion of the MS4 watershed.
- In Development – Permittee initiated development of a Green Street Policy that is in compliance with the requirements of Order R4-2012-0175 for its portion of the MS4 in the watershed within 60 days of the effective date of Order R4-2012-0175 and will have a draft policy.

[1] Watershed area acreage shown includes school districts and other state and federal owned lands that the permittees have no jurisdiction over.

[2] The City of Long Beach's Complete Streets Program is in place and is considered equivalent to the requirements for a Green Streets Policy.

Watershed-wide development of a draft Green Streets Policy for more than 50 percent of the area begin on or before February 26, 2012 with some permittees making individual efforts while others worked in conjunction with the Gateway Water Management Authority's effort.

SECTION 5

GEOGRAPHIC SCOPE OF WATERSHED MANAGEMENT PROGRAM

The Los Angeles River Watershed covers a land area of 834 square miles. The western portion spans from the Santa Monica Mountains to the Simi Hills and in the east from the Santa Susana Mountains to the San Gabriel Mountains. It flows 51 miles from the western end of the San Fernando Valley to the Queensway Bay and Pacific Ocean at Long Beach. There are over 40 major Permittees in the Los Angeles River watershed, 10 of which are participants herein.The Flood Control District (LACFCD) owns, operates and maintains storm drains and channels within the Los Angeles County and is also included as a participant. This WMP will cover all of the areas within each of the jurisdictions of the MS4 Permittees within the Lower Los Angeles RiverWatershed as shown in Figure 1. The total WMP area for the Lower Los Angeles River Watershed is approximately 27,981 acres. Table 6 provides a breakdown of the land area within the Lower Los Angeles River Watershed by Permittee.

The Permittees have jurisdiction over essentially 100% of the total watershed area, other than schools and other scattered state and federally owned lands. Those school districts, state and federal land areas are included within the land areas as shown on the tables.

Table 6. Lower Los Angeles River Watershed Land Area by Permittees

Permittee	Land Area (Acres)	Percent of Total Area
Downey	3,546	13%
Lakewood	51	0%
Long Beach	12,301	44%
Lynwood	3,098	11%
Paramount	1,997	7%
Pico Rivera	1,510	5%
Signal Hill	774	3%
South Gate	4,704	17%
Caltrans	TBD	TBD
LACFCD	Not Delineated	--

SECTION 6

PLAN CONCEPT AND INTERIM MILESTONES AND TARGET DATES

If at any point, the Permittees elect to develop an EWMP, the Permittees will follow the following program schedule:

Table 7. Watershed Management Program Interim Milestones and Target Completion Dates.

Milestone	Targets
Notify Regional Board on decision to elect to develop Enhanced-WMP instead of WMP	December 2013
Compile technical memorandum of water quality priorities	December 2013
Complete internal draft of EWMP Work Plan	March 2014
Complete draft CIMP	April 2014
Submit final CIMP and final EWMP Work Plan	June 2014
Develop interim numeric milestones for EPA developed TMDLs	August 2014
Conduct initial RAA based on selected watershed control measures	December 2015
Complete internal draft of EWMP	April 2015
Submit draft EWMP to Regional Water Board	June 2015
Submit Final EWMP to Regional Water Board (revised based on the Regional Water Board comments)	January 2016

SECTION 7

COST ESTIMATE

It is estimated that the cost to hire a consultant for the development of the CIMP and WMP is $800,000, which includes past TMDL Implementation Plan development costs. In addition, it is estimated that the Lower Los Angeles River Watershed Agencies will contribute several hundred thousands of dollars in in-kind services and contract administration costs.

The LACFCD, having no land authority over the Lower Los Angeles River Watershed, will contribute 10% of the total consultant CIMP and WMP development cost while the other 90% of the cost will be funded by the remaining Permittees, based upon their respective land area percentages in the Lower Los Angeles River watershed as shown in Table 6.

SECTION 8

PERMITTEE MEMORANDA OF UNDERSTANDING

All Permittees to the WMP are committed to the completion of the program development.

A copy of a draft WMP Memorandum of Understanding (MOU) is included. This draft MOU will be used as a template if the permittees elect to convert to Enhanced-WMP. This agreement would be executed before December 28, 2013.

SECTION 9

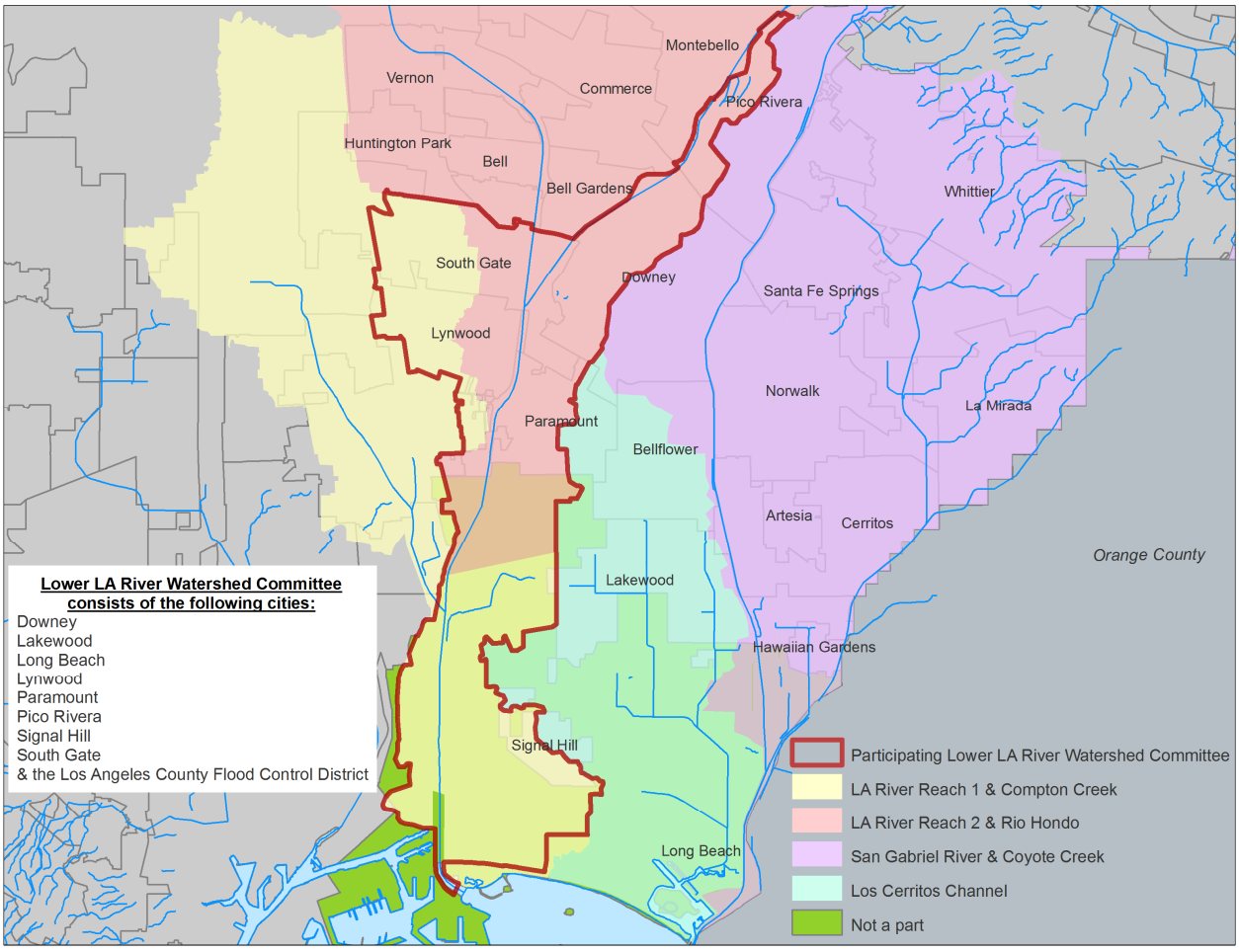
COMMITMENT TO IMPLEMENT A STRUCTURAL BMP OR SUITE OF BMPS

Should the Permittees decide to pursue the EWMP compliance path, the Permittees listed in Table 1 will implement the identified structural BMP or suite of BMPs to fulfill the obligations under PartVI.C.4.b.iii.(5).

Table 8. Structural BMP or Suite of BMPs to be Implemented in the WMP Watershed

Watershed	Permittee	Structural BMP or Suite of BMPs to be Implemented	Planned Implementation Date
Lower Los Angeles River	All listed on Table 1	The permittees are evaluating open space sites within the watershed for possible runoff treatment projects.	June 28, 2015

Figure 1: Lower Los Angeles River Watershed Map



Note: Caltrans areas are not identified.

Attachment A

Memoranda of Understanding (MOU)

MEMORANDUM OF UNDERSTANDING
BETWEEN THE LOS ANGELES GATEWAY REGION INTEGRATED REGIONAL WATER MANAGEMENT JOINT POWERS AUTHORITY
AND
THE CITIES OF DOWNEY, LAKEWOOD, LONG BEACH, LYNWOOD, PARAMOUNT, PICO RIVERA, SIGNAL HILL, SOUTH GATE AND THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

FOR ADMINISTRATION AND COST SHARING TO PREPARE AND IMPLEMENT A WATERSHED MANAGEMENT PROGRAM "WMP" and COORDINATED INTEGRATED MONITORING PROGRAM "CIMP" AS REQUIRED BY THE REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION (REGIONAL WATER BOARD), NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM MUNICIPAL SEPARATE STORM SEWER SYSTEM PERMIT ORDER NO. R4-2012-0175 ("MS4 PERMIT")

This memorandum of understanding ("MOU") is made and entered into as of the date of the last signature set forth below, by and between the Los Angeles Gateway Region Integrated Regional Water Management Joint Powers Authority ("GWMA"), a California Joint Powers Authority, and the Cities of Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, and South Gate, the Los Angeles County Flood Control District ("District"), and the California Department of Transportation ("Caltrans") (hereafter jointly referred to as the "Watershed Permittees"):

RECITALS

WHEREAS, the mission of the GWMA includes the equitable protection and management of water resources within its area; and

WHEREAS, the Watershed Permittees manage, drain and convey stormwater wholly or partially into Reach 1, Reach 2, and the estuary of the Los Angeles River, the Rio Hondo and Compton Creek hereafter referred to as the Lower Los Angeles River Watershed (Lower LAR) as shown on Exhibit A; and

WHEREAS, several of the Watershed Permittees are in multiple watersheds and this MOU shall only pertain to those areas that are within the jurisdiction of the Watershed Permittees and also tributary to Reach 1 and 2 of the Los Angeles River, Compton Creek, the Rio Hondo and the estuary of the Los Angeles River; and

WHEREAS, in 2009, the Watershed Permittees with the exception of the District created Technical Committees consisting of voluntary representatives from the Watershed Permittees, for the preparation of Implementation Plans for the Los Angeles River Metals TMDL (Metals TMDL); and

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WHEREAS, in 2009, the Watershed Permittees with the exception of the District entered into MOUs with the Gateway Cities Council of Governments and the San Gabriel Valley Council of Governments to act as the fiduciary agents for the development of the Metals TMDL Implementation Plans for Reach 1 including Compton Creek and Reach 2 including Rio Hondo respectively; and

WHEREAS, the MS4 Permit was adopted by the Regional Water Board on November 8, 2012 and became effective on December 28, 2012 and allows permittees to prepare a Watershed Management Program ("WMP") or an Enhanced Watershed Management Program (EWMP) and a Coordinated Integrated Monitoring Program ("CIMP"), collectively "the Plans," to address certain elements of the MS4 Permit; and

WHEREAS, the Watershed Permittees and the GWMA wish to maintain continuity of the Metals TMDL Technical Committees in coordinating the preparation and submission of the plans to be presented to the Regional Water Board; and

WHEREAS, the California Department of Transportation ("Caltrans") is regulated under a separate MS4 permit and considering entering into a separate MOU with the Watershed Permittees and the GWMA to coordinate preparation of the Plans; and

WHEREAS, the Los Angeles River Reach 1 Technical Committee and representatives of Pico Rivera, Downey, Paramount and the District decided at a meeting held on April 22, 2013 to prepare a Watershed Management Program (WMP) with the option of converting the WMP to an Enhanced Watershed Management Program upon approval by the Technical Committee prior to December 28, 2013; and

WHEREAS, on May 20, 2013 the Watershed Permittees with the exception of the District voted to change the name of the Los Angeles River Reach 1 Technical Committee to the Lower Los Angeles River Watershed Committee (Lower LAR Watershed Committee) to reflect the expanded duties; and

WHEREAS, the Watershed Permittees and the GWMA are collectively referred to as the "Parties"; and

WHEREAS, preparation of the Plans requires administrative coordination for the Watershed Permittees that the GWMA can provide; and

WHEREAS, there are remaining funds on deposit with the Gateway Cities Council of Governments for use in implementation measures for the Metals TMDL in a previous MOU and the Lower LAR Watershed Committee approved spending the remaining funds for the development of the WMP prior to expending any funding from this MOU; and

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WHEREAS, the Lower LAR Watershed Committee has approved a Scope of Work (Exhibit C); and

WHEREAS, the Parties have determined that authorizing GWMA to retain the consultant which prepared the Metals TMDL Implementation Plan and hire additional consultants as necessary to prepare and deliver the Plans will be beneficial to the Parties; and

WHEREAS, the Watershed Permittees have determined to pay their proportionate share of the costs of preparing the Plans and other related costs (Proportionate costs) to be incurred by the GWMA in accordance with the Cost Sharing Allocation Formula reflected in Exhibit B.

NOW, THEREFORE, in consideration of the mutual covenants and conditions set forth herein, the Parties do hereby agree as follows:

Section 1. Recitals. The recitals set forth above are fully incorporated as part of this MOU.

Section 2. Purpose. The purpose of this MOU is to cooperatively support and undertake preparation of the Plans, and any additional services agreed to by the Watershed Permittees working through the Lower LAR Watershed Committee and as approved by the GWMA. This MOU does not include services related to the implementation of the Plans and required monitoring. The Parties will enter into an amendment to the MOU if they desire to collectively provide such services.

Section 3. Cooperation. The Parties shall fully cooperate with one another to achieve the purposes of this MOU.

Section 4. Voluntary Nature. The Parties voluntarily enter into this MOU.

Section 5. Binding Effect. This MOU shall become binding on GWMA and the Watershed Permittees that execute this MOU.

Section 6. Term. This MOU shall expire on June 30, 2014 except for those Watershed Entities that agree to the extent of the MOU. The term of the MOU for the District shall expire upon approval of the Plans by the Regional Water Board unless the Parties agree to an amendment to this MOU providing for continuing participation by the District.

Section 7. Lower LAR Watershed Committee Representative.

a) Each Watershed Permittee shall appoint a representative ("Representative") to the Lower LAR Watershed Committee. Each member shall have one vote on the Lower LAR Watershed Committee.

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b) All Draft and Final Plans shall be reviewed by the Lower LAR Watershed Committee for further revision and/or completion. No Plan or Plans shall be submitted to the Regional Water Board unless and until it/they have been approved, by a majority vote of the Lower LAR Watershed Committee, for submittal, excepting only a Party or Parties whose involvement in this MOU has been terminated.

c) In the absence of the Representative, the Lower LAR Watershed Committee may appoint an interim Representative for such time as the Representative provides in writing. The interim Representative shall have all the authority of the Representative during that time.

d) The Lower LAR Watershed Committee shall appoint a Representative ("Representative") and may appoint an Alternate Representative ("Alternate Representative"), each of whom shall have the authority to speak on behalf of the Lower LAR Watershed Committee to the GWMA on decisions to be made by the Lower LAR Watershed Committee. The Lower LAR Watershed Committee shall inform the GWMA of the names of the Representative and Alternate Representative in writing. The GMWA may rely on written directions from either the Representative or the Alternate Representative. In the event of conflicting directions from the Representative and the Alternative Representative, the GWMA shall rely on the Representative's direction.

Section 8. Role of the GWMA. The GWMA will contract with and serve as a conduit for paying the Consultants as approved by the Watershed Permittees. The consultant or consultants ("Consultant") shall prepare the Plans and any other plans and/or projects that the Lower LAR Watershed Committee have determined are necessary and the costs of which the Watershed Permittees have agreed to pay. The Representative and the Alternative Representative shall be the means of communication between the Lower LAR Watershed Committee and the GWMA on the approval of the Consultant and any other work the Lower LAR Watershed Committee requests and which will be paid by the Watershed Permittees.

Section 9. Financial Terms.

a) Each Watershed Permittee shall pay its Proportional Costs as provided in Exhibit B for Consultant and any other related costs to which the Representative or the Alternate Representative informs the GWMA the Watershed Permittees informs the GWMA in writing that the Lower LAR Watershed Committee has approved.

b) Each Permittee shall also pay its proportional share of GWMA's staff time for retaining a Consultant and invoicing the Watershed Permittees, audit expenses and other overhead costs, including legal

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fees, ("MOU Costs") incurred by GWMA in the performance of its duties under this MOU. GWMA shall add a percentage not to exceed three percent (3%) to each invoice submitted to each Permittee to cover each Permittee's share of the MOU Costs. The MOU Costs percentage shall be set each fiscal year through a majority vote by the GWMA Policy Board.

c) GWMA shall submit an invoice to each Permittee upon selection of a Consultant reflecting each Permittee's estimated Proportional Costs for Consultant services through the following June 30th or December 31st, whichever date is earlier. Prior to releasing payment to the Consultant the GWMA shall submit a copy of the Consultant's invoice to the Lower LAR Watershed Committee for approval. The GWMA shall not make any payment to a Consultant without the approval of the Lower LAR Watershed Committee as expressed in writing the Representative or Alternate Representative.

d) GWMA shall not be required to incur obligations for its 2013-14 fiscal year in excess of the budget reflected in Table 1 or in excess of any budget approved by the GWMA and the Lower LAR Watershed Committee unless the Lower LAR Watershed Committee authorizes the GWMA to expend the additional funds. GWMA may suspend the work of the Consultants if the Lower LAR Watershed Committee does not provided authorization to incure these additional obligations.

e) Upon receiving the first and each subsequent invoice, each Permittee shall pay their Proportional Costs to the GWMA within forty-five days (45) days of receipt.

f) Upon execution of this MOU, the Lower LAR Watershed Committee shall recommend to GWMA a budget for the 2013-14 fiscal year. Each successive year, commencing May 15, 2014, the Lower LAR Watershed Committee shall recommend to GWMA a budget for the following fiscal year. Within 30 days of receiving the recommendation of the Lower LAR Watershed Committee, GWMA shall consider the recommendation and adopt a budget inclusive of the Lower LAR Watershed Committee's recommendation for the 2013-14 fiscal year. For each successive year, GWMA shall consider the Lower LAR Watershed Committee's recommendation and adopt a budget by June 30th inclusive of the Lower LAR Watershed Committee's recommendation. GWMA will send each Watershed Permittee an invoice during the first month of each fiscal year representing the Watershed Permittee's Proportional Costs of the adopted budget as provided in Table 2. GWMA shall not expend funds nor incur obligations in excess of the budgeted amount without prior notification to and approval by the Lower LAR Watershed Committee.

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g) Each year GWMA shall provide an invoice to each Watershed Permittee, except the City of Long Beach, representing that Watershed Entity's Proportionate Share of the approved budget within thirty (30) days of approval of its budget for expenses related to the MOU. GWMA shall submit its invoices to the City of Long Beach no earlier than October 1st of each year.

h) A Permittee will be delinquent if the invoiced payment is not received by the GWMA within forty-five (45) days after first being invoiced by the GWMA. The GWMA will follow the procedure listed below, or such other procedure that the Watershed Technical Committee directs to effectuate payment: 1) verbally contact the representative of the Permittee and at phone number listed in Section 14 of the MOU, and 2) submit a formal letter from the GWMA Executive Officer to the Permittee at the address listed in Section 14 of the MOU. If payment is not received within sixty (60) days of the due date, the GWMA may terminate the MOU unless the City Managers/Administrators for those Watershed Permittees in good standing inform the GWMA in writing that they agree to adjust their Proportional Cost allocations in accordance with the Cost Share Formula in Table 2 or such other formula to which the Watershed Permittees shall direct to account for the delinquent Watershed Permittees costs. However, no such termination may be ordered unless the GWMA first provides the Watershed Permittees with ninety (90) days written notice of its intent to terminate the MOU. If the GWMA receives such confirmation from the City Managers/Administrators, the delinquent Permittee's participation in this MOU will be terminated and the Cost Share Formula in Exhibit B will be adjusted. A terminated Permittee shall remain obligated to GWMA for its delinquent payments and any other obligations incurred prior to the date of termination.

i) GWMA may suspend or modify the scope of work being performed by any Consultant retained by GWMA if any Watershed Permittee has not paid its invoice within forty five (45) of receipt unless the City Managers/Administrators/Representatives of those Watershed Permittees in good standing inform the GWMA that they will pay the delinquent Permittee's costs once the MOU with the delinquent Permittee has been terminated.

j) Any delinquent payments by a Watershed Permittee shall accrue compound interest at the then-current rate of interest in the Local Agency Investment Fund, calculated from the first date of delinquency until the payment is made

k) Funds remaining in the possession of the GWMA at the end of the term of this MOU, or at the termination of this Agreement, whichever

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occurs earlier, shall be promptly returned to the then remaining Watershed Permittees in good standing and in accordance with the Cost Share Formula in Exhibit B.

l) The Watershed Permittees with the exception of the District previously funded Los Angeles River Metals TMDL Implementation Plans through separate MOUs. The MOU with the GCCOG has funds remaining and upon execution of this WMP MOU, and the complete use of funds remaining in the Metals TMDL MOU, the Lower LAR Watershed Committee will inform the GCCOG that the Metals TMDL MOU shall be terminated and any remaining available funds are to be used to fund the development of Plans through this MOU.

Section 10. Letter of Intent. Pursuant to Section V.C.4.b (page 55) of the MS4 Permit, the Watershed Permittees agree to jointly draft, execute and submit to the Regional Water Board by June 28, 2013, a "Letter of Intent" that complies with all applicable MS4 Permit provisions.

Section 11. Independent Contractor.

a) The GWMA is, and shall at all times remain, a wholly independent contractor for performance of the obligations described in this MOU. The GWMA's officers, officials, employees and agents shall at all times during the Term of this MOU be under the exclusive control of the GWMA. The Watershed Permittees cannot control the conduct of the GWMA or any of its officers, officials, employees or agents. The GWMA and its officers, officials, employees, and agents shall not be deemed to be employees of the Watershed Permittees.

b) The GWMA is solely responsible for the payment of salaries, wages, other compensation, employment taxes, workers' compensation, or similar taxes for its employees and consultants performing services hereunder.

Section 12. Indemnification and Insurance.

a) The GWMA shall include in the agreements with the Consultants an indemnification clause requiring the Consultants to defend, indemnify and hold harmless each of the Watershed Permittees and the GWMA, their officers, employees, and agents, from and against any and all liabilities, actions, suits, proceedings, claims, demands, losses, costs, and expenses, including legal costs and attorney's fees, for injury to or death of person(s), for damage to property (including property owned by the GWMA or any Permittee) resulting from negligent or intentional acts, errors and omissions committed by Consultants, their officers, employees, and other representatives and agents, arising out

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of or related to Consultants' performance under this MOU. This provision shall also apply to any subcontractors hired by the Consultant.

b) The Parties shall defend, indemnify and hold harmless each other as well as their officers, employees, and other representatives and agents from and against any and all liabilities, actions, suits proceedings, claims, demands, losses, costs, and expenses, including legal costs and attorney's fees, for injury to or death of person(s), for damage to property (including property owned by the GWMA and any Permittee) for negligent or intentional acts, errors and omissions committed by another member of the Parties, its officers, employees, and agents, arising out of or related to that Watershed Entity's performance under this MOU, except for such loss as may be caused by GWMA's or any other Permittee's gross negligence of its officers, employees, or other representatives and agents other than the Consultants.

c) The GWMA shall defend, indemnify and hold harmless the Watershed Permittees, their officers, employees, and other representatives and agents of the Watershed Permittees, from and against any and all liabilities, actions, suits proceedings, claims, demands, losses, costs, and expenses, including legal costs and attorney's fees, for injury to or death of person(s), for damage to property (including property owned by the Watershed Permittees) and for negligent or intentional acts, errors and omissions committed by GWMA, its officers, employees, and agents, arising out of or related to GWMA's performance under this MOU.

d) Consultant's Insurance. The GWMA shall require the Consultants to obtain and maintain throughout the term of their contracts with the GWMA insurance.

e) GWMA makes no guarantee or warranty that the reports prepared by GWMA and its Consultant shall be approved by the relevant governmental authorities. GWMA shall have no liability to the Watershed Permittees for the negligent or intentional acts or omissions of GWMA's Consultants. The Watershed Permittees' sole recourse for any negligent or intentional act or omission of the GWMA's Consultant shall be against the Consultant and its insurance.

Section 13. Termination.

a) A Permittee may terminate its participation in this MOU in whole or in part, for any reason, or no reason, by giving the other Watershed Permittees thirty (30) days written notice thereof. The terminating

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Permittee shall be responsible for its Proportional Costs, which the GWMA incurred or to which it became bound through the effective date of termination. Such MOU Costs shall include the remaining fees of any Consultant retained by the GWMA prior to the effective date of termination. Should any Permittee terminate the MOU, the remaining Watershed Permittees' Proportional Cost allocation shall be adjusted in accordance with the Cost Share Formula in Exhibit B.

b) The GWMA may, with a two-thirds(2/3) vote of the GWMA's full Policy Board, terminate this MOU upon not less than thirty (30) days notice, effective on May 1 or December 1 of each year. Any remaining funds not due and payable or otherwise legally committed to Consultant shall be returned to the remaining Watershed Permittees in accordance with the Cost Allocation Formula set forth in Exhibit B.

Section 14. Miscellaneous.

a) Notices. All Notices which the Parties require or desire to give hereunder shall be in writing and shall be deemed given when delivered personally or three (3) days after mailing by registered or certified mail (return receipt requested) to the following address or as such other addresses as the Parties may from time to time designate by written notice in the aforesaid manner:

DRAFT FINAL

To GWMA:

Ms. Grace Kast
GWMA Executive Officer
c/o Gateway Cities Council of Governments
16401 Paramount Boulevard
Paramount, CA 90723

To the Watershed Permittees:

Mr. John Oskoui
Assistant City Manager/Director of Public Works
City of Downey
11111 Brookshire Ave.
Downey, CA 90241

Ms. Lisa A. Rapp
Director of Public works
City of Lakewood
5050 Clark Avenue
Lakewood, CA 90712

Mr. Anthony Arevalo
Storm Water/Environmental Compliance
Storm Water Management, a Division
City of Long Beach
333 West Ocean Boulevard, 9th Floor
Long Beach, CA 90802

Mr. Roger L. Haley
City Manager
City of Lynwood
11330 Bullis Road
Lynwood, CA 90262

Mr. Christopher S. Cash
Public Works Director
City of Paramount
16400 Colorado Ave
Paramount, CA 90723

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Mr. Arturo Cervantes, PE
Director of Public Works/City Engineer
City of Pico Rivera
6615 Passon Boulevard
Pico Rivera, CA 90660

Mr. Steve Myrter
Public Works Director
City of Signal Hill
2175 Cherry Ave
Signal Hill, CA 90775

Mr. Mohammad Mostahkami
Director of Public Works/City Engineer
City of South Gate
8650 California Ave
South Gate, CA 99280

Mr. Gary Hildebrand
Los Angeles County Flood Control District
County of Los Angeles Department of Public Works
Watershed Management Division, 11th Floor
900 S. Fremont Avenue
Alhambra, CA 91803-1331

b) Separate Accounting and Auditing. The GWMA will establish a separate account to track revenues and expenses incurred by the GWMA on behalf of the Watershed Permittees. Any Permittee may upon five (5) days written notice inspect the books and records of the GWMA to verify the cost of the services provided and billed by GWMA. GWMA shall prepare and provide to the Watershed Permittees annual financial statements and audits, after review and approval by the Lower LAR Watershed Committee.

c) Amendment. The terms and provisions of this MOU may not be amended, modified or waived, except by a written instrument signed by all Parties and approved by all Parties as substantially similar to this MOU.

d) Waiver. Waiver by either the GWMA or a Permittee of any term, condition, or covenant of this MOU shall not constitute a waiver of any other term, condition, or covenant. Waiver, by the GWMA or a Permittee, to any breach of the provisions of this MOU shall not constitute a waiver of any other provision or a waiver of any subsequent breach of any provision of this MOU.

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e) Law to Govern: Venue. This MOU shall be interpreted, construed, and governed according to the laws of the State of California. In the event of litigation between the Parties, venue shall lie exclusively in the County of Los Angeles.

f) No Presumption in Drafting. The Parties to this MOU agree that the general rule than an MOU is to be interpreted against the Parties drafting it, or causing it to be prepared, shall not apply.

g) Severability. If any term, provision, condition or covenant of this MOU is declared or determined by any court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions of this MOU shall not be affected thereby and this MOU shall be read and construed without the invalid, void, or unenforceable provisions(s).

h) Entire Agreement. This MOU constitutes the entire agreement of the Parties with respect to the subject matter hereof and supersedes all prior or contemporaneous agreements, whether written or oral, with respect thereto.

i) Counterparts. This MOU may be executed in any number of counterparts, each of which shall be an original, but all of which taken together shall constitute but one and the same instrument, provided, however, that such counterparts shall have been delivered to all Parties to this MOU.

j) Legal Representation. All Parties have been represented by counsel in the preparation and negotiation of this MOU. Accordingly, this MOU shall be construed according to its fair language.

k) Agency Authorization. Each of the persons signing below on behalf of the Parties represents and warrants that he or she is authorized to sign this MOU on their respective behalf.

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE:_____

LOS ANGELES GATEWAY REGION INTEGRATED REGIONAL WATER MANAGEMENT JOINT POWERS AUTHORITY

_____
Christopher S. Cash
GWMA Chair

DRAFT FINAL

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE: _____

CITY OF DOWNEY
Mr. Gilbert Livas
City Manager
11111 Brookshire Ave.
Downey, CA 90241

_____
Gilbert Livas, City Manager

ATTEST:

_____

_____
City Clerk

APPROVED AS TO FORM:

_____

_____
City Attorney

DRAFT FINAL

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE: _____

CITY OF LAKEWOOD
Mr. Howard L. Chambers
City Manager
5050 Clark Avenue
Lakewood, CA 90712

_____
Howard L. Chambers, City Manager

ATTEST:

_____
City Clerk

APPROVED AS TO FORM:

_____
City Attorney

DRAFT FINAL

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE: _____

CITY OF LONG BEACH
Mr. Patrick H. West
City Manager
333 West Ocean Boulevard, 13th Floor
Long Beach, CA 90802

_____
Patrick H. West, City Manager

ATTEST:

_____
City Clerk

APPROVED AS TO FORM:

_____
City Attorney

DRAFT FINAL

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE: _____

CITY OF LYNWOOD
Mr. Roger L. Haley
City Manager
11330 Bullis Road
Lynwood, CA 90262

_____
Roger L. Haley, City Manager

ATTEST:

_____

_____
City Clerk

APPROVED AS TO FORM:

_____

_____
City Attorney

DRAFT FINAL

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE: _____

CITY OF PARAMOUNT
Ms. Linda Benedetti-Leal
City Manager
16400 Colorado Ave
Paramount, CA 90723

_____
Linda Benedetti-Leal, City Manager

ATTEST:

_____
City Clerk

APPROVED AS TO FORM:

_____
City Attorney

DRAFT FINAL

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE: _____

CITY OF PICO RIVERA
Mr. Ronald Bates, Ph. D.
City Manager
6615 Passons Boulevard
Pico Rivera, CA 90660

_____
Ronald Bates, Ph. D., City Manager

ATTEST:

_____
City Clerk

APPROVED AS TO FORM:

_____
City Attorney

DRAFT FINAL

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE: _____

CITY OF SIGNAL HILL
Mr. Ken Farfsing
City Manager
2175 Cherry Ave
Signal Hill, CA 90775

_____
Ken Farfsing, City Manager

ATTEST:

_____

_____
City Clerk

APPROVED AS TO FORM:

_____

_____
City Attorney

DRAFT FINAL

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE: _____

CITY OF SOUTH GATE
Mr. Michael Flad
City Manager
8650 California Ave
South Gate, CA 90280

_____
Michael Flad, City Manager

ATTEST:

_____
City Clerk

APPROVED AS TO FORM:

_____
City Attorney

DRAFT FINAL

IN WITNESS WHEREOF, the Parties hereto have caused this MOU to be executed on their behalf, respectively, as follows:

DATE: _____

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
County of Los Angeles Department of Public Works
Watershed Management Division, 11th Floor
900 S. Fremont Avenue
Alhambra, CA 91803-1331

By_____
Chief Engineer

ATTEST:

_____

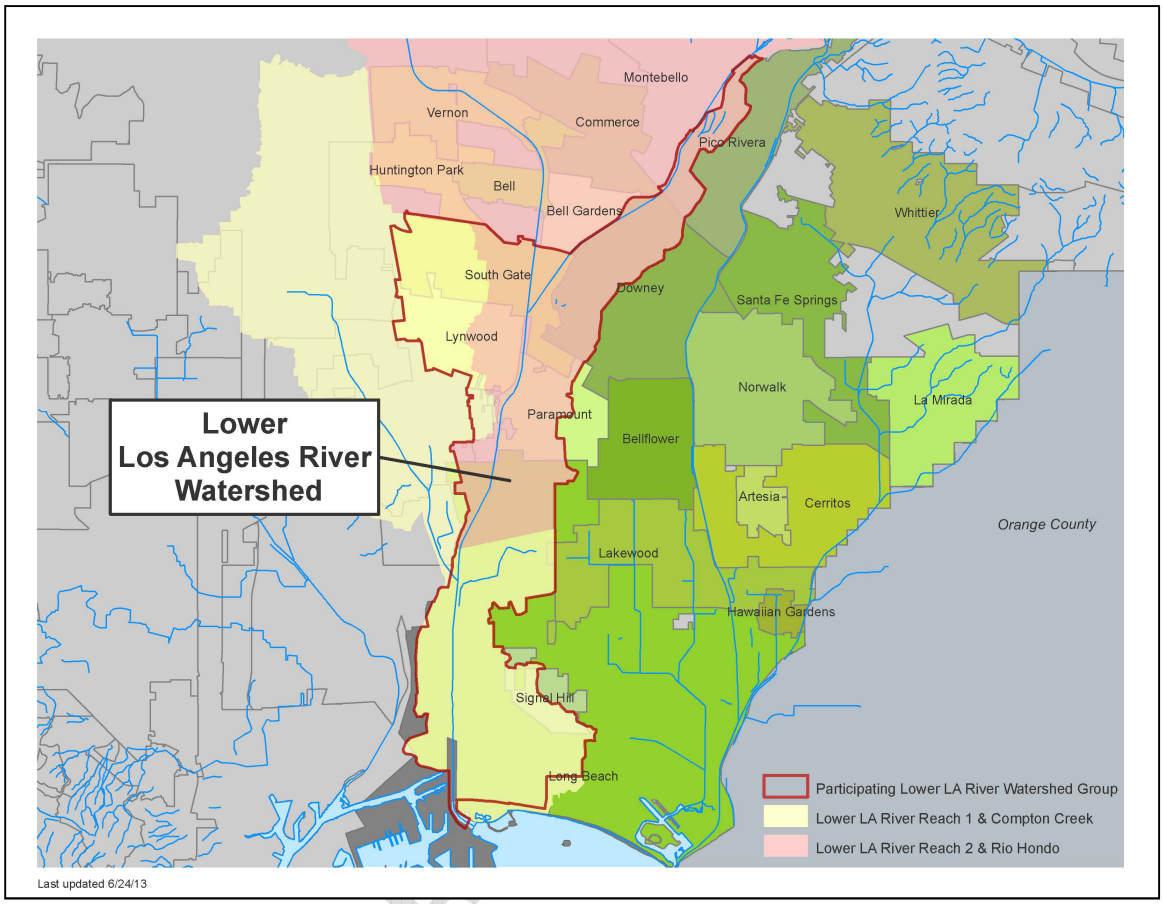
_____
TITLE

APPROVED AS TO FORM:

_____
John F. Krattli
County Counsel

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EXHIBIT A



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EXHIBIT B
Cost Sharing

The Watershed Permittees agree to pay for the cost of preparation of the WMP (or EWMP if subsequently designated by the parties) and the CIMP. The District will pay 10 percent (10%) of the cost of developing the WMP (or EWMP) and CIMP. Each remaining Watershed Permittee will pay according to the cost sharing formula as approved in the prior MOU for the Los Angeles River Metals TMDL Implementation Plan Reach 1; each Permittee (other than the Districts) shall pay an equal share of 20 percent of the cost, 80 percent of the costs to be paid based on proportion of the Watershed Permittees' area. All Watershed Permittees shall pay the 3 percent (3%) GWMA administrative costs.

TABLE 1
Cost Sharing Table through submittal of WMP on or before June 28, 2014

WMP/CIMP			**$657,400**	**TOTAL**	**$677,122**
GWMA Administration (3%)			**$19,722**		
LACFCD Allocation (10%)					**$67,712**
Distributed Cost					**$609,410**
Agency	**Area (sq mi)**	**% of Total Area**	**20 percent of Distributed Cost proportioned equally**	**80 percent of Distributed Cost proportioned based on area**	**TOTAL Per Agency**
Downey	5.54	12.7%	$13,542	$61,777	**$75,320**
Lakewood	0.08	0.2%	$13,542	$892	**$14,435**
Long Beach	19.22	44.0%	$13,542	$214,325	**$227,867**
Lynwood	4.84	11.1%	$13,542	$53,972	**$67,514**
Paramount	3.12	7.1%	$13,542	$34,792	**$48,334**
Pico Rivera	2.36	5.4%	$13,542	$26,317	**$39,859**
Signal Hill	1.21	2.8%	$13,542	$13,493	**$27,035**
South Gate	7.35	16.8%	$13,542	$81,961	**$95,503**
Caltrans[1]	TBD	TBD	$13,542	TBD	**$13,542**
TOTAL	**43.72**	**100%**	**$108,340**	**$487,528**	**$609,410**

NOTES:

- *[1] Caltrans cost sharing will be determined at a later date. Each agency's total will be adjusted accordingly.*
- *Unincorporated areas of Los Angeles County are not participants in this MOU.*
- *Watershed Permittees and the cost share are subject to modifications due to, but not limited to, changes in the number of participating agencies, refinements in mapping, and changes in boundaries.*
- *Other agencies may participate upon approval of cost sharing agreements by the Lower LAR Watershed Committee and GWMA. Any future participants shall be assessed a late entry cost as if they had been a participant from the beginning of the Metals MOU, as of July 1, 2010, unless otherwise determined by the Lower LAR Watershed Committee.*

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Table 2

Estimated Cost Sharing Formula per $100,000 beginning June 29, 2014 through September 30, 2026.

Agency	TOTAL COST TO BE DISTRIBUTED				$ 100,000
	Area (sq mi)	% of Total Area	20 percent of cost proportioned equally	80 percent of cost proportioned based on area	TOTAL
Downey	5.54	12.7%	$2,222	$10,137	$12,359
Lakewood	0.08	0.2%	$2,222	$146	$2,369
Long Beach	19.22	44.0%	$2,222	$35,169	$37,391
Lynwood	4.84	11.1%	$2,222	$8,856	$11,079
Paramount	3.12	7.1%	$2,222	$5,709	$7,931
Pico Rivera	2.36	5.4%	$2,222	$4,318	$6,541
Signal Hill	1.21	2.8%	$2,222	$2,214	$4,436
South Gate	7.35	16.8%	$2,222	$13,449	$15,671
Caltrans	TBD	TBD	$2,222	TBD	$2,222
TOTAL	**43.72**	**100%**	**$17,778**	**$80,000**	**$100,000**

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Exhibit C
Scope of Work

a. BACKGROUND/HISTORICAL DATA/HYDROLOGICAL SETTING

This task will build upon the readily available data developed as part of the Reach 1 and 2 Metals TMDL Implementation Plans and include:

Deliverables:

- Source Assessment based on waterbody/pollutant combinations
- Review of applicable IRWMPs
- Baseline map
- Historical Water Quality Data
- Identification of water quality priorities
- Evaluation of existing water quality conditions
- Prioritization of the water quality issues
- Assemble available water quality reports
- Survey Permittee and Compile of existing control measures (Permittee surveys and annual reports)

b. MONITORING

Several agencies have recently and/or are currently collecting samples within the Lower LAR receiving waters including: Los Angeles County Flood Control at the mass emission stations, Los Angeles City under contract to the Gateway COG for Metals and Bacteria TMDL as well as the Special Studies through the CPR group. While this offers the opportunity to realize a considerable cost savings, monitoring will require a high degree of coordination amongst the various agencies. This task will include:

Deliverables:

- Summary of outfall/receiving water /special study requirements
- Summary of existing Monitoring Programs
- Review past GIP site monitoring
- Receiving Water Monitoring – for this Scope of Work, it is assumed County Flood Control will continue monitoring at Mass Emission Station.
- Prepare Coordinated Integrated Monitoring Program (CIMP), including:
  - Wet-weather outfall based monitoring program
  - Non-stormwater Outfall based monitoring and screening plan
- Inspection of outfalls
- An approach to integrating MS4, TMDL and Special Study monitoring
- Set up shared database for new development/redevelopment Effectiveness Tracking
- Regional Studies (participate in Southern California Monitoring Coalition)
- Attend regular meetings of the Los Angeles River TMDL Monitoring Technical Committees
- Ongoing review of monitoring data as it becomes available

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c. REASONABLE ASSURANCE ANALYSIS (RAA)

Contact the Regional Water Board to investigate if the previous modeling (Reach 2 metals TMDL) satisfies their interpretation of an adequate RAA.

Contact a minimum of four modeling consultants to provide cost estimates and scopes of work to conduct a RAA using a peer-reviewed, public domain, quantitative modeling system. The Technical Committee will select the consultant and modeling system. A budgetary allowance for the RAA has been included.

Deliverables:

- Draft Technical Memorandum
- Final Technical Memorandum

d. REVIEW AND EVALUATE MINIMUM CONTROL MEASURES

The MS4 permit requires an evaluation and customization of the Minimum Control Measures (MCMs, formerly referred to as BMPs). Watershed Permittees not implementing a WMP or EWMP are required to implement all MCMs.

Deliverables:

- Develop list of potential EWMP project sites,
- Summarize scientific data supporting potential EWMP sites,
- Source control,
- Operational Controls,
- Identify potential opportunities for customization of the MS4's Minimum Control Measures (Part VI.D.8.D). Describe the modification, potential justifications for those modifications and provide materials for compilation.

e. WATERSHED MANAGEMENT PROGRAM PLAN

This task represents the analysis of the information developed and compilation into a first draft for review by the Technical Committee, then preparation of a final draft for submittal to the Regional Water Board.

Deliverables:

- Communication with Regional Water Board and preparation of documents (December 28, 2013, for potential conversion to EWMP.
- First Draft Watershed Implementation Plan submitted to Technical Committee:
  - Target Date April 1, 2014
- Final Draft Watershed Implementation Plan for submittal to Regional Water Board:
  - Target date June 1, 2014

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f. COORDINATION WITH TECHNICAL COMMITTEE

Regular meetings and communications with the Watershed Permittees will be critical during the preparation of the WMP. This will include:

Deliverables:

- Schedule and prepare agenda and summary notes for monthly meetings
- Attend and participate in the Technical Advisory Committee
- Attend and participate in Regional Water Board meetings

DRAFT FINAL

Attachment B

Signed Letters of Intent

City of Downey

FUTURE UNLIMITED

June 24, 2013

CITY COUNCIL

MAYOR
DN. MARIO A. GUERRA

MAYOR PRO TEM
FERNANDO VASQUEZ

COUNCIL MEMBERS
ROGER C. BROSSMER
LUIS H. MARQUEZ
ALEX SAAB

CITY MANAGER
GILBERT A. LIVAS

CITY CLERK
ADRIA M. JIMENEZ, CMC

CITY ATTORNEY
YVETTE M. ABICH GARCIA

Samuel Unger, Executive Officer
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Attention: Renee Purdy

Subject: **LETTER OF INTENT TO PARTICIPATE IN THE DEVELOPMENT OF A WATERSHED MANAGEMENT PROGRAM (WMP) AND COORDINATED INTEGRATED MONITORING PROGRAM (CIMP) IN COOPERATION WITH THE LOWER LOS ANGELES RIVER WATERSHED GROUP**

Dear Mr. Unger:

The City of Downey submits this Letter of Intent as our written notification to participate and share the cost for the development of a Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program (CIMP) for the Lower Los Angeles River Watershed and to satisfy the CIMP notification requirement of Section IV.C.1 of Attachment E of Order No. R4-2012-0175 (MS4 Permit). The Lower Los Angeles River Watershed Group is comprised of the following Permittees: Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, South Gate and the Los Angeles Flood Control District.

While maintaining the 18 month schedule for development of the WMP, the Lower Los Angeles River Watershed Group intends to continue to evaluate and consider the Enhanced WMP (EWMP) option. If the group decides to develop an EWMP prior to the December 28, 2013 deadline, your office will be notified in a separate letter prior to any such change.

If you have any questions, please contact Jason Wen at 562-904-7201.

Very truly yours,

CITY OF DOWNEY

Gilbert A. Livas
City Manager

June 26, 2013

Samuel Unger, Executive Officer
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Attention: Renee Purdy

LETTER OF INTENT TO PARTICIPATE IN THE DEVELOPMENT OF A WATERSHED MANAGEMENT PROGRAM (WMP) AND COORDINATED INTEGRATED MONITORING PROGRAM (CIMP) IN COOPERATION WITH THE LOWER LOS ANGELES RIVER WATERSHED GROUP

Dear Mr. Unger;

The City of Lakewood submits this Letter of Intent as our written notification to participate and share the cost for the development of a Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program (CIMP) for the Lower Los Angeles River Watershed and to satisfy the CIMP notification requirement of Section IV.C.1 of Attachment E of Order No. R4-2012-0175 (MS4 Permit). The Los Angeles Lower Los Angeles River Watershed Group is comprised of the following Permittees: Downey, Lakewood, Long Beach, Lynwood, Paramount, City of Pico Rivera, City of Signal Hill, City of South Gate and the Los Angeles Flood Control District.

While maintaining the 18 month schedule for development of the WMP, the Lower Los Angeles River Watershed Group intends to continue to evaluate and consider the Enhanced-WMP (EWMP) option. If the group decides to develop an EWMP prior to the December 28, 2013 deadline, your office will be notified in a separate letter prior to any such change.

At their meeting on June 25, 2013, the City council authorized the submittal of this letter of intent. In addition, the City Council has approved a draft Green Streets Policy Manual and draft Low Impact Development (LID) Ordinance.

If you have any questions, please contact Ms. Konya Vivanti, Sr. Management Analyst at (562) 866-9771 ext. 2507 or kvivanti@lakewoodcity.org.

Sincerely,

Howard L. Chambers
City Manager

CITY OF LONG BEACH
DEPARTMENT OF PUBLIC WORKS

STORM WATER MANAGEMENT
CITY OF LONG BEACH

333 W. Ocean Blvd., 9th Floor | Long Beach, CA 90802 | (562) 570-66023 FAX: (562) 570-6501

STORM WATER/ENVIRONMENTAL COMPLIANCE DIVISION

June 25, 2013

Samuel Unger, Executive Office
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Long Angeles, California 90013

Attn: Renee Purdy

LETTER OF INTENT TO PARTICIPATE IN THE DEVELOPMENT OF A WATERSHED MANAGEMENT PROGRAM (WMP) AND COORDINATED INTEGRATED MONITORING PROGRAM (CIMP) IN COOPERATION WITH THE LOWER LOS ANGELES RIVER WATERSHED GROUP

Dear Mr. Unger:

The City of Long Beach (City) intends to participate in the development of the Lower Los Angeles River Watershed Group Watershed Management Program (WMP) and in a Coordinated Integrated Monitoring Program (CIMP). Information developed in this regional participation of the subject WMP can be use in the City's future NPDES Permit.

Should you have any questions please contact me at your convenience at 562-570-6023.

Sincerely,

Anthony Arevalo
Storm Water Environmental/Compliance Officer

AA:la
LOI_LAR_R1.doc

RB-AR10116

ROGER L. HALEY
City Manager

City of
LYNWOOD
Incorporated 1921
11330 Bullis Road, Lynwood, CA 90262
(310) 603-0220 x 200
rhaley@lynwood.ca.us

June 25, 2013

Samuel Unger, Executive Officer
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Attention: Renee Purdy

LETTER OF INTENT TO PARTICIPATE IN THE DEVELOPMENT OF A WATERSHED MANAGEMENT PROGRAM (WMP) AND COORDINATED INTEGRATED MONITORING PROGRAM (CIMP) IN COOPERATION WITH THE LOWER LOS ANGELES RIVER WATERSHED GROUP

Dear Mr. Unger;

The City of Lynwood submits this Letter of Intent as our written notification to participate and share the cost for the development of a Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program (CIMP) for the Lower Los Angeles River Watershed and to satisfy the CIMP notification requirement of Section IV.C.1 of Attachment E of Order No. R4-2012-0175 (MS4 Permit). The Los Angeles Lower Los Angeles River Watershed Group is comprised of the following Permittees: Carson, Downey, Lakewood, Long Beach, Lynwood, Paramount, City of Pico Rivera, City of Signal Hill, City of South Gate and the Los Angeles Flood Control District.

While maintaining the 18 month schedule for development of the WMP, the Lower Los Angeles River Watershed Group intends to continue to evaluate and consider the Enhanced-WMP (EWMP) option. If the group decides to develop an EWMP prior to the December 28, 2013 deadline, your office will be notified in a separate letter prior to any such change.

If you have any questions, please contact Mr. Emilio M. Murga, our Director of Public Works/City Engineer at (310) – 603-0220 extension 287.

Very truly yours,

Roger L. Haley
City Manager

GENE DANIELS
Mayor

DIANE J. MARTINEZ
Vice Mayor

TOM HANSEN
Councilmember

DARYL HOFMEYER
Councilmember

PEGGY LEMONS
Councilmember

June 17, 2013

Samuel Unger, Executive Office
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, CA 90013

Attn.: Renee Purdy

LETTER OF INTENT TO PARTICIPATE IN THE DEVELOPMENT OF A WATERSHED MANAGEMENT PROGRAM (WMP) AND COORDINATED INTEGRATED MONITORING PROGRAM (CIMP) IN COOPERATION WITH THE LOWER LOS ANGELES RIVER WATERSHED GROUP

Dear Mr. Unger:

The City of Paramount submits this Letter of Intent as our written notification to participate and share the cost for the development of a Watershed Management Program (WMP) and a Coordinated Integrated Monitoring Program (CIMP) for the Lower Los Angeles River Watershed and to satisfy the CIMP notification requirement of section IV.C.1 of Attachment E of Order No. R4-2012-0175 (MS4 Permit). The Los Angeles Lower Los Angeles River Watershed Group is comprised of the following Permittees: Downey, Lakewood, Long Beach, Lynwood, Paramount, City of Pico Rivera, City of Signal Hill, City of South Gate and the Los Angeles Flood Control District.

While maintaining the 18 month schedule for development of the WMP, the Lower Los Angeles River Watershed Group intends to continue to evaluate and consider the Enhanced-WMP (EWMP) option. If the group decides to develop an EWMP prior to the December 28, 2013 deadline, your office will be notified in a separate letter prior to any such change.

At its meeting of June 4, 2013, the City Council adopted a Green Streets Policy for Paramount and had the first reading of its draft Low Impact Development (LID) Ordinance. Adoption of the LID Ordinance is expected on July 2, 2013.

Should you have any questions, please contact Sarah Ho at 562.220.2020. Thank you.

Sincerely,

CITY OF PARAMOUNT

Linda Benedetti-Leal
City Manager

16400 Colorado Avenue • Paramount, CA 90723-5012 • Ph: 562-220-2000 • Fax: 562-630-6731
www.paramountcity.com

RB-AR10118

City of Pico Rivera
OFFICE OF THE CITY MANAGER
6615 Passons Boulevard · Pico Rivera, California 90660
(562) 801-4379
Web: www.pico-rivera.org · e-mail: rbates@pico-rivera.org

Ronald Bates, Ph. D.
City Manager

City Council
Gustavo V. Camacho
Mayor
Brent A. Tercero
Mayor Pro Tem
Bob J. Archuleta
Councilmember
David W. Armenta
Councilmember
Gregory Salcido
Councilmember

June 24, 2013

Samuel Unger, Executive Officer
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Attention: Renee Purdy

SUBJECT: LETTER OF INTENT TO PARTICIPATE IN THE DEVELOPMENT OF A WATERSHED MANAGEMENT PROGRAM (WMP) AND COORDINATED INTEGRATED MONITORING PROGRAM (CIMP) IN COOPERATION WITH THE LOWER LOS ANGELES RIVER WATERSHED GROUP

Dear Mr. Unger:

The City of Pico Rivera submits this Letter of Intent as our written notification to participate and share the cost for the development of a Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program (CIMP) for the Lower Los Angeles River Watershed and to satisfy the CIMP notification requirement of Section IV.C.1 of Attachment E of Order No. R4-2012-0175 (MS4 Permit). The Lower Los Angeles River Watershed Group is comprised of the following Permittees: Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, South Gate and the Los Angeles Flood Control District. The WMP and CIMP will be drafted to meet the requirements by the MS4 Permit for the aforementioned permittee's respective watersheds.

While maintaining the 18-month schedule for development of the WMP, the Lower Los Angeles River Watershed Group intends to continue to evaluate and consider the Enhanced-WMP (EWMP) option. If the group decides to develop an EWMP prior to the December 28, 2013 deadline, your office will be notified in a separate letter prior to any such change.

If you have any questions, please contact Arturo Cervantes, Director of Public Works/City Engineer at 562-801-4425.

Very truly yours,

Ronald Bates, Ph.D.
City Manager

cc: Mayor and City Council
Director of Public Works/City Engineer

CITY OF SIGNAL HILL

2175 Cherry Avenue • Signal Hill, California 90755-3799

June 24, 2013

Samuel Unger, Executive Officer
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Attention: Renee Purdy

Subject: Letter of Intent to Participate in the Development of a Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program (CIMP) in Coopertion with the Lower Los Angeles River Watershed Group

Dear Mr. Unger;

The City of Signal Hill submits this Letter of Intent as our written notification to participate and share the cost for the development of a Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program (CIMP) for the Lower Los Angeles River Watershed and to satisfy the CIMP notification requirement of Section IV.C.1 of Attachment E of Order No. R4-2012-0175 (MS4 Permit). The Los Angeles Lower Los Angeles River Watershed Group is comprised of the following Permittees: Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, South Gate, and the Los Angeles Flood Control District.

While maintaining the 18 month schedule for development of the WMP, the Lower Los Angeles River Watershed Group intends to continue to evaluate and consider the Enhanced WMP (EWMP) option. If the group decides to develop an EWMP prior to the December 28, 2013 deadline, your office will be notified in a separate letter prior to any such change.

At its meeting of June 18, 2013, the City Council authorized the submittal of this letter of intent. In addition, on June 4, 2013, the City Council adopted a Green Streets Policy, and on June 18, 2013, had the first reading of its draft Low Impact Development (LID) Ordinance. Adoption of the LID Ordinance is expected in July.

If you have any questions, please contact Steve Myrter, the Director of Public Works at (562) 989-7356.

Very truly yours,

Kenneth C. Farfsing
City Manger

City of South Gate
8650 CALIFORNIA AVENUE • SOUTH GATE, CA 90280-3075 • (323) 563-9543
www.cityofsouthgate.org FAX (323) 569-2678

GIL HURTADO, Mayor
HENRY C. GONZALEZ, Vice Mayor
MARIA DAVILA, Council Member
W.H. (BILL) DE WITT, Council Member
JORGE MORALES, Council Member

June 25, 2013

Samuel Unger, Executive Officer
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Attention: Renee Purdy

LETTER OF INTENT TO PARTICIPATE IN THE DEVELOPMENT OF A WATERSHED MANAGEMENT PROGRAM (WMP) AND COORDINATED INTEGRATED MONITORING PROGRAM (CIMP) IN COOPERATION WITH THE LOWER LOS ANGELES RIVER WATERSHED GROUP

Dear Mr. Unger:

The City of South Gate submits this Letter of Intent as our written notification to participate and share the cost for the development of a Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program (CIMP) for the Lower Los Angeles River Watershed and to satisfy the CIMP notification requirement of Section IV.C.1 of Attachment E of Order No. R4-2012-0175 (MS4 Permit). The Los Angeles Lower Los Angeles River Watershed Group is comprised of the following Permittees: Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, South Gate and the Los Angeles Flood Control District.

While maintaining the 18 month schedule for development of the WMP, the Lower Los Angeles River Watershed Group intends to continue to evaluate and consider the Enhanced WMP (EWMP) option. If the group decides to develop an EWMP prior to the December 28, 2013 deadline, your office will be notified in a separate letter prior to any such change.

If you have any questions, please contact Mohammad Mostahkami, Director of Public Works/City Engineer (323) 357-9657 or John Hunter, the City's Consultant at 562/802-788.

Sincerely,

Gil Hurtado
Mayor

RB-AR10122

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

GAIL FARBER, Director

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE
REFER TO FILE: WM-7

June 24, 2013

Mr. Samuel Unger, P.E.
Executive Officer
California Regional Water Quality
Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Attention Ms. Renee Purdy

Dear Mr. Unger:

LETTER OF INTENT – LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
LOWER LOS ANGELES RIVER WATERSHED
WATERSHED MANAGEMENT PROGRAM AND
COORDINATED INTEGRATED MONITORING PROGRAM

The Los Angeles County Flood Control District (LACFCD) submits this Letter of Intent to participate in and share the cost of the development of a Watershed Management Program (WMP) and a Coordinated Integrated Monitoring Program (CIMP) with the Lower Los Angeles River Watershed Committee. This Letter of Intent serves to satisfy the WMP/EWMP notification requirements of Section VI.C.4.b of Order No. R4-2012-0175 (Municipal Separate Storm Sewer Systerm Permit) and the CIMP requirements of Section IV.C.1 of Attachment E of the Municipal Separate Storm Sewer System Permit.

The Lower Los Angeles River Watershed Committee consists of the following agencies: LACFCD and cities of Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, and South Gate. The Lower Los Angeles River Watershed Committee has included a final draft Memorandum of Understanding in the Notice of Intent. The LACFCD intends to submit a final Memorandum of Understanding to the County of Los Angeles Board of Supervisors (which is the LACFCD's governing body) for approval prior to December 28, 2013.

If you have any questions, please contact Ms. Terri Grant at (626) 458-4309 or tgrant@dpw.lacounty.gov.

Very truly yours,

for GAIL FARBER
Chief Engineer of the Los Angeles County Flood Control District

LP:jht
P:\wmpub\Secretarial\2013 Documents\Letter\LOI Lower LAR LACFCD.doc\C13222

cc: City of Downey (John Oskoui)
City of Lakewood (Konya Vivanti)
City of Long Beach (Anthony Arevalo)
City of Lynwood (Josef Kekula)
City of Paramount (Christopher Cash)
City of Pico Rivera (Art Cervantes)
City of Signal Hill (Steve Myrter)
City of South Gate (Mohammad Mostahkami)

DEPARTMENT OF TRANSPORTATION
OFFICE OF THE DIRECTOR
P.O. BOX 942873, MS-49
SACRAMENTO, CA 94273-0001
PHONE (916) 654-5266
FAX (916) 654-6608
TTY 711
www.dot.ca.gov

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June 18, 2013

Samuel Unger, Executive Office
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Attn.: Renee Purdy

LETTER OF INTENT TO PARTICIPATE IN THE DEVELOPMENT OF A WATERSHED MANAGEMENT PROGRAM (WMP) AND COORDINATED INTEGRATED MONITORING PROGRAM (CIMP) IN COOPERATION WITH THE LOWER LOS ANGELES RIVER WATERSHED GROUP

Dear Mr. Unger:

Caltrans intends to voluntarily join the Lower Los Angeles River Watershed Group in the Development of the Watershed Management Program (WMP) and a Coordinated Integrated Monitoring Program (CIMP) to meet the intent of Caltrans TMDL requirements as part of the Caltrans Statewide NPDES Permit and the goals of watershed collaboration.

Caltrans recognizes that while maintaining the 18-month schedule for development of the WMP, the Watershed Group intends to continue to evaluate and consider the Enhanced WMP (EWMP) option. If the group decides to develop an EWMP prior to the December 28, 2013 deadline, your office will be notified in a separate letter and confirm whether Caltrans intends to participate in development of the EWMP.

Should you have any questions, please contact Keith Jones at (916) 653-4947. Thank you.

Sincerely,

G. SCOTT McGOWEN
Chief Environmental Engineer
California Department of Transportation

September 25, 2013

Lower Los Angeles River Watershed Management Group
(See Distribution List)

APPROVAL OF NOTIFICATION OF INTENT (NOI) TO DEVELOP A WATERSHED MANAGEMENT PROGRAM (WMP), PURSUANT TO THE LOS ANGELES COUNTY MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT (NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175)

Dear Lower Los Angeles River Watershed Management Group Participants:

Regional Board staff reviewed the NOI to prepare a WMP that the Lower Los Angeles River Watershed Management Group submitted to the Regional Board on June 27, 2013; according to the NOI, the participants in the Lower Los Angeles River Watershed Management Group are the Cities of Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, South Gate, and the Los Angeles County Flood Control District, and Caltrans. Upon review, Regional Board staff determined the NOI meets the notification requirements of Part VI.C of Order No. R4-2012-0175, *Waste Discharge Requirements for MS4 Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach* (hereafter, Order).

As you are aware, the Order allows permittees the option to submit to the Regional Board for approval an NOI to prepare a WMP. Preparing a WMP allows permittees to implement the requirements of the Order on a watershed scale through customized strategies, control measures, and best management practices (BMPs). Implementing a WMP allows permittees to address the highest watershed priorities, including complying with the requirements of Part V.A (Receiving Water Limitations), Part VI.E (Total Maximum Daily Load Provisions) and Attachments L through R, by customizing the control measures in Parts III.A (Prohibitions – Non-Storm Water Discharges) and VI.D (Minimum Control Measures) of the Order.

The Lower Los Angeles River Watershed Management Group must submit to the Regional Board for review and approval a draft WMP for the Lower Los Angeles River watershed no later than June 28, 2014. Until Regional Board staff approves the Lower Los Angeles River Watershed Management Group WMP, each Lower Los Angeles River Watershed Management Group participant must do the following:

RB-AR10126

1. Continue to implement all the watershed control measures in their corresponding storm water management programs, including actions within each of the six categories of minimum control measures consistent with Title 40 Code of Federal Regulations Section 122.26(d)(2)(iv) and Part VI.C.4.d.i of the Order.
2. Continue to implement watershed control measures to eliminate non-storm water discharges through the MS4 that are a source of pollutants to receiving waters consistent with Clean Water Act Section 402(p)(3)(B)(ii) and Part VI.C.4.d.ii of the Order.
3. Implement watershed control measures, including those identified in existing TMDL implementation plans, to ensure MS4 discharges achieve compliance with interim and final trash WQBELs and all other final WQBELs and receiving water limitations pursuant to Part VI.E and set forth in Attachments L through Q by the applicable compliance deadlines occurring prior to approval of the WMP per Part VI.C.4.d.iii of the Order.
4. Target implementation of watershed control measures listed above to address known contributions of pollutants from MS4 discharges to receiving waters.
5. Meet all interim and final deadlines for development of a WMP.

The Regional Board understands that the Lower Los Angeles River Watershed Management Group may opt to develop an enhanced watershed management program (EWMP) instead of a WMP, after further evaluation. Regional Board staff determined the NOI the Lower Los Angeles River Watershed Management Group submitted met most of the requirements specific to an EWMP but lacked sufficiently detailed information about the structural best management practice(s) the Lower Los Angeles River Watershed Management Group participants will implement to provide meaningful water quality improvement. If the Lower Los Angeles River Watershed Management Group decides to develop an EWMP, please notify the Regional Board in writing no later December 28, 2013. Along with this written notification, submit a copy of the executed memorandum of understanding describing the mechanism to fund the development of the EWMP, and detailed technical information on the structural best management practice (BMP) or suite of BMPs the Lower Los Angeles River Watershed Management Group will implement, including the BMPs to quantifiably reduce pollutant loads, the size of the drainage area, the volume of storm water addressed, and the estimated pollutant load reduction.

If you have any questions, please contact Ms. Pavlova Vitale of the Storm Water Permitting Unit by electronic mail at Pavlova.Vitale@waterboards.ca.gov or by phone at (213) 576-6761. Alternatively, you may also contact Mr. Ivar Ridgeway, Chief of the Storm Water Permitting Unit, by electronic mail at Ivar.Ridgeway@waterboards.ca.gov or by phone at (213) 620-2150.

Sincerely,

Samuel Unger

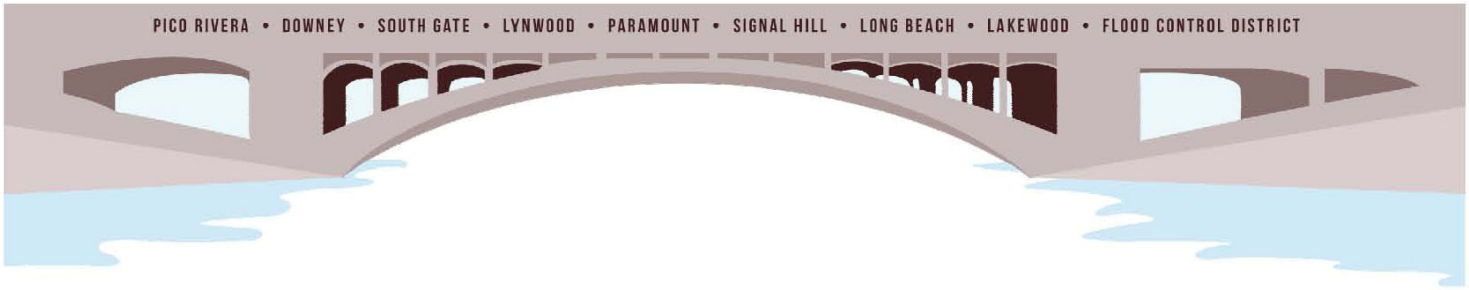
Samuel Unger, P.E.
Executive Officer

cc: Jason Wen, City of Downey
Konya Vivanti, City of Lakewood
Anthony Arevalo, Long Beach
Emilio Murga, City of Lynwood
Sarah Ho, City of Paramount
Arturo Cervantes, City of Pico Rivera
Steve Myrter, City of Signal Hill
Mohammad Mostahkami, City of South Gate
Keith Jones, Caltrans
Terry Grant, Los Angeles County Flood Control District
Dave Smith, US EPA
Walt Shannon, State Water Resources Control Board – Storm Water Section
Jennifer Fordyce, State Water Resources Control Board – Office of Chief Counsel

ECM#

Distribution List for the Lower Los Angeles River Watershed Management Group

1. Gilbert Livas, City Manager
   11111 Brookshire Avenue
   Downey, CA 90241
2. Howard Chambers, City Manager
   City of Lakewood
   5050 Clark Ave
   Lakewood, CA 90712
3. Anthony Arevalo, Storm Water Compliance Officer
   City of Long Beach
   333 West Ocean Blvd 9th Floor
   Long Beach, CA 90802
4. Roger Haley, City Manager
   11330 Bullis Road
   Lynwood, CA 90262
5. Linda Benedetti-Leal, City Manager
   16400 Colorado Ave.
   Paramount, CA 90723
6. Ronald Bates, City Manager
   6615 Passons Boulevard
   Pico Rivera, CA 90660
7. Kenneth Farfsing, City Manager
   2175 Cherry Ave
   Signal Hill, CA 90755
8. Gil Hurtado, Mayor
   8650 California Ave
   South Gate, CA 90280
9. Gail Farber, Chief Engineer
   Los Angeles County Flood Control District
   900 S. Fremont Ave.
   Alhambra, CA 91803
10. Scott McGowen, Chief Environmental Engineer
    Caltrans
    S 1120 N Street, MS-27
    Sacramento, CA 95814



Lower Los Angeles River Watershed Management Program

June 27, 2014

DRAFT

Prepared For:

Lower Los Angeles River Watershed Group

Prepared By:

John L. Hunter and Associates, Inc.

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EXECUTIVE SUMMARY

This Watershed Management Program (WMP) sets forth a path to achieve pollutant reductions in the waterbodies of the Lower Los Angeles River and its tributaries. The WMP includes a discussion of existing and planned watershed control measures, a Reasonable Assurance Analysis (RAA) based upon the Watershed Management Modeling System previously developed by the Los Angeles County Flood Control District in collaboration with the USEPA and a Coordinated Integrated Monitoring Program (CIMP) to be implemented over a three year period.

The Watershed Group has been working cooperatively towards the goal of a cleaner Los Angeles River for several years. Beginning in the late 2000s, all Cities within the Group (as part of a larger Gateway cities effort) pursued and were awarded a grant to install full trash-capture inserts and partial capture retractable screens catch basins. Thus far nearly 4,800 full capture inserts have been installed in the Lower LAR drainage area. In 2009 the Lower LAR cities again worked together, forming Technical Committees and funding the development of Implementation Plans for Reach 1 and Reach 2 and tributaries for the Metals TMDL of the Los Angeles River. The Technical Committees that were formed as a result of the Metals TMDL effort continued their effort and in 2011, applicable agencies of both the Reach 1 and 2 committees merged into a single Lower LAR Watershed Committee. The funding of Committee activities has been authorized by city council and governing board Memorandums of Understanding through 2028. This cooperative effort continues and in 2014, the Watershed Group was notified of their successful multi-city grant application (as part of a larger Gateway effort) to install 23 LID BMPs along selected major thoroughfares.

These efforts are in addition to many equally successful efforts by individual agencies which have resulted in the planning, construction and installation of both regional and local stormwater treatment systems. These include:

- The Los Angeles County Flood Control District's Dominguez Gap Wetlands,
- South Gate's Azalea infiltration system,
- South Gate's Atlantic Boulevard tree box filtration systems,
- Signal Hill's and Long Beach's Hamilton Bowl trash capture systems and
- Downey's over 500 treatment systems on individual parcels.

Many additional individual treatment systems are located in cities throughout the Lower LAR Watershed. This summer, ground breaking is anticipated for the City of Long Beach's Deforest Park natural habitat.

Prior to 2012, National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) Permits required cities and agencies to implement a series of best management practices such as street sweeping and catch basins cleaning to demonstrate compliance. With the adoption of the fourth term MS4 permit by the Los Angeles Regional Water Quality Control Board on November 8, 2012, the emphasis shifted to a more watershed based effort that includes the goals of achieving specific pollutant targets as runoff leaves the storm drain system and enters the main river channels.

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This WMP is a long-term planning document that takes a comprehensive look at the Lower LAR Watershed, including its land uses, MS4 system, existing and planned control measures (both structural and nonstructural), existing storm water treatment systems, historical monitoring data and the various segments of the Los Angeles River and its tributaries that have been identified as impaired by various pollutants. Using that data, the Watershed Management Modeling System – one of the three modeling system authorized by the MS4 Permit – is used to generate the RAA which predicts an optimal combination of structural treatment systems and construction timelines to achieve the goals of the MS4 Permit. The RAA distributes the responsibility for implementation of future treatment systems amongst all Lower LAR Watershed Cities.

The RAA identifies wet weather zinc as the primarily pollutant of concern[1] and that by designing treatment systems and other non-structural controls measures for zinc, the targets for other pollutants of concern will also be met. The first target for zinc occurred in 2012, when 25% of the area within the Lower LAR Watershed was to meet the wet weather zinc reduction goal. The wetlands, detention basins, extensive number of per-parcel treatment systems and non-structural control measures were designed to achieve that goal along with other pollutant reductions and multi-use factors such as groundwater recharge and recreational use.

The next wet weather target specified in the MS4 Permit occurs in 2024 when 50% of the area must achieve the zinc reduction goal. In order to maintain continued progress towards the 2024 goal, this WMP establishes an early-action milestone of 31% that is to be achieved through an effective combination of enhanced non-structural control measures and structural treatment projects that have been completed or are substantially through the planning and design phase by December 28, 2017. The RAA provides a recommended volume of wet weather runoff on a city-by-city basis to be used as the target in order to meet the early-action step of 31% by December 28, 2017, and the MS4 Permit targets of 50% by 2024 and 100% by 2028. Cumulatively, the RAA establishes a final (2028) goal of capturing and treating 803.2 acre feet. The ultimate cost will vary considerably depending on the availability and configuration of suitable treatment locations and effectiveness of nonstructural watershed control measures but is estimated to be in the range of $156 million - $293 million. The treatment volumes recommended by the RAA are estimates based on current land used data, historical monitoring and assumed treatment system efficiencies. The WMP also incorporates an adaptive management strategy to adjust and modify the various control measures as necessary.

A Coordinated Integrated Monitoring Program (CIMP) has been developed at a part of this WMP which greatly expands the monitoring of water quality in the Lower LAR watershed. The CIMP goals are in part to measure the overall effectiveness of the control measures the Watershed Group is implementing. Four new outfall monitoring sites along the Los Angeles River Channel and three new bacteria TMDL monitoring sites within the Los Angeles River Estuary are scheduled to be phased in over a 3-year period. These will be in addition continued operation of three of the four existing Metals TMDL

[1] The discharge of copper is anticipated to be reduced as copper is removed from brake pads over the next decade. Trash is on a separate compliance path with cities individually reporting greater than 90 percent of all catch basins retrofitted with full trash capture inserts or equivalent within the current Trash TMDL reporting year (ending September 30, 2014)

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monitoring stations and the existing Mass Emission Station currently operated by the Los Angeles County Flood Control District near the interface of the river and estuary which measures the comingled runoff from the entire Los Angeles River Watershed.

This WMP and its components, including Chapter 3 *Selection of Watershed Control Measures*, Chapter 4 *RAA* and Chapter 8 *CIMP* outline a path to achieve significantly improved water quality in the Lower LAR Watershed. The WMP outlines a path based on the optimal placement of treatment systems determined by the RAA, but this is not the only viable path. The Watershed Group can follow the adaptive management strategy described in Chapter 9 to adjust the number, locations and sizes of future treatment systems as long as the timelines and goals of this WMP are followed. While this WMP is developed for the Watershed Group to implement the recommended volume reduction goals on a city-by-city basis, it does not preclude participating agencies from collaborating on potentially more cost effective regional and multi-city runoff treatment systems.

As part of the overall collaborative and inclusive effort, this Draft Watershed Management Program was presented at a public stakeholder meeting at the Downey City Hall on May 1, 2014. The Watershed Control Measures, Reasonable Assurance Analysis and Coordinated Integrated Monitoring Programs were discussed and comments from interested members of the public were solicited.

DRAFT

RB-AR10142

1 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Watershed Management Program (WMP) has been developed to implement the requirements of Los Angeles Regional Water Quality Control Board Order Nos. R4-2012-0175 and R4-2014-0024 (National Pollutant Discharge Elimination System (NPDES) Permit Nos. CA004001, CA004003 respectively) on a watershed scale. In addition, elements of this WMP relating to Total Maximum Daily Loads (TMDLs) address requirements of California State Water Resources Control Board Order No. 2012-0011-DWQ (the Caltrans Stormwater Permit) for those TMDLs within the watershed area as described in the following section. Combined, the Orders set forth waste discharge requirements for the Municipal Separate Storm Sewer (MS4) discharges by Caltrans, the Los Angeles County Flood Control District (LACFCD), the County of Los Angeles and 85 cities within the coastal watersheds of Los Angeles County (Permittees). The goal of these requirements is to reduce the discharge of pollutants from MS4s to the maximum extent practicable.[1]

1.1.1 PARTICIPATING AGENCIES

This WMP is a collaborative effort of ten participating agencies with MS4 facilities within the subwatersheds[2] of Reach 1 and Reach 2 of the Los Angeles River, Compton Creek and the Rio Hondo. For the purposes of this WMP, the area defined by the boundaries of the participating agencies with these subwatersheds is referred to as the Lower Los Angeles River Watershed (Lower LAR Watershed). The participating agencies and their respective MS4 stormwater Permits addressed by this WMP are listed in Table 1-1.

Table 1-1: Participating Agencies of the Lower LAR Watershed

Agency	Permit Order No.	Permit Name
Downey	R4-2012-0175	Los Angeles County NPDES MS4 Permit (LA MS4 Permit)
LACFCD[3]		
Lakewood		
Lynwood		
Paramount		
Pico Rivera		
Signal Hill		
South Gate		
Long Beach	R4-2014-0024	Long Beach NPDES MS4 Permit (LB MS4 Permit)
Caltrans[3]	2012-0011-DWQ	Caltrans Stormwater Permit (Caltrans MS4 Permit)

[1] Reference: http://www.swrcb.ca.gov/water_issues/programs/stormwater/municipal.shtml
[2] Subwatersheds within this WMP are the "HUC-12 Equivalent" drainage areas as defined in 1.E.3.
[3] LACFCD and Caltrans participation is restricted to their land and stormwater facilities within the Lower LA River Watershed.

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1.1.2 MS4 PERMITS ADDRESSED

As noted in Table 1-1, Caltrans and the City of Long Beach are regulated under their own MS4 Permits, separate from the Los Angeles MS4 Permit. The extent to which this impacts the contents of this WMP is explained in this section.

LONG BEACH AND LOS ANGELES MS4 PERMITS

The Long Beach and Los Angeles MS4 Permits, adopted by the Los Angeles Regional Water Quality Control Board (Regional Board) within 15 months of each other, contain similar language and requirements. Specifically, both Permits include a WMP approach to compliance. These similarities allow for the preparation of one WMP to address the requirements of both permits. Except where otherwise noted, the term *MS4 Permit* will refer exclusively to the Los Angeles and Long Beach MS4 Permits.

CALTRANS STORMWATER PERMIT

Discharges to Caltrans' MS4 are regulated through the Caltrans MS4 Permit. Although the Caltrans Stormwater Permit does not include a WMP compliance approach like the Los Angeles and Long Beach MS4 Permits, its TMDL provisions do require cooperation with agencies subject to the same TMDLs. As such, Caltrans' participation is restricted to those sections of the WMP related to TMDL requirements. Caltrans has acknowledged their intent to participate.

1.1.3 NON-PARTICIPATING AGENCIES

All other permitted agencies within these subwatersheds that are not listed above have developed either individual or collaborative WMPs or draft EWMPs separately and are not participating in this WMP. Non-participating agencies include the County of Los Angeles (unincorporated areas), the Cities of Los Angeles, Compton and Carson and multiple cities within Reach 2 of the Los Angeles River and the Rio Hondo. Figure 1-1 shows the participating agencies within the Lower LAR.

1.1.4 THE LOWER LOS ANGELES RIVER WATERSHED GROUP

DESIGNATION

The participating agencies have a long history of working together to address TMDL issues. Prior to the adoption of the current MS4 Permits[4], the agencies were under a Memoranda of Understanding to develop Implementation Plans for the Los Angeles River Metals TMDL. After Permit adoption, the agencies decided to continue their collaborative efforts to develop a WMP. In addition, the LACFCD decided to participate in this joint effort. The agencies' intent was to focus collective resources on water quality prioritization and implementation efforts to their shared receiving waters. The ten agencies submitted a Notice of Intent to develop a WMP to the Regional Board prior to the June 28, 2013[5], deadline and each signed a Memoranda of Understanding to develop the WMP.

[4] The Los Angeles MS4 Permit adopted November 8, 2012, expires December 28, 2017 and the Long Beach MS4 Permit adopted February 6, 2014, expires March 28, 2019

[5] The Notice of Intent was approved by the Regional Board on September 25, 2013

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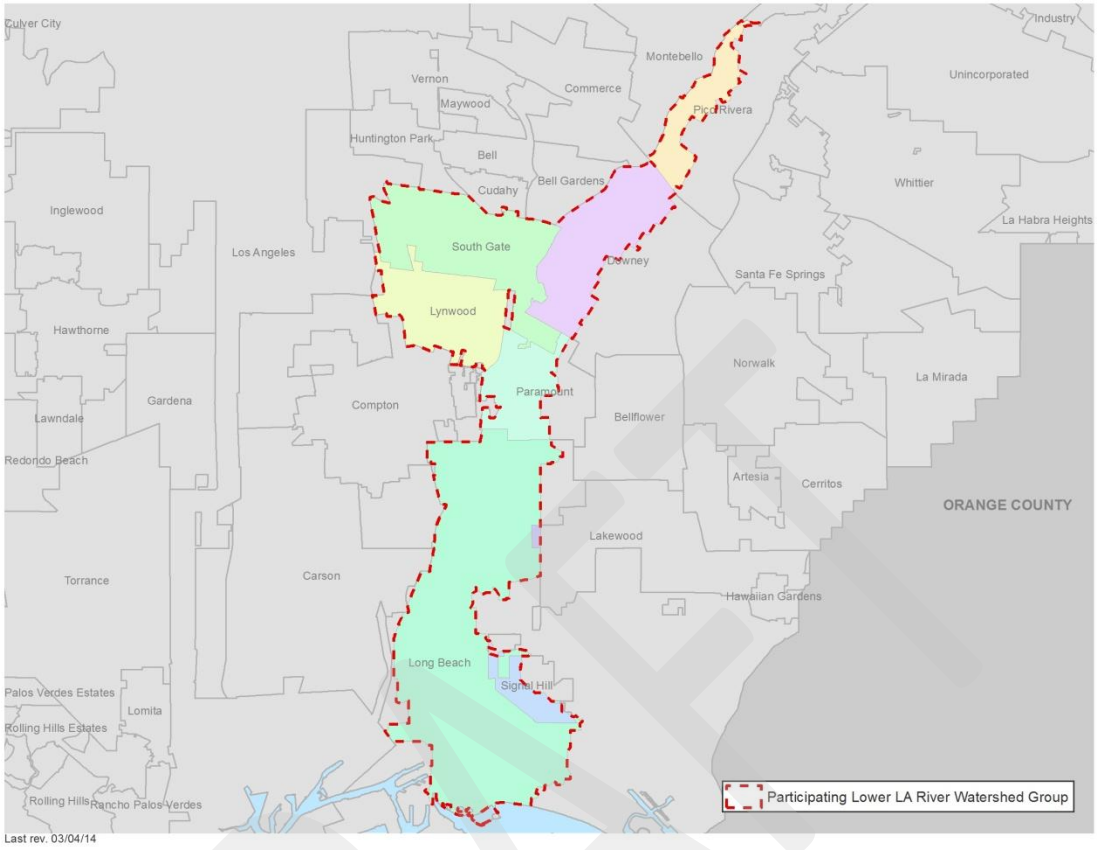


Figure 1-1: Participating Agencies Map

BOUNDARIES

The Lower LAR Watershed is located within the Los Angeles River Watershed Management Area (WMA) as designated in the Los Angeles MS4 Permit (Figure B-4). The three main water bodies located within the Lower LAR - Compton Creek, Los Angeles River (Reach 1 and 2)[6] and Rio Hondo Reach 1 - are defined by the Regional Board as inland Surface Waters of the State. As part of the main stem of the Los Angeles River, Reaches 1 and 2 and the Estuary are designated Waters of the United States (EPA, 2010). By definition its tributaries are also Waters of the United States, which includes Compton Creek and Rio Hondo.

Within the Lower LAR Watershed, the main channels of the Los Angeles River, Compton Creek and the Rio Hondo and most of their tributaries are owned by the LACFCD. The Army Corps of Engineers does not have ownership of channels, although there are privately owned and maintained drains and open channels.

[6] The LAR Estuary is not considered an inland Surface Water of the State

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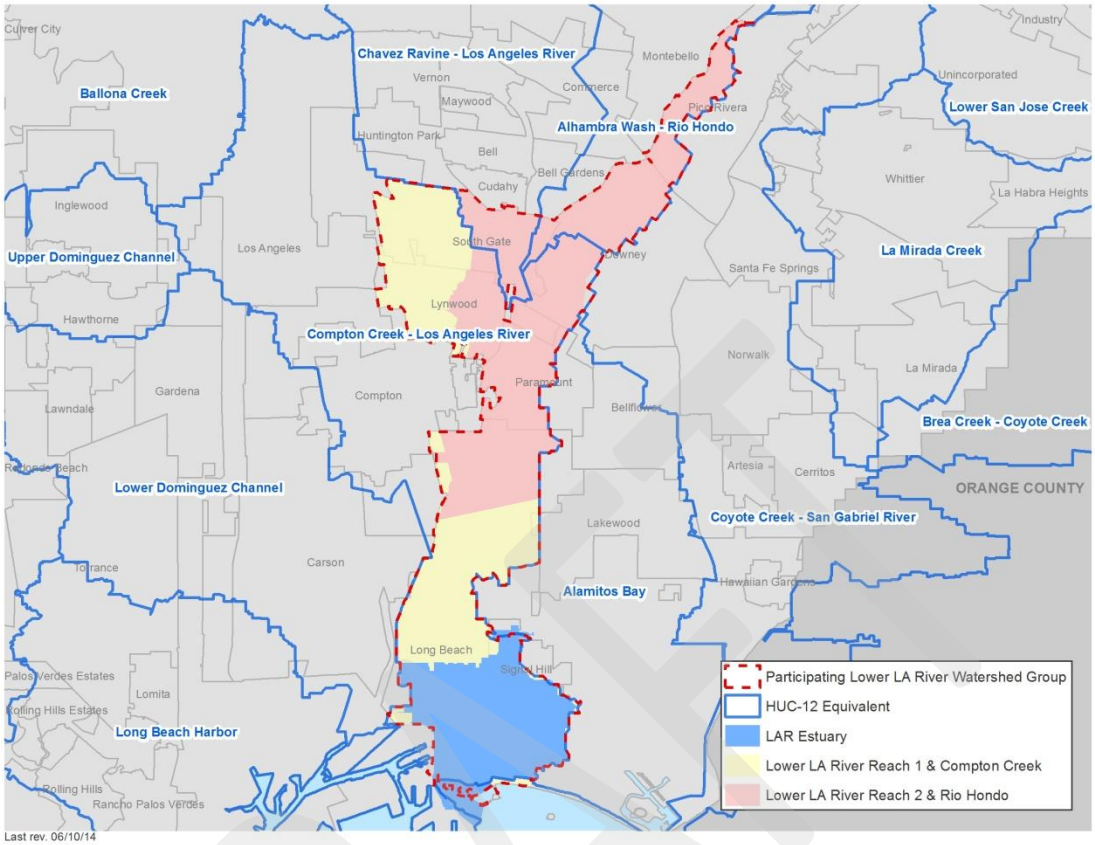


Figure 1-2: Watershed Map with HUC-12 Equivalent Subwatersheds

HYDROLOGIC UNIT CODES (HUC)

The United States Geological Survey's (USGS) Hydrologic Unit Codes (HUCs) are referenced in the MS4 Permit requirements. The HUC system divides the United States into a hierarchical classification of defined, hydrologically-based watersheds. The LACFCD found that some of the HUC boundaries within the Los Angeles Basin were incorrect and have since developed more accurate "HUC equivalents". Following the HUC equivalent system, Compton Creek and the Los Angeles River Estuary and Reach 1 are within subwatershed 180701050402, the Los Angeles River Reach 2 is within subwatersheds 180701050401 and 180701050402 and Rio Hondo Reach 1 is within subwatershed 180701050303. The subwatersheds of the Lower LAR are shown in Figure 1-2 and listed in Table 1-2.

The subwatersheds defined by these 12 digit numbers are referred to as HUC-12. Groups of subwatersheds that share a common downstream waterbody form a watershed. A watershed is designated by the first 10 digits of a HUC-12 and as such is referred to as HUC-10. In the case of the Lower LAR Watershed, Compton Creek and Los Angeles River Reach 1 and 2 are within the Lower Los Angeles River HUC-10 watershed and the Rio Hondo Reach 1 is within the neighboring Rio Hondo HUC-10 watershed. Both watersheds are within the Los Angeles HUC-08 subbasin, which shares most of its borders with the Los Angeles River WMA (Figure B-4).

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Table 1-2: Subwatersheds/Water Bodies within the Lower LAR Watershed

Subwatershed/ Water Body	HUC 12 Equivalent	HUC Name	Area within Lower LAR Watershed (mi^2)
Compton Creek	180701050402	Compton Creek – Los Angeles River	6.83
LA River Reach 1	180701050402	Compton Creek – Los Angeles River	16.3
LA River Reach 2	180701050402	Compton Creek – Los Angeles River	16.18
	180701050401	Chavez Ravine – Los Angeles River	
LA River Estuary	180701050402	Compton Creek – Los Angeles River	
Rio Hondo Reach 1	180701050303	Alhambra Wash – Rio Hondo	6.04

WATERSHED AUTHORITY GROUP

Watershed Authority Groups (WAGs) as described in State Assembly Bill 2554, which in 2010 amended the Los Angeles County Flood Control District Act, are referenced in the MS4 Permits. The purpose of the WAGs is to implement collaborative water quality improvement projects and services, with the goal of improving water quality and reducing stormwater and urban runoff pollution. The creation and funding of the WAGs has not yet occurred - it is dependent upon voter approval of the LACFCD's Water Quality Funding Initiative (a countywide parcel fee). AB 2554 divides the County into nine WAGs - the Lower LAR Watershed is located within the Lower Los Angeles River WAG, which shares borders with the Lower Los Angeles River HUC-10 watershed. Figure 1-3 is a complete map of the WAG groups.

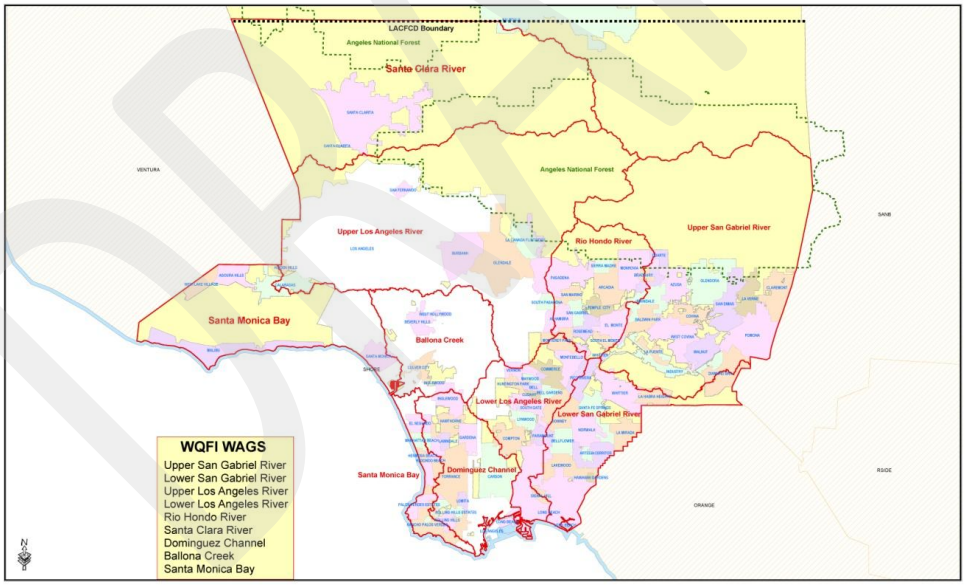


Figure 1-3: Watershed Authority Groups Map

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1.2 THE WATERSHED MANAGEMENT PROGRAM

1.2.1 PURPOSE OF THE MS4 PERMIT

MS4s receive stormwater and non-stormwater discharges from various sources, including municipal MS4s and other public agencies, discharges under NPDES permits or authorized by the USEPA[7], groundwater and natural flow. As the discharges flow over the urban landscape, they may pick up pollutants generated by urban activities, such as metals, bacteria, pesticides, fertilizers and trash. Polluted stormwater and non-stormwater discharges conveyed through the MS4 ultimately reach receiving waters, resulting in adverse water quality impacts.[8]

The goal of the MS4 Permit is to reduce the discharge of these pollutants from MS4s to the maximum extent practicable.

1.2.2 WATERSHED MANAGEMENT EMPHASIS

The watershed management approach to permit implementation – described in the current MS4 Permits as a voluntary approach to compliance – is a departure from previous permit structures. The previous MS4 Permits (Order Nos. 01-182 and 99-060) addressed implementation through jurisdictional Stormwater Quality Management Programs (SQMPs). The Los Angeles countywide SQMP, prepared jointly by the Permittees and approved by the Regional Board in 2001, described the controls to be implemented in order to comply with the special provisions (now referred to as the Minimum Control Measures, or MCMs) of the MS4 Permit. These controls were identical for each Permittee and did not 1) differentiate between watersheds or agencies or 2) target or identify priority pollutants.

The emphasis of the prior SQMP approach was rote program development and implementation. In contrast, management actions under the WMP are driven by the water quality conditions of the receiving waters and outfalls within the watershed.

The Regional Board outlines several reasons for this shift in emphasis from the previous MS4 Permit. A watershed based structure for permit implementation is consistent with TMDLs developed by the Regional Board and USEPA, which are established at a watershed or subwatershed scale and are a prominent part of the MS4 Permit. The participating agencies have already begun collaborating on a watershed scale to develop monitoring and implementation plans required by TMDLs.

1.2.3 WATERSHED MANAGEMENT GOALS

Addressing MS4 discharges on a watershed scale focuses on water quality results by emphasizing the receiving waters and outfalls within the watershed[9]. The conditions of the receiving waters drive

[7] Including discharges subject to a decision document approved pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
[8] MS4 Permit Fact Sheet (pg. F7)
[9] MS4 compliance is measured at 1) Receiving water monitoring, 2) Stormwater outfall based monitoring, 3) Non-storm water outfall based monitoring, and 4) New Development/Re-development effectiveness tracking.

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management actions, which in turn focus on the measures to address pollutant contributions from MS4 discharges.

The ultimate goals of the Watershed Management Programs is to ensure that discharges from the MS4:

1. Achieve applicable Water Quality Based Effluent Limitations (WQBELs) that implement TMDLs,
2. Do not cause or contribute to exceedances of receiving water limitations,
3. Nonstormwater discharges from the MS4 are not a source of pollutants to receiving waters.

1.2.4 WATERSHED MANAGEMENT APPROACH

In order to achieve the goals listed in the previous section, the approach of the WMP is to:

- Prioritize water quality issues resulting from stormwater and non-stormwater discharges from the MS4 to receiving waters,
- Identify and implement strategies, control measures, and BMPs that:
    - Achieve applicable water quality-based effluent limitations[10]
    - Do not cause or contribute to exceedances of receiving water limitation[11]
    - Do not include non-stormwater discharges that are effectively prohibited[12]
    - Ensure that controls are implemented to reduce the discharge of pollutants to the maximum extent practicable[13]
- Execute an integrated monitoring program and assessment program[14] to determine progress towards achieving applicable limitations and/or action levels
- Modify strategies, control measures, and BMPs as necessary based on analysis of monitoring data collected pursuant to the Monitoring and Reporting Program (MRP) to ensure that applicable water quality-based effluent limitations and receiving water limitations and other milestones set forth in the WMP are achieved in the targeted timeframes.
- Provide opportunity for meaningful stakeholder input. This includes participation in a permit-wide WMP technical advisory committee (TAC) that advises and participates in the development of the WMP from month six through the date of program approval.

The overall approach is adaptive, whereby BMPs will be implemented, their effectiveness monitored and modifications to this WMP will be made as needed. These modifications will maintain consistency with the assumptions and requirements of applicable TMDL Waste Load Allocations.

1.2.5 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The goals and objectives of the WMP may be achieved by development of storm water structural controls that may require discretionary approval subject to review under the California Environmental

[10] Pursuant to Part VI.E and Attachments L through R pursuant to corresponding compliance schedules
[11] Pursuant to Parts V.A and VI.E and Attachments L through R of the Permit
[12] Pursuant to Part III.A of the Permit
[13] Pursuant to Part IV.A.1 of the Permit
[14] Pursuant to Attachment E – MRP, Part IV of the Permit

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Quality Act (CEQA). The participating agencies intend to comply with CEQA when implementing structural BMPs. Public agencies responsible for carrying out or approving stormwater structural controls are identified as the lead agency. The environmental review required imposes both procedural and substantive requirements. At a minimum, the lead agency must adhere to the consultation and public notice requirements set forth in the CEQA Guidelines, make determinations whether the proposed stormwater structural control is a "project", and if so, conduct an initial review of the project and its environmental effects. The lead agency must identify and document the potential environmental impacts of the proposed project in accordance with CEQA, (Public Resources Code Section 21000 et seq.), and the CEQA Guidelines (Title 14 of the California Code of Regulations, Section 15000, et seq.).

Certain classes of projects have been determined not to have significant effect on the environment and are exempt from the provisions of CEQA by statute or category. When a public agency decides that a project is exempt from CEQA, and the public agency approves or determines to carry out the project, the agency may file a Notice of Exemption. For projects deemed not exempt, the lead agency will prepare and Initial Study and decide whether a Negative Declaration will be required for the project, or depending on the potential effects, a further, and more substantial review may be conducted in the form of an Environmental Impact Report (EIR). A project may not be approved as submitted if feasible alternatives or Mitigation Measures are able to substantially lessen the significant environmental effects of the project. Moreover, environmental review must include provisions for wide public involvement, formal and informal, in order to receive and evaluate public reactions to environmental issues, and when deciding the matter, the lead agency must consider all comments it receives (Cal. Pub. Res. Code § 21091(d)(1); 14 CCR § 15074(b)). The lead agency will use the EIR in determining the environmental effects of the proposed storm water treatment control project, and whether or not to approve the proposed project. If the proposed project is approved, all conditions and mitigations made in the adopted EIR will become part of any subsequent actions taken by the lead agency. The EIR will also be used by permitting agencies, funding agencies and the public to support proposed project decisions.

The National Environmental Quality Act (NEPA) comes into play less often than CEQA, but may be included for storm water treatment control projects involving federal funding. A joint NEPA and CEQA review process is encouraged to improve coordination and avoid redundancies. Like CEQA, NEPA process provides opportunities to address issues related to proposed projects early in the planning stages. NEPA was codified under Title 42 of the United States Code sections 4331 et seq. (42 U.S.C. 4331 et seq.).

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1.3 LOWER LOS ANGELES RIVER WATERSHED

1.3.1 OVERVIEW OF THE LOS ANGELES RIVER WATERSHED

The Los Angeles River Watershed drains a watershed of 824 square miles[15]. The Los Angeles River WMA is one of the largest in the region and is also one of the most diverse in terms of land use patterns. Approximately 324 square miles of the watershed are covered by forest or open space land including the area near the headwaters, which originate in the Santa Monica, Santa Susana, and San Gabriel Mountains. The remainder of the watershed is highly developed. The river flows through the San Fernando Valley past heavily developed residential and commercial areas. From the confluence with the Arroyo Seco, north of downtown Los Angeles, to the confluence with the Rio Hondo, the river flows through industrial and commercial areas and is bordered by rail yards, freeways, and major commercial and government buildings. From the Rio Hondo to the Pacific Ocean, the river flows through industrial, residential, and commercial areas, including major refineries and petroleum products storage facilities, major freeways, rail lines, and rail yards serving the Ports of Los Angeles and Long Beach. Due to major flood events at the beginning of the century, by the 1950s most of the Los Angeles River was lined with concrete. The Los Angeles River tidal prism/estuary begins in Long Beach at Willow Street and runs approximately three miles before joining with Queensway Bay. The channel has a soft bottom in this reach with concrete-lined sides.

The remaining discussion on the watershed will solely refer to the specific characteristics of the Lower Los Angeles River Watershed.

1.3.2 LOWER LOS ANGELES RIVER WATERSHED AREA

REGIONAL AND LOCAL SETTING

The Lower LAR Watershed encompasses approximately 43.7 square miles (27,981 acres) within Los Angeles County and comprises 5.3% of the drainage area of the Los Angeles River Watershed. The boundaries of the watershed are shown in Figure 1-1 and further explained in Section 1.1.

CLIMATE

Average annual precipitation for the watershed area is highly variable and terrain-dependent, averaging fifteen (15) inches annually and mainly occurring during the winter months (November through April). Due to the atmospheric dominance of the stable marine layer, significant precipitation is rare between May and October.

During the winter months Pacific storms often push cold fronts across California from northwest to southeast. These storms and frontal systems account for the vast bulk of the area's annual rainfall. Such rainy season storms are migratory, with wet and dry periods alternating during the winter and early

[15] MS4 Permit Fact Sheet (pg. F94)

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spring with irregularity in timing and duration. Rainfall patterns average 3.68 inches of rainfall in February to 0.01 inches of rainfall in July[16].

With the highly developed conditions within the watershed, most stormwater flows generated by the rainfall is routed to the ocean through the curb and gutters along the streets, catch basins and storm drains into the Los Angeles River. The velocity of the storm flows within this watershed ranges up to 20 feet per second within the waterways.

RAINFALL AND FLOW CHARACTERISTICS

Historical rainfall records from two existing rain gauges located near the Lower LAR Watershed were obtained and utilized in this analysis. These meteorological stations and resulting rain gauge data are maintained by National Climatic Data Center. The gauges were chosen due to their active status and the duration of available data. Their locations are shown in Figure 1-4 with detailed location information provided in Table 1-3.

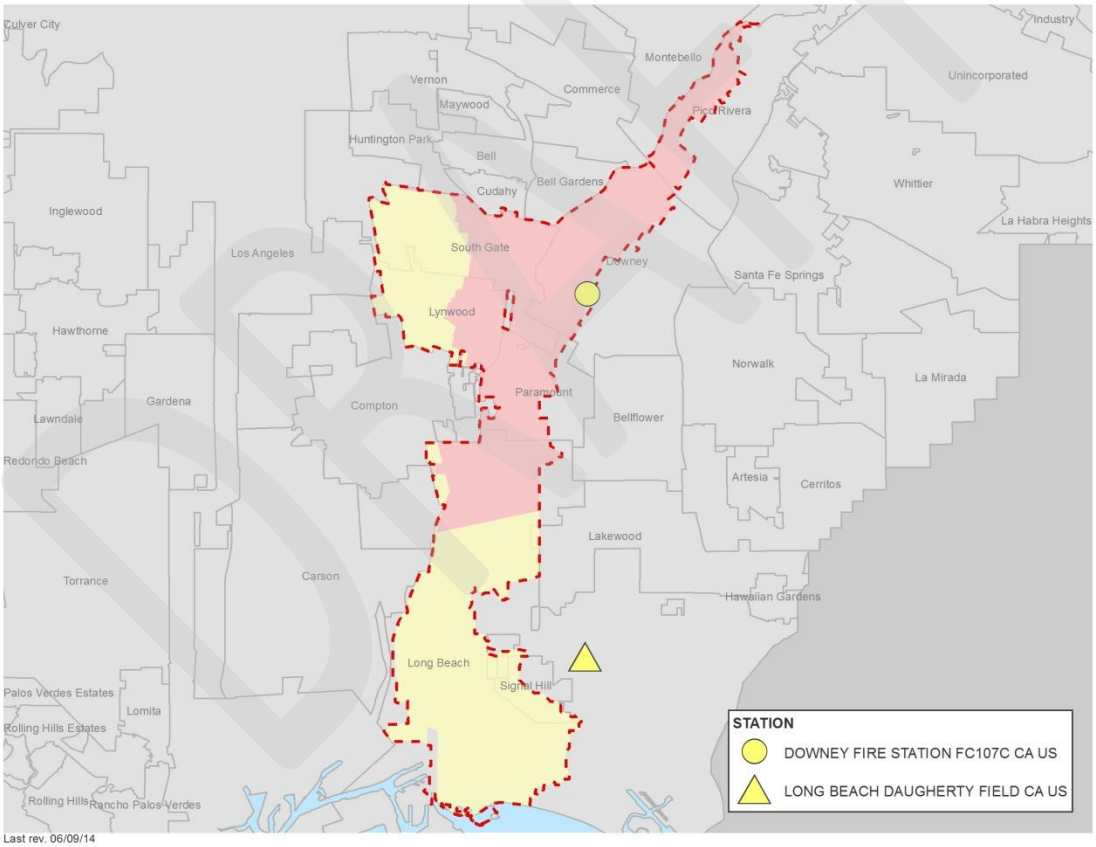


Figure 1-4: Rainfall Gauge Stations in Downey and Long Beach (Yellow Squares)

[16] National Climatic Data Center, http://lwf.ncdc.noaa.gov

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Table 1-3: Rainfall Data Summary

Station ID	Station	Period	Latitude	Longitude	Elevation (ft)	Mean Annual Precipitation (in)	85th Percentile Storm (in)
USC00042494	Downey Fire Station	1949 - 2012	33.929	-118.145	110.0	12.32	0.22
USW00023129	Long Beach Daugherty Field	1949-2014	33.811	-118.146	30.84	11.20	0.18

(1) National Climatic Data Center, http://lwf.ncdc.noaa.gov

Average monthly rainfall for the historical record has been calculated for each rain gauge and is provided in Table 1-4. The monthly values are similar among the two rain gauges.

Table 1-4: Summary of Average Monthly Rainfall (in)

Month	Downey Fire Station	Long Beach Daugherty Field
January	3.0	2.6
February	3.2	2.9
March	2.4	1.8
April	1.1	0.7
May	0.2	0.2
June	0.1	0.1
July	<0.1	<0.1
August	0.1	0.1
September	0.3	0.2
October	0.4	0.4
November	1.6	1.2
December	2.5	1.8
Total Average Monthly Rainfall	**1.2**	**1.0**

(1) National Climatic Data Center, http://lwf.ncdc.noaa.gov

DRY WEATHER FLOWS TO THE LOWER LOS ANGELES RIVER

Dry weather flow in the Los Angeles River comes predominantly from effluent discharges and groundwater inflow. Sources of effluent discharges in the Lower LA River watershed include wastewater treatment plants, urban runoff such as irrigation overflows and car wash water, and various industrial discharges.

The Sanitation Districts of Los Angeles County maintain a regional, interconnected sewerage system called the Joint Outfall System. The Joint Outfall System includes six satellite water reclamation plants (WRPs), including the Whittier Narrows WRP, which discharges effluent during dry weather into the Rio Hondo above the Whittier Narrows dam. The Whittier Narrows WRP is located at 301 N. Rosemead Boulevard in the City of El Monte. The plant occupies 27 acres south of the Pomona (60) Freeway, and provides primary, secondary and tertiary treatment for 15 million gallons of wastewater per day. Most of the reclaimed water is reused as groundwater recharge into the Rio Hondo and San Gabriel Coastal

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Spreading Grounds, or for irrigation at an adjacent nursery. Remaining effluent is discharged directly into the Rio Hondo and the San Gabriel River at 3 effluent discharge points.

The average monthly effluent discharge from the LA County Sanitation District's Whittier Narrows Water Reclamation Plant was 6.44 MGD in 2012, with the average monthly max being 8.05 MGD and the average monthly minimum flows measured at 4.97 MGD.

The three publicly owned treatment works (POTWs) discharge to the Los Angeles River (Tillman Water Reclamation Plant, LA-Glendale Water Reclamation Plant, and Burbank Water Reclamation Plant) and constitute the majority of the flow and metals loadings during dry weather[17]. The critical flow for the entire river (each reach and tributary) is 203 cfs, which is equal to the combined design flow of the three POTWs (169 cfs) plus the median flow from the storm drains and tributaries (34 cfs).

WET WEATHER FLOWS TO THE LOWER LOS ANGELES RIVER

In addition to stormwater flows within the Los Angeles Basin, wet weather flows from the Santa Monica Mountains, the Verdugo Mountains, the Santa Susana Mountains and the San Gabriel Mountains also contribute to flows in the Los Angeles River.

WATERSHED CATCHMENT HYDROLOGIC CONNECTIVITY

The upstream limit of the LLAR subwatershed begins at the north stem of Reach 2 Los Angeles River within the City of South Gate and the downstream limit ends at the Estuary. The main reach through the watershed is the Los Angeles River, with Compton Creek and the Rio Hondo as major tributaries. The stretch of Los Angeles River within the watershed consists of a concrete lined channel spanning 400 to 465 feet in width. Compton Creek and the Rio Hondo are primarily concrete channels within the Lower LAR Watershed. Figure 1-5 shows the LACFCD storm drain system within the Lower LAR Watershed as well as its main channels and tributaries.

The Compton Creek subwatershed drains approximately 42 square miles to its confluence with the Los Angeles River. The subwatershed is almost entirely developed.

The Rio Hondo subwatershed drains approximately 143 square miles to its confluence with the Los Angeles River.

The Lower LAR Watershed drains runoff directly from urbanized area totaling approximately 43.7 square miles. From its upstream beginning in South Gate to its downstream confluence with the Los Angeles River Estuary, the Lower LAR stretches approximately 13.3 miles.

The Los Angeles County Department of Public Works provided the delineation of the catchments within each subwatershed. Approximately 53 catchments are located within this watershed[18]. These delineations are based on a combination of contour information and existing underground storm drain systems.

[17] Los Angeles River Metals TMDL Basin Plan Amendment, 2006

[18] Los Angeles County Watershed Management Modeling System, http://dpw.lacounty.gov/wmd/wmms/

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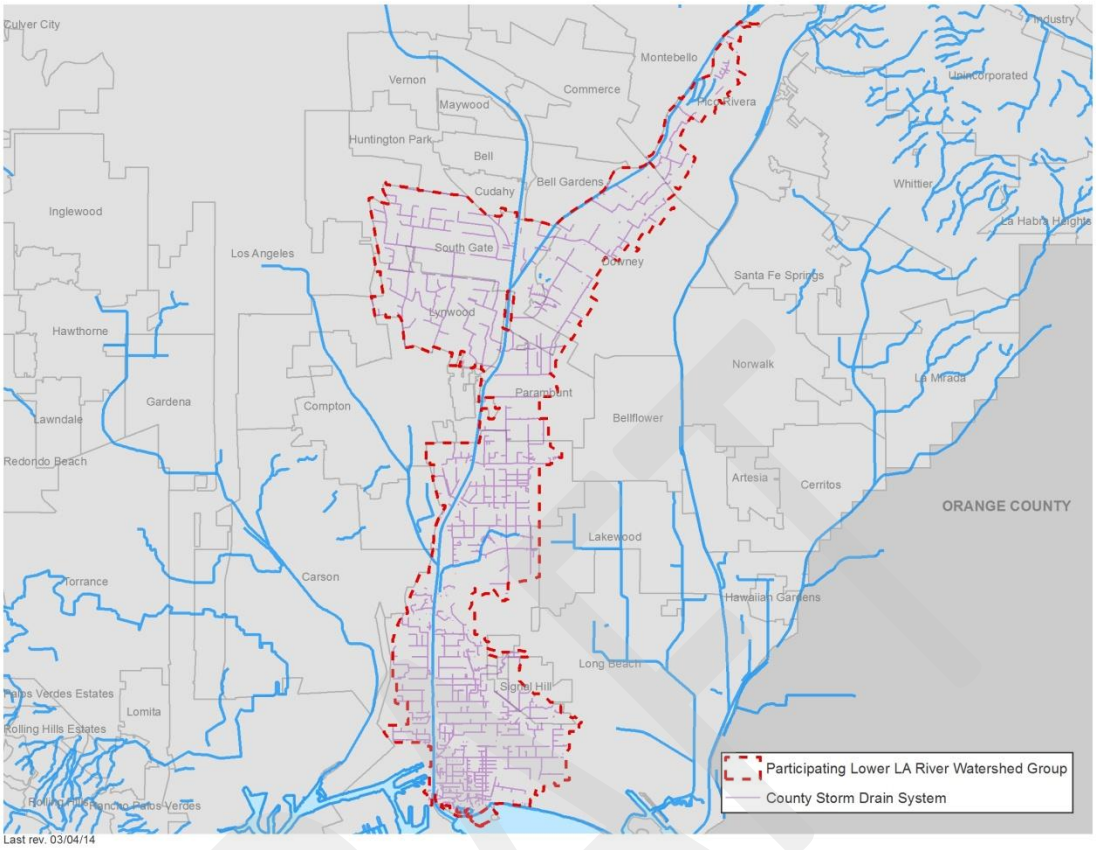


Figure 1-5: LACFCD Storm Drains

The watershed is predominantly served by storm sewer systems, across ten agency jurisdictions, connecting drainage in urbanized areas with the main tributaries. Due to the narrow shape of the watershed, the participating agencies are directly adjacent to either the Lower LAR or its main tributaries Compton Creek and the Rio Hondo.

GEOPHYSICAL SETTING

TOPOGRAPHY

Natural topography is comprised of the existing soils, ground elevation/slope, vegetation, stream network, and groundwater. These features impact each other in both the natural and built environments, and therefore should not be analyzed independently when evaluating BMP location options.

SOILS

The Lower LAR Watershed can be characterized as having seven soil types. Figure 1-6 shows the various soil types underlying the watershed. Soils range from sandy loam to clay loam, having a varying range of saturated hydraulic conductivity.

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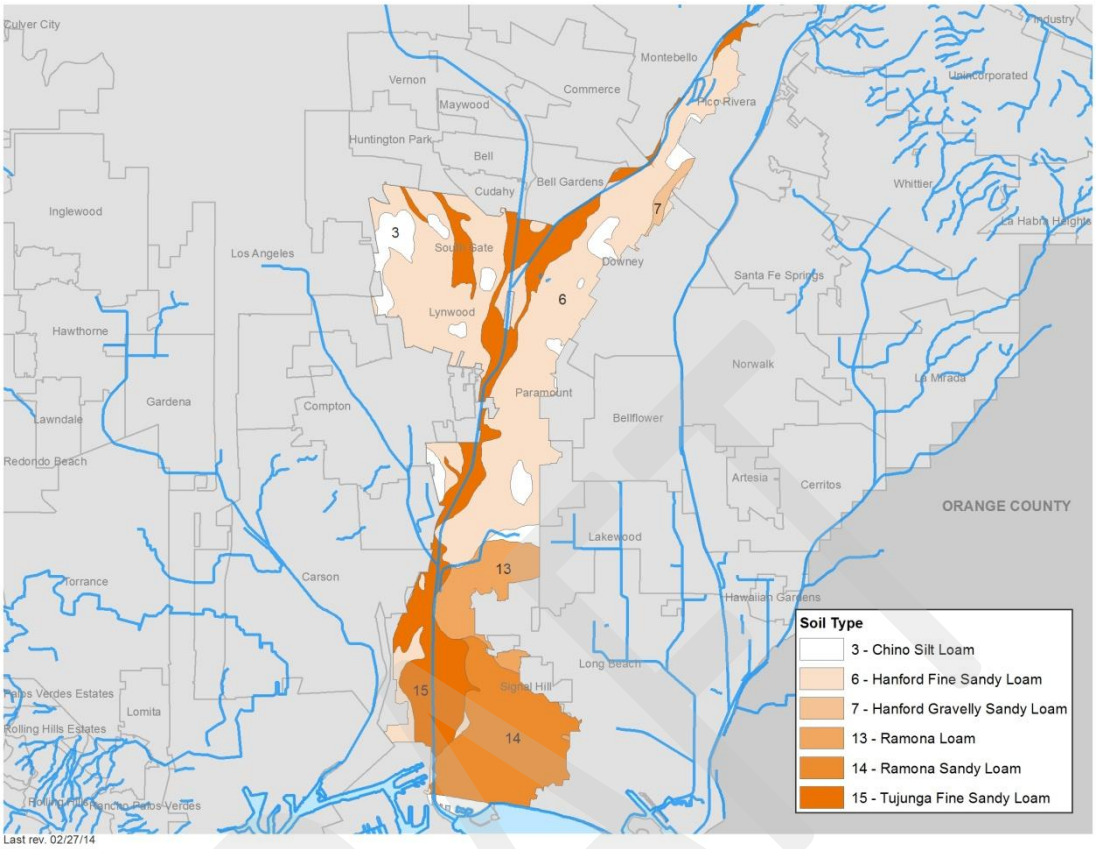


Figure 1-6: Soil Types[19]

GROUNDWATER

Groundwater flow in the Lower LAR Watershed generally mimics surface topography. Depth to the groundwater varies from 11 feet to greater than 40 feet. Figure 1-7 shows the groundwater basin for the Lower LAR Watershed.

WATERSHED LAND AREA

Table 1-5 lists the percent land area within the Lower LAR for each participant.

LAND USES

Table 1-6 lists and Figure 1-8 shows the developed and undeveloped land within the Lower LAR Watershed.

[19] Source: LA County Department of Public Works, **http://ladpw.org/wrd/publication/Engineering/hydrology/soil_types.zip**

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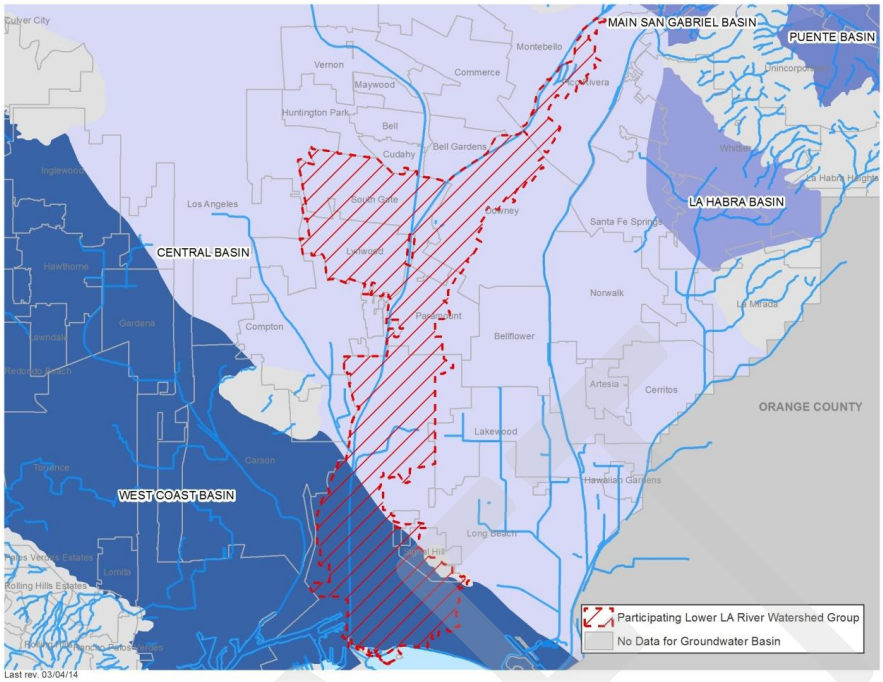


Figure 1-7: Groundwater Basins

Table 1-5: Watershed Land Area by Participant

Agency	Land area (Acres)	Percent of total area (%)
Downey	3,546	13
Lakewood	51	<1
Long Beach	12,301	42
Lynwood	3,098	11
Paramount	1,997	7
Pico Rivera	1,510	5
Signal Hill	774	3
South Gate	4,704	15
Caltrans	Caltrans owns and operates approximately 4% of the watershed	
LACFCD	N/A	N/A

Table 1-6: Developed and Undeveloped Land

Agency	Acres developed	Acres undeveloped	% Developed lands
Downey	5,074	379	93%
LACFCD	ND	ND	ND
Lakewood	47	3	94%
Long Beach	18,068	1,320	93%
Lynwood	2,180	50	98%
Paramount	3,350	26	99%
Pico Rivera	1,580	13	99%
Signal Hill	1,890	17	99%
South Gate	3,820	14	99%
Caltrans	ND	ND	ND

ND - Not delineated

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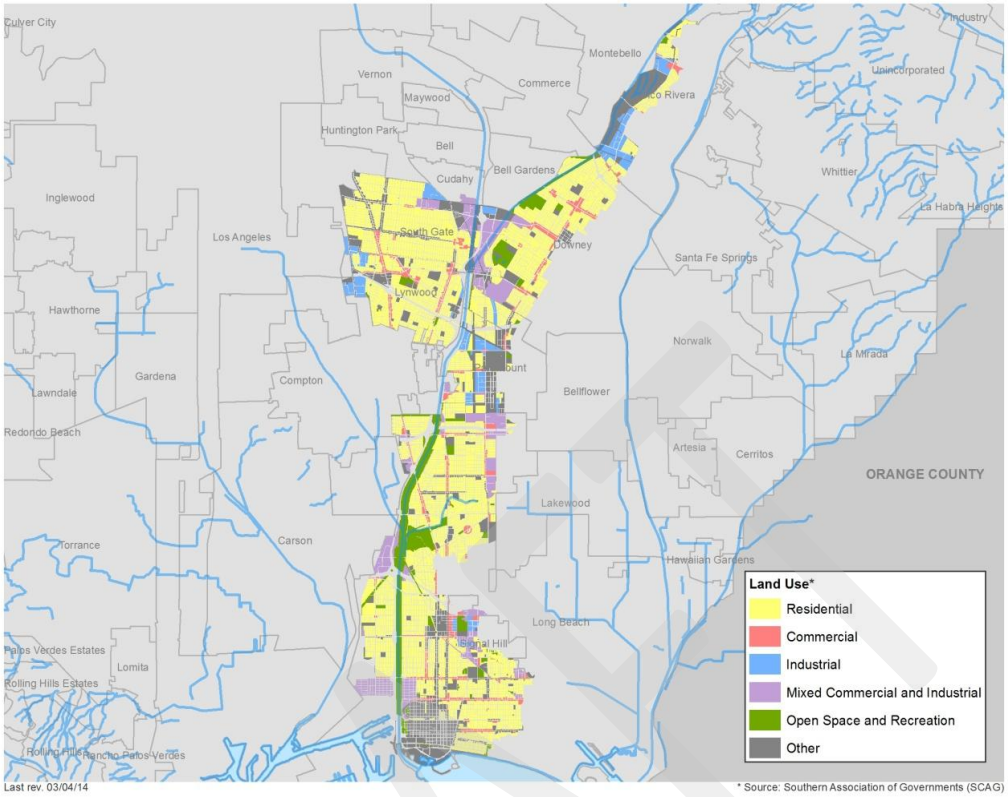


Figure 1-8: Land Use Map

DISADVANTAGED COMMUNITY

The Lower LAR Watershed is in a geographic area encompassing all or part of eight cities. This area is a high-minority and economically disadvantaged region. Of the eight cities participating in this WMP, three are categorized as disadvantaged communities as a whole, meaning that the median income levels in the city as a whole are less than 80% of the state's median household income ($48,706)[20]. All of the remaining five cities that are not disadvantaged as a whole are disadvantaged in part. Table 1-7 lists the income statistics for each city and Figure 1-9 is a map of the disadvantaged communities.

Table 1-7: DAC Percentage by City

City	DAC Percentage[1]
Downey	29%
Lakewood	3%
Long Beach	49%
Lynwood*	100%
Paramount*	100%
Pico Rivera	34%
Signal Hill	34%
South Gate*	100%

* Denotes disadvantaged community as a whole

[20] Integrated Regional Water Management, Grants, DAC Maps, *www.water.ca.gov/irwm/grants/resourceslinks.cfm*

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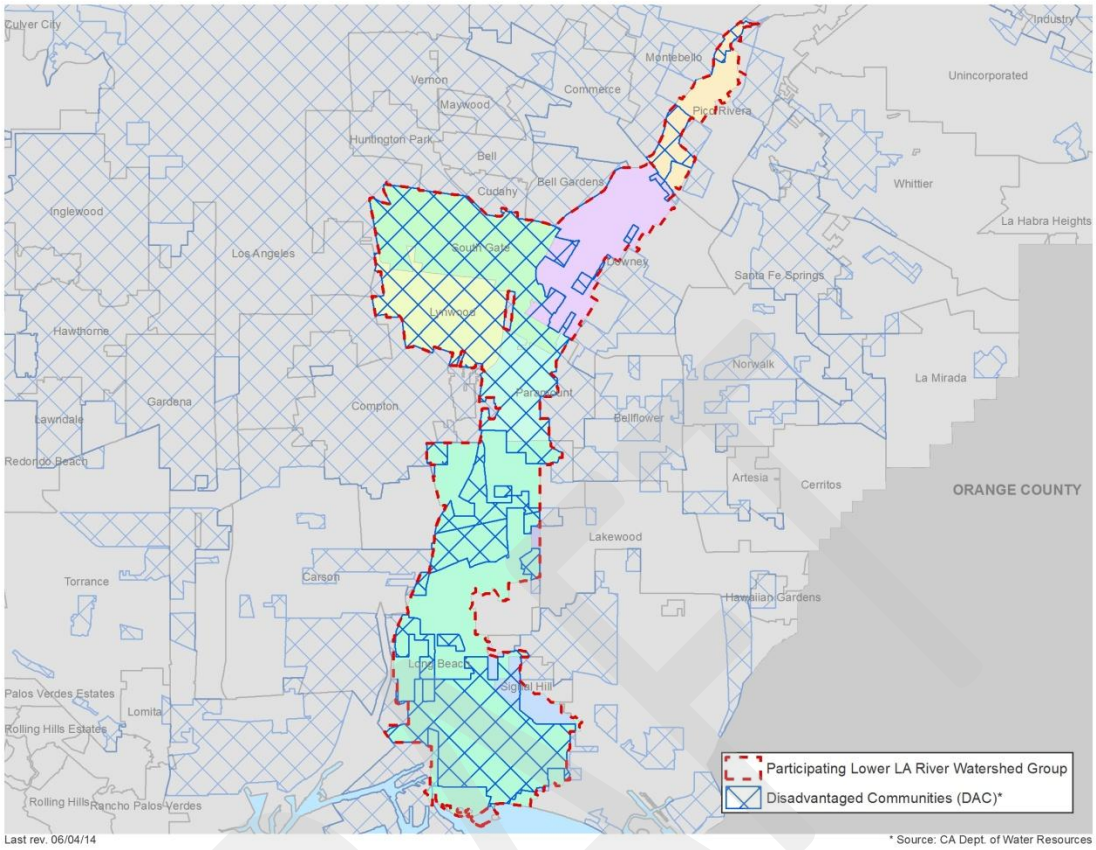


Figure 1-9 - Disadvantaged Community Map

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1.4 WATER QUALITY IMPAIRMENTS

1.4.1 HISTORY OF IMPAIRMENTS IN THE LOWER LAR WATERSHED

Various reaches within the Lower LAR Watershed are on the 2010 CWA Section 303(d) List of impaired water bodies for trash, nitrogen compounds and related effects (ammonia, nitrate, nitrite, algae, pH, odor, and scum), metals (copper, cadmium, lead, zinc, aluminum and selenium), bacteria, and historic pesticides. Beneficial uses impaired by trash in the Los Angeles River are REC-1, REC-2, WARM, WILD, EST, MAR, RARE, MIGR, SPWN, COMM, WET and COLD. The excess nitrogen compounds may be causing impairments to the WARM and WILD designated beneficial uses of Los Angeles River. Excess metals may be causing impairments to the WILD, RARE, WARM, WET, and GWR designated beneficial uses of the Los Angeles River and its tributaries. Elevated indicator bacteria densities are listed impairments to the REC-1 and REC-2 designated beneficial uses of Los Angeles River.

1.4.2 ORGANIZING TO ADDRESS TMDLS

TMDLs represent large-scale efforts crossing jurisdictional boundaries and often encompassing the entire drainage of a major regional waterbody (e.g., Los Angeles River). Within the Lower LAR, these efforts have included the following:

- Beginning in 2009, the Los Angeles River working group was formed for development of the Metals TMDL implementation plan. The group eventually developed into the Lower LAR Watershed group to develop this WMP.
- All Lower LAR cities participated in and received funding as part of a grant to sixteen cities in the Gateway region whereby city-owned and LACFCD owned catch basins were retrofitted with full-capture trash inserts[21].
- The Cities of Signal Hill and Long Beach (together with the LACFCD) worked together and were awarded a grant to install full capture end-of-pipe trash nets and screens in Hamilton Bowl.
- The Cities of Downey, Lynwood, Paramount, Pico Rivera, Signal Hill and South Gate were awarded a Proposition 84 grant to install Low Impact Development (LID) BMPs along high traffic transportation corridors.

1.5 WATER QUALITY ISSUES AND THE HISTORY OF WATER QUALITY REGULATIONS

1.5.1 FEDERAL AND STATE LAW

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for all inland surface waters, estuaries, and coastal waters. The federal Environmental Protection Agency (EPA) is ultimately responsible for

[21] State Water Board Project No C-06-6439-110, December 2011

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implementation of the CWA and its associated regulations. However, the CWA allowed EPA to authorize the NPDES Permit Program to state governments, enabling states to perform many of the permitting, administrative, and enforcement aspects of the NPDES Program. California, like other states, implements the CWA by promulgating its own water quality protection laws and regulations. As long as this authority provides equivalent protections as the federal CWA, EPA can delegate CWA responsibilities to the state while retaining oversight responsibilities. In some cases, California has established requirements that are more stringent than federal requirements.

The 1970 Porter-Cologne Water Quality Control Act granted the California State Water Resources Control Board (SWRCB) and nine California Regional Water Quality Control Boards (Regional Boards) broad powers to protect water quality. This Act and its governing regulations provide the basis for California's implementation of CWA responsibilities. The Los Angeles Regional Water Quality Control Board (Regional Board) is the governing regulatory agency for the Lower LAR Watershed.

Section 303(d) of the CWA requires waterbodies not meeting water quality objectives even after all required effluent limitations have been implemented (e.g. through wastewater or stormwater discharge permits) to be regularly identified. These waters are often referred to as "303(d) listed" or "impaired" waters. Waterbodies that are listed on the 303(d) list typically require development of a Total Maximum Daily Load (TMDL) for the pollutant(s) impairing the use of the water. Development and approval of the 303(d) list is a lengthy state and federal process. A list is not effective until the EPA approves the list. The current EPA-approved 303(d) list for California is the 2010 list, which can be found in Appendix A-2-2.

A TMDL establishes the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. Depending on the nature of the pollutant, TMDL implementation requires limits on the contributions of pollutants from point sources (waste load allocation), nonpoint sources (load allocation), or both. The Regional Board is responsible for TMDL development in the Lower LAR Watershed.

Adoption of a TMDL requires an amendment to the Water Quality Control Plan (known as the Basin Plan) for the Los Angeles Region. The Regional Board's Basin Plan is designed to preserve and enhance water quality and protect the beneficial uses of regional waters. Specifically, the Basin Plan (i) designates beneficial uses for surface and ground waters, (ii) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy, and (iii) describes implementation programs to protect all waters in the Region. The Basin Plan is reviewed and updated as necessary (Regional Board 1994, as amended). Following adoption by the Regional Board, the Basin Plan and subsequent amendments are subject to approval by the State Board, the State Office of Administrative Law (OAL), and the Environmental Protection Agency (EPA).

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1.5.2 WATER QUALITY REQUIREMENTS

The Regional Board designates "beneficial uses" for waterbodies in the watersheds that it governs and adopts water quality objectives to protect these uses[22]. In some cases, EPA may also promulgate objectives where it makes a finding that the state's objectives are not protective enough to protect the beneficial use. The nature of the objectives is directly related to the type of beneficial use. For example, the freshwater warm habitat beneficial use protects aquatic organisms resident in warm-water streams. The associated water quality objectives are for those constituents known to affect both the growth and reproduction of aquatic life. These objectives range from physical characteristics such as temperature, dissolved oxygen, and pH to potential toxic constituents including metals and organics. In California, the objectives for metals and a number of organic compounds have been established by the federal EPA rather than the state (California Toxics Rule, 2000). The EPA promulgated numeric water quality criteria for priority toxic pollutants and other water quality standards provisions based on the determination that the numeric criteria were necessary (since the state had been without numeric water quality criteria for many priority toxic pollutants as required by the CWA) to protect human health and the environment. These Federal criteria are legally applicable in the state for inland surface waters, enclosed bays and estuaries for all purposes and programs under the CWA.

1.6 MS4 PERMIT REQUIREMENTS

The development of this WMP is a compliance option of the MS4 permits held by the Permittees[23]. The WMP includes an evaluation of existing water quality conditions, including characterization of storm water and non-storm water discharges from the MS4 and receiving water quality to support identification and prioritization/sequencing of management actions. At a minimum, water quality priorities within each Watershed Management Area must include achieving applicable water quality based effluent limitations and/or receiving water limitations established.

The MS4 permit requires that this WMP identifies strategies, control measures, and BMPs to implement through the stormwater management programs on a watershed scale, with the goal of creating an efficient program to focus collective resources on watershed priorities and effectively eliminate the source of pollutants. Customization of the BMPs to be implemented, or required to be implemented, is

[22] See Regional Board's 1994 Los Angeles Region Basin Plan, as amended.

[23] The Cities of Pico Rivera, Downey, Lynwood and Signal Hill (hereinafter "the Cities") submitted Administrative Petitions (Petitions) to the California State Water Resources Control Board (SWRCB) pursuant to section 13320(a) of the California Water Code requesting that the SWRCB review various terms and requirements set forth in the 2012 MS4 Permit, Order No. R4-2012-0175 (2012 Permit) adopted by the California Regional Water Quality Control Board, Los Angeles Region (Regional Board)." These Cities have participated in good faith in the development of this Lower Los Angeles River Watershed Management Program (WMP). Nothing in this WMP shall affect those cities' administrative petitions, nor shall anything in this WMP constitute a waiver of any positions or rights therein.

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done with the goal of creating an efficient program to focus individual and collective resources on watershed priorities.

On the basis of the evaluation of existing water quality conditions, waterbody-pollutant combinations are classified into one of the following three categories:

- CATEGORY 1 (HIGHEST PRIORITY): Waterbody-pollutant combinations for which water quality based effluent limitations and/or receiving water limitations are included in the MS4 Permits to implement TMDLs.

- CATEGORY 2 (HIGH PRIORITY): Pollutants for which data indicate water quality impairment in the receiving water according to the State's Listing Policy and for which MS4 discharges may be causing or contributing to the impairment.
- CATEGORY 3 (MEDIUM PRIORITY): Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable receiving water limitations contained in the MS4 permit and for which MS4 discharges may be causing or contributing to the exceedances.

Sources for the waterbody-pollutant combinations are identified by considering the following:

- Review of available data, including historical findings from the participating agencies' Minimum Control Measure and TMDL programs, watershed model results and other pertinent information, data or studies.
- Locations of major MS4 outfalls and major structural controls for stormwater and nonstormwater that discharge to receiving waters.
- Other known and suspected sources of pollutants from the MS4 to receiving waters.

Based on the findings of the source assessment, the issues within the watershed are prioritized and sequenced. Factors considered in establishing watershed priorities include:

1. Pollutants for which there are water quality based effluent limitations and/or receiving water limitations with interim or final compliance deadlines within the permit term.
2. Pollutants for which there are water quality based effluent limitations and/or receiving water limitations with interim or final compliance deadlines between October 26, 2012 and October 25, 2017.
3. Pollutants for which data indicate impairment in the receiving water and the findings from the source assessment implicates discharges from the MS4, but no TMDL has been developed.

1.6.1 REASONABLE ASSURANCE ANALYSIS AND WATERSHED CONTROL MEASURES

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As part of the WMP plan, a Reasonable Assurance Analysis (RAA) is conducted for each waterbody-pollutant combination. The RAA consists of an assessment, through quantitative analysis or modeling, to demonstrate that the activities and control measures (i.e. BMPs) identified in the Watershed Control Measures section of the WMP are performed to demonstrate that applicable water quality based effluent limitations and/or receiving water limitations with compliance deadlines during the permit term will be achieved. Watershed Control Measures are subdivided into 1) Minimum Control Measures, 2) Non-Stormwater Discharge Measures 3) TMDL Control Measures and 4) other control measures for water-body pollutant Categories 1, 2 and 3.

Schedules are developed for strategies, control measures and BMPs to be implemented by each individual Permittee within its jurisdiction and for those that will be implemented by multiple Permittees on a watershed scale. The schedules will measure progress at least twice during the permit term and incorporate 1) Compliance deadlines occurring within the permit term for all applicable interim and/or final water quality based effluent limitations and/or receiving water limitations to implement TMDLs, 2) Interim deadlines and numeric milestones within the permit term for any applicable final water quality based effluent limitation and/or receiving water limitation to implement TMDLs, where deadlines within the permit term were not otherwise specified, and 3) For watershed priorities related to addressing exceedances of receiving water limitations.

1.6.2 ADAPTIVE MANAGEMENT

An adaptive management process will be implemented every two years from the date of program approval, adapting the WMP to become more effective, based on, but not limited to the following:

1. Progress toward achieving the outcome of improved water quality in MS4 discharges and receiving waters through implementation of the watershed control measures,
2. Progress toward achieving interim and/or final water quality based effluent limitations and/or receiving water limitations, or other numeric milestones where specified, according to established compliance schedules,
3. Re-evaluation of the highest water quality priorities identified for the Watershed Management Area based on more recent water quality data for discharges from the MS4 and the receiving water(s) and a reassessment of sources of pollutants in MS4 discharges,
4. Availability of new information and data from sources other than the Permittees' monitoring program(s) within the Watershed Management Area that informs the effectiveness of the actions implemented by the Permittees,
5. Regional Water Board recommendations; and
6. Recommendations for modifications to the WMP solicited through a public participation process

Based on the results of the iterative process, modifications necessary to improve the effectiveness of the WMP will be reported in the Annual Report, and as part of the Report of Waste Discharge (ROWD). Any necessary modifications to the WMP will be implemented upon acceptance by the Regional Water Board Executive Officer or within 60 days of submittal if the Regional Water Board Executive Officer expresses no objections.

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2 IDENTIFICATION OF WATER QUALITY PRIORITIES

2.1 WATERBODY POLLUTANT CLASSIFICATION

One of the goals of this Watershed Management Program (WMP) is to identify and address water quality priorities within the Lower Los Angeles River (Lower LAR) Watershed. In order to begin prioritizing water quality issues within the Lower LAR Watershed, an evaluation of existing water quality conditions, including characterization of stormwater and nonstormwater discharges from the Municipal Separate Storm Sewer System (MS4) and receiving waters has been completed per section VI.C.5.a of the MS4 Permit.

The existing water quality conditions of the Lower LAR Watershed were used to classify pollutants into three categories each containing specific subcategories. These categories form the basis for identifying watershed priorities, which include, at a minimum, achieving applicable water quality-based effluent limitations and/or receiving water limitations established pursuant to TMDLs. The three categories and their subcategories are described below:

CATEGORY 1: Waterbody-pollutant combinations for which water quality-based effluent limitations and/or receiving water limitations are established in Part VI.E TMDL Provisions and Attachments L through R of the MS4 Permit.

- CATEGORY 1A: Final deadlines within Permit term (after approval of WMP[1] & prior to December 28, 2017)
- CATEGORY 1B: Interim deadlines within Permit term (after approval of WMP[2] & prior to December 28, 2017)
- CATEGORY 1C: Final deadlines between December 29, 2017 - December 28, 2022
- CATEGORY 1D: Interim deadlines between December 29, 2017 - December 28, 2022
- CATEGORY 1E: Interim & final deadlines after December 28, 2022
- CATEGORY 1F: Past final deadlines (final deadlines due prior to approval of WMP)
- CATEGORY 1G: USEPA established TMDLs with no implementation schedule

CATEGORY 2: Pollutants for which data indicate water quality impairment in the receiving water according to the State Board's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) and for which MS4 discharges may be causing or contributing to the impairment.

- CATEGORY 2A: Non-legacy pollutants
- CATEGORY 2B: Bacterial indicators
- CATEGORY 2C: Legacy pollutants
- CATEGORY 2D: Water quality indicators

[1] Upon approval and no later than April 28, 2015.
[2] *Ibid.*

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CATEGORY 3: Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable receiving water limitations contained in this Order and for which MS4 discharges may be causing or contributing to the exceedance.

- CATEGORY 3A: Non-legacy pollutants
- CATEGORY 3B: Bacterial indicators
- CATEGORY 3C: Legacy pollutants
- CATEGORY 3D: Water quality indicators

The Lower LAR Watershed encompasses Reaches 1 and 2 of the Los Angeles River, the Los Angeles River Estuary, Reach 1 of the Rio Hondo, and Compton Creek. The pollutants for which the Lower LAR Watershed is listed as impaired for are shown on Figure 2-1.

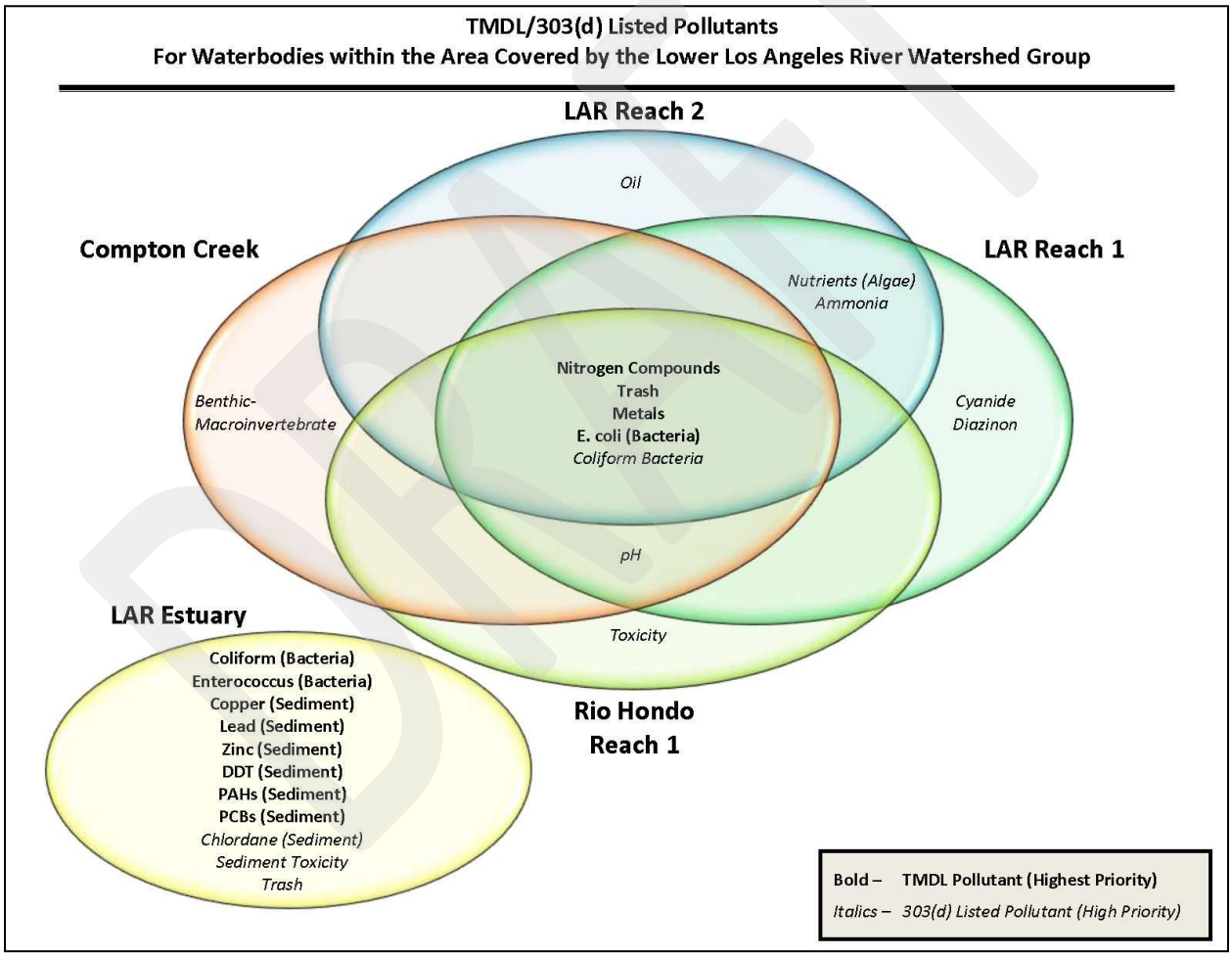


Figure 2-1: Lower Los Angeles River Watershed Pollutant Venn Diagram

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The pollutant categories for the Lower LAR are summarized below including the weather condition for which impairment was determined:

CATEGORY 1A

- TRASH – Los Angeles River Reach 1 (Wet & Dry), Los Angeles River Reach 2 (Wet & Dry), Compton Creek (Wet & Dry), Rio Hondo Reach 1 (Wet & Dry)
- NITROGEN COMPOUNDS – Los Angeles River Reach 1(Wet & Dry), Los Angeles River Reach 2 (Wet & Dry), Compton Creek (Wet & Dry), Rio Hondo Reach 1 (Wet & Dry)

CATEGORY 1B

- COPPER – Los Angeles River Estuary (Wet & Dry)
- LEAD – Los Angeles River Estuary (Wet & Dry)
- ZINC – Los Angeles River Estuary (Wet & Dry)
- DDT – Los Angeles River Estuary (Wet & Dry)
- PAHS – Los Angeles River Estuary (Wet & Dry)
- PCBS – Los Angeles River Estuary (Wet & Dry)

CATEGORY 1C

- BACTERIA (E. COLI) – Los Angeles River Reach 1 (Wet & Dry), Compton Creek (Wet & Dry)

CATEGORY 1E

- CADMIUM – Los Angeles River Reach 1 (Wet), Los Angeles River Reach 2 (Wet), Compton Creek (Wet), Rio Hondo Reach 1 (Wet)
- COPPER – Los Angeles River Reach 1 (Wet & Dry), Los Angeles River Reach 2 (Wet & Dry), Compton Creek (Wet & Dry), Rio Hondo Reach 1 (Wet & Dry)
- LEAD – Los Angeles River Reach 1 (Wet & Dry), Los Angeles River Reach 2 (Wet & Dry), Compton Creek (Wet & Dry), Rio Hondo Reach 1 (Wet & Dry)
- ZINC – Los Angeles River Reach 1 (Wet), Los Angeles River Reach 2 (Wet), Compton Creek (Wet), Rio Hondo Reach 1 (Wet & Dry)
- BACTERIA (E. COLI) – Los Angeles River Reach 2 (Wet & Dry), Rio Hondo Reach 1 (Wet and Dry)

CATEGORY 1G (USEPA ESTABLISHED)

- BACTERIA (COLIFORM & ENTEROCOCCUS) – Los Angeles River Estuary (Wet & Dry)

CATEGORY 2A

- CHLORDANE (SEDIMENT) – Los Angeles River Estuary (Wet & Dry)
- CYANIDE – Los Angeles River Reach 1 (Wet & Dry)
- DIAZINON – Los Angeles River Reach 1 (Wet & Dry)
- OIL – Los Angeles River Reach 2 (Wet & Dry)
- TRASH – Los Angeles River Estuary (Wet & Dry)

CATEGORY 2B

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- COLIFORM BACTERIA – Los Angeles River Reach 1 (Wet & Dry), Los Angeles River Reach 2 (Wet & Dry), Compton Creek (Wet & Dry), Rio Hondo Reach 1 (Wet & Dry)

CATEGORY 2C

- ALUMINUM– Los Angeles River Reach 1(Wet & Dry)
- SELENIUM – Los Angeles River Reach 1 (Dry), Los Angeles River Reach 2(Dry)

CATEGORY 2D

- PH – Los Angeles River Reach 1 (Wet & Dry), Compton Creek (Wet & Dry), Rio Hondo Reach 1 (Wet & Dry)
- SEDIMENT TOXICITY[3] – Los Angeles River Estuary (Wet & Dry)
- BENTHIC-MACROINVERTEBRATE (BMI) BIOASSESSMENTS – Compton Creek (Wet & Dry)
- TOXICITY – Rio Hondo Reach 1 (Wet & Dry)
- MBAS – Los Angeles River Reach 1, Los Angeles River Reach 2 (Wet)

CATEGORY 3A

- BIS(2-ETHYLHEXYL)PHTHALATE – Los Angeles River Reach 1 (Wet & Dry)
- CHLORIDE – Los Angeles River Reach 1 (Dry), Los Angeles River Reach 2 (Dry), Rio Hondo Reach 1 (Wet)
- Chlorpyrifos – Compton Creek (Dry)
- CYANIDE – Rio Hondo Reach 1 (Wet & Dry)
- DIAZINON – Rio Hondo Reach 1 (Wet)
- PAHS – Los Angeles River Reach 1 (Wet & Dry), Los Angeles River Reach 2 (Wet & Dry)

CATEGORY 3C

- MERCURY – Los Angeles River Reach 1 (Wet & Dry)
- NICKEL – Los Angeles River Reach 1 (Dry)
- Thallium – Los Angeles River Reach 1 (Dry), Los Angeles River Reach 2 (Dry)

CATEGORY 3D

- DISSOLVED OXYGEN[4] – Los Angeles River Reach 1 (Wet), Los Angeles River Reach 2 (Wet)
- PH – Rio Hondo Reach 1 (Wet & Dry)

Tables 2-1 and 2-2 summarize the waterbody pollutant combinations for the Lower LAR Watershed Group.

[3] It is anticipated that the control measures used to address the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Toxics TMDL will address sediment toxicity in the Los Angeles River.
[4] This listing is based on an exceedance that occurred during the 03-04 storm year. There have been no exceedances since that time.

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Table 2-1: Wet Weather Waterbody/Pollutant Classifications for the Lower LAR Watershed Group

Category	Pollutant	Waterbody				
		LARE[(a)]	LAR1[(b)]	LAR2[(c)]	CC[(d)]	RH1[(e)]
1	Cadmium		×	×	×	×
	Copper	×	×	×	×	×
	Lead	×	×	×	×	×
	Zinc	×	×	×	×	×
	Trash[1]		×	×	×	×
	Nitrogen Compounds[2]		×	×	×	×
	DDT	×				
	PCBs	×				
	PAHs	×				
	E. coli		×	×	×	×
	Coliform & Enterococcus	×				
2	Chlordane (sediment)	×				
	Coliform Bacteria		×	×	×	×
	Aluminum		×			
	Diazinon		×			
	Oil			×		
	Trash	×				
	Toxicity					×
	Sediment Toxicity	×				
	Cyanide		×			
	MBAS		×	×		
	Benthic Macroinvertebrate Bioassessments				×	
	pH		×		×	×
3	Chloride					×
	Mercury		×			
	Diazinon					×
	PAHs		×	×		
	Bis(2-ethylhexyl)phthalate		×			
	Cyanide					×
	pH					×
	Dissolved Oxygen		×	×		

(a) Los Angeles River Estuary
(b) Los Angeles River Reach 1
(c) Los Angeles River Reach 2
(d) Coyote Creek
(e) Rio Hondo Reach 1

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia and Nutrients (algae) included in nitrogen compounds for category 1

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Table 2-2: Dry Weather Waterbody/Pollutant Classifications for the Lower LAR Watershed Group

Category	Pollutant	Waterbody				
		LARE[(a)]	LAR1[(b)]	LAR2[(c)]	CC[(d)]	RH1[(e)]
1	Copper	×	×	×	×	×
	Lead	×	×	×	×	×
	Zinc	X				×
	Trash[1]		×	×	×	×
	Nitrogen Compounds[2]		×	×	×	×
	DDT	×				
	PAHs	×				
	PCBs	×				
	E. coli		×	×	×	×
	Coliform & Enterococcus	×				
2	Chlordane (sediment)	×				
	Coliform Bacteria		×	×	×	×
	Aluminum		×			
	Selenium		×	×		
	Cyanide		×			
	Oil			×		
	Trash	×				
	Toxicity					×
	Sediment Toxicity	×				
	Benthic Macroinvertebrate Bioassessments				×	
	pH		×		×	×
3	Chloride		×	×		
	Cyanide					×
	pH					×
	Mercury		×			
	Nickel		×			
	Thallium		×	×		
	Chlorpyrifos				×	
	PAHs		×	×		
	Bis(2-ethylhexyl)phthalate		×			

(a) Los Angeles River Estuary
(b) Los Angeles River Reach 1
(c) Los Angeles River Reach 2
(d) Coyote Creek
(e) Rio Hondo Reach 1

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia and Nutrients (algae) included in nitrogen compounds for category 1

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2.1.1 CATEGORY 1 POLLUTANTS

TRASH

Trash is classified as a Category 1A pollutant for the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines within the MS4 Permit term.

NITROGEN COMPOUNDS (INCLUDING AMMONIA)

Nitrogen compounds are classified as a Category 1A pollutant for the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines within the MS4 Permit term.

METALS (CADMIUM, COPPER, LEAD, & ZINC)

Cadmium, Copper, Lead, & Zinc (herein collectively referred to as "Metals") are classified as a Category 1E pollutant for the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines after December 28, 2022.

According to the California 2010 Integrated Report, cadmium is being considered for removal from the 303(d) list for Los Angeles River Reach 1. The weight of evidence indicated that there is sufficient justification for removing this water segment pollutant combination from the 303(d) list based on the conclusion that the data used satisfies the quality requirements of the State's Listing Policy, and the amount of samples exceeding water quality objectives do not exceed the allowable frequency listed in Table 4.1 of the State's Listing Policy. It has been recommended that the decision to remove Cadmium be approved by the State Board; however, it has not yet been removed from the 303(d) list for Reach 1 of the Los Angeles River[5].

ESTUARY METALS (COPPER, LEAD, & ZINC)

Copper, Lead, & Zinc are classified as a Category 1B pollutant for the Los Angeles River Estuary, which has an interim TMDL deadline within the MS4 Permit term[6].

BACTERIA (E. COLI)

E. Coli bacteria is classified as a Category 1C pollutant for the Los Angeles River Reach 2 which has a final TMDL deadline between December 29, 2017 to December 28, 2022 and a Category 1E for the Los Angeles River Reach 1, Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines after December 28, 2022.

BACTERIA (COLIFORM & ENTEROCOCCUS)

Coliform and enterococcus bacteria are classified as a Category 1G pollutant for the Los Angeles River Estuary.

[5] Based on data from the State Listing Policy lines of evidence ID #2332 and #2331 collected by the County of Los Angeles Department of Public Works.
[6] Dominguez Channel and Great Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL

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2.1.2 CATEGORY 2 POLLUTANTS

The following pollutants have been categorized as Category 2 because data indicate water quality impairment according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy)[7].

ALUMINUM

LA County Flood Control District (LACFCD) mass emissions station S(10) detected 30 out of 40 wet weather and 11 out of 23 dry weather exceedances of the USEPA National Recommended Water Quality Criteria for aluminum between 2002 and 2012. Since this meets the State Listing Policy for 303(d) listing, aluminum will be classified as a Category 2C pollutant for Reach 1 of the Los Angeles River.

COLIFORM BACTERIA

Coliform bacteria are microorganisms known to be harmful in water with high concentrations. The 303(d) List has indicated that the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 are impaired by coliform bacteria; therefore, coliform bacteria is classified as a Category 2B pollutant for Reaches 1 and 2 of the Los Angeles River, Compton Creek, and Reach 1 of the Rio Hondo.

BENTHIC-MACROINVERTEBRATE (BMI) BIOASSESSMENTS

Benthic macroinvertebrate (BMI) communities are both bioindicators of stream condition and a food resource for fish. The 303(d) List has indicated that Compton Creek is impaired as indicated through BMI bioassessments; therefore, BMIs are classified as a Category 2D for Compton Creek.

The State Water Board staff has determined that BMI populations are impacted by a wide range of anthropogenic stressors and has recommended listing for benthic-macroinvertebrate bioassessment. It is anticipated that the BMI population will be subsequently improved by the control measures implemented for other pollutants.

CHLORDANE (SEDIMENT)

Chlordane is an organochlorine compound used as a pesticide. The 303(d) List has indicated that sediment in Los Angeles River Estuary is impaired by chlordane; therefore, chlordane is classified as a Category 2A pollutant for the Los Angeles River Estuary.

CYANIDE

Cyanide is an inorganic chemical compound. The 303(d) List has indicated that Los Angeles River Reach 1 is impaired by cyanide; therefore, cyanide is classified as a Category 2A pollutant for the Reach 1 of the Los Angeles River.

DIAZINON

[7] An excerpt of the 2010 California 303(d) List of Water Quality Limited Segments for Region 4 is included in Appendix 2-1.

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Diazinon is an organophosphate insecticide. The 303(d) List has indicated that Los Angeles River Reach 1 is impaired by diazinon; therefore, diazinon is classified as a Category 2A pollutant for the Reach 1 of the Los Angeles River.

METHYLENE BLUE ACTIVE SUBSTANCE (MBAS)

An MBAS assay is used to detect the presence of detergents or foaming agents in water samples.

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by MBAS, the LACFCD Mass Emissions station S(10) in the LA River collected 11 out of 40 wet weather samples that exceeded the LA Basin Plan Water Quality Objective (WQO) for MBAS between 2002 and 2012, which meets the State Listing Criteria for 303(d) listing[8]. Therefore, MBAS will be classified as a Category 2D within this WMP. It is anticipated that the control measures used to address the pollutants of concern in this watershed will subsequently address MBAS levels; however, if exceedances are found to occur and the implemented or proposed control measures do not address MBAS, the WMP will be revised to include control measures to address the pollutant directly.

OIL

Oil is a chemical substance. The 303(d) List has indicated that the Los Angeles River Reach 2 is impaired by oil; therefore, oil is classified as a Category 2A pollutant for Reach 2 of the Los Angeles River.

PH

pH is a measure of the acidity or basicity of an aqueous solution. The 303(d) List has indicated that Los Angeles River Reach 1, Compton Creek, and Rio Hondo Reach 1 are impaired by pH; therefore, pH is classified as a Category 2D for Reach 1 of the Los Angeles River, Compton Creek, and Reach 1 of the Rio Hondo.

SEDIMENT TOXICITY

Sediment Toxicity is a measurement of toxicity within a sediment sample. The 303(d) List has indicated that the Los Angeles River Estuary contains sediment toxicity; therefore, it is classified as a Category 2D for the Los Angeles River Estuary. It is anticipated that sediment toxicity in the Los Angeles River Estuary will be addressed through the Dominguez Channel and Greater Los Angeles and Long Beach Harbors Toxics TMDL.

SELENIUM

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by selenium, the LACFCD Mass Emissions station S(10) in the LA River collected 2 out of 23 dry weather samples that exceeded the CTR Chronic WQO for selenium between 2002 and 2012, which meets the State Listing Criteria for 303(d) listing[9]. Selenium will be considered as a Category 2C pollutant within this WMP when

[8] According to the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List Minimum Number of Measured Exceedances Needed to Place a Water Segment on the Section 303(d) List for Toxicants and Conventionals – Tables 3.1 & 3.2.

[9] According to the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List Minimum Number of Measured Exceedances Needed to Place a Water Segment on the Section 303(d) List for Toxicants – Table 3.1.

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determining the control measures to be implemented in the Los Angeles River Reaches 1 and 2. It is anticipated that the control measures used to address the pollutants within Los Angeles River and Tributaries Metals TMDL will subsequently address selenium levels; however, if exceedances are found to occur and the implemented or proposed control measures do not address selenium, the WMP will be revised to include control measures to address the pollutant directly.

TOXICITY

The 303(d) List has indicated that Rio Hondo Reach 1 is impaired by toxicity; therefore, toxicity is classified as a Category 2D for Reach 1 of Rio Hondo.

TRASH

Although the Los Angeles River Estuary is not included in the Los Angeles River Watershed Trash TMDL, the 303(d) List has indicated that the Los Angeles River Estuary is impaired by trash; therefore, trash is classified as a Category 2A pollutant for the Los Angeles River Estuary.

2.1.3 CATEGORY 3 POLLUTANTS

The waterbody-pollutant combinations described below have been identified as exceeding water quality objectives (WQOs) in the Lower LAR Watershed. Through the adaptive management process, water quality priorities identified in this WMP will be re-evaluated every two years, and if exceedances of Category 3 WQOs are identified through monitoring, then the WMP will be adapted to become more effective in addressing these constituents, per Section VI.C.8.a.ii of the MS4 Permit.

BIS(2-ETHYLHEXYL)PHTHALATE

LACFCD mass emission station S(10) detected 2 out of 40 wet weather and 4 out of 23 dry weather exceedances of the National Toxics Rule WQO for bis(2ethylhexyl)phthalate between 2002 and 2012. Therefore, bis(2ethylhexyl)phthalate will be classified as a Category 3A pollutant within this WMP for Reach 1 of the Los Angeles River.

CHLORIDE

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by chloride, the LACFCD Mass Emissions station S(10) in the LA River collected 1 out of 23 dry weather samples, and the tributary station TS06 (Rio Hondo) collected 1 out of 9 wet weather samples exceeding the Basin Plan WQO for this pollutant between 2002 and 2012. Chloride will be considered as a Category 3A pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address chloride pollutants, the WMP will be revised to include control measures to address the pollutant directly.

CHLORPYRIFOS

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by chlorpyrifos, data from the LACFCD mass emission monitoring and the City of Los Angeles Status and Trends Monitoring program detected 3 out of 91 dry weather exceedances in Los Angeles River Reach 1 and 2 9ut of 112 dry weather exceedances in Los Angeles River Reach 2 of the CTR WQO for chlorpyrifos

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between 2001 and 2013. Chlorpyrifos is classified as a Category 3A pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address chlorpyrifos, the WMP will be revised to include control measures to address the pollutant directly.

CYANIDE

Cyanide is listed as a Category 2 pollutant for the LA River Reach 1; however, no other reaches are listed on the State's 303(d) list for cyanide. Although the other waterbodies are not listed as impaired by cyanide, the LACFCD Tributary station TS(06) in the Rio Hondo collected 1 out of 9 wet weather samples and 2 out of 3 dry weather samples exceeding the CTR WQO for this pollutant between 2002 and 2012. Cyanide will be considered as a Category 3A pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address cyanide, the WMP will be revised to include control measures to address the pollutant directly.

DIAZINON

Diazinon is listed as a Category 2 pollutant for the LA River Reach 1; however, no other reaches are listed on the State's 303(d) list for Diazinon. Although the other waterbodies are not listed as impaired by Diazinon, the LACFCD Tributary station TS(06) in the Rio Hondo collected 3 out of 9 wet weather samples exceeding the California Department of Fish and Game's WQO for this pollutant between 2002 and 2012. Diazinon will be considered as a Category 3A pollutant within thisWMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address diazinon, the WMP will be revised to include control measures to address the pollutant directly.

DISSOLVED OXYGEN

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by low dissolved oxygen, the LACFCD Mass Emissions station S(10) in the LA River collected 1 out of 39 wet weather samples below the dissolved oxygen water quality criteria between 2002 and 2012. This exceedance occurred during the 2003-04 storm year and there have been no exceedances since this time. Therefore, dissolved oxygen will be classified as a Category 3D within this WMP, however will not be addressed directly through this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address dissolved oxygen, the WMP will be revised to include control measures to address it directly.

MERCURY

LACFCD mass emission station S(10) detected 1 out of 40 wet weather and 1 out of 23 dry weather exceedances of the USEPA National Recommended Water Quality Criteria for mercury between 2002 and 2012. Therefore, mercury will be classified as a Category 3C pollutant within this WMP for Reach 1 of the Los Angeles River.

NICKEL

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LACFCD mass emission station S(10) detected 1 out of 23 dry weather exceedances of the CTR WQO for nickel between 2002 and 2012. Therefore, nickel will be classified as a Category 3C pollutant within this WMP for Reach 1 of the Los Angeles River.

pH

pH is listed as a Category 2 pollutant for the LA River Reaches 1 & 2 and Compton Creek; however, no other reaches are listed on the State's 303(d) list for pH. Although the other waterbodies are not listed as impaired by pH, the LACFCD Tributary station TS(06) in the Rio Hondo collected 1 out of 9 wet weather samples and 1 out of 3 dry weather samples exceeding the LA Basin Plan WQO for this pollutant between 2002 and 2012. pH will be considered as a Category 3D pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address pH, the WMP will be revised to include control measures to address the pollutant directly.

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are chemical compounds that occur naturally in the environment and can also be man-made. PAHs are created during incomplete combustion of coal, oil, gas, and garbage. According to the Toxic Release Inventory, there are approximately twenty compounds defining this group, even though there are hundreds of PAH combinations.

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by PAHs, a five year SCCRWP study conducted partially in the watershed estimates that the LA River is a source of PAH loading to the ocean. Therefore, PAHs will be classified as Category 3A pollutants within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address PAH pollutants, the WMP will be revised to include control measures to address them directly.

Thallium

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by thallium, the LACSD WRP effluent monitoring collected 1 out of 4 dry weather samples exceeding the USEPA National Recommended Water Quality Criteria this pollutant between 2009 and 2011. Thallium is classified as a Category 3C pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address thallium, the WMP will be revised to include control measures to address the pollutant directly.

2.1.4 Pollutant Classification

In order to determine the sequence of addressing pollutants of concern, the pollutants have been placed into classification groups. Pollutants have been identified to be in the same "class" if they have a similar fate and transport, can be addressed via the same types of control measures, and can be addressed within the same timeline. The seven following classes have been identified:

- Metals
- Nutrients

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- Pesticides
- Bacteria
- Semivolatile Organic Compounds (SVOC)
- Water Quality Indicators/General
- Trash

The specific classes and pollutants associated can be found below. Since similar control measures and timelines are to be implemented for pollutants within the same class, each class will be treated with the highest priority of any one pollutant within that class. See Section 2.4 for a table of Water Quality Priorities (WQPs). Watershed Control Measures and Implementation Schedules are discussed in Sections 3 and 5, respectively.

METALS	PESTICIDES	WATER QUALITY INDICATORS/GENERAL	TRASH
Aluminum	Chlordane	Benthic-Macroinvertebrate (BMI)	Trash
Cadmium	Chlorpyrifos	Chloride	
Copper	DDT	Cyanide	
Lead	Diazinon	Dissolved Oxygen	
Mercury	PCBs	MBAS	
Nickel		Oil	
Selenium		pH	
Thallium		Sediment Toxicity	
Zinc		Toxicity	

NUTRIENTS	BACTERIA	SVOC
Ammonia	Coliform &	Bis(2ethylhexyl)phthalate
Nitrogen Compounds	Enterococcus	PAHs
Nutrients (Algae)	e. Coli	

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2.2 WATER QUALITY CHARACTERIZATION

In order characterize existing water quality conditions in the Lower LAR watershed, and to identify pollutants of concern for prioritization per section VI.C.5.a.ii of the MS4 Permit, available monitoring data collected during the previous ten years were analyzed. The following sources were utilized during the water quality characterization:

- LACFCD Mass Emission and Tributary Monitoring Programs
- LA County Sanitation Districts Monitoring
- City of Long Beach Stormwater Monitoring Program
- LAR Metals, Trash, and Bacteria TMDL Monitoring Programs
- Southern California Coastal Water Research Project (SCCWRP) Pollutant Loading Study
- Los Angeles River Watershed Monitoring Program (LARWMP)

A summary of each of these monitoring efforts and relevant findings is presented below. In addition to providing a characterization of the current conditions within the watershed, this information will be used to target watershed management efforts in the Lower LAR watershed.

2.2.1 MASS EMISSIONS HISTORICAL DATA ANALYSIS

Since 1994, the LACFCD has conducted stormwater monitoring in Los Angeles County. The LACFCD operates seven mass emission monitoring stations, which collect runoff from the major watersheds in the county with the goal of estimating the mass emissions from the MS4, assessing mass emissions trends, and determining whether the MS4 is contributing to exceedances of water quality objectives by comparing results to applicable objectives in the Water Quality Control Plan for the Los Angeles Region (Basin Plan), and the California Toxics Rule (CTR).

The LACFCD Monitoring Station, S(10), collects samples that are applicable to the Lower LAR Watershed. Station S(10) is located in the Los Angeles River at the existing stream gauge station (Stream Gauge No. F319-R) between Willow Street and Wardlow Road in the City of Long Beach and is shown in Figure 2-2. At this location, which was chosen to avoid tidal influences, the total upstream tributary drainage area for the Los Angeles River is 825 square miles. Station S(10) is equipped with automated samplers with integral flow meters, and collects flow composite samples from a minimum of three storm events, including the first storm, and two dry weather events in accordance with the 1996 MS4 Permit.

Monitoring data from stormwater collected at Station S(10) during the previous ten years of monitoring (2002-2012) were compared to the most stringent applicable water quality objectives (WQOs)to date to determine exceedances of receiving water limitations. WQOs were determined pursuant to TMDLs, the Basin Plan and the California Toxics Rule, 40 CFR Part 131.38 (CTR). Water quality objectives for chlorpyrifos and diazinon are determined using the freshwater final acute criteria set by the California Department of Fish and Game. Many of the WQOs were used as benchmarks for determining Water Quality Priorities, and should not be used for compliance purposes. Please refer to the Lower LAR Watershed Coordinated Integrated Monitoring Plan (CIMP) for a table of monitored constituents along with their most up-to-date WQOs.

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A summary of the constituents not attaining WQOs at station S(10) during the monitoring years 2002-2012 is presented in Tables 2-3 and 2-4. Complete tables of monitoring results can be found in Appendix A-2-2.

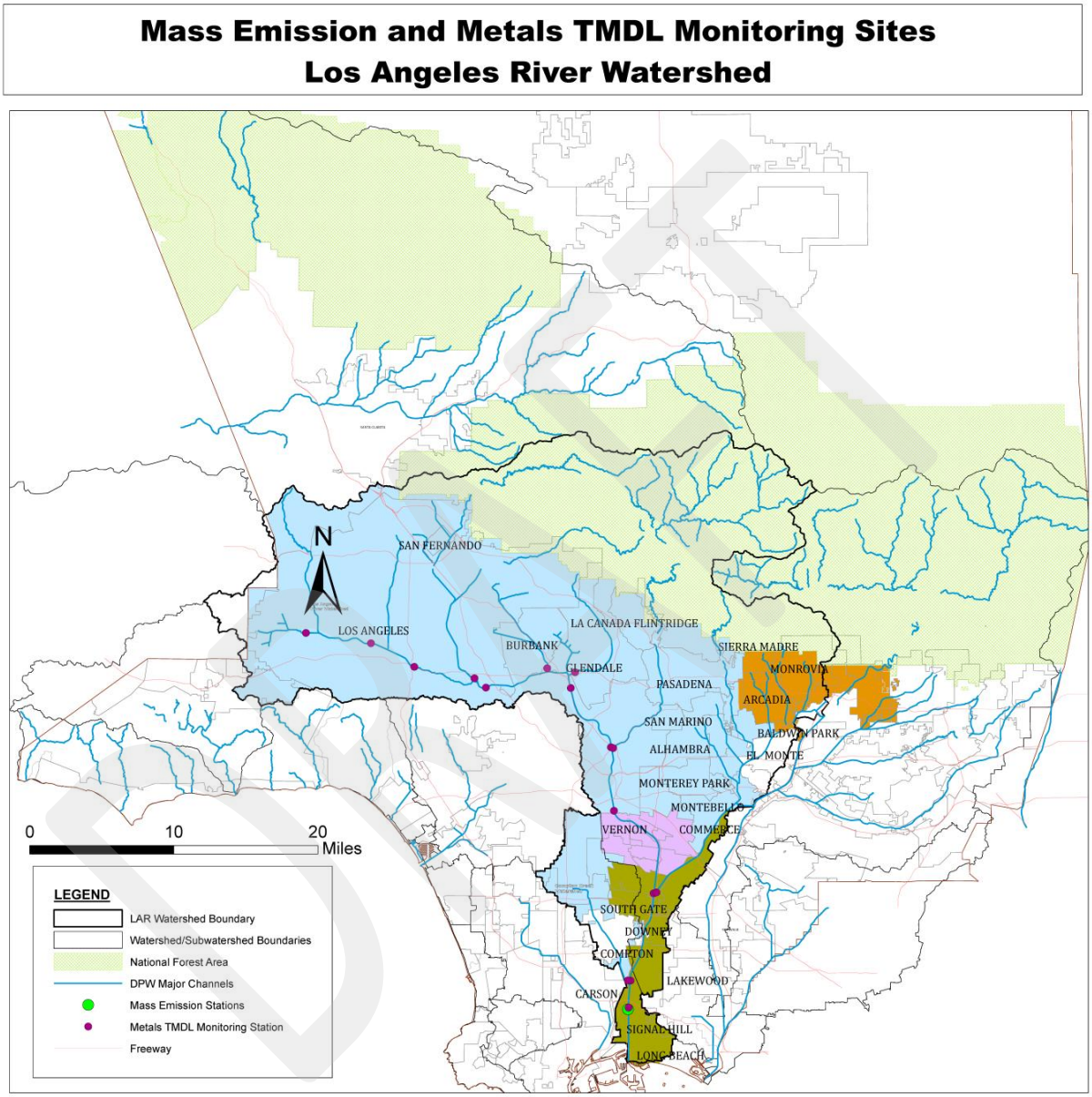


Figure 2-2: Mass emission and metals TMDL monitoring sites courtesy of LACFCD

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Table 2-3: S10 Constituents exceeding WQOs during wet weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	40	9	23	0.022	CTR Freshwater Aquatic Life Protection, Acute
pH	40	5	13	6.5-8.5	LA Basin Plan
DO	39	1	3	5	LA Basin Plan
Total Coliform	40	40	100	10000	LA Basin Plan - Marine Waters
Fecal Coliform	40	39	98	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	40	40	100	104	LA Basin Plan - Marine Waters
MBAS	40	11	28	0.5	LA Basin Plan
Total Aluminum	40	30	75	750	USEPA National Recommended WQ Criteria
Total Cadmium	40	5	13	3.1	LA River Metals TMDL
Total Copper	40	33	83	17	LA River Metals TMDL
Total Lead	40	10	25	62	LA River Metals TMDL
Total Mercury	40	1	2.5	0.051	CTR Human Health
Dissolved Zinc	40	9	23	120	CTR-100mg/L CMC
Total Zinc	40	24	60	159	LA River Metals TMDL
Bis(2-ethylhexyl)phthalate	40	2	5	5.9	National Toxics Rule Human Health
Diazinon	40	2	5	0.08	CADF&G

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Table 2-4: S10 Constituents exceeding WQOs during dry weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	23	20	87	0.0052	CTR Freshwater Aquatic Life Protection, Chronic
pH	23	11	48	6.5-8.5	LA Basin Plan
Total Coliform	22	6	27	10000	LA Basin Plan - Marine Waters
Fecal Coliform	23	11	48	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	23	14	61	104	LA Basin Plan - Marine Waters
Chloride	23	1	4	150	LA Basin Plan
Nitrate	8	2	25	8	LA River Nutrient TMDL
Nitrite	22	6	27	1	LA River Nutrient TMDL
Total Aluminum	23	11	48	87	USEPA National Recommended WQ Criteria
Total Copper	23	2	9	23	LA River Metals TMDL
Total Mercury	23	1	9	0.051	CTR Human Health
Total Nickel	23	1	9	24	CTR Chronic
Total Selenium	23	2	9	5	National Toxics Rule
Total Zinc	23	1	4	131	LA River Metals TMDL
Bis(2-ethylhexyl)phthalate	23	4	17	5.9	National Toxics Rule Human Health
Diazinon	23	2	9	0.05	CADF&G

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2.2.2 LACFCD TRIBUTARY MONITORING

In addition to the Mass Emission Station monitoring, LACFCD conducted tributary monitoring during the 2002-03 and 2003-04 storm years. This monitoring occurred at 1 tributary station in the Lower LAR Watershed: Rio Hondo (TS06). Rio Hondo Channel monitoring station is located on Beverly Boulevard, downstream of Whitter Narrows dam, at the USGS – U.S. Army Corps of Engineers (ACOE) Stream gage No. 1102300 or E327-R. The upstream tributary watershed area is approximately 142 square miles.

Monitoring data from stormwater collected at station TS06 was compared to the most stringent applicable water quality objectives (WQOs) to determine exceedances of receiving water limitations. WQOs were determined pursuant to TMDLs, the Basin Plan and the California Toxics Rule, 40 CFR Part 131.38 (CTR). Water quality objectives for chlorpyrifos and diazinon were determined using the freshwater final acute criteria set by the California Department of Fish and Game. Many of the WQOs were used as benchmarks for determining Water Quality Priorities, and should not be used for compliance purposes. Please refer to the Lower LAR Watershed Coordinated Integrated Monitoring Plan (CIMP) for a table of monitored constituents along with their most up-to-date WQOs.

A summary of the constituents not attaining WQOs at station TS06 during the monitoring years 2002-2012 is presented in Tables 2-5 and 2-6. Complete tables of monitoring results can be found in Appendix A-2-2.

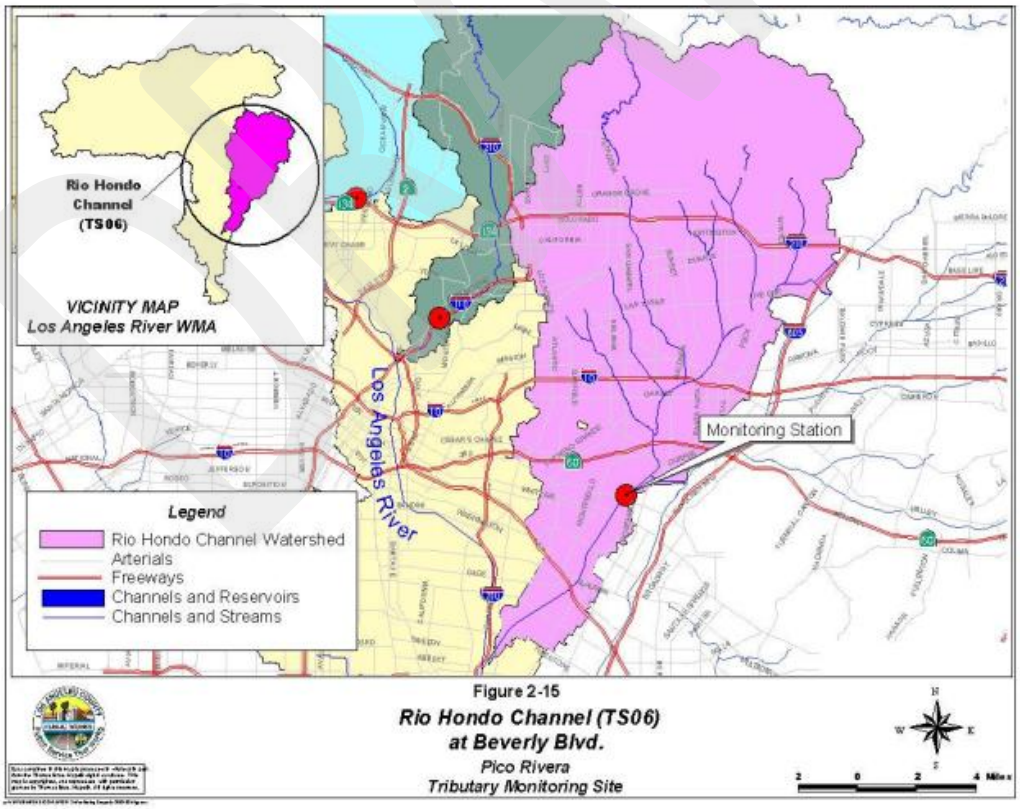


Figure 2-3: Rio Hondo tributary station

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Table 2-5: TS06 constituents exceeding WQOs during wet weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	9	1	11	0.022	CTR Freshwater Aquatic Life Protection, Acute
pH	9	1	11	6.5-8.5	LA Basin Plan
Total Coliform	9	9	100	10000	LA Basin Plan - Marine Waters
Fecal Coliform	9	9	100	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	9	9	100	104	LA Basin Plan - Marine Waters
Chloride	9	1	11	150	LA Basin Plan
Total Copper	9	4	44	17	LA River Metals TMDL
Total Lead	9	1	11	62	LA River Metals TMDL
Total Zinc	9	1	11	159	LA River Metals TMDL
Diazinon	9	3	33	0.08	CADF&G

Table 2-6: TS06 constituents exceeding WQOs during dry weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	3	2	67	0.0052	CTR Freshwater Aquatic Life Protection, Chronic
pH	3	2	67	6.5-8.5	LA Basin Plan
Total Coliform	3	1	33	10000	LA Basin Plan - Marine Waters
Fecal Coliform	3	2	67	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	3	2	67	104	LA Basin Plan - Marine Waters
Total Copper	3	2	67	13	LA River Metals TMDL

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2.2.3 LA COUNTY SANITATION DISTRICT MONITORING

The County Sanitation Districts of Los Angeles County (LACSD) are a confederation of 23 independent special districts serving the water pollution control management needs of about 5.7 million people in Los Angeles County. The Sanitation Districts' service area covers approximately 820 square miles and encompasses 78 cities and unincorporated territory within the County. With regard to wastewater treatment, the Sanitation Districts construct, operate and maintain facilities to collect, treat and dispose of wastewater and industrial wastes.

Seventeen of the 23 districts are signatory to an agreement which provides for sewerage service to the majority of residential, commercial and industrial users (IUs) within the County, but mostly located outside of the City of Los Angeles service area. This treatment system, known as the Joint Outfall System (JOS), currently consists of the Joint Water Pollution Control Plant (JWPCP) located in the City of Carson and six upstream water reclamation plants (WRPs); the Whittier Narrows WRP near the City of South El Monte, the Los Coyotes WRP in the City of Cerritos, the San Jose Creek WRP adjacent to the City of Industry, the Long Beach WRP in the City of Long Beach, the Pomona WRP in the City of Pomona and the La Cañada WRP in La Cañada Flintridge. All JOS facilities except the La Cañada WRP are regulated under the NPDES program; all six WRPs are subject to California Waste Discharge or Water Reclamation Requirements. See Chapter 1 Introduction for more detail on the WRP discharges within the Lower LAR Watershed.

The LACSD monitors its effluent at multiple locations within the Lower LAR Watershed. Data from 2004 to 2012 was analyzed and exceedances of WQOs were added to the Lower LAR WQPs.

2.2.4 LOS ANGELES RIVER METALS TMDL MONITORING DATA ANALYSIS

The Los Angeles River Metals TMDL became effective on October 29, 2008. For compliance with the requirements of this TMDL, a Coordinated Monitoring Plan (CMP) was developed and implemented jointly by the responsible LA River Watershed MS4 Permittees in October 2008. Wet and dry weather monitoring began at 13 locations in the LA River and major tributaries (shown in Figure 2-2) in 2008 to characterize ambient water quality and measure attainment of effluent limitations set forth in the TMDL and outlined in Table 2-7.

Table 2-7: Los Angeles River Metals Water Quality Based Effluent Limitations (Total Recoverable)

	Effluent Limitations Daily Maximum (µg total recoverable metals/L)		
Waterbody	Copper	Lead	Zinc
LA River Reach 2	WER[1] x 22	WER[1] x 11	-
LA River Reach 1	WER[1] x 23	WER[1] x 12	-
Compton Creek	WER[1] x 19	WER[1] x 8.9	-
Rio Hondo Reach 1	WER[1] x 13	WER[1] x 5.0	WER[1] x 131

[1] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.

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Five of the thirteen monitoring locations identified in the CMP are located within, and collect runoff from, the Lower LAR Watershed:

LAR I-9: The LAR I-9 sampling site is located between the 710 Freeway bridge to the north and Imperial Highway bridge to the south in the main channel, upstream of the Rio Hondo confluence. The site is located in Reach 2.

LAR I-10: LAR I-10 is currently monitored by the City of Los Angeles as part of its Status and Trends Monitoring Program. The site is located in Reach 2.

LAR I-11: LAR I-11 is located in Long Beach at Del Amo Boulevard in the main channel upstream of the Compton Creek confluence. The site is located at the bottom of Reach 2.

LAR I-12: LAR I-12 is currently monitored by the City of Los Angeles as part of its Status and Trends Monitoring Program. The site is located in Reach 1.

LAR I-13: LAR I-13 is an existing Los Angeles County mass emission sampling site located in Long Beach south of Wardlow Road and north of Willow Street in the main channel. This is the location of an existing Los Angeles County gauging station identified as F319-R. The site is located in Reach 1.

A summary of the constituents not attaining applicable WQBELs at these monitoring locations during the monitoring years 2008-2012 is shown in Tables 2-8 and 2-9. Note that while some collected samples were found to exceed WQBELs during this time, the watershed is on schedule to meet applicable interim and final WLAs as outlined in the LA River Metals TMDL and the JG1 and JG2 LA River Metals TMDL Implementation Plans.

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Table 2-8: Lower LAR metal exceedances, dry weather exceedances by location (total dry samples)

Constituent	LAR I-9 Reach 2 at 710 Freeway	LAR I-10 Rio Hondo	LAR I-11 Reach 2 at Rio Hondo	LAR I-12 Compton Creek	LAR I-13 Reach 1 at Wardlow
Total Recoverable Copper	0	7(10)	0	0	0
Total Recoverable Zinc	0	0	0	0	0
Total Recoverable Lead	0	2(10)	0	0	0

Table 2-9: Lower LAR metal exceedances, wet weather exceedances by location (total dry samples)

Constituent	LAR I-11 Reach 2 at Rio Hondo	LAR I-13 Reach 1 at Wardlow
Total Recoverable Copper	17(17)	20(20)
Total Recoverable Zinc	3(17)	4(20)
Total Recoverable Lead	16(17)	16(20)
Total Recoverable Cadmium	0	0

*Only sampling locations LAR I-11 and LA I-13 are sampled during wet weather in the Lower LAR Watershed

2.2.5 CITY OF LONG BEACH STORMWATER MONITORING

The City of Long Beach first established a monitoring site at the Dominguez Gap Pump Station during the 2000/2001 wet season. Refer to Section 5 (the RAA) for further information on the project.

The Dominguez Gap Pump Station and adjacent infiltration/detention basin started undergoing major renovations during the summer of 2006 and work extended through most of the 2007/2008 wet season. During that time period, land disturbances associated with development of the wetland system resulted in elevated levels of sediment. By late 2009 the wetland vegetation had become well established and the water quality changes observed during the construction phase were no longer evident.

The Dominguez Gap has been determined to play a critical role in attainment of TMDL requirements for Reach 1. Discussions with the LACFCD have emphasized the benefits of operating water levels to benefit both the wetland habitat and minimize mass emissions of trace metals and other contaminants to (or back to) the Los Angeles River.

The Los Angeles River Metals TMDL established concentration-based targets at 23 µg/L for total recoverable copper and 12 µg/L for total recoverable lead at the downstream Wardlow monitoring site during dry weather. A summary of all dry weather monitoring data from the Dominguez Gap Pump Station for these metals (Tables 2-10 and 2-11 and

Figure **2-4: Total and dissolved metals in dry weather discharges from the Dominguez Gap pump station**

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4) shows consistently low concentrations of copper, lead and zinc in both the total recoverable and dissolved forms. Concentrations of these metals in Dominguez Gap Pump Stations dry weather discharges have also remained lower than measurements made within the Los Angeles River by the Coordinated Monitoring Program. This indicates that the wetland system is has very effective in removing these metals.

The Los Angeles River Metals TMDL establishes wet weather water quality targets based on the acute CTR criteria and the 50th percentile hardness values for stormwater collected at the County's Wardlow water quality monitoring site on the Los Angeles River. These targets are for total recoverable metals:

- Cadmium: 3.1 ug/l
- Copper: 17 ug/l
- Lead: 62 ug/l
- Zinc: 159 ug/l

In a total of 37 monitored storm events concentrations of total cadmium have never exceeded 0.55 mg/L and the median concentration has been 0.26 mg/L. Long-term trends for discharges of total copper, lead and zinc are illustrated in Figure 2-5. This figure examines trends in flow, concentrations of the target metals, and loads of trace metal discharges. The graphs on the left side of the figure illustrate trends both before and after implementation of the TMDL while the graphs on the right side of the figure trends without regard to the implementation date. Stormwater discharges have tended to decrease over time however this watershed was reconfigured when the treatment wetland system was created. It now has a smaller drainage area. Concentrations of total copper, total lead and total zinc were all increasing prior to both completion of the wetland treatment system and implementation of the TMDL. General trends suggest that loads of all three metals have been decreasing in recent years but further data will be necessary to confirm this trend. Concentrations of total copper still occasionally exceed the current water quality target established for the Los Angeles River at Wardlow (17 ug/L) but measured concentrations in the past three years have never exceeded 21 ug/L. Concentrations of total lead present in wet weather discharges from the Dominguez Gap Pump Station are less than 25% of the established objective. Concentrations of total zinc are also declining and, in recent years, have remained less than 2/3 of the water quality target in Los Angeles River Reach 1.

The Los Angeles River Nitrogen TMDL established WLAs for both ammonia-N and nitrate-N that apply to minor discharges that discharge both below the Los Angeles-Glendale WRP and within Reach 1 of the Los Angeles River. Ammonia-N WLAs were established for a 1-hour average (8.7 mg/L) and a 30-day average (2.4 mg/L). WLAs for both nitrate-N and nitrate+nitrite-N were both set at 8.0 mg/L for a 30-day average. Concentrations of ammonia-N have consistently been less than 0.7 mg/L during both dry and wet weather monitoring (Figure 2-6). Median concentrations of ammonia are 0.18 mg/L during dry weather and 0.38 mg/L during wet weather discharges. Concentrations of nitrate-N in dry weather discharges have never exceeded 1.9 mg/L and all wet weather discharges have had concentrations of less than 1.4 mg/L. Thus all discharges from the Dominguez Gap Pump Station continue to achieve the WLAs established for nitrogen compounds. Furthermore, total nitrogen (TKN plus nitrate/nitrite-N)

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concentrations typically range between 2.0 and 3.0 mg/L with the highest measured concentration being reported at 5.02 mg/L during a wet weather discharge.

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Table 2-10: Total metals in dry weather discharges from the Dominguez Gap pump station

Statistic	*Copper*	*Lead*	*Zinc*
LA River @ Wardlow TMDL objective	23	12	
No. of Events	7	7	7
Mean	4.2	3.5	23.8
Standard Deviation	2.2	1.5	12.0
Minimum	1.7	2.2	8.8
Median	3.9	3.1	21
Maximum	8.8	6.5	47

Table 2-11: Dissolved metals in dry weather discharges from the Dominguez Gap pump station

Statistic	*Copper*	*Lead*	*Zinc*
CTR Objective (median hardness 282 mg/L, 10^{th} percentile hardness 219 mg/L)	22	7.6	230
No. of Events	7	7	7
Mean	1.88	0.6	12.8
Standard Deviation	1.04	0.22	6.68
Minimum	0.54	0.39	6.3
Median	2.1	0.62	11
Maximum	3.6	1.0	24

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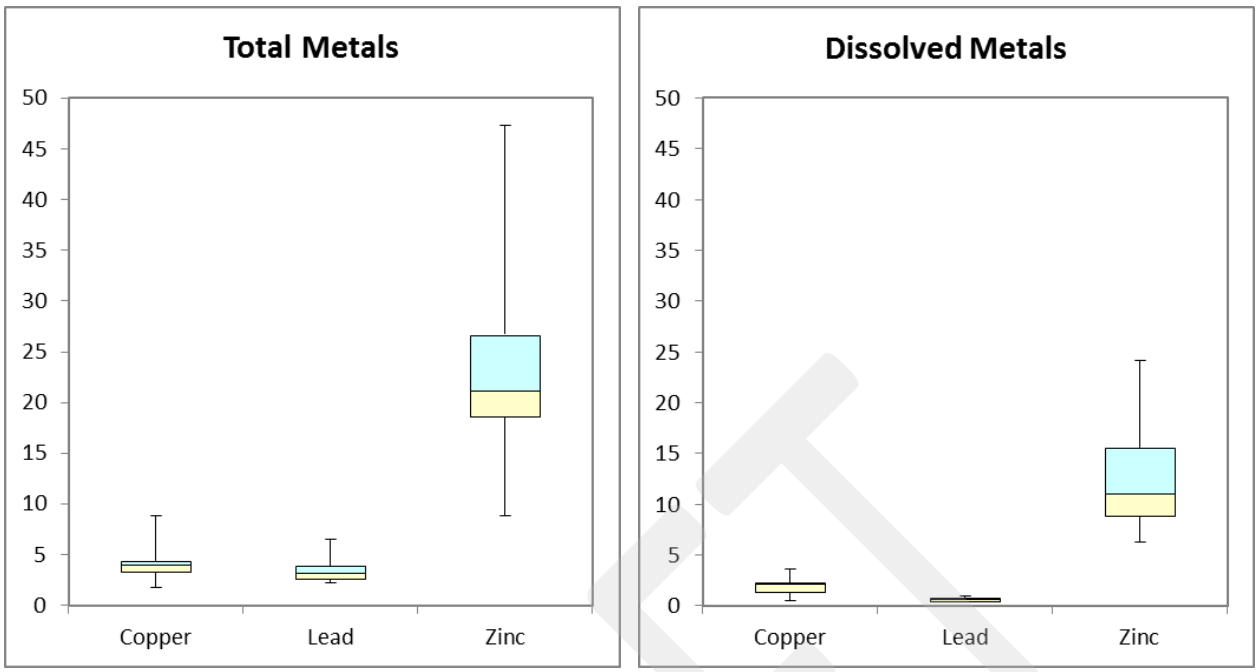
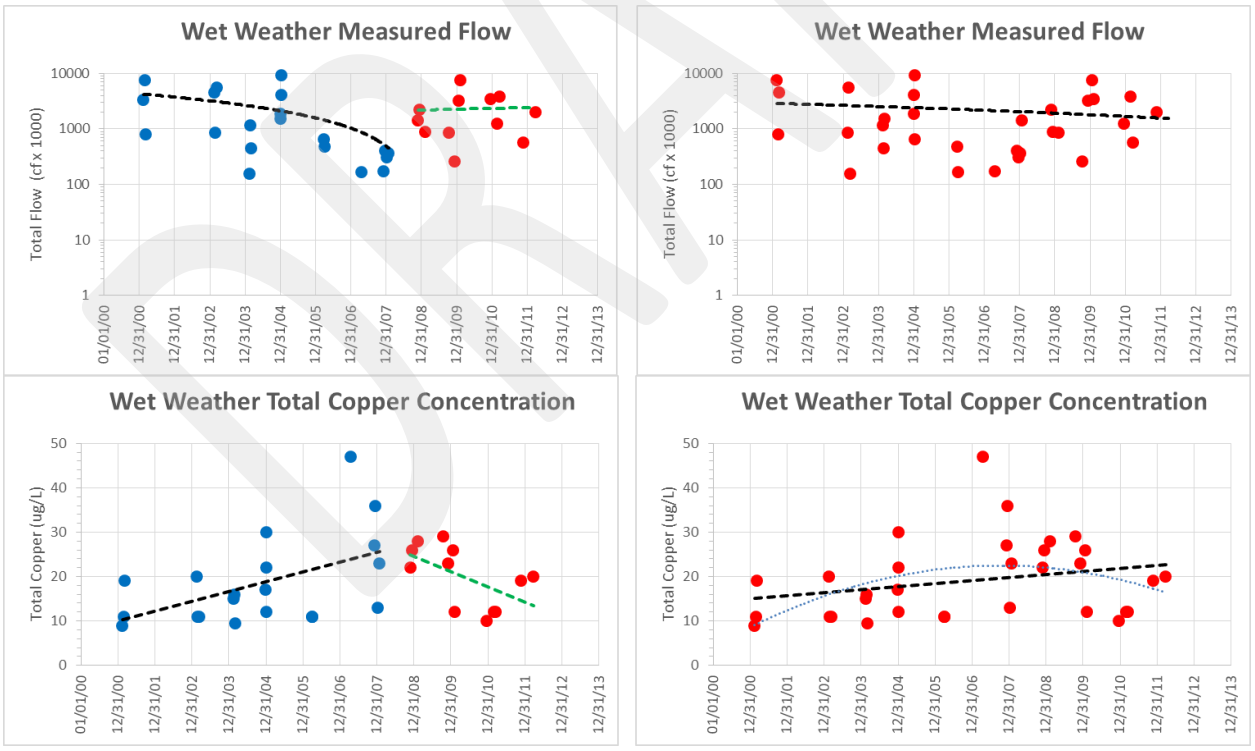
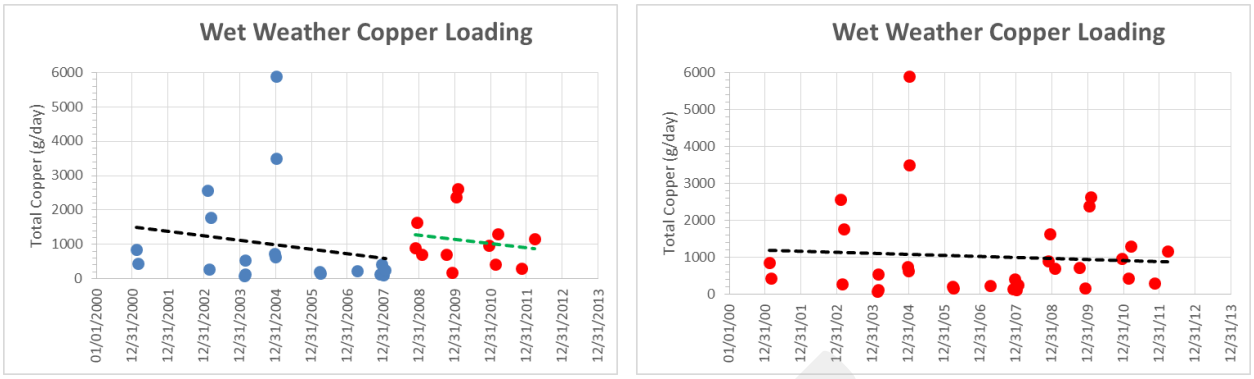


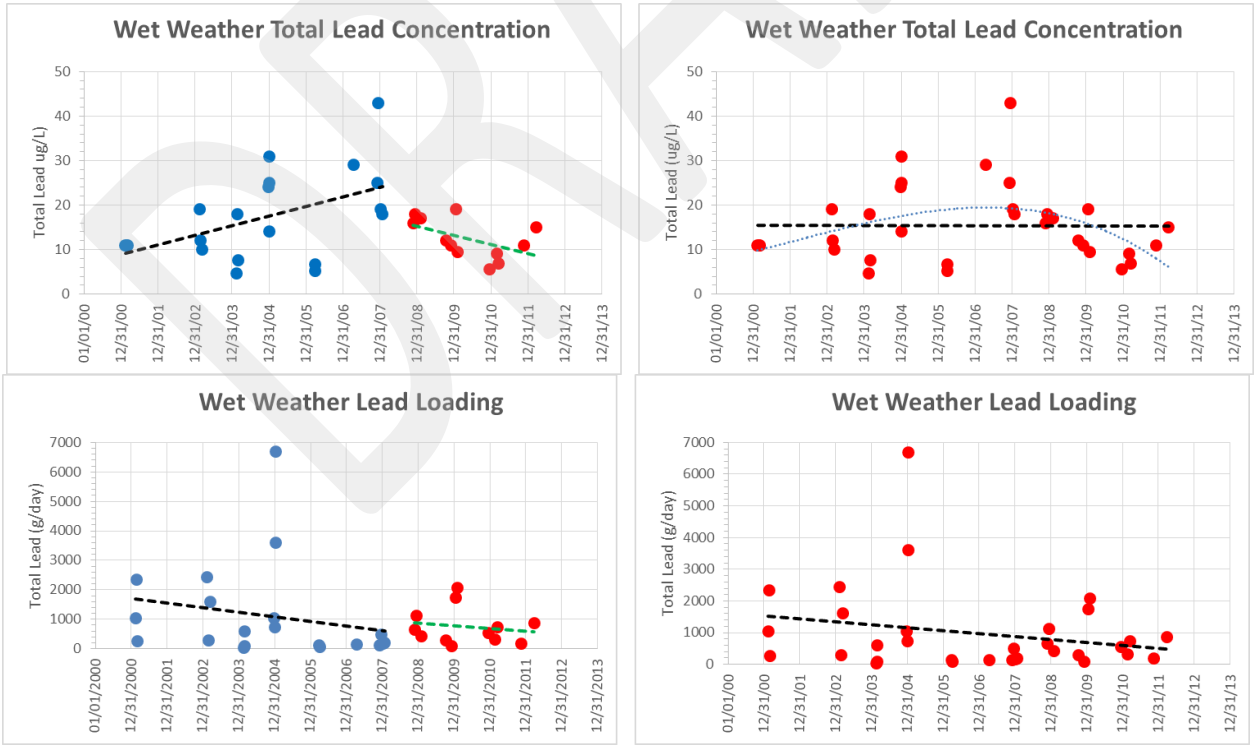
Figure 2-4: Total and dissolved metals in dry weather discharges from the Dominguez Gap pump station

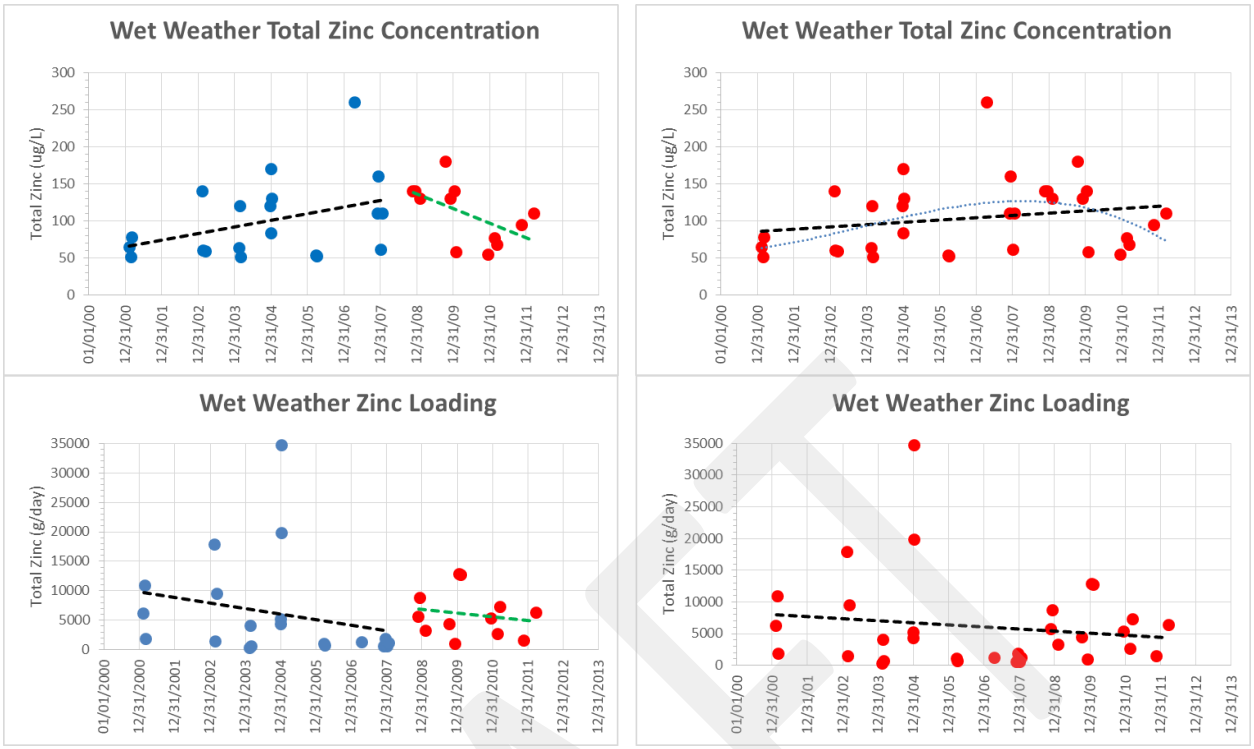




Note: Graphs on the left illustrate samples taken before and after the effective date of the TMDL (10/29/2008). Graphs on the right illustrate trends without consideration of the effective date of the TMDL. Dashed lines are based upon simple linear regression. The fine dotted line represents a non-linear regression.

Figure 2-5: Stormwater flow, concentration and loads for total Cu, Pb and Zn at the Dominguez Gap





Note: Graphs on the left illustrate samples taken before and after the effective date of the TMDL (10/29/2008). Graphs on the right illustrate trends without consideration of the effective date of the TMDL. Dashed lines are based upon simple linear regression. The fine dotted line represents a non-linear regression.

Figure 2-5 (Cont.): Stormwater flow, concentration and loads for total Cu, Pb, Zn - Dominguez Gap pump station

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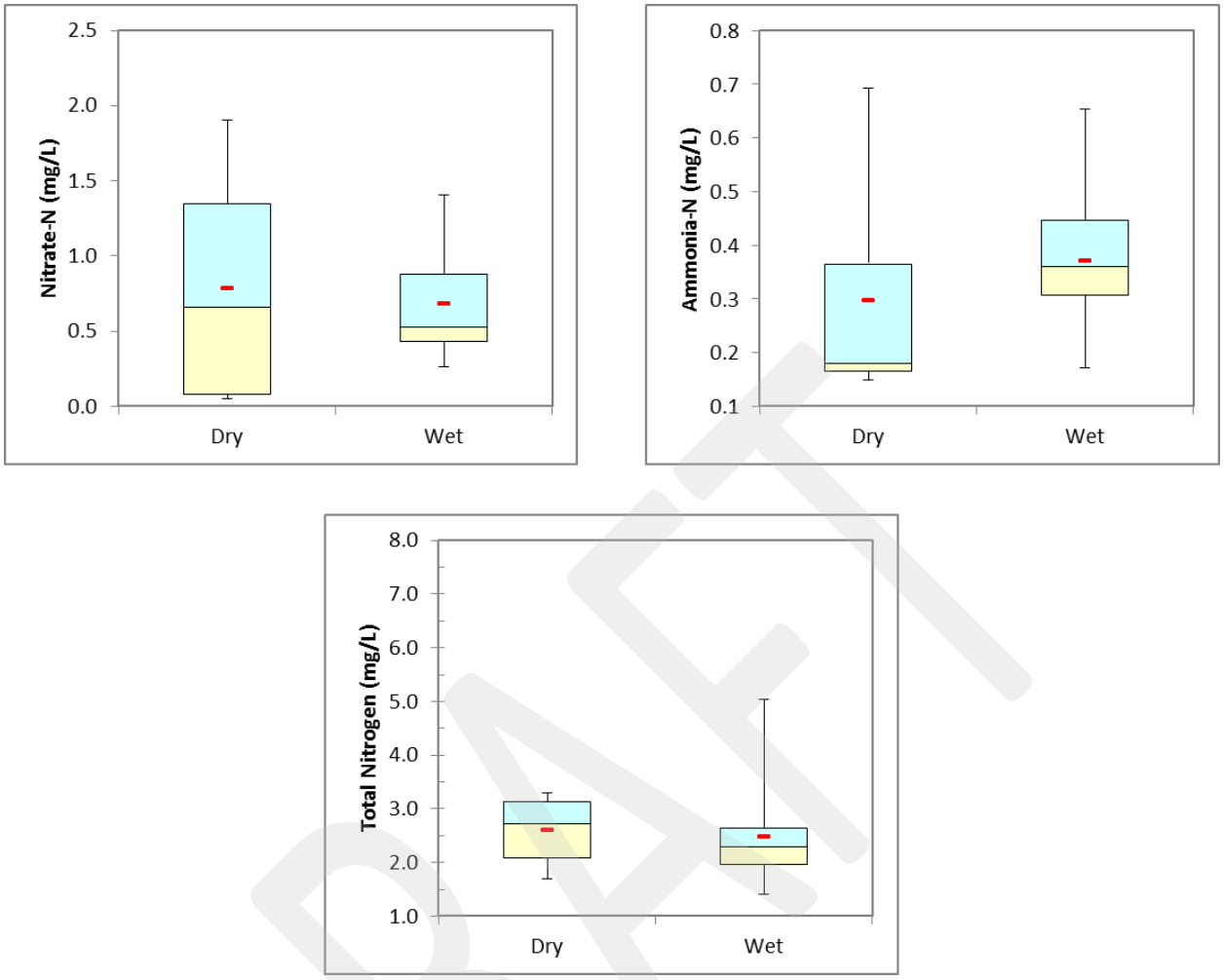


Figure 2-6: Distribution of Ammonia-N, Nitrate-N and Total Nitrogen measured in both dry and wet weather discharges from the Dominguez pump station, 2008-2013

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2.2.6 LOS ANGELES RIVER BACTERIA SOURCE IDENTIFICATION STUDY/CLEANER RIVERS THROUGH EFFECTIVE STAKEHOLDER-LED TMDLS (CREST) STUDY

Multiple data sets were analyzed during the development of the LA River Bacteria TMDL. Data from the City of Los Angeles' Status and Trends monitoring program, the Monitoring and Reporting Programs for the City of Los Angeles' LA-Glendale and D.C. Tillman Water Reclamation Plants and the Burbank Water Reclamation Plant, and data from the Mass Emission and Tributary instream monitoring stations under the Monitoring and Reporting Program of the MS4 Permit were analyzed over a period beginning November 1997 and ending February 2008.

The data in Table 2-12 were compiled by the Regional Board for the Los Angeles River Watershed Bacteria TMDL. Exceedance percentages, which are calculated as the number of single sample exceedances of Rec-1 WQOs divided by sample count are shown for the monitoring locations relevant to the Lower LAR Watershed. The exceedance count and sample count are also listed next to the exceedance percentage in parentheses.

On average, E. Coli and fecal coliform samples exceeded WQOs over 80% of the time in the LA River, and over 75% of the time in LA River Tributaries.

It should be noted that the Regional Board recognizes that there are natural sources of bacteria within watersheds that may contribute to exceedances of the Rec-1 WQOs, and have implemented a reference system/antidegradation compliance procedure. According to the LA River Bacteria TMDL, under this protocol, "*a certain frequency of exceedance of the single sample objectives shall be permitted on the basis of the observed exceedance frequency in the selected reference system(s) or the targeted waterbody*"(Staff Report pg. 18). In addition, the LA River and the Rio Hondo are subject to the high flow suspension (HFS) of Rec-1 WQOs for bacteria during days with rainfall of 0.5" inches or greater and the following 24 hours, so many of the wet weather exceedances expressed above over- represent the bacterial impairment in these waterbodies[10].

A map of monitoring locations sampled is shown in Figure 2-7.

[10] Los Angeles River Watershed Bacteria Total Maximum Daily Load. Staff Report, California Regional Water Quality Control Board, Los Angeles Region. July 15, 2010

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Table 2-12: LA River bacteria source identification study monitoring data exceedance summary

	Parameter	LA River Reach 1 Nov '97-Feb '08 Exceedance %	LA River Reach 2 Jan '01-Feb '08 Exceedance %	Compton Creek Jan '02-Feb '08 Exceedance %	Rio Hondo Reach 1 Jan '02-Feb '08 Exceedance %
Single Sample	Fecal Coliform	86.2% (50/58)	80.0% (4/5)	87.5% (14/16)	90.9% (10/11)
	E. Coli	83.1% (226/272)	81.9% (443/541)	53.3% (48/90)	69.1% (56/81)
	Exceedance Days	84.4% (276/327)	82.3% (445/541)	57.3% (59/103)	79.0% (64/81)
	Dry Weather	79.4% (189/238)	79.3% (345/435)	58.7% (54/92)	78.3% (54/69)
	Wet Weather	91.6% (87/95)	88.5% (100/113)	45.5% (5/11)	83.3% (10/12)
	Summer	77.0% (134/174)	79.2% (244/313)	90.5% (38/42)	49.2% (38/48)
	Winter	89.3% (142/159)	87.7% (201/229)	63.4% (21/33)	68.8% (22/32)
Geometric Means	Fecal Coliform	100.0% (11/11)	N/A	N/A	N/A
	E.Coli	100.0% (22/22)	100.0% (59/59)	N/A	N/A
	Exceedance Days	100.0% (33/33)	100.0% (59/59)	N/A	N/A
	Summer	100.0% (3/3)	100.0% (6/6)	N/A	N/A
	Winter	100.0% (30/30)	100.0% (53/53)	N/A	N/A

** Data expressed in terms of exceedance days of the Basin Plan Rec-1 WQO in which single sample bacteria densities exceed bacteria water quality standards for Rec-1 Beneficial Use.
***LA River is subject to the High Flow Suspension of Rec-1 WQOs, therefore these exceedances may be overrepresented



Figure 2-7: LA River Bacteria Source Identification Study monitoring locations

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2.2.7 LA RIVER TRASH TMDL DATA

The Cities have successfully implemented the LA River Trash TMDL, achieving a greater than 80% reduction in trash through the installation of certified full capture catch basin inserts, trash nets, and retention basins. Table 2-13 displays each City's status in achieving 100% trash capture.

Table 2-13: Percentage of catch basins equipped with full capture devices by City

City	Percentage of Catch Basins Equipped with Full Capture Device
Downey	90
Lakewood	100
Pico Rivera	84
Paramount	94
Signal Hill	89
South Gate	86
Long Beach	90

2.2.8 SCCRWP POLLUTANT LOADING STUDY

The Southern California Coastal Water Research Project, which was formed in 1969 to "enhance the scientific understanding of linkages among human activities, natural events, and the health of the Southern California coastal environment" conducted a five-year study of the spatial and temporal patterns of stormwater contaminants from 2000 through 2005 in five watersheds throughout Los Angeles County. They collected data during 11 storm events from twelve mass emissions sites and eight land use types to characterize pollutant loading of trace metals, organic compounds, and bacteria. Ten (10) to fifteen (15) grab samples were collected for each event, and samples were targeted at early season storms and large rainfall events. Data was collected from the LA River at Wardlow, making the results of this study applicable to the Lower LAR Watershed.

Researchers found that stormwater concentrations of trace metals exceeded CTR WQOs in greater than 80% of the wet weather samples at mass emissions sites. They also found consistent fecal indicator bacteria exceedances at both mass emissions and land use sites. Results also indicated that annual loading of Polycyclic aromatic hydrocarbons (PAHs) from the Los Angeles River watershed into the Pacific Ocean is approximately 92.8 kg/year. The EPA regulatory guidelines suggest a practical PAH detection limit between 1 - 5ug/L, and this study mostly found mean PAH concentrations below this threshold. However, they suggest that PAH concentrations may be underreported due to the fact that most monitoring efforts collect composite samples, and this study observed almost all PAH pollutant loading to occur during the first flush of a storm event.

2.2.9 COUNCIL FOR WATERSHED HEALTH LOS ANGELES RIVER WATERSHED MONITORING PROGRAM

Since 2007, the Los Angeles River Watershed Monitoring Program (LARWMP), a group of stakeholders representing major permittees, regulatory and management agencies, and conservation groups led by

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the Council for Watershed Health, has conducted watershed scale monitoring at targeted and random sites throughout the Los Angeles River watershed. A map of monitoring locations is shown in Figure 2-8.

Significant observations found during the 2010 monitoring season under this program are as follows[11]:

- "The ambient condition of streams in the Los Angeles River Watershed was assessed using a variety of indicators collected at randomly selected sites in three sub-regions (natural, urban and effluent dominated). Indicators included water chemistry, toxicity, bioassessment and physical habitat condition."
- "Dissolved oxygen, pH and temperature were greatest at effluent dominated sites and lowest at natural upper watershed sites. Water Reclamation Plants and urban run-off discharge into concrete lined channels, with limited canopy cover. Therefore, sunlight has the opportunity to increase water temperature and encourage photosynthesis, which results in cyclic oscillation in pH and dissolved oxygen."
- "The concentrations of zinc, selenium, and lead were highest at effluent dominated sites and arsenic, chromium and copper were higher at urban sites. Other than copper and selenium in urban streams, concentrations of the other metals were generally below CTR thresholds."
- "Effluent-dominated sites had higher median concentrations of dissolved nutrients compared to the other sub-regions and the range of values was greatest at the urban sites. Nitrogen concentrations at all watershed sub-regions were below the basin plan objective of 10 mg/L-N for nitrate and 1.0 mg/L-N for nitrite."
- "Watershed-wide, 80% of the random sites sampled had IBI scores that indicated degraded habitat or ecosystem conditions, most of these were concrete lined channels in the urban and effluent dominated sub-regions. The BMI communities were strongly affected by the 2009 Station Fire which reduced the biological condition in the upper watershed."
- "Physical habitat conditions, as measured by CRAM, were poorest in the lower watershed, where concrete channels predominate, and best in the upper watershed."
- "There was a strong positive correlation between good biological conditions (IBI scores) and canopy cover and stream slope. Each of these habitat characteristics was favorable for BMIs in the upper watershed where IBI scores were correspondingly high. IBI scores were generally lowest in the urban and effluent sub regions, where concrete lined channels predominate."

The Lower LAR Watershed will use these results, and continue to track future LARWMP results to help target watershed control measures identified in the WMP.

[11] Morris, K. et al.

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Figure 2-8: LARWMP 2010 monitoring locations

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2.3 SOURCE ASSESSMENT

This section identifies the potential sources of pollutants within the Lower LAR Watershed for the waterbody-pollutants classified in section 2.2. Information was gathered from several water quality monitoring programs and special studies related to pollutant sources and conditions that contribute to the highest water quality priorities to identify known and suspected stormwater and nonstormwater pollutants sources to and from the Municipal Separate Storm Sewer System (MS4).

The pollutants addressed in this section are bacteria, nutrients, metals, sediment, and trash. To generally describe the potential sources in the Lower LAR Watershed for these pollutants, pollutant sources have been divided into the following categories: NPDES discharges, road infrastructure, atmospheric deposition, and wastewater from sanitary sewer and SSOs.

2.3.1 NPDES SOURCES

There are two categories of pollutant sources, point sources and non-point sources. Point source discharges are regulated through National Pollutant Discharge Elimination System (NPDES) permits. Point sources include those associated with the MS4 (stormwater and urban runoff) and other NPDES discharges. Stormwater runoff in the watershed is regulated through four types of permits including MS4 permits, a statewide stormwater permit for Caltrans; a statewide Construction General Permit (CGP); and a statewide Industrial General Permit (IGP). The NPDES IGP regulates stormwater discharges and authorized non-stormwater discharges from ten specific categories of industrial facilities, including manufacturing facilities, oil and gas mining facilities, landfills, and transportation facilities. Furthermore, the NPDES CGP regulates stormwater discharges from construction sites that result in land disturbances equal to or greater than one acre. Point source discharges from thee IGP, CGP, residential, commercial and transportation activities can be a significant source of pollutant loads.

Non-point sources, by definition, include pollutants that reach waters from a number of land uses and are not regulated through NPDES permits. Non-point sources include existing contaminated sediments within the watershed and direct air deposition to the waterbody surface.

The following provides additional discussion regarding the presence of pollutants in stormwater runoff within the watershed.

BACTERIA

Specific sources of bacteria are associated with categories such as, anthropogenic, non-anthropogenic, and environmental sources, which may include:

- Sanitary sewer overflows (SSOs), leaks and spills; illicit connections of sanitary lines to the storm drain system;
- Animal wastes – the bacteria indicators used to assess water quality are not specific to human sewage; therefore, natural influences of fecal matter from animals and birds can also be a source of elevated levels of bacteria.

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- Organic debris from gardens, landscaping, parks, food waste and illegal dumping from recreational vehicle holding tanks among others, can be a source of elevated levels of total coliform bacteria.
- Environmental – soils, decaying vegetation
- Illegal connections and illicit discharges (IC/IDs) to the MS4 are also very likely sources of bacteria in stormwater discharges. Table 2-14 includes data based on annual reports submitted to the LA County DPW (previous principal permittee), for illicit connections and illicit discharges. Current data on the constituents for the IC/IDs recorded during this period is not available.

Table 2-14: Illicit Connections/Illicit Discharges 2001-2012

Agency	Illicit Connections	Illicit Discharges
Downey	6	467
Lakewood	0	162
Long Beach	No Data	No Data
Lynwood	1	38
Pico Rivera	No Data	No Data
Signal Hill	0	88
South Gate	0	104
Total	7	917

NUTRIENTS

Possible sources of nutrients include runoff from residential and commercial areas due to landscaping activities and use of fertilizer for lawns and gardens, including organic debris. Activities such as washing cars, parking lots and driveways can contribute to nutrients pollutants in the MS4 since most of the detergents used contain phosphorus. Other sources of nutrients include food wastes, domestic animal waste; and human waste from areas inhabited by the homeless. These pollutants build up and are then washed into the waterways through the storm drain system when it rains. These kinds of loads are typically highest during the first major storm flush and even after extended periods of dry weather when pollutants have accumulated. Other major categories of nutrients sources include:

- Direct discharges from wastewater reclamation plants within the Los Angeles River. The three largest POTWs (Donald C. Tillman Water Reclamation Plant, Los Angeles Glendale Water Reclamation Plant, and Burbank Water Treatment Plant) constitute the major sources of nitrogen in the watershed[12].
- Golf courses – these are a major source of nutrients since fertilization activities and watering rates are generally much greater than the residential and commercial areas. The excess nutrients accumulated in the soils can be transported to waterways through excess irrigation or stormwater runoff. There are approximately 15 golf courses within the watershed area.

METALS

[12] LARWQCB (Los Angeles Regional Water Quality Control Board). 2003. *Total Maximum Daily Loads for Nitrogen Compounds and Related Effects.* California Regional Water Quality Control Board, Los Angeles Region, Los Angeles, CA.

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Heavy metals including copper, lead, and zinc are Category 1 pollutants in the Lower LAR Watershed. Although naturally occurring, concentrations of these metals are a concern in many watersheds because of potential industrial and urban discharges. These types of sources include Industrial General Permit (IGP) covered facilities, Construction General Permit (CGP) covered facilities, and other types of urban activities.

INDUSTRIAL GENERAL PERMIT ACTIVITIES

The types of facilities covered under the IGP have the potential for metal loads, in particular metal plating, transportation, scrap yards and recycling and manufacturing facilities.

According to the Storm Water Multiple Application and Report Tracking System (SMARTS) database, there are approximately 227 current active industrial permits within the watershed; and from 2002-2012 there have been approximately 287 combined, active/terminated, industrial permits. Approximately 141 violations were recorded on the SMARTS database for inspections conducted from 2002-2012. No further data is available to determine the kind of violations or the kind of pollutants these facilities contributed to.

Table 2-15: Active IGP Facilities as of May 1, 2014

Agency	Total
Downey	22
Lakewood	1
Long Beach	78
Lynwood	15
Paramount	40
Pico Rivera	12
Signal Hill	6
South Gate	53
Total	227

CONSTRUCTION GENERAL PERMIT ACTIVITIES

Discharges covered under the CGP also have the potential to contribute metals loading from construction sites. Sediment delivered from construction sites can contain metals from construction materials and heavy equipment. Additionally, metals can leach out of building materials and construction waste exposed to stormwater[13].

Pollutants sources from construction activities are not considered a major concern since the watershed is mainly built-out. However, according to the SMARTS database, there are approximately 78 current active constructions permits within the watershed; and from 2002-2012 there have been approximately 337 combined, active/inactive, construction permits. Approximately 28 violations were recorded on the SMARTS database for inspections conducted from 2002-2012. No further data is available to determine the kind of violations or the kind of pollutants these facilities contributed to.

[13] Raskin, L., M.J. Singer, and A. DePaoli. 2004. Final Report to the State Water Resources Control Board Agreement number 01-269-250. University of California, Davis, CA.

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Table 2-16: Active CGP sites as of May 1, 2014

Agency	Total
Downey	7
Lakewood	4
Long Beach	44
Lynwood	3
Paramount	2
Pico Rivera	9
Signal Hill	5
South Gate	4
Total	78

LAND USE ACTIVITIES

These include general wear and tear of automotive parts which can be a significant source of metals. For example, brake wear can release copper, lead, and zinc into the environment and this contributes to concentrations of metals in urban runoff. Motor oil and automotive coolants spills are another potential land use source of metals. Pesticides, algaecides, wood preservatives, galvanized metals, and paints used across the watershed can also contain these metals. In the watershed, sources for these heavy metals have been identified as automotive repair, maintenance, fueling, cleaning and painting locations, metal fabrication facilities, and transportation activities and facilities.

The fertilizers used for lawn and landscape maintenance are also a source of metals and organic chemicals. Fertilizers, herbicides, and pesticides contain metals such as cadmium, copper, mercury, zinc, lead, iron, and manganese, which are also distributed when applying fertilizers and pesticides.

TRASH

The major source of trash in the river results from litter, which is intentionally or accidentally discarded in watershed drainage areas. Transport mechanisms include storm drain, wind action and direct disposal. Several studies have shown that commercial operations generate more pollutants than residential operations, and as much as three times the amount generated from light industrial operations[14].

2.3.2 ROAD INFRASTRUCTURE SOURCES

Runoff from highways and roads carries a significant load of pollutants. Pollutants originate from cars, roadway degradation, and surrounding landscape. Typical contaminants associated with these include sediment, heavy metals, oils and grease, debris, fertilizers, and pesticides, among others[15]. The use and wear of cars is one of the most prevalent sources of roadway pollutants. A study found that cars are the leading source of metal loads in stormwater, producing over 50 percent of copper, cadmium, and zinc

[14] LARWQCB. 2007. Trash Total Maximum Daily Loads for the Los Angeles River Watershed. Los Angeles, CA.
[15] Caltrans (California Department of Transportation). 2003. Discharge characterization study report. California Department of Transportation, Sacramento, CA.

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loads[16]. Vehicle brake pads constitute the single largest source of copper[17]. Simultaneously, tires, and engine parts are also a significant source of metals pollutants; almost 50 percent of tire wear accounts for over 50 percent of the total cadmium and zinc loads[18]. Roadways can also be a source of nutrients because nutrients are found in fertilizers that are commonly applied.

Table 2-17: Typical Sources of Pollutants from Road Infrastructure[19]

Source	Cadmium	Chromium	Copper	Iron	Nickel	Lead	Zinc	PAHs	Nutrients	Synthetic Organic Chemicals
Gasoline	●		●			●	●			
Exhaust					●	●		●		●
Motor oil and grease				●	●	●	●	●		
Antifreeze	●	●	●	●		●	●	●		
Undercoating						●	●			
Brake Linings			●	●	●	●	●			
Tires	●		●			●	●	●		
Asphalt	●		●		●		●	●		
Concrete			●		●		●			
Diesel Oil	●	●				●	●			●
Engine wear				●	●	●	●			
Fertilizers, pesticides, and herbicides	●		●	●	●		●		●	●

2.3.3 ATMOSPHERIC DEPOSITION

Atmospheric deposition is the direct and indirect transfer of pollutants from the air to surface waters. Pollutants in the atmosphere deposit onto solid surfaces and can then be washed off by rain, becoming part of the stormwater runoff that reaches the watershed. Atmospheric deposition of pollutants can be a large source of contamination to surface waters. Typical pollutants associated with atmospheric deposition are metals, PAHs, PCBs, and, to a lesser extent, nutrients. These pollutants enter the atmosphere from point sources (i.e., industrial facility emitting metals into the air). A comparison of trace metal contributions from aerial deposition, sewage treatment plans, industrial activities, and power plants is shown in Table 2-18.

In addition to the trace metals, nutrients are also atmospherically deposited. The annual loading of nitrogen through atmospheric deposition in the Los Angeles River watershed is 5,559 tons per year, with 845 tons per year in the neighboring Ballona Creek watershed.[20]

16 Schueler, T., and H.K. Holland. 2000. The Practice of Watershed Protection. Center for Watershed Protection, Ellicott City.
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18 Davis A.P., M. Shokouhian, and S. Ni. 2001. Loading estimates of lead, copper, cadmium, and zinc in urban runoff from specific sources. Chemosphere.
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Table 2-18 Comparison of source annual loadings to Santa Monica Bay (metric tons/year)

Metal	Aerial Deposition	Non-Aerial Sources		
		Sewage Treatment Plants	Industrial	Power Plants
Chromium	0.5	0.6	0.02	0.14
Copper	2.8	16	0.03	0.01
Lead	2.3	<0.01	0.02	<0.01
Nickel	0.45	5.1	0.13	0.01
Zinc	12.1	21	0.16	2.4

2.3.4 SANITARY SEWERS AND SEPTIC SYSTEMS

Sanitary sewer systems and septic systems are potential sources of contaminants. Aging systems in need of repair or replacement, severe weather, improper system operation and maintenance (O&M), clogs, and root growth can contribute to sanitary sewer leaks and overflows. When sanitary sewers overflow or leak, they can release raw sewage into the environment, which can contain pollutants such as suspended solids, pathogenic organisms, toxic pollutants, oil and grease but in particular, high concentrations of bacteria and nutrients[19].

According to the Sanitary Sewer Overflow (SSO) database in the California Integrated Water Quality System (CIWQS), a total of 226 SSOs have been recorded within the watershed since 2006. Table 2-19 includes information on the total reported SSO discharges.

Table 2-19: Total number of SSOs and volume

Total SSOs	Total Volume (gal)
226	360,476

2.3.5 SUMMARY

Typical sources of these pollutants are summarized in Table 2-20.

[20] Lu, R., K. Schiff, S. Solzenbach, and D. Keith. 2004. *Nitrogen Deposition on Coastal Watersheds in the Los Angeles Region*. Southern California Coastal Water Research Project Annual Report. 2003-2004. pp. 73– 81.

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Table 2-20: Typical sources of pollutants

Potential Source	Pollutants				Key References
	Bacteria	Nutrients	Metals	TSS/ Turbidity	
NPDES Sources					
Residential land areas	●	●		●	1, 2, 3, 4, 5, 6, 7, 8, 9
Agricultural activities (i.e., animal operations, land applications)	●	●		●	7,8,9
Metallurgical industries/activities			●		7, 10
Construction activities			●	●	7, 9
Industrial/municipal activities	●		●		6, 11
POTW discharges			●		12
Landscaping, fertilizers		●			7, 9
Homeless encampments	●				13
Pet waste	●	●			9,
Wildlife	●				7, 1
Native geology		●	●		7, 1
Land surface erosion			●	●	7
Detergents		●			9
Car washing				●	7, 9
Road Infrastructure					
Transportation sources (i.e., copper brake pads, tire wear)			●		7, 9, 14, 15
Pavement erosion			●	●	7, 16
Atmospheric Deposition					
Industrial activities			●		7, 10
Construction activities			●		7, 9
Roofing			●		7
Resuspension of historic emissions in road dusts and soil particles			●		17
Land surface erosion		●			18
Sanitary Sewer and sanitary sewer overflows (SSOs)					
Sewer Leaks, SSOs, illicit discharges, septic systems	●	●		●	7, 5, 19
POTW discharges		●	●		12

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2: City of San Diego. 2009. Aerial Deposition Study, Phase III. Source Evaluation of TMDL Metals in the Chollas Creek Watershed. Final Report. San Diego, CA.

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4: San Diego County. 2011. 2009-2010 Urban Runoff Monitoring Annual Report. January 2011.

5: SDRWQCB (San Diego Regional Water Quality Control Board). 2010. Revised TMDL for Indicator Bacteria, Project I - Twenty Beaches and Creeks in the San Diego Region. Resolution No. R9-2010-0001.

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7: County of Los Angeles. 2010. Multi-pollutant TMDL Implementation Plan for the Unincorporated County Area of Los Angeles River Watershed. County of Los Angeles, Los Angeles, CA

8: City of San Diego. 2011. Mission Bay and La Jolla Watershed Urban Runoff Management Program. Fiscal Year 2010 Annual Report.

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9: USEPA (U.S. Environmental Protection Agency). 2011. Sanitary sewer overflows and peak flows.
10: San Diego County. 2011. 2010 Air Toxics "Hot Spots" Program Report for San Diego County. San Diego County, San Diego, CA
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16: Caltrans (California Department of Transportation). 2003. A Review of the Contaminants and Toxicity Associated with Particles in Stormwater runoff. August 2003.
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2.4 PRIORITIZATION

Section VI.C.5.a.iv of the MS4 Permit outlines factors that should be considered when developing the sequence of addressing pollutants of concern within the Lower LAR Watershed. Based on the source assessment analysis, Water Quality Priorities (WQPs) within the watershed have been determined based on the following:

HIGHEST WQPS: TMDLS

- TMDL pollutants with past due interim or final limits
- TMDL pollutants with interim and final limits that fall within the MS4 Permit term, or the time period: September 6, 2012 – October 25, 2017
- Pollutants that are in the same class as a TMDL pollutant

HIGH WQPS: OTHER RECEIVING WATER CONSIDERATIONS

- Pollutants on the 303(d) List for which MS4 discharges are a suspected source based on findings from the source assessment
- Pollutants that exceed receiving water limitations and the findings from the source assessment indicate the MS4 as a source (these pollutants will be evaluated based on monitoring data collected as part of the CIMP).

All Category 1 pollutants with TMDL compliance deadlines that are past due, or that fall within the MS4 Permit term are prioritized as a Highest WQP. In addition, pollutants that fall within the same class (as defined in Section 2.1) as a TMDL pollutant with a compliance deadline that is past due or falls within the MS4 Permit term are prioritized as a Highest WQP. All other pollutants that are associated with the MS4 (based on the Source Assessment in Section 2.3) are prioritized as a High WQP. Table 2-21 summarizes the WQPs for the watershed based on the criteria described above.

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Table 2-21: WQPs

Category	Class	Pollutant	Waterbody	Associated with MS4	Priority
Category 1	Trash	Trash	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
	Nutrients	Nitrogen Compounds	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
	Metals	Copper	Los Angeles River Estuary	Yes	Highest
		Lead	Los Angeles River Estuary	Yes	Highest
		Zinc	Los Angeles River Estuary	Yes	Highest
	Pesticides	DDT	Los Angeles River Estuary	Yes	Highest
		PCBs	Los Angeles River Estuary	Yes	Highest
	SVOC	PAHs	Los Angeles River Estuary	Yes	Highest
	Bacteria	Coliform & Enterococcus	Los Angeles River Estuary	Yes	High
	Metals	Cadmium	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
		Copper	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
		Lead	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
		Zinc	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
	Bacteria	e.Coli	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	High
Category 2	Metals	Aluminum	Los Angeles River Reach 1	UTD	Highest
		Selenium	Los Angeles River Reach 1 & 2	UTD	Highest
	Bacteria	Coliform and Enterococcus	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	High
	Pesticides	Chlordane	Los Angeles River Estuary	UTD	High
		Diazinon	Los Angeles River Reach 1	UTD	High
	Water Quality Indicators/ General	BMI	Compton Creek	UTD	High
		Cyanide	Los Angeles River Reach 1	UTD	High
		Oil	Los Angeles River Reach 2	Yes	High
		pH	Los Angeles River Reach 1, Compton Creek, and Rio Hondo Reach 1	UTD	High
		Toxicity	Los Angeles River Estuary, Rio Hondo Reach 1	Yes	High
		MBAS	Los Angeles River Reach 1 & 2	UTD	High
	Trash	Trash	Los Angeles River Estuary	Yes	Highest
Category 3	Metals	Mercury	Los Angeles River Reach 1	UTD	Highest
		Nickel	Los Angeles River Reach 1	UTD	Highest
		Thallium	Los Angeles River Reach 1, Los Angeles River Reach 2	UTD	Highest
	Water Quality Indicators/ General	Dissolved Oxygen	Los Angeles River Reach 1 & 2	UTD	High
		pH	Rio Hondo Reach 1	UTD	High

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	SVOC	Bis(2-ethylhexyl)phthalate	Los Angeles River Reach 1	UTD	High
		PAHs	Los Angeles River Reach 1 & 2	Yes	Highest
	Water Quality Indicators/ General	Chloride	Los Angeles River Reach 1 & 2, Rio Hondo Reach 1	UTD	High
		Cyanide	Rio Hondo Reach 1	UTD	High
	Pesticides	Chlorpyrifos	Compton Creek	UTD	High
		Diazinon	Rio Hondo Reach 1	UTD	High

UTD – Unable to determine at this time

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3 SELECTION OF WATERSHED CONTROL MEASURES

This chapter identifies Watershed Control Measures (WCMs) to implement through the Participating Agencies' jurisdictional stormwater management programs, and collectively on a watershed scale. The WCMs are structural and/or nonstructural controls designed with the following objectives:

- Prevent or eliminate nonstormwater discharges to the MS4 that are a source of pollutants from the MS4 to receiving waters.
- Implement pollutant controls necessary to achieve all applicable interim and final water quality-based effluent limitations and/or receiving water limitations pursuant to corresponding compliance schedules.
- Ensure that discharges from the MS4 do not cause or contribute to exceedances of receiving water limitations.

The goal is to create an efficient program that focuses individual and collective resources on water quality priorities (WQPs). The WCMs are categorized as

- Minimum Control Measures (MCMs),
- Nonstormwater Discharge (NSWD) Measures and
- Targeted Control Measures (TCMs), which are designed to achieve applicable water quality-based effluent limitations and receiving water limitations.

Each WCM category may be further categorized as either structural or nonstructural (nonstructural includes operation and maintenance procedures and pollution prevention measures) as well as either existing or proposed. Combined with Chapter 4 (RAA) and Chapter 5 (Compliance Schedules), the WMP includes the nature, scope and timing of implementation for each WCM and provides interim milestones for the WCMs to achieve TMDL compliance. Also included are the responsibilities of each Permittee.

3.1 STRATEGY FOR SELECTION AND IMPLEMENTATION OF WATERSHED CONTROL MEASURES

Pursuant to Part VI.C.1.a of the MS4 Permit (Part VII.C.1.a - LB Permit), the Watershed Group has developed customized strategies, control measures and BMPs to implement the requirements of the MS4 Permit. Addressing WQPs will be based on a multi-faceted strategy initially focused on source control, including total suspend solids (TSS) reduction and runoff reduction. If pollutants are not generated or released, they will not be available for transport to the receiving waters. In addition, if soils can be stabilized, sediment controlled, and dry-weather runoff and initial flushes of stormwater runoff eliminated or greatly reduced, the major transportation mechanisms will be eliminated or greatly reduced, and fewer pollutants will reach the receiving waters.

The Watershed Group is particularly focused on source control because major sources of many of the highest WQPs, such as copper, lead and zinc, are released into the atmosphere, resulting in widespread

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aerial deposition onto impervious surfaces in the Watershed. In addition, these pollutants are discharged directly onto streets, highways, parking lots, and driveways from motor vehicle components such as brakes, wheel weights, and tires. The Participating Agencies have concluded that the most cost-effective and long-lasting way to address WQPs is to develop and support state-wide or regional measures that will encourage or require, if necessary, product or material substitution at the manufacturing stage. This can be a complex and time-consuming process, but the payoff in water quality improvement can be tremendous.

For example, the recent efforts of the California Stormwater Quality Association (CASQA) and Sustainable Conservation that led to the passage of the SB 346 legislation is a milestone that will significantly reduce the level of copper in metropolitan area waters throughout the state. SB 346 requires incremental reduction in the amount of copper in vehicle brake pads, which constitute the single largest source of copper in metropolitan environments. Based on available information, which was largely developed through a lengthy collaboration among brake pad manufacturers, government agencies, and environmental groups in the Brake Pad Partnership, a preliminary estimate of copper runoff reduction due to this piece of legislation was developed[1]. The estimate examined three scenarios and determined a 45 - 60% reduction in copper in runoff could be attributed to reduction of its use in brake pads. Already in effect, new edge codes required on brake pads sold in California will provide information on copper content and a notice that on and after January 1, 2014 any motor vehicle brake friction materials sold in California must contain no more than 0.1 percent by weight of the following materials: cadmium and its compounds, chromium (VI) salts, lead and its compounds, mercury and its compounds, and asbestiform fibers.

In addition, the Department of Toxic Substances Control (DTSC) adopted new Safer Consumer Product Regulations that became effective October 1, 2013. These regulations contain a process for identifying and prioritizing Chemicals of Concern in Priority Products containing these constituents, as well as a process for eliminating or reducing the adverse impacts of Chemicals of Concern in Priority Products. It will apply to most consumer products placed into the stream of commerce in California. It specifically applies to adverse environmental impacts, including adverse water quality impacts, and it contains a petition process for identification and prioritization of chemicals and projects. CASQA, supported by Watershed Group, has started the process of conducting research and building a file of critical information to support the designation of zinc in tires as a future priority product/constituent combination.

As explained later in this chapter, many of the new requirements of the MS4 Permit also involve enhanced source control measures that will be implemented such as enhanced inspections programs and outfall screening measures. The *Targeted Control Measures* section of this chapter supplements these efforts with targeted source control measures such as incentives for irrigation control and upgraded street sweeping equipment, designed with the objective of achieving interim and final water quality-based effluent limitations and/or receiving water limitations.

[1] Based on the Los Cerritos Channel Watershed Group commissioned study, "Estimate of Urban Runoff Copper Reduction in Los Angeles County from the Brake Pad Copper Reductions Mandated by SB 346."

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In concert with these initial source control efforts, which constitute 10% of the load reduction in the RAA (higher reductions may be realized), structural controls will also be implemented. The MS4 Permit mandates implementation of structural LID BMPs for certain classes of new developments and roadway projects. In addition, the *Targeted Control Measures* section of this chapter describes supplemental targeted structural BMPs. These structural controls are used to meet the load reduction requirements and structural BMP capacities for each participating agency as noted in Chapter 4 (the RAA) following the schedules provided for each agency in Chapter 5 (Compliance Schedules).

3.2 MINIMUM CONTROL MEASURES

The Minimum Control Measures (MCMs) are baseline WCMs required for all Permittees. The MCMs are defined in the MS4 Permit (excluding modifications set forth in an approved WMP) and are generally implemented individually by each Permittee. The objectives of the MCMs are to 1) result in a significant reduction in pollutants discharged into receiving waters and 2) satisfy the requirements of 40 CFR §122.26(d)(2)(iv). The MCMs are separate from Targeted Control Measures, which are developed by the Watershed Group and included in the WMP to specifically address WQPs.

The MS4 Permit allows the modification of several MCMs programs, so long as the modified actions are set forth in the approved WMP and are consistent with 40 CFR §122.26(d)(2)(iv). The modifications are based on an assessment to identify opportunities for focusing resources on WQPs. The term "modifications" refers only to instances where language from the MS4 Permit MCM provisions is removed and/or replaced. Any control measures that are strictly enhancements of the existing programs (i.e. do not conflict with the MS4 Permit MCM provisions) are included in the separate category of Targeted WCMs.

The following sections include a summary of the assessment of each MCM program as well as a determination as to whether each Participating Agency will implement the MCM provisions 1) as explicitly stated in the corresponding section of the MS4 Permit or 2) with modifications to focus resources on WQPs. Independent of the determinations made, the Agencies may consider additional MCM modifications through the Adaptive Management Process. Implementation of the MCMs will follow the approval of this WMP by the Regional Board Executive Officer following MS4 Permit §VI.D.1.b (LB Permit - §VII.D.1.ii).

3.2.1 LOS ANGELES COUNTY FLOOD CONTROL DISTRICT MINIMUM CONTROL MEASURES

The LACFCD will implement the MCMs as defined from §VI.D.1 to §VI.D.4 of the MS4 Permit. See Appendix A-3-4 for additional information.

3.2.2 ASSESSMENT OF MINIMUM CONTROL MEASURES (CITIES ONLY)

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Pursuant to MS4 Permit §VI.C.5.b.iv.(1).(a) (LB Permit - §VII.C.5.h.i), the following section is an assessment of the MS4 Permit MCMs, intended to identify opportunities for focusing resources on WQPs.

3.2.2.1 DEVELOPMENT CONSTRUCTION PROGRAM

ASSESSMENT

Although controlling sediment is not a WQP, the reduction of sediment through an effective Development Construction Program will address WQPs. This is because sediment mobilizes other pollutants, including many of the WQP pollutants. As such the Development Construction Program is an integral component of each City's jurisdictional stormwater management program.

Compared to the prior MS4 Permit, the current Permit expands the provisions for the Development Construction Program. This expansion includes additional or enhanced requirements for plan review, site tracking, inspection frequencies, inspection standards, BMP implementation and employee training. If implemented effectively, these enhancements will aid in the control of sediment within the Watershed, and consequently, will address WQPs. As such, no modifications to the provisions of the Development Construction Program have been identified.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.8 of the MS4 Permit (§VII.D.K of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.2 INDUSTRIAL/COMMERCIAL FACILITIES PROGRAM

ASSESSMENT

The MS4 Permit provisions for the Industrial/Commercial Facilities Program provide opportunities for customization to address WQPs. Specifically, §VI.D.6.e.i.4 (§VII.D.G.5.i.4 - LB Permit) states that industrial inspection frequencies may be modified through the WMP development process. The Cities propose modifying the inspection frequencies of both industrial and commercial facilities based on a facility prioritization scheme that considers WQPs. For example, facilities that are deemed to have a high potential to discharge metals (a WQP pollutant) may be prioritized as "High" and inspected more frequently while facilities that have a small likelihood to adversely impact WQPs may be prioritized as "Low" and inspected less frequently.

DETERMINATION

Sections VI.D.6.d and VI.D.6.e of the MS4 Permit (Sections VII.D.G.4 and VII.D.G.5 of the LB Permit) will be replaced with the language in Table 3-3, which is located in the following *New Fourth Term Permit MCMs* section of this chapter and is identified as MCM-ICF-3.

In order to provide clarity to the Cities, one combined guidance document has been prepared for the Program, with the prioritization and revised inspection frequencies included – see Appendix A-3-1. The

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document is also intended to assist the Cities in the development and implementation of a jurisdictional program.

3.2.2.3 ILLICIT CONNECTION AND ILLICIT DISCHARGES ELIMINATION PROGRAM

ASSESSMENT

The purpose of the Illicit Connection and Illicit Discharges Elimination (ICID) Program is to detect, investigate and eliminate IC/IDs to the MS4. In order to address WQPs, a potential modification to MS4 Permit provisions would be the inclusion of a proactive approach for the detection of illicit discharges. However such an approach will be addressed through nonstormwater outfall based screening monitoring as outlined in the MRP. Also, such activities do not conflict with the MS4 Permit provisions for an IC/ID Program, and as such would be classified as a Targeted Control Measure. As such there is no need to modify the base provisions of the program.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.10 of the MS4 Permit (§VII.D.M of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.4 PLANNING AND LAND DEVELOPMENT PROGRAM

ASSESSMENT

Following MS4 Permit §VI.C.5.b.iv.1.a (LB Permit - §VII.C.5.h.i.), the Planning and Land Development Program was not assessed for potential modifications.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.7 of the MS4 Permit (§VII.D.J of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.5 PUBLIC AGENCY ACTIVITIES PROGRAM

ASSESSMENT

The Public Agency Activities Program is divided into several sub-programs. Many of the MS4 Permit provisions within the sub-programs consist of baseline BMPs that do not suggest modification. The sub-programs that do suggest a prioritized approach – such as street sweeping and catch basin cleaning frequencies – already provide this opportunity (frequencies are based on a City's assessment of trash and debris generation). The Public Facility Inventory sub-program also provides a prioritization opportunity, based on the tracking data obtained for each facility. However, since these facilities are not subject to regular "public agency" inspections as in the Industrial/Commercial Facilities Program, there is little utility in incorporating such a prioritization. The provisions of the public construction activities sub-program are considered an integral component of the jurisdictional stormwater program, for the

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reasons explained in the assessment of the Development Construction Program provisions. In summary there is no need to modify the MS4 Permit provisions of the program.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.9 of the MS4 Permit (§VII.D.L of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.6 PUBLIC INFORMATION AND PARTICIPATION PROGRAM

ASSESSMENT

The MS4 Permit allows a City to implement the requirements of the Public Information and Participation Program (PIPP) 1) by participating in a County-wide effort, 2) by participating in a Watershed Group effort, 3) individually within its jurisdiction or 4) through a combination of these approaches. The Cities will implement the PIPP following a combination of approaches. Consequently some clarifications of the MS4 Permit provisions are necessary.

In terms of modifications to address WQPs, the MS4 Permit provisions for the PIPP are not particularly prescriptive, thus allowing the Cities the flexibility to focus efforts on WQPs through the development of the program. As such, there is no need to modify the MS4 permit provisions of the program.

DETERMINATION

The table below provides clarification on elements of the MS4 Permit provisions for the PIPP:

Permit section	Clarification
§VI.D.5.c.(i) - MS4 Permit §VII.D.F.3.i - LB Permit Public Participation	Each City will participate in a County-wide sponsored PIPP to provide a means for public reporting of clogged catch basin inlets and illicit discharges/dumping, faded or missing catch basin labels, and general stormwater and nonstormwater pollution prevention information.
§VI.D.5.d - MS4 Permit §VII.D.F.4- LB Permit Residential Outreach Program	Each City will work in conjunction with a County-wide sponsored PIPP to implement the Residential Outreach Program. Elements of the program that will not be administered or implemented as a county-wide effort (currently the provision to provide educational materials to K-12 school children) will be addressed individually by each City or jointly on a watershed level. Through the adaptive management process, PIPP participation may develop into a watershed group or individual effort, or some combination of these approaches.

In order to provide clarity to the Cities, one combined guidance document has been prepared for the Program, with the approach for each provision (i.e. joint or individual effort) included – see Appendix A-3-1. The document is also intended to assist the Cities in the development and implementation of a jurisdictional program.

3.2.2.7 PROGRESSIVE ENFORCEMENT AND INTERAGENCY COORDINATION

ASSESSMENT

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Following MS4 Permit §VI.C.5.b.iv.1.a (LB Permit - §VII.C.5.h.i), the Progressive Enforcement and Interagency Coordination Program was not assessed for potential modifications.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.2 of the MS4 Permit (§VII.D.2 of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.3 THIRD TERM MS4 PERMIT MINIMUM CONTROL MEASURES

Until the WMP is approved by the Executive Officer of the Regional Board, the MCM provisions of the prior third term MS4 permit continue to be implemented by the participating agencies. Some of the MCMs of the current MS4 Permit are relatively unchanged carry-overs from the prior third term permit. The remaining MCMs are either enhancements of the third term MCMs or entirely new provisions. These new and enhanced fourth term MCMs are described in the following section.

3.2.4 NEW FOURTH TERM MS4 PERMIT MINIMUM CONTROL MEASURES (CITIES ONLY)

Part VI.D of the MS4 Permit and Part VII.D of the LB Permit (the MCM provisions) introduces many new provisions and program elements to be developed and incorporated within each participating agency's jurisdictional stormwater program. This section briefly describes the new and enhanced MCMs required for the Cities (City MCMs), excluding those required for the LACFCD in §VI.D.4. An MCM is considered new if it was not required by the prior MS4 Permit and is considered enhanced if it is an enhancement of a related provision of the prior MS4 Permit.

The details of each provision may be found in the relevant sections of the MS4 Permit, which are included. Unless an alternate date is provided in the MS4 Permit or in this section, the adoption date for the City MCMs coincides with the approval of the WMP by the Regional Board's Executive Officer.

3.2.4.1 STRUCTURAL CONTROLS

The new and enhanced MCMs consist primarily of nonstructural control measures, with the marked exception of the Planning and Land Development provisions, described as follows.

LID AND HYDROMODIFICATION

MS4 Permit §VI.D.7 (LB Permit §VII.D.J)

The LID and hydromodification provisions of the Planning and Land Development program are a significant enhancement from the prior MS4 Permit. The implementation of structural LID BMPs at new developments throughout the watershed will appreciably decrease the effective impervious area, reducing flow and, consequently, pollutant loads. The program is unique in that it will increase in effectiveness over time as more and more existing developments are redeveloped and bound to the LID/hydromodification requirements.

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TRASH EXCLUDER INSTALLATION

MS4 Permit §VI.D.9.h.vii.(1) (LB Permit §VII.D.L.8. vii.(1))

In areas that are not subject to a trash TMDL, the Public Agency Activities Program includes a requirement to install excluders (or equivalent devices) on or in Priority A (MS4 Permit §VI.D.9.h.iii.(1)), LB Permit §VII.D.L.8. iii.(1)) area catch basins or outfalls to prevent the discharge of trash to the MS4. For LA MS4 Permittees, the deadline is no later than four years after the effective date of the Permit. This provision may be supplanted by the statewide trash amendments, which in their current draft iteration include the installation of full-capture devices in the priority land use areas of high density residential, industrial, commercial, mixed urban and public transportation stations as a compliance route.

3.2.4.2 NONSTRUCTURAL CONTROLS

Table 3-2 lists the new and enhanced nonstructural City MCMs as well as the new and enhanced NSWD measures. The BMP effectiveness from Table 3-2 is based on similar BMPs listed in Tetra Tech's Comprehensive Load Reduction Plan (CLRP) for Chollas Creek Watershed in San Diego County, 2012. The correlation of BMP effectiveness with WQPs is based on Table 3-1. The pages following Table 3-2 describe each of the listed controls.

Table 3-1 Pollutant Category versus Water Quality Classification

Waterbody-pollutant classification	Type of pollutant								
	Bacteria	Metals	Organics	Sediment	Pesticides	Nutrients	Oil and grease	Dissolved minerals	Trash
Category 1	✗	✗	✗		✗	✗			✗
Category 2	✗	✗	✗		✗	✗			✗
Category 3		✗	✗					✗	

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Table 3-2: New Fourth Term MS4 Permit Nonstructural MCMs (Cities only) and NSWDs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency								
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Flood Control	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
		Planning and Land Development														
1	MCM-PLD-1	Amend development regulations to facilitate LID implementation	◆	◆	◈	◆	◆	✗	✗	✗	✗	✗	--	✗	✗	✗
2	MCM-PLD-2	Post-construction BMP tracking, inspections and enforcement	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
		Existing Development														
3	MCM-ICF-1	Increase in facility types inspected and number of inspections conducted	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
4	MCM-ICF-2	Business assistance program and BMP notification	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
5	MCM-ICF-3 (TCM-ICF-1)	Prioritize facilities/inspections based on water quality priorities	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
		Construction														
6	MCM-DC-1	Enhanced plan review program	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
7	MCM-DC-2	Enhanced inspection standards and BMP requirements	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	--	✗	✗	✗

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Table 3-2: New Fourth Term MS4 Permit Nonstructural MCMs (Cities only) and NSWDs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency								
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Flood Control	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
8	MCM-DC-3	Increased inspection frequencies	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	- -	✗	✗	✗
9	MCM-TRA-1	Enhanced staff training program	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	- -	✗	✗	✗
		Illicit Discharge Detection/Elimination														
10	MCM-ICID-1	Enhanced IC/ID enforcement and written procedures	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗	✗
11	NSWD-1	Outfall screening and source investigations	◈	◈	◈	◈	◆	✗	✗	✗	✗	✗	✗	✗	✗	✗
12	MCM-TRA-1	Enhanced staff/contractor training	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗	✗
		Dry weather runoff reduction														
13	NSWD-1	Outfall screening and source investigations	◈	◈	◈	◈	◆	✗	✗	✗	✗	✗	✗	✗	✗	✗
14	NSWD-2	Enhanced conditions for NSWDs, including irrigation reduction	◆	◆	◈	◆	◆	✗	✗	✗	✗	✗	✗	✗	✗	✗
		Public Information and Participation														

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Table 3-2: New Fourth Term MS4 Permit Nonstructural MCMs (Cities only) and NSWDs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency								
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Flood Control	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
15	MCM-PIP-1	Stormwater resources on City website	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
		Public Agency Activities														
16	MCM-PAA-1	Enhanced BMP requirements for fixed facility/field activities	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
17	MCM-PAA-2	Reprioritization of catch basins and clean-out frequencies	◆	◆	◆	◆	◇	✗	✗	✗	✗	✗	--	✗	✗	✗
18	MCM-PAA-3	Integrated Pest Management Program	◈	◈	◈	◇	◇	✗	✗	✗	✗	✗	--	✗	✗	✗
19	MCM-PAA-4	Enhanced measures to control infiltration from sanitary sewers	◆	◆	◇	◇	◇	✗	✗	✗	✗	✗	--	✗	✗	✗
20	MCM-PAA-5	Inspection and maintenance of Permittee owned treatment controls	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
21	MCM-TRA-1	Enhanced inspector/staff training	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗

✗ – To be implemented by agency within current MS4 Permit term. MCM – Minimum Control Measure. NSWD – Nonstormwater discharge measure.

◆ Primary pollutant reduction ◈ Secondary pollutant reduction ◇ Pollutant not addressed

BMP effectiveness ratings based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012.

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ENHANCED STAFF/CONTRACTOR TRAINING PROGRAMS ***MCM-TRA-1***

MS4 Permit §VI.D.7.d.iv.(b), §VI.D.8.l, §VI.D.9.k, §VI.D.10.f (LB Permit §VII.D.J.5.iv.(b), §VII.D.K.xiv, §VII.D.L.11, §VII.D.M.6)

Measures introduced:

- Prescriptive staff training requirements to the Development Construction, Illicit Connections and Illicit Discharges Elimination and Public Agency Activities Programs. For example, relevant staff involved with the Construction Program must be knowledgeable in procedures consistent with the State Water Board sponsored Qualified SWPPP Practitioner/Developer (QSP/QSD) program.
- Inspections of structural BMPs under the Planning and Land Development Program must be conducted by trained personnel.
- Outside contractors are bound to the same training standards as in-house staff

These new and enhanced provisions will increase the overall effectiveness of the jurisdictional stormwater management programs (JSWMPs).

AMEND DEVELOPMENT REGULATIONS TO FACILITATE LID IMPLEMENTATION ***MCM-PLD-1***

MS4 Permit §VI.C.4.c.i, §VI.D.7.d.i (LB Permit §VII.C.4.c.i, §VII.D.J.5.i)

The participating agencies have developed and adopted LID ordinances and Green Street Policies. These measures will facilitate LID implementation.

POST-CONSTRUCTION BMP TRACKING, INSPECTIONS AND ENFORCEMENT ***MCM-PLD-2***

MS4 Permit §VI.D.7.d.iv (LB Permit §VII.D.J.5.iv)

The Cities must track post-construction BMPs, conduct BMP verification and maintenance inspections and follow the Progressive Enforcement Policy in cases of non-compliance. This will improve the effectiveness of the Planning and Land Development program.

INCREASE IN FACILITY TYPES INSPECTED AND NUMBER OF INSPECTIONS CONDUCTED ***MCM-IFC-1***

MS4 Permit §VI.D.6.d, §VI.D.6.e (LB Permit §VII.D.G.4, §VII.D.G.5) also affected by NPDES No. CAS000001, the State Water Resources Control Board's (SWRCB) Industrial General Permit (IGP)

Measures introduced:

- Inspect nurseries and nursery centers
- Perform follow-up *No Exposure Verification* inspections for at least 25% of industries that have filed a *No Exposure Certification (NEC)*
- Inspect light industrial facilities. Under the SWRCB's IGP adopted in April 1, 2014, light industries previously excluded from coverage under the IGP must now obtain coverage. Light industry is defined as SICs 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39 and 4221-4225. This includes facilities ubiquitous

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in industrial zones such as warehouses and machine shops. Although many of these facilities will likely qualify for the NEC, the type and number of facilities requiring inspection under the MS4 Permit will still increase.

These new and enhanced measures will increase the effectiveness of the Industrial/Commercial Facilities Program.

BUSINESS ASSISTANCE PROGRAM AND BMP NOTIFICATION ***MCM-IFC-2***

MS4 Permit: §VI.D.6.c (LB Permit §VII.D.G.3)

Measures introduced:

- Notify industrial/commercial owner/operators of applicable BMP requirements.
- Implement a Business Assistance Program to provide technical information to businesses to facilitate their efforts to reduce the discharge of pollutants in stormwater. The business assistance program described in the prior LA MS4 Permit was an optional provision.

These new and enhanced measures will increase the effectiveness of the Industrial/Commercial Facilities Program.

PRIORITIZE FACILITIES/INSPECTIONS BASED ON WATER QUALITY PRIORITIES ***MCM-IFC-3 (TCM-ICF-1)***

MS4 Permit: Modified MCM (replaces §VI.D.6.d, §VI.D.6.e), LB Permit: (replaces §VII.D.G.4, §VII.D.G.5)

A program has been developed to prioritize industrial/commercial facilities based on their potential to adversely impact WQPs. The resulting prioritization scheme determines the inspection frequency, replacing the uniform inspection frequency provided in the MS4 Permit. This allows Cities to concentrate efforts on WQPs. Sections VI.D.6.d and VI.D.6.e of the MS4 Permit (Sections VII.D.G.4 and VII.D.G.5 of the LB Permit) will be replaced with the language presented in Table 3-3.

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TABLE 3-3

REPLACES §VI.D.6.D AND §VI.D.6.E OF THE MS4 PERMIT
***REPLACES*§VII.D.G.4 AND §VII.D.G.5 OF THE LB PERMIT**

MS4 PERMIT VI.D.6.d (LB Permit VII.D.G.4) Prioritize Critical Industrial/Commercial Sources

MS4 Permit VI.D.6.d.i (LB Permit VII.D.G.4.i) Prioritization Method

Prioritizing facilities by potential water quality impact provides an opportunity to optimize the effectiveness of the Industrial/Commercial Facilities Program and to focus efforts on water quality priorities. The inventory fields in Part VI.D.6.b.ii (VII.D.G.2.i) provide information that allows for such a facility prioritization. Based on these fields, Figure ICF-1 establishes a method for each City to prioritize all industrial/commercial facilities into three tiers – High, Medium and Low. A City may follow an alternative prioritization method provided it results in a similar three-tiered scheme.

Prioritization factors

Factor	Description
A	Status of exposure of materials and industrial/commercial activities to stormwater
B	Identification of whether the facility is tributary to a waterbody segment with impairments[2] for pollutants that are also generated by the facility
C	Other factors determined by the City, such as size of facility, presence of exposed soil or history of stormwater violations

Utilizing these factors, follow steps 1, 2 and 3 below:

1. Collect necessary information to evaluate factors

Factor	Initial method	Subsequent method
A	Satellite imagery	Results of stormwater inspection
B	Cross reference Table 4 or Table 5* with tributary TMDL/ 303(d) pollutants	Cross reference inspection results with tributary TMDL/ 303(d) pollutants
C	Varies	

* See pages 9 and 10 of Appendix A-3-1 ICF (guidance for the Industrial/Commercial Facilities Program)

2. Evaluate factors

Factor	Result	Score
	Low or no exposure	0
A	Moderate exposure	½
	Significant exposure	1
B	No**	0
	Yes***	1
	Low	0
C	Medium	½
	High	1

** No pollutant generation/impairment matches
*** ≥ 1 pollutant generation/impairment matches

3. Prioritize facilities

		C Score		
		0	**½**	**1**
A×B Score	**0**	Low	Medium	High
	½	Medium	High	High
	1	High	High	High

This method serves only as a guide to prioritization. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C.

Figure ICF-1: Industrial/Commercial Facility Prioritization Scheme

Step 3 in Figure ICF-1 may also be expressed by the relationships $A \cdot B + C \geq 1 \rightarrow$ High, $1 > A \cdot B + C > 0 \rightarrow$ Medium

[2] CWA §303(d) listed or subject to a TMDL

TABLE 3-3

REPLACES §VI.D.6.D AND §VI.D.6.E OF THE MS4 PERMIT
***REPLACES*§VII.D.G.4 AND §VII.D.G.5 OF THE LB PERMIT**

and A·B + C = 0 → Low. The purpose of multiplying A and B is to scale the impact of the presence of the pollutants at a facility (B) by the likelihood that they will be discharged to the MS4 (A). Factor C quantifies water quality concerns that are independent of A or B and as such is incorporated through addition. The purpose of this numerical approach is to provide consistency to the prioritization process. It is intended solely as a guide. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C as listed in Figure ICF-1.

MS4 Permit VI.D.6.d.i.(1), (LB Permit VII.D.G.4.(1)), Prioritization Condition
The following condition will be met during the prioritization process: ***The total number of low priority facilities is less than or equal to 3 times the number of high priority facilities***. This condition is applied to maintain a minimum inspection frequency as explained in Section VI.D.6.e.i.

MS4 Permit VI.D.6.d.i.(2), (LB Permit VII.D.G.4.(2)), Prioritization Frequency
The default priority for a facility is Medium. Prioritization and reprioritization may be conducted at any time based on the discretion of the City. Figure ICF-2 is a flowchart of the prioritization process.

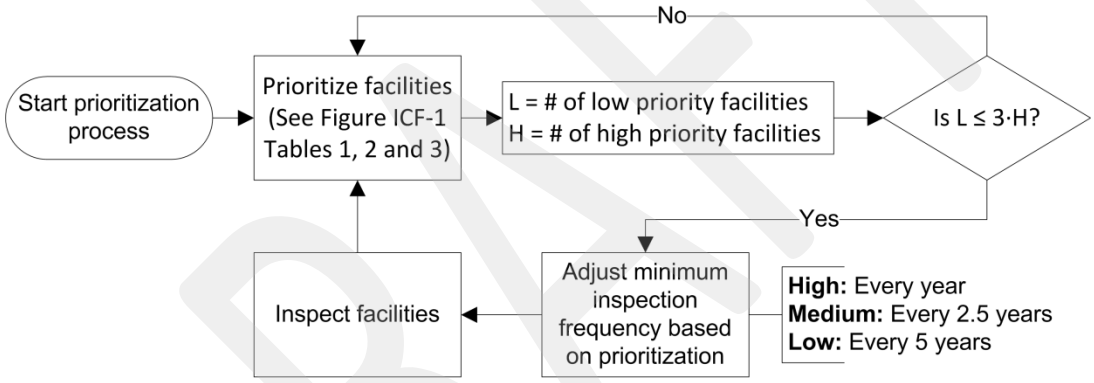


Figure ICF-2

MS4 Permit VI.D.6.e (LB Permit VII.D.G.5) Inspect Critical Industrial/Commercial Sources

MS4 Permit VI.D.6.e.i (LB Permit VII.D.G.5.i) Frequency of Industrial/Commercial Inspections
Following the facility prioritization method in Part VI.D.6.d.i, each City will inspect high priority facilities annually, medium priority facilities semi-quinquennially (once every 2.5 years) and low priority facilities quinquennially (once every five years). The frequencies may be altered by the exclusions defined in Part VI.D.6.e.i.(1). The condition in Part VI.D.6.d.i.(1) ensures at least the same average number of inspections conducted per year as the semi-quinquennial frequency defined in the MS4 Permit.

Each City will conduct the first compliance inspection for all industrial/commercial facilities within one year of the approval of their Watershed Management Program by the Executive Officer. A minimum interval of six months between the first and the second mandatory compliance inspection is required.

MS4 Permit VI.D.6.e.i.(1) (LB Permit VII.D.G.5.i(1)) Exclusions to the Frequency of Industrial Inspections

MS4 Permit VI.D.6.e.i.(1).(a) (LB Permit VII.D.G.5.i(1).(a)) Exclusion of Facilities Previously Inspected by the Regional Water Board
Each City will review the State Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS) database at defined intervals to determine if an industrial facility has recently been inspected by the

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TABLE 3-3

REPLACES §VI.D.6.D AND §VI.D.6.E OF THE MS4 PERMIT
***REPLACES*§VII.D.G.4 AND §VII.D.G.5 OF THE LB PERMIT**

Regional Water Board. The first interval will occur approximately 2 years after the effective date of the Order. The City does not need to inspect the facility if it is determined that the Regional Water Board conducted an inspection of the facility within the prior 24 month period. The second interval will occur approximately 4 years after the effective date of the Order. Likewise, the City does not need to inspect the facility if it is determined that the Regional Water Board conducted an inspection of the facility within the prior 24 month period.

MS4 Permit VI.D.6.e.i.(1).(b) (LB Permit VII.D.G.5.i(1).(b)) No Exposure Verification

As a component of the first mandatory inspection, each City will identify those facilities that have filed a No Exposure Certification with the State Water Board. Approximately 3 to 4 years after the effective date of the Order, each City will evaluate its inventory of industrial facilities and perform a second mandatory compliance inspection at a minimum of 25% of the facilities identified to have filed a No Exposure Certification. The purpose of this inspection is to verify the continuity of the no exposure status.

MS4 Permit VI.D.6.e.ii (LB Permit VII.D.G.5.ii) Scope of Industrial/Commercial Inspections

MS4 Permit VI.D.6.e.ii.(1) (LB Permit VII.D.G.5.ii.(1) Scope of Commercial Inspections

Each City will inspect all commercial facilities to confirm that stormwater and nonstormwater BMPs are being effectively implemented in compliance with municipal ordinances. At each facility, inspectors will verify that the operator is implementing effective source control BMPs for each corresponding activity. Each City will require implementation of additional BMPs where stormwater from the MS4 discharges to a significant ecological area (SEA), a water body subject to TMDL provisions in Part VI.E, or a CWA §303(d) listed impaired water body. Likewise, for those BMPs that are not adequately protective of water quality standards, a City may require additional site-specific controls.

MS4 Permit VI.D.6.e.ii.(2) (LB Permit VII.D.G.5.ii.(2) Scope of Industrial Inspections

Each City will confirm that each industrial facility:

a) Has a current Waste Discharge Identification (WDID) number for coverage under the Industrial General Permit, and that a Stormwater Pollution Prevention Plan (SWPPP) is available on-site; or
b) Has applied for, and has received a current No Exposure Certification for facilities subject to this requirement;
c) Is effectively implementing BMPs in compliance with municipal ordinances. Facilities must implement the source control BMPs identified in Table 10, unless the pollutant generating activity does not occur. The Cities will require implementation of additional BMPs where stormwater from the MS4 discharges to a water body subject to TMDL Provisions in Part VI.E, or a CWA §303(d) listed impaired water body. Likewise, if the specified BMPs are not adequately protective of water quality standards, a City may require additional site-specific controls. For critical sources that discharge to MS4s that discharge to SEAs, each City will require operators to implement additional pollutant-specific controls to reduce pollutants in stormwater runoff that are causing or contributing to exceedances of water quality standards.
d) Applicable industrial facilities identified as not having either a current WDID or No Exposure Certification will be notified that they must obtain coverage under the Industrial General Permit and will be referred to the Regional Water Board per the Progressive Enforcement Policy procedures identified in Part VI.D.2 of the MS4 Permit (Part VII.D.2 of the LB Permit).

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ENHANCED PLAN REVIEW PROGRAM ***MCM-DC-1***

MS4 Permit: §VI.D.8.h, §VI.D.8.i (LB Permit: §VII.D.K.x, §VII.D.K.xi)

In general the MS4 Permit introduces provisions that conform to the SWRCB's Construction General Permit. For construction sites one acre or greater, measures include the following:

- Construction activity operators must submit Erosion and Sediment Control Plans (ESCPs) prior to grading permit issuance, developed and certified by a QSD to SWPPP standards.
- Operators must propose minimum BMPs that meet technical standards. The cities must provide these standards.
- Develop procedures and checklists to review and approve relevant construction plans.

These new and enhanced measures will increase the effectiveness of the Development Construction Program, which in turn is expected to reduce TSS loading into the MS4. TSS reduction is an integral component in addressing WQPs.

ENHANCED INSPECTION STANDARDS/BMP REQUIREMENTS AT CONSTRUCTION SITES ***MCM-DC-2***

MS4 Permit: §VI.D.8.d, §VI.D.8.i, §VI.D.8.j (LB Permit: §VII.D.K.vi, §VII.D.K.xi, §VII.D.K.xii)

Measures introduced:

- Ensure BMPs from the ESCPs are properly installed and maintained.
- Ensure the minimum BMPs for sites less than one acre are installed and maintained.
- Develop and implement standard operating procedures for City stormwater inspections of construction sites.
- Require activity-specific BMPs for paving projects.

These new and enhanced measures will increase the effectiveness of the Development Construction Program, which in turn is expected to reduce TSS loading into the MS4. TSS reduction is an integral component in addressing WQPs.

INCREASED INSPECTION FREQUENCIES ***MCM-DC-3***

MS4 Permit: §VI.D.8.j (LB Permit: §VII.D.K.xii)

The inspection frequency for construction sites one acre or more has significantly increased. The prior LA MS4 Permit required a minimum of one inspection during the rainy season. The current MS4 Permit requires monthly inspections year-round, as well as mandatory inspections based on the phase of construction. This enhanced measure will increase the effectiveness of the Development Construction Program, which in turn is expected to reduce TSS loading into the MS4. TSS reduction is an integral component in addressing WQPs.

ENHANCED IC/ID ENFORCEMENT AND WRITTEN PROGRAM PROCEDURES ***MCM-ICID-1***

MS4 Permit: §VI.D.2, §VI.D.10; LB Permit: §VII.D.2 , §VII.D.M

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Measures introduced:

- Develop and implement a Progressive Enforcement Policy that applies to the IC/ID Elimination, Development Construction, Planning and Land Development and Industrial/Commercial Facilities Programs. The Progressive Enforcement Policy is an augmentation of the policy listed in the prior LA MS4 Permit, which was restricted to the Industrial/Commercial Facilities Program.
- Maintain written procedures for receiving complaints, conducting investigations and responding to spills.

These new and enhanced measures will increase the effectiveness of the IC/ID Elimination program, as well as the related enforcement components of the Development Construction, Planning and Land Development and Industrial/Commercial Facilities Programs.

STORMWATER RESOURCES ON CITY WEBSITE ***MCM-PIP-1***

MS4 Permit: §VI.D.5.d.i.(4) (LB Permit: §VII.D.F.4.i.(4))

Measures introduced:

- The MS4 Permit introduces a requirement to maintain a stormwater webpage or provide links to stormwater websites via the City's website. The website (in-house or linked) will include:
  - Educational material and
  - Opportunities for the public to participate in stormwater pollution prevention and clean-up activities.

ENHANCED BMP REQUIREMENTS FOR FIXED FACILITY/FIELD ACTIVITIES ***MCM-PAA-1***

MS4 Permit: §VI.D.9.e (LB Permit: §VII.D.L.5)

Measures introduced:

- Implement effective source control BMPs for 65 specific pollutant-generating activities such as mudjacking, shoulder grading and spall repair.
- Contractually require hired contractors to implement and maintain the activity specific BMPs. Conduct oversight of contractor activities to ensure the BMPs are implemented and maintained.

These new and enhanced measures will increase the effectiveness of the Public Agency Activities program.

REPRIORITIZATION OF CATCH BASINS AND CLEAN-OUT FREQUENCIES ***MCM-PAA-2***

MS4 Permit: §VI.D.9.h.iii (LB Permit: §VII.D.L.8.iii)

In areas not subject to a trash TMDL, measures introduced include the following:

- Determine priority areas and update the map of catch basins with GPS coordinates and priority.
- Include the rationale or data to support the priority designations.

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These new and enhanced measures will increase the effectiveness of the Public Agency Activities program.

INTEGRATED PEST MANAGEMENT PROGRAM

MCM-PAA-3

MS4 Permit: §VI.D.9.g (LB Permit: §VII.D.L.7)

The MS4 Permit introduces entirely new, prescriptive requirements to implement an Integrated Pest Management (IPM) Program for public agency activities and at public facilities. These requirements include adopting and verifiably implementing policies, procedures and/or ordinances that support the IPM program. Intertwined with the IPM provisions are additional requirements to control and minimize the use of fertilizers. These new and expansive measures will increase the effectiveness of the Public Agency Activities program and address WQPs.

ENHANCED MEASURES TO CONTROL INFILTRATION FROM SANITARY SEWERS

MCM-PAA-4

MS4 Permit: §VI.D.9.ix (LB Permit: §VII.D.L.ix)

The MS4 Permit introduces specific requirements to control infiltration from the sanitary sewer into the MS4. The measures include adequate plan checking, preventative maintenance, spill response, enforcement, interagency coordination and staff/contractor education. The requirements may be fulfilled through implementation of a Sewer System Management Plan in accordance with the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.

INSPECTION AND MAINTENANCE OF PERMITTEE OWNED TREATMENT CONTROLS

MCM-PAA-5

MS4 Permit: §VI.D.9.x (LB Permit: §VII.D.L.x)

The MS4 Permit introduces requirements to implement an inspection and maintenance program for all Permittee owned treatment control BMPs, including post-construction treatment control BMPs. This measure will increase the effectiveness of the Public Agency Activities program.

DRAFT

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3.3 NONSTORMWATER DISCHARGE MEASURES

The Participating Agencies will require dischargers that drain to their respective MS4s to implement the Nonstormwater Discharge (NSWD) Measures as defined in §III.A of the MS4 Permit (§IV.B of the LB Permit). If the Participating Agencies identify nonstormwater discharges from the MS4 as a source of pollutants that cause or contribute to exceedances of receiving water limitations, the WCMs will be modified and implemented – subject to the adaptive management process – to effectively eliminate the source of pollutants consistent with MS4 Permit §III.A and §VI.D.10 (LB Permit §IV.B and §VII.D.M). In these instances, potential WCMs may include prohibiting the nonstormwater discharge to the MS4, requiring the responsible party to 1) incorporate additional BMPs to reduce pollutants in the nonstormwater discharge or conveyed by the nonstormwater discharge or 2) divert to a sanitary sewer for treatment, or strategies to require the nonstormwater discharge to be separately regulated under a general NPDES permit.

It is important to note that the nonstormwater Outfall Based Screening and Monitoring Program (MRP §IX) introduces additional NSWD measures through the intensive procedures required for the identification of NSWDs from MS4 outfalls.

3.3.1 NEW FOURTH TERM PERMIT NONSTORMWATER DISCHARGE MEASURES

Parts III.A and VI.B (MRP IX) of the MS4 Permit (Parts IV.B and VII.B (MRP IX) of the Long Beach Permit introduce new provisions and program elements that address NSWDs. This section briefly describes these new and enhanced NSWD measures. A NSWD measure is considered new if it was not required by the prior MS4 Permit and is considered enhanced if it is an enhancement of a related provision of the prior MS4 Permit.

Table 3-2 from the previous section lists the new and enhanced nonstructural NSWD measures as well as the City MCMs. The BMP effectiveness from Table 3-2 is based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012. The correlation of BMP effectiveness with WQPs is based on Table 3-1. The following pages describe each of the listed controls. The details of each provision may be found in the relevant sections of the MS4 Permit, which are included. Unless an alternate date is provided in the MS4 Permit or in this section, the adoption date for the NSWD measures coincides with the approval of the WMP by the Regional Board's Executive Officer.

NSWD-1 OUTFALL SCREENING AND SOURCE INVESTIGATIONS ***NSWD-1***

MS4 Permit: §VI.B (MRP §IX) (LB Permit: MRP §IX)

The outfall screening and source investigation provisions of the MS4 Permit constitute an entirely new, expansive addition to each City's JSWMP. Implementing these new provisions will significantly support the control of unauthorized nonstormwater discharges.

ENHANCED CONDITIONS FOR EXEMPT NONSTORMWATER DISCHARGES ***NSWD-2***

MS4 Permit: §III.A (LB Permit: §IV.B)

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The NSWD prohibitions of the MS4 Permit, which include specific measures to reduce irrigation runoff, are a significant enhancement from the prior LA MS4 Permit. Measures introduced include the following:

- Require the implementation of BMPs following established BMP manuals for discharges from non-emergency fire fighting activities and drinking water supplier distribution systems. Require specific BMPs for lake dewatering, landscape irrigation, pool and fountain discharges and non-commercial car washing.
- Require notification, monitoring (i.e. sampling) and reporting for drinking water supplier discharges and lake dewatering greater than 100,000 gallons.
- Require advance notification for any discharge of 100,000 gallons or more into the MS4.
- Minimize discharge of landscape irrigation through implementation of an ordinance specifying water efficient landscaping standards.
- Promote water conservation programs to minimize the discharge of landscape irrigation water into the MS4. This includes the following, where applicable:
    - Coordinate with local water purveyor(s) to promote:
        - Landscape water efficiency requirements for existing landscaping,
        - Drought tolerant, native vegetation, and
        - Less toxic options for pest control and landscape management.
    - Develop and implement a coordinated outreach and education program to minimize the discharge of irrigation water and pollutants associated with irrigation water.
- If monitoring results indicate that a conditionally exempt NSWD is a source of pollutants that causes or contributes to exceedances of applicable receiving water limitations and/or water quality-based effluent limitations, the Permittee must either:
    - Effectively prohibit the nonstormwater discharge to the MS4, or
    - Impose additional conditions, subject to approval by the Regional Water Board Executive Officer, or
    - Require diversion of the NSWD to the sanitary sewer, or
    - Require treatment of the NSWD prior to discharge to the receiving water.

Implementing these enhanced provisions will significantly support the control of unauthorized nonstormwater discharges.

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3.4 TARGETED CONTROL MEASURES

Targeted Control Measures (TCMs) are additional control measures beyond the baseline MCMs and NSWD measures of the MS4 Permit that are intended to target the Watershed Group's WQPs. TCMs may be divided into two categories: nonstructural and structural. The selection of structural and nonstructural control measures to address WQPs within the Watershed Group is a vital component of the WMP planning process.

The Participating Agencies have already proposed and implemented a number of structural and nonstructural control measures in the watershed that collectively may contribute to considerable pollutant load reductions. These existing and planned BMPs provide a head start in the planning process to address WQPs within the Watershed Group. There are many different types of structural and nonstructural control measures that provide varying benefits from their implementation. The following sections describe Planned TCMs to be implemented, Potential TCMs that may be implemented (implementation is conditional upon factors such as site constraints, governing body approval, etc.) as well types of structural BMPs available to the Watershed Group.

3.4.1 CONTROL MEASURES IDENTIFIED IN TMDLS/IMPLEMENTATION PLANS

This section describes the control measures that have been previously identified in TMDLs and corresponding implementation plans and the status of their implementation. For those TMDLs that do not sufficiently identify control measures, or if implementation plans have not yet been developed, control measures are identified in the planned Targeted Control Measures as described in the following sections in this chapter.

3.4.1.1 LOS ANGELES RIVER NITROGEN COMPOUNDS AND RELATED EFFECTS

The Los Angeles River Nitrogen TMDL is the only TMDL applicable to the Lower Los Angeles River Watershed in which final water quality based effluent limits (WQBELs) went into effect prior to the MS4 Permit. The TMDL was adopted by the Regional Board (Resolution 2003-16) on December 4, 2003, and became effective on September 27, 2004.[3] Waste load allocations (WLAs) for point sources were established and required MS4 Permittees to: 1) submit a monitoring plan (completed March 23, 2005), and 2) incorporate monitoring at the Wardlow (S10) Mass Emission station in the LA River. Specific control measures were not included. The MS4 Permit modified the requirements of the TMDL by assigning WQBELs (MS4 Permit Appendix O).

CONTROL MEASURES AND IMPLEMENTATION

The LA River Nitrogen TMDL recommended implementation alternative allowed time for NPDES permitted Publically Owned Treatment Plants (POTWs) that discharge into the LA River to complete an upgrade of treatment facilities to nitrification/denitrification facilities without increasing current ammonia, nitrate and nitrite loads in the interim period. As the nitrification/denitrification facilities came on board, the reductions in ammonia and nitrate loads significantly reduced impairments caused

[3] MS4 Permit Fact Sheet (Page F-87)

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by nutrient effects. These upgrades, in combination with the control measures the Watershed Group is implementing, appear to be effectively meeting the targets of the TMDL.

3.4.1.2 LOS ANGELES RIVER TRASH TMDL

In August 2007, The Regional Board adopted the Trash TMDL, which set a numeric limit of zero trash being discharged into the receiving water bodies from the storm drain system by the year 2016.

The MS4 permit provides four methodologies to determine compliance:

1. Full Capture Systems - The Regional Board's Executive officer has certified eight types of trash capture systems to be full capture[4]:
    a. Vortex Separation Systems (which include CDS units)
    b. Catch basin inserts (brush inserts; mesh screens; vertical and horizontal trash capture screens; and connector pipe screen (CPS).
    c. Specific designs of trash nets (including the Fresh Creek system at Hamilton Bowl)
    d. Two gross solids removal devices (including the Linear Radial systems at Hamilton Bowl)
2. Partial Capture Devices and institutional controls
    a. Partial capture devices estimated on demonstrated performance
    b. Daily Generation Rate (DGR) Studies
3. Combined Compliance Approaches
4. Minimum Frequency Assessment and Collection Approach (MFAC)[5]

CONTROL MEASURES AND IMPLEMENTATION

The Cities have implemented an effective combination of: (1) Full and partial capture catch basin inserts, (2) regional trash capture projects, and (3) institutional controls.

FULL CAPTURE INSERTS

In 2009, the Gateway Water Management Authority (GWMA) received funding from the State Revolving Fund through the American Recovery and Reinvestment Act to install full capture trash systems (CPS devices). The funding was for retrofitting all catch basins with full capture systems. Due primarily to physical constraints some of the catch basins could not be retrofitted and instead partial capture systems were installed. In some cases no systems were able to be installed due to retrofitting constraints.

PARTIAL CAPTURE SYSTEMS

During the installation of the full capture systems, on average, 8% - 16% of catch basins could not be retrofitted for a variety of reasons. This included: size constraints where the catch basin was found to be too small; catch basin outlets on the bottom which would compromise the CPS overflow capabilities and increase the chance of flooding; and inlets on the catch basins sides which would prevent the trash

[4] NPDES MS4 Permit, VI.E.5.b.

[5] Not a listed compliance option in the Los Angeles River Trash TMDL

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laden flows from entering the CPS. Many of these catch basins could be retrofitted with an Automatic Retractable Screen (ARS) which has been demonstrated to be 86 percent effective[6].

Table 3-4: Number of catch basins installed with Full capture (CPS) and Partial Capture (ARS) systems

City	Catch basins installed with CPS	Catch basins in City	Catch basins with CPS (%)	Catch basins with only ARS	Catch basins with only ARS (%)
Downey	399	444	90	4	0.1
Lakewood	4	6	67	0	0
Long Beach	2707	3042	89	137	5
Lynwood	579	630	92	29	5
Paramount	230	245	94	0	0
Pico Rivera	56	67	84	8	12
Signal Hill	138	175	79	0 (2)	
South Gate	684	796	86	60	8

Regional Full Capture Systems

In addition to the catch basin inserts and screens, the following regional full capture systems are in place in the Lower LAR Watershed.

Table 3-5: Regional full trash capture systems

System	Description/location
Trash nets/radial systems	4 creek trash nets and two linear Radial systems installed in Hamilton Bowl beginning in the mid 2000s and subsequently by the City of Signal Hill as part of a Grant from the State Water Resources Board[7].
Long Beach trash nets	
Long Beach CDS (vortex)	Walnut Ave
Lakewood Retention basin	Cherry Cove Park

Non-Structural and Institutional Controls

In addition to the structural controls summarized above, the agencies of the Lower LAR continue to implement a program of effective institutional controls. These programs are described below.

Daily Generation Rate Studies

Permittees have been authorized by the Regional Board to comply with the interim effluent limitations through the installation of partial capture devices and the implementation of institutional controls. The Cities of South Gate, Lynwood and Pico Rivera have participated in Daily Generation Rate (DGR) studies to determine the effectiveness of the institutional control measures in place (see Section 3.2 Minimum Control Measures, Section 3.3 Nonstormwater Discharge Measures, and Section 3.4 Targeted Control Measures for more detail on institutional control measures in the Lower LAR Watershed). The DGR uses a mass balance equation to estimate the amount of trash being deposited on the cities' public streets. To establish the DGR, trash from approximately 10% of the cities' curb miles in designated areas was collected prior to regularly scheduled street sweepings. The collected trash was quantified and used to calculate the amount of trash flowing into the storm drain systems to determine the level of compliance. The studies have been conducted for several years and have determined that participating

[6] City of Los Angeles Bureau of Sanitation, Watershed Protection Division, June 2006. *Technical Report: Assessment of Catch Basin Opening Screens Covers.*

[7] Systems are currently being replaced as part of recreational upgrade to Hamilton Bowl by the City of Long Beach

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cities' are below the Trash TMDL levels and therefore in compliance. This compliance level is pre-insert and demonstrates that the participating cities' non-structural controls have a significant impact towards reducing the baseline amount of anthropogenic trash.

SUMMARY

The cities have implemented an effective program of structural and non-structural control measures and are currently meeting the interim WQBELs. See Section 5 Compliance Schedule for an analysis of achieved trash capture effectiveness to date along with future WQBEL compliance dates.

3.4.1.3 LOS ANGELES RIVER METALS TMDL

The Los Angeles River Metals TMDL was adopted by the Regional Board on June 2, 2005 and became effective on October 29, 2008. The TMDL establishes WQBELs for copper, lead and zinc. Separate WQBELs are established for each waterbody segment in the Los Angeles River and tributaries, but the TMDL does not extend to the Los Angeles River Estuary.

There are two reaches within the Lower LAR Watershed (Reach 1 and 2) and two tributaries (Compton Creek and the Rio Hondo) with WLAs under this TMDL. Responsible Agencies within the Lower LAR Watershed are listed in Table 3-6 along with the applicable segment to which they discharge or contribute runoff.

Table 3-6: Lower LAR Agencies and LAR Waterbody Segment

Agency	LAR Reach 1	LAR Reach 2	Compton Creek	Rio Hondo Reach 1
Downey		×		×
Lakewood	×			
Long Beach	×	×	×	
Lynwood			×	
Paramount		×		
Pico Rivera				×
Signal Hill	×			
South Gate			×	×
LACFCD	×	×	×	×

CONTROL MEASURES AND IMPLEMENTATION

The Los Angeles River metals TMDL established compliance goals by waterbody segment. The cities draining to Reach 1 of the Los Angeles River and Compton Creek joined to form Jurisdiction Group 1. Similarly, many agencies of Reach 2 of the Los Angeles River and the Rio Hondo joined to form Jurisdictional Group 2. The Lower LAR WMP encompasses parts of both Jurisdictional Groups.

On October 11, 2010 both of these Jurisdictional Groups submitted separate Implementation Plans to the Regional Board[8]. These implementation plans took slightly differing approaches to attaining

8 Jurisdiction Group 1. Metals TMDL Implementation Plan Reach 1 of the Los Angeles River and Compton Creek for the Cities of Carson, Compton, Huntington Park, Lakewood, Long Beach, Lynwood, Signal Hill, and South Gate, and the California Department of Transportation (Caltrans). Prepared by John L. Hunter and Associates, Inc., Richard

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compliance. Jurisdiction Group 1 focused on Source Control as a means of achieving WQBELs. In addition to Source Control Strategies, the Jurisdictional Group 1 Metals TMDL Implementation Plan took advantage of existing flood control basins and wetlands, which were and still are, receiving runoff from tributary areas along the lower portions of the LAR. Additionally, Structural Controls were discussed as potential BMPs to address metals if other control measures did not address the water quality issues.

The Jurisdictional Group 2 Metals TMDL Implementation Plan categorizes BMP implementation into three key areas:

- New Development and Significant Redevelopment – Water quality benefits to be obtained through ongoing implementation of new development and significant redevelopment activities;
- Non-structural BMPs – Identifying new or enhanced existing non-structural BMP activities that will result in reductions of metals in urban runoff; and
- Structural BMPs – Identifying and implementing the necessary structural BMPs to fill expected water quality gaps not addressed by any of the above.

The BMPs are discussed in these Implementation Plans are discussed in detail in Section 3.2 Minimum Control Measures, Section 3.3 Nonstormwater Discharge Measures, and Section 3.4 Targeted Control Measures and Section 3.4.2 Structural Targeted Control Measures.

MONITORING

In order to measure the progress toward achieving the Metals TMDL WQBELs, the two Jurisdictional Groups commenced a Coordinated Monitoring Program (CMP) beginning in October of 2008. This monitoring program consists of wet and dry weather sampling at two sampling stations in the Lower LAR Watershed (Wardlow Blvd. and Del Amo Blvd).

SUMMARY

The Participating Agencies have been and will continue to implement a multi-faceted approach towards achieving the Water Quality Based Effluent Limitations. The CMP monitoring that has been conducted to date indicates that the Lower LAR Watershed is meeting the TMDL dry weather targets. Achieving the wet weather targets will be achieved through the Watershed Control Measures described in the rest of this Chapter and demonstrated by the Reasonable Assurance Analysis (Chapter 4).

3.4.1.4 LOWER LOS ANGELES RIVER BACTERIA TMDL

The Los Angeles River Bacteria TMDL (Resolution R1-007) was adopted by the Regional Board on July 9, 2010 and subsequently went into effect on March 23, 2012. The TMDL establishes WLAs for E.Coli in wet and dry weather and determines an allowable number of exceedances days of these objectives.

CONTROL MEASURES AND IMPLEMENTATION

Watson and Associates, Inc., California Watershed Engineering, Inc., and Kinnetic Laboratories, Inc. October 11, 2010; and Los Angeles River and Tributaries Total Maximum Daily Loads for Metals Final Implementation Plan for Reach 2 Participating Jurisdictions. Prepared by CDM. October 11, 2010.

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For compliance purposes, the main stem of the river was broken down into segments, each with its own allocations and compliance schedule. During dry weather, the segments are phased into compliance through the development and implementation of a Load Reduction Strategy (LRS).

> *A LRS is "both [1] a suite of actions performed by MS4 Permittees along a Los Angeles River segment or tributary and [2] a document submitted to the Regional Board Executive Officer for approval. The document must describe the suite of actions that will be performed and demonstrate reasonable assurance of interim and final WLA attainment. A LRS may include 1) outfall methods such as structural methods like dry weather diversions, 2) source control and, in appropriate circumstances, 3) downstream methods to treat waters at the end of tributaries*[9].

Tables 3-7 summarizes the first compliance deadline and the submittal of the Load Reduction Strategy for the Agencies within the Lower LAR Watershed during dry weather. During wet weather there is not a phased implementation schedule similar to dry-weather. The final wet weather WQBELs go into effect on March 23, 2037.

Table 3-7: Lower LAR Load Reduction Strategy Submittal Deadline

Segment B, 2014-2022: Lower LAR Agencies discharging to Los Angeles River (main channel) Between Rosecrans Avenue and Patata Street RR Bridge)		
Agencies	Implementation Action	Deadline
South Gate, Downey, Lynwood, Paramount, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	September 23, 2014
Segment A, 2014-2024: Lower LAR Agencies discharging to Segment A of the Los Angeles River (main channel) Between Estuary (Willow Avenue) and Rosecrans Avenue		
Agencies	Implementation Action	Deadline
Lakewood, Long Beach, Lynwood, Paramount, Signal Hill, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	September 23, 2016
Rio Hondo 2014-2023:Lower LAR Agencies discharging to Rio Hondo		
Agencies	Implementation Action	Deadline*
Pico Rivera, South Gate, Downey, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	March 23, 2016
Compton Creek 2014-2025:Lower LAR Agencies with discharges entering Compton Creek		
Agencies	Implementation Action	Deadline*
Long Beach, Lynwood, South Gate, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	March 23, 2018

*If compliance targets are not being met, submit new LRS by September 23, 2026 to begin second phase

SUMMARY

The Agencies within the Lower LAR Watershed Group will submit a LRS in accordance with the deadlines in Table 3-7. The Control Measures discussed in the remainder of this Chapter will address bacteria

[9] Los Angeles Regional Water Quality Control Board. Los Angeles River Watershed Bacteria TDML Staff Report. Attachment A to Resolution No. R10-007. July 15, 2010.

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loads and provide reasonable assurance of meeting WQBELs, however the LRS will outline a more targeted approach to address bacteria in the Lower LAR Watershed.

3.4.1.5 LOS ANGELES RIVER ESTUARY BACTERIA TMDL

On March 26, 2012, the US EPA adopted the Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL. This TMDL establishes numeric WLAs for E.Coli (freshwater), fecal coliform, enterococcus, and total coliform (marine) in the Los Angeles River Estuary (LARE) and the Long Beach shoreline beaches and determines an allowable number of exceedances days of these objectives.

This Watershed Management Program incorporates the LARE which extends from Willow Ave to the mouth of the Estuary (Queensway Bay near the site of the Queen Mary). The portion of this TMDL dealing with the Long Beach Shoreline beaches will be addressed in a separate watershed management program to be submitted by the City of Long Beach.

CONTROL MEASURES AND IMPLEMENTATION

In contrast to TMDLs adopted by the Regional Board, US EPA TMDLs do not contain an Implementation Plan or Schedule. The Regional Board has the option of adopting a separate implementation plan through a Basin Plan amendment or issuing a compliance schedule in a separate enforcement order. As the Regional Board has not adopted either of these alternatives, and given the limited amount of time to comply with this TMDL, the Regional Board has determined that:

> *…numeric water quality based effluent limitation for these USEPA established TMDLS are infeasible at the present time. The Regional Board may at its discretion revisit this decision within the term of the [MS4 Permit] or in a future permit, as more information is developed to support the inclusion of numeric water quality based effluent limitations[10].*

In lieu of the inclusion of numerical limits in the MS4 Permit, the Agencies subject to this TMDL are required to propose and implement Best Management Practices (BMPs) in the Watershed Management Program to meet WLAs.

As the estuary receives the majority of flow from the Los Angeles River, the Lower LAR Watershed Group is proposing to follow the LAR Load Reduction Strategy described above, and align the submittal and implementation deadlines with Segment C and D of the LAR. Table 3-8 summarizes the proposed timeline for submittal of the LRS for Agencies discharging to the LAR Estuary.

Table 3-8 Lower LAR Estuary Load Reduction Strategy Submittal Deadline

Lower LAR Permittees	Implementation Action	Deadline*
Long Beach, Signal Hill, and LACFCD	Submit Load Reduction Strategy (LRS) to Regional Board	March 23, 2023
	Complete Implementation of LRS	September 23, 2027
	Achieve interim (dry-weather) WQBEL and submit report to Regional Board	September 23, 2030

* If compliance targets are not being met, submit new LRS by September 23, 2031 to begin second phase

[10] California Regional Water Quality Control Board, Los Angeles Region Los Angele County MS4 Permit Response to Comments on the Tentative Order TMDL (General) Matrix.

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The Lower LAR Agencies discharging to the LAR Estuary have already taken some early action steps towards low flow diversion projects to address bacteria loading. Table 3-9 summarizes the status of Control Measures that are currently in progress.

Table 3-9: Status of Lower LAR Dry-Weather Diversion Projects (as of June 1, 2014)

Agency	Conceptual Design	Approved Project	Design Plans	Constructed
Signal Hill	10% design complete	--	--	--
Long Beach	--	x	--	--

SUMMARY

In order to meet the LAR Estuary Bacteria TDML WLA, a LRS or equivalent will be developed and submitted to the Regional Board in accordance with the schedule outlined in Table 3-9. The Control Measures discussed in the remainder of this Chapter will address bacteria loads and provide reasonable assurance of meeting WQBELs, however the LRS will outline a more targeted approach to address bacteria in the Lower LAR Estuary Watershed.

3.4.1.6 DOMINGUEZ CHANNEL AND GREATER LOS ANGELES AND LONG BEACH HARBOR WATERS TOXIC POLLUTANTS TMDL

This TMDL was adopted by the Regional Board on May 5, 2011 and became effective on March 23, 2012. It establishes WQBELs for Copper, Lead, Zinc, PAHs, DDT, and PCBs. This TMDL effectively divides the Lower LAR into two compliance areas: (1) those areas tributary to the LAR above the estuary; and (2) those areas tributary directly to the estuary. The areas under this TMDL discharging directly to the Los Angeles and Long Beach Harbors will be addressed separately in the Long Beach individual WMP tentatively scheduled for submittal in March 2015.

CONTROL MEASURES AND IMPLEMENTATION

This TMDL does not assign a WLAs or WQBELs for agencies with discharges above the estuary. All of the Lower LAR Agencies subject to this TMDL (Cities of Signal Hill, Long Beach, Caltrans, and the LACFCD[11]) discharge to the LAR above the Estuary (which begins at Willow Street). For these agencies, The TMDL requires:

- Monitoring (which will be addressed separately in the CIMP) and
- A Report of Implementation, to be submitted on December 15, 2013 and annually thereafter to describe how current activities support the downstream TMDL. The MS4 Annual Report with the inclusion of data gathered from the CIMP will constitute reporting of activities in support of the downstream monitoring TMDL.

In addition, the Cities of Signal Hill and Long Beach, and the LACSD developed a Contaminated Sediment Management Plan to support the long-term recovery of sediment and water quality in the Long Beach

[11] Paramount and Lakewood are incorrectly included in MS4 Permit Table K-5. The TMDL does not list Paramount or Lakewood and being subject to the Estuary provisions of the TMDL. Lakewood and Paramount are listed in Table K-7 under the Los Cerritos Channel Watershed area. These two cities will not be further addressed under this section.

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Harbor, Eastern San Pedro Bay, and the LAR Estuary. This Plan outlines an approach to sediment contamination reduction. This approach summarizes a process for identifying and designating areas for remediation and determining the appropriate management alternatives to implement. The approach considers the following sediment management alternatives:

- Source Control
- Monitored Natural Recovery
- Enhanced Natural Recovery
- Capping
- In Situ Treatment
- Dredging

SUMMARY

The Watershed Control Measures described in this chapter will provide reasonable assurance that the Lower LAR Agencies are addressing the TMDL pollutants of concern in their discharges and conducting activities to support the achievement of WQBELs. Monitoring conducted through the CIMP along with an Annual Report of Implementation will document the Lower LAR Watershed Group's progress. In addition, the sediment management efforts in the LAR Estuary will likely achieve significant contaminant reduction.

As recognized by the footnote in Attachment K-4 of the Permit, the Participating Agencies have entered into an Amended Consent Decree with the United States and the State of California, including the Regional Board, pursuant to which the Regional Board has released the Participating Agencies from responsibility for toxic pollutants in the Dominguez Channel and the Greater Los Angeles and Long Beach Harbors. Accordingly, no inference should be drawn from the submission of this CIMP or from any action or implementation taken pursuant to it that the Participating Agencies are obligated to implement the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL, including this CIMP or any of the TMDL's other obligations or plans, or that the Participating Agencies have waived any rights under the Amended Consent Decree.

3.4.2 NONSTRUCTURAL TARGETED CONTROL MEASURES

3.4.2.1 TOTAL SUSPENDED SOLIDS REDUCTION

As explained in the introduction to this chapter, emphasis is placed on source control as a cost-effective measure to reduce pollutant loads. In this WMP, the chief approach is controlling Total Suspended Solids (TSS) at the source, as explained in the following section. Combining this approach with true source control, low impact development, green streets, and the MCMs constitutes a strong and effective initial implementation of the WMP, providing time for funding measures to be put in place to pay for the design, construction, and operation of stormwater capture and low flow diversion facilities and to develop working relationships with water and wastewater agencies.

BACKGROUND

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TSS is the governing pollutant for metals. This is consistent with that found within the USEPA approved *Los Angeles River Metals TMDL* which represents metals (copper, lead, and zinc) through their associations with sediment. Reducing TSS in the receiving waters is anticipated to result in a significant reduction of metals in the receiving waters since both pollutant groups adhere to sediment; therefore initial implementation will focus on TSS reduction. Initial emphasis on TSS reduction should reduce the volume of water that ultimately needs to be captured and infiltrated or used to achieve standards for the Category 1 pollutants being addressed by the WMP – namely metals. This would make implementation of the WMP more cost-efficient.

Documentation is not available for the Lower LAR watershed; however it is available for the adjacent Los Cerritos Channel (LCC) Watershed, of which many Lower LAR watershed Cities drain to in part. For that watershed, Table 3-10 provides a summary of TSS concentrations at the Stearns Street monitoring site over a 13-year period based on 74 wet-weather observations and 25 dry-weather observations.

Table 3-10: TSS statistics measured at LCC TMDL Monitoring Site

Statistic	Wet weather (mg/L)	Dry weather (mg/L)
No. of observations	74	25
Minimum	17	2
Maximum	1700	128
1st Quartile	96	7.5
Median	155	13
3rd Quartile	260	41
Mean	227	27
Standard deviation (n-1)	256	30

Although the RAA is only assuming a 5% pollutant load reduction through implementation of the TSS Reduction Strategy, the Watershed Group is targeting greater reductions. In an analysis performed by the Los Cerritos Channel WMP Group, it was determined that the expected reduction in the mean concentration of TSS at Stearns Street from 227 mg/l to 150 mg/l, which would be a 34% reduction in the mean concentration of TSS. The reduced value is consistent with those found in other watersheds with similar land uses.

TSS Reduction Quantification

Although expected pollutant reductions resulting from the TSS Reduction Strategy are not modeled empirically within WMMS, a rudimentary quantification of the program's potential effectiveness may be calculated through the application of the Revised Universal Soil Loss Equation (RUSLE). The RUSLE is defined as

$$A = RKLS$$

where

$A =$ Spatially and temporally averaged soil loss per unit area per unit time. The result is expressed in the units elected for K and R.

$R =$ Rainfall-runoff erosivity factor (per unit time, generally one year),

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$K =$ Soil erodibility factor (mass per unit area – an area density – generally tons per acre),
$L =$ Slope length factor and
$S =$ Slope steepness factor.

Using local values of R, K and LS obtained through maps available on the State Water Resources Control Board's website for the Construction General Permit[12],

$$R \approx 40\ year^{-1}$$
$$K \approx 0.32\ \frac{tons}{acre}\ \text{and}$$
$$LS \approx 0.45$$

giving

$$A = (40\ year^{-1})\left(0.32\ \frac{tons}{acre}\right)0.45$$
$$A = 5.76\ \frac{tons}{acre\ year}.$$

Following the CGP Risk assessment procedures, 5.76 tons per acre year is within the "low sediment risk" designation.

During the cooperative preparation of the Lower San Gabriel River, Lower Los Angeles River and Los Cerritos Channel (LCC) WMPs, several participating agencies provided estimates of exposed soil within their jurisdiction that were not related to construction activities. The City of Bellflower, within the adjacent LCC and Lower SGR watersheds, field-verified these estimates which totaled approximately 18 acres or about 0.5% of the City. Following the calculated value for A, this equates to approximately 100 tons of soil loss per year. The City of Signal Hill derived an exposed-soil percentage roughly one order of magnitude larger than Bellflower – however this is an anomalous circumstance specific to the City. Applying the more conservative value of 0.5% to extrapolate the soil loss tonnage to the Lower LAR Watershed gives

$$M_{TSS} = fWA = 0.005(27{,}968\ acres)\left(5.76\ \frac{tons}{acre\ year}\right)$$
$$M_{TSS} = 140\ acres\left(5.76\ \frac{tons}{acre\ year}\right)$$
$$M_{TSS} \approx 800\ \frac{tons}{year}$$

where

$M_{TSS} =$ Estimated annual soil loss within the Lower LAR watershed in tons,
$f =$ Estimated fraction of exposed soil (non-construction) within a given urbanized area and
$W =$ Watershed area.

[12] http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

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Historical monitoring results from the adjacent LCC Watershed suggest that approximately 1.8 grams of zinc adheres to every kilogram of TSS, so that the zinc discharge M_{Zn} associated with M_{TSS} is

$$M_{Zn} \approx \left(\frac{1.8}{1000}\right) M_{TSS}$$
$$M_{Zn} \approx \left(\frac{1.8}{1000}\right)\left(800\ \frac{tons}{year}\right)\left(\frac{2000\ lbs}{1\ ton}\right)$$
$$M_{Zn} \approx 2{,}900\ \frac{lbs}{year}\ or\ 1{,}300\ \frac{kg}{year}.$$

Assuming that within the term of the MS4 Permits the TSS Reduction Strategy approaches an effectiveness goal of 10%, at this time the reduction would equate to 130 kg/year. Reductions of this magnitude for zinc (and other metals) will significantly aid in the achievement of the applicable WQBLs and RWLs of the MS4 Permit.

TSS REDUCTION STRATEGY

The core of the TSS Reduction Strategy is the Group's soil stabilization/sediment control. Two key components of this strategy are implementation of enhanced erosion and sediment control at construction sites, in accordance with each city's Development Construction Program, and stabilization of exposed soil not associated with construction sites. Initial assessments conducted by the LCC Watershed Group have indicated that vacant lots, Caltrans rights-of-way and transmission line rights-of-way are the primary areas of exposed soil not associated with construction sites. Specific control measures for these areas are explained in the following section.

3.4.2.2 LIST OF NONSTRUCTURAL TARGETED CONTROL MEASURES

Table 3-11 lists planned and potential nonstructural TCMs for each participating agency. The BMP effectiveness from Table 3-2 is based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012. The correlation of BMP effectiveness with WQPs is based on Table 3-1. The pages following Table 3-11 describe each of the listed controls.

The responses for each agency under Table 3-11 are defined as follows:

- ✗ *Planned TCM*. Under the presumption that 1) the TCM will likely not require approval of the governing body and 2) the governing body approves adequate staff/budget (if necessary), the TCM will be implemented.

- **P** *Potential TCM*. The TCM is under consideration by the agency, however implementation is contingent upon yet to be determined factors. These factors include approval by the governing body, additional time needed to inform the governing body and/or relevant staff and approval of service contracts. As such implementation cannot be assured at this time. If the Potential TCM is not adopted by the agency within the first two years of the implementation of the WMP, it will be reconsidered through the adaptive management process.

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C *Completed TCM*. The TCM is preexisting (has been in effect for several years or more).

It is important to note that Caltrans and the LACFCD are operating regional stormwater programs and consequently incorporating localized institutional TCMs may not be feasible. As such their exclusion from such TCMs is justified.

The schedule of implementation for the TCMs is provided in Chapter 5.

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Table 3-11 Nonstructural TCMs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency									
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	LACFCD	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
		Planning and Land Development															
1	TCM-PLD-1	Train staff/councils to facilitate LID and Green Streets implementation	◈	◈	◈	◈	◈	✗	N/A	✗	✗	✗	✗	✗	✗	✗
2	TCM-PLD-2	Ordinance requires LID BMPs for projects below MS4 Permit thresholds	◆	◆	◈	◆	◆	✗	N/A		✗				✗	✗
		Existing Development															
3	TCM-ICF-1 (MCM-ICF-3)	Prioritize facilities/inspections based on water quality priorities	◈	◈	◈	◈	◈	✗	N/A	✗	✗	✗	✗	✗	✗	✗
4	TCM-TSS-1	Exposed soil ordinance	◈	◈	◈	◆	◇		N/A		P		P	P	✗	✗
5	TCM-TSS-2	Erosion repair and slope stabilization on private property	◈	◈	◈	◆	◇		N/A		P		P	P	✗	
6	TCM-TSS-3	Private parking lot sweeping ordinance	◆	◆	◆	◆	◇	✗	N/A		P		P		✗	
7	TCM-TSS-4	Sweeping of private roads and parking lots	◆	◆	◆	◆	◇	✗	N/A		P		P		✗	
8	TCM-TSS-5	Negotiations with regulated utilities for erosion control within R.O.W.	◈	◈	◈	◆	◇				**Watershed Group**					

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Table 3-11 Nonstructural TCMs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency									
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	LACFCD	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
9	TCM-RET-1	Encourage retrofitting of downspouts (downspout disconnect)	◈	◈	◈	◈	◆	✗	N/A		P	✗	P	✗		✗
		Dry weather runoff reduction														
10	TCM-NSWD-1	Incentives for irrigation reduction practices	◆	◆	◈	◆	◆	✗	N/A	✗	✗	✗	✗	✗	✗	✗
		Public Information and Participation														
11	TCM-PIP-1	Refocused outreach to target audiences and water quality priorities	◆	◆	◆	◆	◆	**Watershed Group**								
		Public Agency Activities														
12	TCM-PAA-1	Upgraded sweeping equipment (e.g. regenerative)	◆	◆	◆	◆	◇	✗	N/A	C	P	C	C	C	C	C
13	TCM-PAA-2	Adopt Sewer System Management Plan (SSMP)	◆	◆	◇	◇	◇	✗	N/A	✗	✗	✗	✗	✗	✗	✗
14	TCM-PAA-3	Increased street sweeping frequency or routes	◆	◆	◆	◆	◇	P	N/A			P	✗			
15	TCM-TSS-6	Erosion repair and slope stabilization on public property and right of way	◈	◈	◈	◆	◇	✗	N/A		✗		P		✗	
		Reporting/Adaptive Management														

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Table 3-11 Nonstructural TCMs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency								
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	LACFCD	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
16	TCM-MRP-1	Enhanced tracking through use of online GIS MS4 Permit database	◈	◈	◈	◈	◈	✗		✗	P	✗	✗	P	✗	✗
		Jurisdictional SW Management														
17	TCM-SWM-1	Prepare guidance documents to aid in implementation of MS4 Permit MCMs	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗	✗
		Initiatives														
18	TCM-INI-1	Copper reduction through implementation of SB 346	◆	◆	◆	◇	◇	✗	✗	✗	✗	✗	✗	✗	✗	✗
19	TCM-INI-2	Lead reduction through implementation of SB 757	◆	◆	◆	◇	◇	✗	✗	✗	✗	✗	✗	✗	✗	✗
20	TCM-INI-3	Support zinc reduction in tires through safer consumer product regs	◆	◆	◆	◇	◇	**Watershed Group**								
21	TCM-INI-4	Apply for grant funding for stormwater quality/capture projects	◆	◆	◈	◆	◆	✗	✗		✗	✗	✗	✗	✗	✗

✗ – Planned TCM. **P** – Potential TCM. **C** – Completed/implemented TCM.

◆ Primary pollutant reduction ◈ Secondary pollutant reduction ◇ Pollutant not addressed

BMP effectiveness ratings based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012.

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ENHANCED TRACKING THROUGH USE OF ONLINE GIS MS4 PERMIT DATABASE ***TCM-MRP-1***

Measures:

- Enter the enhanced tracking requirements of the fourth term MS4 Permit on an online GIS database management system dedicated to Phase I MS4 Permit compliance. Program elements addressed include all the MCMs (Development Construction, Planning and Land Development, Industrial/Commercial Facilities, Public Agency Activities, Public Information and Participation and Illicit Connection/Discharge Elimination) and the Monitoring and Reporting Program.
- Use the consolidated tracking data to:
    - Improve the effectiveness of the JSWMP (e.g. examine geospatial trends in IC/IDs, which could be used to strategically distribute public education materials) and WMP.
    - Assess the JSWMP and improve the annual reporting process.
    - Guide the adaptive management process through this assessment.

Many of the cities are implementing the measures through the use of *MS4Front*, a propriety online GIS MS4 Permit database management system.

TRAIN STAFF TO FACILITATE LID AND GREEN STREETS IMPLEMENTATION ***TCM-PLD-1***

Measures:

- Conduct training for relevant staff in LID and Green Streets implementation prior to the onset of the programs. The elements of the training follow the provisions listed in MS4 Permit §VI.D.7.
- Educate governing bodies in LID and Green Streets implementation (optional).

Several cities have already accomplished these measures, which facilitate LID implementation and address WQPs.

ORDINANCE REQUIRES LID BMPS FOR PROJECTS BELOW MS4 PERMIT THRESHOLDS ***TCM-PLD-2***

Measures:

- Adopt an ordinance requiring LID BMPs for smaller development projects that are below the thresholds for inclusion under the Planning and Land Development MCM Program.

Downey, South Gate and Signal Hill have already accomplished this measure, which facilitates LID and addresses WQPs.

PRIORITIZE FACILITIES/INSPECTIONS BASED ON WATER QUALITY PRIORITIES ***TCM-ICF-1 (MCM-ICF-3)***

MS4 Permit: Modified MCM (replaces §VI.D.6.d, §VI.D.6.e)

A program has been developed to prioritize industrial/commercial facilities based on their potential to adversely impact WQPs. The resulting prioritization scheme determines the inspection frequency, replacing the uniform inspection frequency provided in the MS4 Permit. This allows Cities to concentrate efforts on WQPs.

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The complete program is detailed in the Minimum Control Measures section of this chapter – see MCM-ICF-3.

EXPOSED SOIL ORDINANCE

TCM-TSS-1

This TCM is an element of the TSS Reduction Strategy.

- Adopt ordinances that require landscaping, erosion control, and sediment control on vacant lots and other significant sources of exposed dirt.
- These efforts are distinct from construction activity control measures, which are addressed under the Development Construction MCM program.

Within the neighboring Lower San Gabriel River Watershed, the City of Whittier has successfully adopted and implemented such an ordinance. The ordinance also requires drought tolerant landscaping/xeriscaping. The ordinance language may be used as a template to develop similar ordinances for the other participating agencies, and as such is included in Appendix A-3.2.

Due to the considerable amount of exposed dirt within their jurisdiction, the City of Signal Hill has agreed to develop and adopt a similar ordinance. This ordinance may also be used as a template for the remaining Watershed Group Cities.

EROSION REPAIR AND SLOPE STABILIZATION ON PRIVATE PROPERTY

TCM-TSS-2

This TCM is an element of the TSS Reduction Strategy. Measures include:

- If adopted, enforce the ordinances from TCM-TSS-1.
- Proactively enforce the existing stormwater ordinance regarding TSS-laden stormwater discharges (or potential discharges) from significant sources of exposed dirt and follow the Progressive Enforcement Policy. This may include observing site conditions prior to rain events and visual monitoring of stormwater discharges.

Within the neighboring Lower San Gabriel River Watershed, the City of Whittier has successfully implemented an ordinance that conforms to TCM-TSS-1. The following are pictures of some of the landscaped lots.





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Wardman St and Philadelphia St, NW corner (1)



Greenleaf Ave and Philadelphia St, east side

Wardman St and Philadelphia St, NW corner (2)



Bailey St and Comstock Ave, NW corner

A similar effort will be undertaken by the City of Signal Hill. Pending adoption, the City of Signal Hill's Exposed Soil Ordinance (see the description for TCM-TSS-1) will also be implemented and enforced.

PRIVATE PARKING LOT SWEEPING ORDINANCE ***TCM-TSS-3***

This TCM is an element of the TSS Reduction Strategy.

- Adopt an ordinance that requires sweeping of private parking lots. Example Municipal Code language from the City of Signal Hill is included in Appendix A-3.3.

SWEEPING OF PRIVATE ROADS AND PARKING LOTS ***TCM-TSS-4***

This TCM is an element of the TSS Reduction Strategy.

- If adopted, enforce the ordinance from TCM-TSS-3.
- Proactively enforce the existing stormwater ordinance regarding TSS-laden stormwater discharges (or potential discharges) for private roads and parking lots and follow the Progressive Enforcement Policy. This may include observing site conditions prior to rain events and visual monitoring of stormwater discharges.

NEGOTIATIONS WITH REGULATED UTILITIES FOR EROSION CONTROL WITHIN R.O.W. ***TCM-TSS-5***

This TCM is an element of the TSS Reduction Strategy.

- As a Watershed Group, pursue agreements between cities and utilities regarding erosion and sediment control in rights-of-way.

Since Caltrans is a participant in the Watershed Group, the cities will work with Caltrans to ensure that its rights-of-way are stabilized in a timely manner. However, since the public and private utilities whose rights-of-way must be stabilized are not members of the Watershed Group, negotiations with the utilities on how best to keep sediment from their rights-of-way out of the storm drain system will be necessary.

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EROSION REPAIR AND SLOPE STABILIZATION ON PUBLIC PROPERTY ***TCM-TSS-6***

This TCM is an element of the TSS Reduction Strategy.

- Implement landscaping, erosion control, and sediment control on significant sources of exposed dirt on public property.

ENCOURAGE RETROFITTING OF DOWNSPOUTS (DOWNSPOUT DISCONNECT) ***TCM-RET-1***

Measures:

- Encourage owners/operators of existing developments to disconnect existing downspouts from the MS4.

INCENTIVES FOR IRRIGATION REDUCTION PRACTICES ***TCM-NSWD-1***

Measures:

- Provide incentives such as rebates for irrigation reduction (i.e. runoff reduction) practices such as xeriscaping and turf conversion.

All cities are currently involved in this effort through the Metropolitan Water District's water conservation rebate program.

REFOCUSED OUTREACH TO TARGET AUDIENCES AND WATER QUALITY PRIORITIES ***TCM-PIP-1***

Measures:

- Within the Public Information and Education Program, elements such as material use/development and advertisements will address WQPs. The development of this effort will be ongoing throughout the MS4 Permit term, and may be regarded as a Watershed Group effort.

UPGRADED SWEEPING EQUIPMENT (E.G. REGENERATIVE) ***TCM-PAA-1***

Measures:

- Upgrade street sweeping equipment to regenerative or other high-efficiency new technology.

Most of the Cities contract street sweeping to private companies. These companies have already phased in regenerative sweepers. The City of Whittier has been phasing in regenerative sweepers and expects to be 100% regenerative by the end of the MS4 Permit term. The City of Long Beach operates vacuum sweepers over regenerative due to maintenance concerns. However the City is considering contracting this service in the near future. If this occurs, the vacuum sweepers will likely be replaced with regenerative sweepers provided by the contractor.

ADOPT SEWER SYSTEM MANAGEMENT PLAN (SSMP): ***TCM-PAA-2***

All agencies are enrolled in the statewide Waste Discharge Requirements for Sanitary Sewer Systems, which required the development and implementation of a SSMP in mid 2009. The goal of the SSMP is to

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reduce and prevent sanitary sewer overflows (SSOs), as well as mitigate any SSOs that do occur. This goal also addresses WQPs. Elements of the SSMP include:

- Sanitary sewer system operation and maintenance program
- Design and performance provisions
- Overflow emergency response plan
- FOG Control Program
- System Evaluation and Capacity Assurance Plan

Following these SSMP elements will address WQPs.

INCREASED STREET SWEEPING FREQUENCY OR ROUTES ***TCM-PAA-3***

Measures:

- Increase the street sweeping frequency, jurisdiction-wide or in high trash-generating areas and/or include additional routes (e.g. center medians and intersections).

PREPARE GUIDANCE DOCUMENTS TO AID IMPLEMENTATION OF MS4 PERMIT MCMS ***TCM-SWM-1***

This WMP includes in Appendix A-3-1 guidance documents and template forms to aid the Agencies in implementation of the MS4 Permit MCMs. These documents were developed to address two issues: 1) the MS4 Permit introduces many new and enhanced MCM provisions that do not have preexisting guidance documentation and 2) the model Stormwater Quality Management Program (SQMP) – which was required in the prior LA MS4 Permit and served as a guide to permit implementation – is now obsolete. Unlike the SQMP, the Agencies are not bound to the guidance and forms provided. They are provided as a resource to improve the effectiveness of the JSWMPs.

COPPER REDUCTION THROUGH IMPLEMENTATION OF SB 346 ***TCM-INI-1***

This initiative TCM has been completed recently. The impact of the TCM over time has been incorporated into the RAA.

LEAD REDUCTION THROUGH IMPLEMENTATION OF SB 757 ***TCM-INI-2***

This initiative TCM has been completed recently.

SUPPORT ZINC REDUCTION IN TIRES THROUGH SAFER CONSUMER PRODUCT REGULATIONS ***TCM-INI-3***

Measures:

- As a Watershed Group, plan to work with others to use the Department of Toxic Substances Control's Safer Consumer Product Regulations to reduce the zinc in tires, which one of the greatest sources of zinc in urban areas.

APPLY FOR GRANT FUNDING FOR STORMWATER CAPTURE PROJECTS ***TCM-INI-4***

Measures:

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- Initiate Individual or multi-jurisdictional efforts to apply for grant funding for stormwater quality/capture projects.

In April 2014, The Gateway Water Management Authority received grant funding of $1.3 million for LID projects in the Cities of Downey, Lynwood, Paramount, Pico Rivera, Signal Hill and South Gate (as well as Norwalk, Santa Fe Springs and Whittier).

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3.4.3 Structural Targeted Control Measures

Structural TCMs are Structural BMPs, in addition to MCMs, designed with the objective to achieve interim and final water quality-based effluent limitations and/or receiving water limitations. Structural TCMs are an important component of the Watershed Group's load reduction strategy. These BMPs are constructed to capture runoff and filter, infiltrate, or treat it. If properly maintained, these BMPs can have high pollutant removal efficiencies (see the *Performance Evaluation of Structural BMPs* element of this section); however, they tend to be more expensive than nonstructural BMPs. The two prevailing approaches for implementing Structural BMPs are regional and distributed approaches. Both serve important purposes and should be considered in combination to determine the best possible implementation strategy to meet the Watershed Group's water quality goals.

Distributed BMPs

Distributed Structural BMPs are generally built at the site-scale. They are intended to treat stormwater runoff at the source and usually capture runoff from a single parcel or site.



Figure 3-1: Distributed BMP Schematic

Regional BMPs

Regional BMPs refer to large structural BMPs that receive flows from neighborhoods or large areas and may serve dual purposes for flood control or groundwater recharge[13].

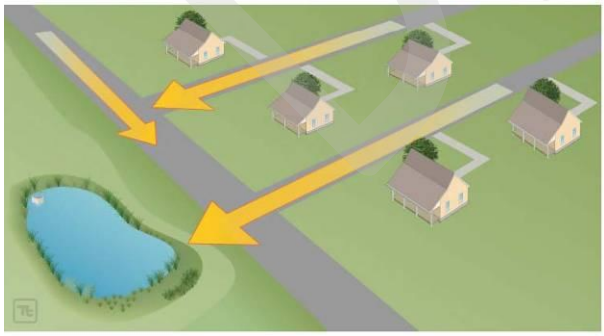


Figure 3-2: Regional BMP Schematic

[13] San Diego River Watershed Comprehensive Load Reduction Plan (2012)

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3.4.3.1 STRUCTURAL BMP SUBCATEGORIES

Structural BMPs fall under a variety of subcategories that correspond to their function and water quality benefit. Some of the most common of these subcategories are described below. These subcategories will be used throughout the WMP to describe existing, planned, and potential regional and distributed BMPs.

INFILTRATION BMPS

Infiltration BMPs allow for stormwater to percolate through the native soils and recharge the underlying groundwater table, subsequently decreasing the volume of water discharged to the downstream waterbodies. These BMPs must be constructed in areas where the native soils have percolation rates and groundwater levels sufficient for infiltration.

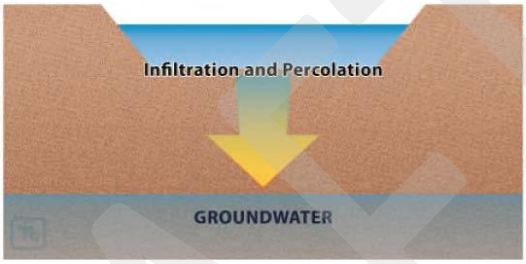


Figure 3-3: Infiltration BMP Schematic

INFILTRATION BASIN

An infiltration basin consists of an earthen basin with a flat bottom. An infiltration basin retains stormwater runoff in the basin and allows the retained runoff to percolate into the underlying soils. The bottom of an infiltration basin is typically vegetated with dryland grasses or irrigated turf grass.

INFILTRATION TRENCH

An infiltration trench is a long, narrow, rock-filled trench with no outlet other than for overflow. Runoff is stored in the void space between stones and infiltrates through the bottom and sides of the trench. Infiltration trenches provide the majority of their pollutant removal benefits through volume reduction. Pretreatment is important for limiting amounts of coarse sediment entering the trench which can clog and render the trench ineffective.

BIORETENTION WITH NO UNDERDRAIN

Bioretention facilities with no underdrain are landscaped shallow depressions that capture and infiltrate stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, engineered media, and vegetation. As stormwater passes down through the media, pollutants are filtered, adsorbed, and biodegraded by the soil and vegetation.

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Figure 3-4: Bioretention without underdrain schematic

DRYWELL

Drywells are similar to infiltration trenches in their design and function; however, drywells generally have a greater depth to footprint area ratio and can be installed at relatively deep depths. A drywell is a subsurface storage facility designed to temporarily store and infiltrate runoff. A drywell may be either a small excavated pit filled with aggregate or a prefabricated storage chamber or pipe segment.

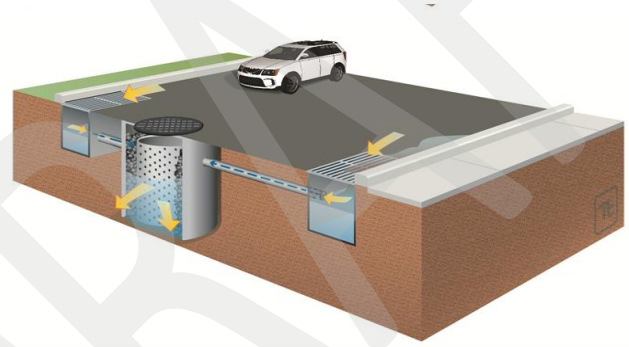


Figure 3-5: Drywell schematic

POROUS PAVEMENT

Porous pavement (concrete, asphalt, and pavers) contain small voids that allow water to pass through to a gravel base. They come in a variety of forms; they may be a modular paving system (concrete pavers, grass-pave, or gravel-pave) or poured in place pavement (porous concrete, permeable asphalt). Porous pavements treat stormwater and remove sediments and metals within the pavement pore space and gravel base. While conventional pavement results in increased rates and volumes of surface runoff, properly constructed and maintained porous pavements allow stormwater to percolate through the pavement and enter the soil below. This facilitates groundwater recharge while providing the structural and functional features needed for the roadway, parking lot, or sidewalk. The paving surface, subgrade, and installation requirements of porous pavements are more complex than those for conventional asphalt or concrete surfaces.

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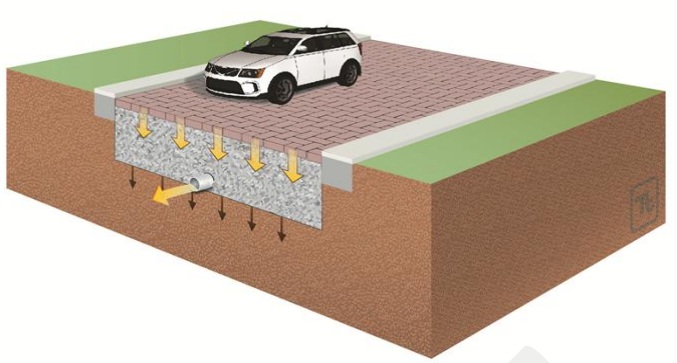


Figure 3-6: Porous pavement schematic

BIOTREATMENT BMPS

Biotreatment BMPs treat stormwater through a variety of physical, chemical, and biological processes prior to being discharged to the MS4 system. These BMPs should be considered where Infiltration BMPs are infeasible.

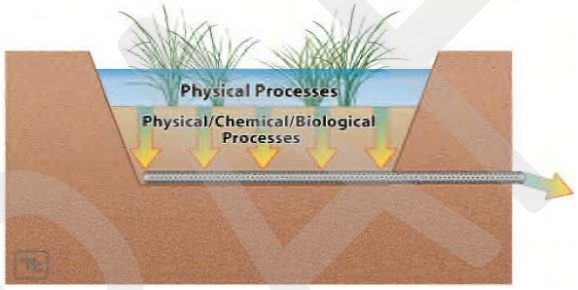


Figure 3-7: Biotreatment BMP schematic

BIORETENTION WITH UNDERDRAINS

Bioretention stormwater treatment facilities are landscaped shallow depressions that capture and filter stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, engineered media, and vegetation. As stormwater passes down through the media, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and vegetation. Bioretention with underdrain systems are utilized for areas containing native soils with low permeability or steep slopes, where the underdrain system routes the treated runoff to the storm drain system.

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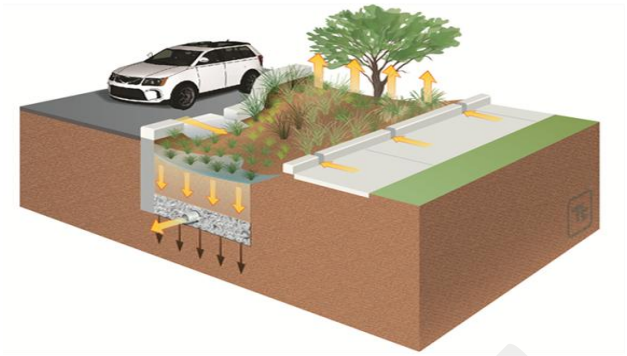


Figure 3-8: Bioretention with Underdrains schematic

VEGETATED SWALES

Vegetated swales are open, shallow channels with low-lying vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. Vegetated swales provide pollutant removal through settling and filtration in the vegetation (usually grasses) lining the channels. In addition, although it is not their primary purpose, vegetated swales also provide the opportunity for volume reduction through subsequent infiltration and evapotranspiration and reduce the flow velocity. Where soil conditions allow, volume reduction in vegetated swales can be enhanced by adding a gravel drainage layer underneath the swale allowing additional flows to be retained and infiltrated. Where slopes are shallow and soil conditions limit or prohibit infiltration, an underdrain system or low flow channel for dry weather flows may be required to minimize ponding and convey treated and/or dry weather flows to an acceptable discharge point. An effective vegetated swale achieves uniform sheet flow through a densely vegetated area for a period of several minutes (depending on design standard used).

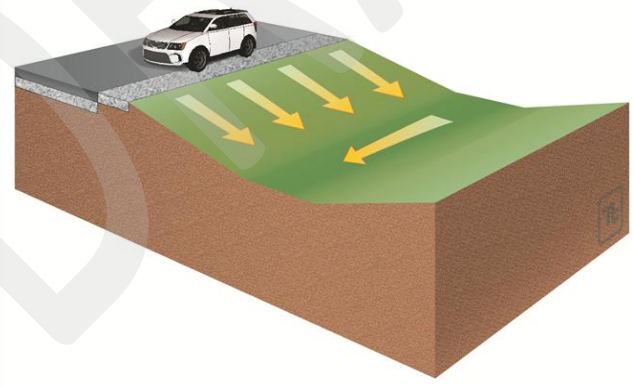


Figure 3-9: Vegetated swale schematic

WET DETENTION BASIN

Wet detention basins are constructed, naturalistic ponds with a permanent or seasonal pool of water (also called a “wet pool” or “dead storage”). Aquascape facilities, such as artificial lakes, are a special form of wet pool facility that can incorporate innovative design elements to allow them to function as a

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stormwater treatment facility in addition to an aesthetic water feature. Wet ponds require base flows to exceed or match losses through evaporation and/or infiltration, and they must be designed with the outlet positioned and/or operated in such a way as to maintain a permanent pool. Wet ponds can be designed to provide extended detention of incoming flows using the volume above the permanent pool surface.

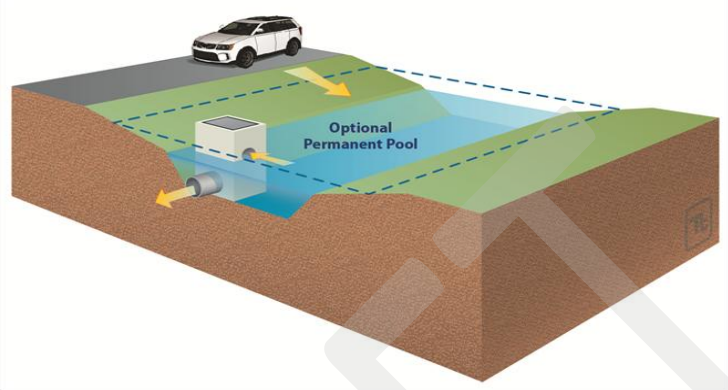


Figure 3-10: Wet detention basin schematic

Dry Extended Detention Basin

Dry extended detention basins are basins whose outlets have been designed to detain the stormwater runoff to allow particulates and associated pollutants to settle out. Dry extended detention basins do not have a permanent pool; they are designed to drain completely between storm events. They can also be used to provide hydromodification and/or flood control by modifying the outlet control structure and providing additional detention storage. The slopes, bottom, and forebay of Dry extended detention basins are typically vegetated.

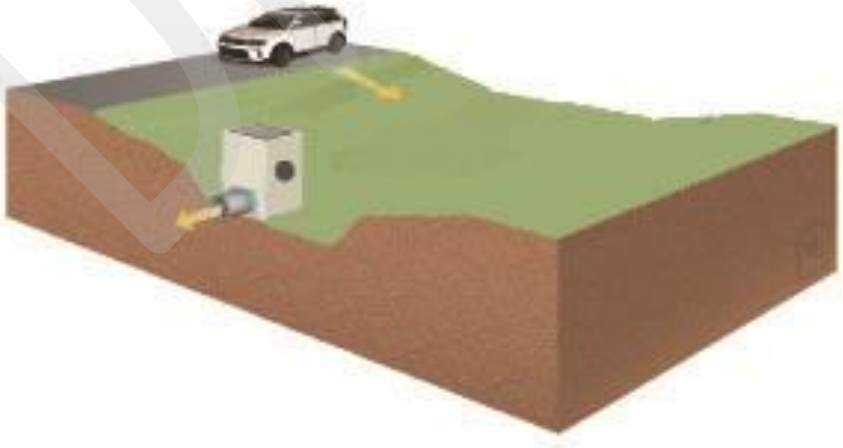


Figure 3-11: Dry extended detention basin schematic

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PRE TREATMENT BMPS

Pre-treatment BMPs are typically not used as primary treatment; however, they are highly recommended for preliminary treatment in order to prolong the life and prevent clogging of the downstream system in a treatment train.

MEDIA FILTERS

Media filters are usually designed as multi-chambered stormwater practices; the first is a settling chamber, and the second is a filter bed filled with sand or another filtering media. As stormwater flows into the first chamber, large particles settle out, and then finer particles and other pollutants are removed as stormwater flows through the filtering medium. They can also be used as pre-treatment, with their location prior to any infiltration or biotreatment BMP.

CATCH BASIN INSERTS

Catch basins inserts typically include a grate or curb inlet and a sump to capture sediment, debris, and pollutants. Filter fabric can also be included to provide additional filtering of particles. The effectiveness of catch basins, their ability to remove sediments and other pollutants, depends on its design and maintenance. Some inserts are designed to drop directly into existing catch basins, while others may require retrofit construction. Similar to media filters, catch basin filters can also be used as a pre-treatment BMP for infiltration and biotreatment BMPs.



Figure 3-12: Pre-treatment BMP schematic

RAINFALL HARVEST

Rainfall Harvest BMPs capture rainwater to be reused in lieu of discharging directly to the MS4.

ABOVE GROUND CISTERNS

Cisterns are large above ground tanks that store stormwater collected from impervious surfaces for domestic consumption. Above ground cisterns are used to capture runoff. Mesh screens are typically used to filter large debris before the stormwater enters the cistern. The collected stormwater could

potentially be used for landscape irrigation and some interior uses, such as toilets and washing machines. The collection and consumption of the stormwater results in pollution control, volume reduction, and peak flow reduction from the site.



Figure 3-13: Above ground cisterns schematic

UNDERGROUND DETENTION

Underground detention systems function similarly to above ground cisterns in that they collect and use stormwater from impervious surfaces. These systems are concealed underground and can allow for larger stormwater storage and capture additional impervious surfaces not easily captured in an above ground system (e.g. parking lots and sidewalks).



Figure 3-14: Underground detention schematic

DIVERSION SYSTEMS

LOW FLOW DIVERSION

Flow diversion systems collect and divert runoff. Flow diversion structures can primarily be used in two ways. First, flow diversion structures may be used to direct dry weather flows to a treatment facility, preventing the runoff from reaching a receiving water body. This is typically done with low flow runoff, which occurs during periods of dry weather. Second, flow diversion structures can also be modified by incorporating them into other BMPs. For example, diverted flow can be fed into a regional BMP. Properly designed stormwater diversion systems are very effective for preventing stormwater from being contaminated and for routing contaminated flows to a proper treatment facility.

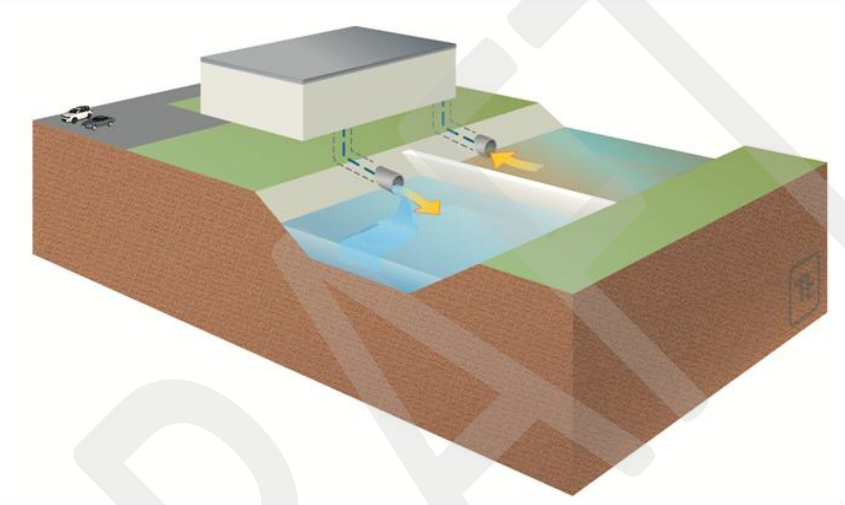


Figure 3-15: Low flow diversion schematic

3.4.3.2 PERFORMANCE EVALUATION OF STRUCTURAL BMPS

It is important to take the performance of stormwater BMPs into consideration during the planning and implementation process. This section provides an analysis of specific BMPs to determine the pollutant removal effectiveness of those BMPs. The International Stormwater BMP Database[14] (BMP Database) project website was used to analyze different BMP types for their effectiveness in removing specific pollutants. The website features a database of over 530 BMP studies, performance analysis results, BMP performance tools, monitoring guidance and other study-related publications. Performance studies relevant to BMPs matching the criteria for an effective regional or distributed application were analyzed to include the following:

- Bioretention
- Bioswale
- Detention Basin

[14] Geosyntec Consultants, Wright Water Engineers. International Stormwater Best Management Practices (BMP) Database Pollutant Category Summary Statistical Addendum: TSS, Bacteria, Nutrients, and Metals. July 2012.

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- Grass Strip
- Porous Pavement
- Retention Pond
- Wetland Basin
- Wetland Channel

The average influent and effluent concentrations for the 95th percentile confidence interval were analyzed for pollutants of concern for the Lower LAR watershed available through the BMP Database. The following pollutants were analyzed:

- Cadmium (Dissolved)
- Cadmium (Total)
- Copper (Dissolved)
- Copper (Total)
- E. coli
- Enterococcus
- Fecal Coliform
- Kjeldahl Nitrogen (Total)
- Lead (Dissolved)
- Lead (Total)
- Nickel (Dissolved)
- Nickel (Total)
- Nitrogen (Total)
- NOx as Nitrogen
- TSS
- Zinc (Dissolved)
- Zinc (Total)

The majority of the BMPs analyzed by the BMP Database project are located in major transportation corridors. Land use categories such as residential, commercial, and industrial are not heavily represented in the analysis. The BMP effectiveness may also vary with regional conditions. Many BMPs were monitored in areas where a higher intensity and volume of rainfall than LA County is observed. Additionally, some of the BMPs monitored were designed in the 1990s, 1980s, or earlier. These are expected to have been designed with less stringent guidelines resulting in a more conservative analysis. Although the conditions noted above may result in a slight variance in BMP effectiveness, the pollutant removal efficiencies are considered to be applicable.

It is important to note that the majority of pollutant load reduction is achieved using infiltration BMPs which result in an overall volume reduction. The analysis emphasizes reduction in concentrations of constituents, rather than volume or load reduction. Flow reduction analyses were not performed due to the dependence on rainfall intensity, soil types, and other site-specific conditions. The RAA has determined the volume reduction needed to meet compliance goals.

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RESULTS

The analysis can be used to evaluate BMPs and support assumptions made in the RAA regarding effluent concentrations from specific BMPs. The required pollutant reductions determined through the RAA will be used to prioritize the BMPs to maximize effectiveness. The results of the BMP Database analysis are presented in a comparison format to easily visualize the pollutant removal efficiencies of each BMP type.

Each pollutant analyzed is a pollutant of concern for the Lower Los Angeles WMP watershed, with the exception of Total Suspended Solids (TSS). The reason for its inclusion is that studies have shown that there is a direct correlation between sediment concentration and various pollutants for which the watersheds are impaired. The data compiled from the BMP Database was used to determine the percent removal of each BMP for each pollutant. Each BMP was ranked in terms of pollutant removal efficiency for each pollutant type (see the following *BMP Pollutant Removal Effectiveness Comparison Charts*). Data for specific pollutants was not available for each BMP; therefore, only available data is presented.

The next analysis included taking the data and grouping the removal efficiencies under each BMP type. The pollutants were then ranked in terms of pollutant removal efficiency for each BMP type (see the *BMP Type Comparison Charts for Pollutant Removal* below). Data for specific pollutants was not available for each BMP; therefore, only available data is presented.

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BMP Pollutant Removal Effectiveness Comparison Charts

Bioretention

TSS	78%
Total Zinc	75%
E. coli	71%
Enterococcus	61%
Total Copper	55%
Total Kjeldahl Nitrogen	36%
Total Lead	33%
Total Nitrogen	28%
NOx as Nitrogen	15%
Total Cadmium	5%

Bioswale

Total Nickel	66%
Dissolved Nickel	59%
Dissolved Zinc	54%
Total Lead	49%
Dissolved Cadmium	43%
Total Copper	40%
Total Cadmium	38%
TSS	37%
Total Zinc	37%
Dissolved Copper	27%
Dissolved Lead	22%
NOx as Nitrogen	17%
Total Kjeldahl Nitrogen	14%
Total Nitrogen	5%
E. coli	-5%
Fecal Coliform	-6%

Detention Basin

E. coli	67%
TSS	64%
Total Zinc	58%
Total Lead	49%
Total Copper	47%
Total Nickel	41%
Dissolved Copper	37%
NOx as Nitrogen	35%
Fecal Coliform	30%
Dissolved Zinc	29%
Total Cadmium	21%
Dissolved Lead	16%
Dissolved Nickel	10%
Total Kjeldahl Nitrogen	-8%
Total Nitrogen	-69%
Dissolved Cadmium	-233%

Grass Strip

Total Lead	78%
Total Zinc	76%
Total Copper	70%
Total Cadmium	65%
Dissolved Zinc	61%
Dissolved Lead	59%
TSS	56%
Dissolved Copper	54%
Total Nickel	46%
NOx as Nitrogen	34%
Dissolved Cadmium	31%
Fecal Coliform	28%
Dissolved Nickel	22%
Total Nitrogen	16%
Total Kjeldahl Nitrogen	16%

Porous Pavement

TSS	80%
Total Zinc	74%
Total Lead	57%
Total Nickel	53%
Dissolved Zinc	52%
Total Kjeldahl Nitrogen	52%
Dissolved Nickel	51%
Total Copper	40%
Dissolved Cadmium	33%
Total Cadmium	11%
Dissolved Lead	0%
Dissolved Copper	-7%
Total Nitrogen	-18%
NOx as Nitrogen	-69%

Retention Pond

E. coli	95%
TSS	81%
Enterococcus	75%
Total Lead	67%
Fecal Coliform	63%
Total Zinc	60%
NOx as Nitrogen	58%
Dissolved Zinc	57%
Total Cadmium	53%
Total Nickel	51%
Total Copper	48%
Dissolved Cadmium	41%
Dissolved Lead	37%
Dissolved Copper	35%
Total Nitrogen	30%
Total Kjeldahl Nitrogen	18%
Dissolved Nickel	-26%

Wetland Basin

Enterococcus	75%
NOx as Nitrogen	67%
TSS	56%
Total Zinc	54%
Fecal Coliform	53%
Total Cadmium	42%
Total Lead	40%
Total Copper	36%
E. coli	19%
Total Nitrogen	-4%
Total Kjeldahl Nitrogen	-6%

Wetland Channel

Dissolved Lead	84%
NOx as Nitrogen	44%
Total Zinc	32%
TSS	29%
Total Nickel	22%
Dissolved Zinc	18%
Total Nitrogen	16%
Total Lead	15%
Total Kjeldahl Nitrogen	15%
Total Cadmium	2%
Total Copper	-6%

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BMP Type Comparison Charts for Pollutant Removal

Influent/Effluent Summary Statistics for Dissolved Cadmium (ug/L)

BMP Type	In	Out	Percent Removal
Bioswale	0.21	0.12	43%
Retention Pond	0.17	0.1	41%
Porous Pavement	0.06	0.04	33%
Grass Strip	0.13	0.09	31%
Detention Basin	0.15	0.5	-233%

Influent/Effluent Summary Statistics for Total Cadmium (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	0.52	0.18	65%
Retention Pond	0.49	0.23	53%
Wetland Basin	0.31	0.18	42%
Bioswale	0.5	0.31	38%
Detention Basin	0.39	0.31	21%
Porous Pavement	0.28	0.25	11%
Bioretention	0.99	0.94	5%
Wetland Channel	0.5	0.49	2%

Influent/Effluent Summary Statistics for Dissolved Copper (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	11.66	5.4	54%
Detention Basin	5.56	3.52	37%
Retention Pond	6.57	4.24	35%
Bioswale	11.01	8.02	27%
Porous Pavement	5.37	5.75	-7%

Influent/Effluent Summary Statistics for Total Copper (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	24.52	7.3	70%
Bioretention	17	7.67	55%
Retention Pond	9.57	4.99	48%
Detention Basin	10.62	5.67	47%
Porous Pavement	13.07	7.83	40%
Bioswale	10.86	6.54	40%
Wetland Basin	5.61	3.57	36%
Wetland Channel	4.52	4.81	-6%

Influent/Effluent Summary Statistics for E. coli (#/100 mL)

BMP Type	In	Out	Percent Removal
Retention Pond	2800	150	95%
Bioretention	150	44	71%
Detention Basin	1300	429	67%
Wetland Basin	785	632	19%
Bioswale	3990	4190	-5%

Influent/Effluent Summary Statistics for Enterococcus (#/100 mL)

BMP Type	In	Out	Percent Removal
Retention Pond	615	153	75%
Wetland Basin	615	153	75%
Bioretention	605	234	61%

Influent/Effluent Summary Statistics for Fecal Coliform (#/100 mL)

BMP Type	In	Out	Percent Removal
Retention Pond	1920	707	63%
Wetland Basin	13000	6140	53%
Detention Basin	1480	1030	30%
Grass Strip	32000	23200	28%
Bioswale	4720	5000	-6%

Influent/Effluent Summary Statistics for Total Kjeldahl Nitrogen (mg/L)

BMP Type	In	Out	Percent Removal
Porous Pavement	1.66	0.8	52%
Bioretention	0.94	0.6	36%
Retention Pond	1.28	1.05	18%
Grass Strip	1.29	1.09	16%
Wetland Channel	1.45	1.23	15%
Bioswale	0.72	0.62	14%
Wetland Basin	0.95	1.01	-6%
Detention Basin	1.49	1.61	-8%

Influent/Effluent Summary Statistics for Dissolved Lead (µg/L)

BMP Type	In	Out	Percent Removal
Wetland Channel	3.26	0.52	84%
Grass Strip	0.64	0.26	59%
Retention Pond	0.76	0.48	37%
Bioswale	1.39	1.08	22%
Detention Basin	0.79	0.66	16%
Porous Pavement	0.5	0.5	0%

Influent/Effluent Summary Statistics for Total Lead (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	8.83	1.96	78%
Retention Pond	8.48	2.76	67%
Porous Pavement	4.3	1.83	57%
Detention Basin	6.08	3.1	49%
Bioswale	3.93	2.02	49%
Wetland Basin	2.03	1.21	40%
Bioretention	3.76	2.53	33%
Wetland Channel	2.94	2.49	15%

Influent/Effluent Summary Statistics for Dissolved Nickel (µg/L)

BMP Type	In	Out	Percent Removal
Bioswale	4.93	2.04	59%
Porous Pavement****	0.88	0.43	51%
Grass Strip	2.68	2.09	22%
Detention Basin	2.82	2.55	10%
Retention Pond	1.68	2.11	-26%

Influent/Effluent Summary Statistics for Total Nickel (µg/L)

BMP Type	In	Out	Percent Removal
Bioswale	9.26	3.16	66%
Porous Pavement	3.64	1.71	53%
Retention Pond	4.46	2.19	51%
Grass Strip	5.41	2.92	46%
Detention Basin	5.64	3.35	41%
Wetland Channel	2.8	2.18	22%

Influent/Effluent Summary Statistics for Total Nitrogen (mg/L)

BMP Type	In	Out	Percent Removal
Retention Pond	1.83	1.28	30%
Bioretention	1.25	0.9	28%
Wetland Channel	1.59	1.33	16%
Grass Strip	1.34	1.13	16%
Bioswale	0.75	0.71	5%
Wetland Basin	1.14	1.19	-4%
Porous Pavement	1.26	1.49	-18%
Detention Basin	1.4	2.37	-69%

Influent/Effluent Summary Statistics for NOx as Nitrogen (mg/L)

BMP Type	In	Out	Percent Removal
Wetland Basin	0.24	0.08	67%
Retention Pond	0.43	0.18	58%
Wetland Channel	0.34	0.19	44%
Detention Basin	0.55	0.36	35%
Grass Strip	0.41	0.27	34%
Bioswale	0.3	0.25	17%
Bioretention	0.26	0.22	15%
Porous Pavement	0.42	0.71	-69%

Influent/Effluent Summary Statistics for TSS (mg/L)

BMP Type	In	Out	Percent Removal
Retention Pond	70.7	13.5	81%
Porous Pavement	65.3	13.2	80%
Bioretention	37.5	8.3	78%
Detention Basin	66.8	24.2	64%
Grass Strip	43.1	19.1	56%
Wetland Basin	20.4	9.06	56%
Bioswale	21.7	13.6	37%
Wetland Channel	20	14.3	29%

Influent/Effluent Summary Statistics for Dissolved Zinc (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	36.1	14	61%
Retention Pond	22.5	9.6	57%
Bioswale	52.7	24.5	54%
Porous Pavement	13.5	6.5	52%
Detention Basin	15.6	11.08	29%
Wetland Channel	11.6	9.5	18%

Influent/Effluent Summary Statistics for Total Zinc (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	103.3	24.3	76%
Bioretention	73.8	18.3	75%
Porous Pavement	57.6	15	74%
Retention Pond	53.6	21.2	60%
Detention Basin	70	29.7	58%
Wetland Basin	48	22	54%
Bioswale	36.2	22.9	37%
Wetland Channel	23	15.6	32%

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RESULTS ANALYSIS SUMMARY

The statistical analysis presented has many applications, including supporting BMP prioritization and the RAA analysis. As future applications are undertaken, the results can be analyzed in more detail. For this analysis, the following observations were discovered:

- Overall, the retention pond returned the best results in terms of pollutant removal efficiency for several pollutants, with more than 60% removal for E. coli, TSS, Enterococcus, total lead, fecal coliform and total zinc.
- Among the constituents analyzed, the percent removals were often the highest for metals, lead and zinc in particular.
- The poorest performance was often observed for nutrients and bacteria, with concentrations increasing for some BMP types. Leaching of nutrients from soils/planting media and resuspension of captured pollutants may be a cause of the increases observed in these BMPs[15].

It is important to note that the majority of pollutant removal associated with stormwater BMPs will be due to infiltration and overall volume reduction. Although this is the case, a small component may be associated with inflow to outflow pollution concentration reduction and the analysis focuses on this percent reduction. Percent reduction is easily understandable and convenient for reporting; therefore, the method seems to be appropriate for this analysis. Refer to the article "Voodoo Hydrology" in the July 2006 article of Stormwater Magazine[16] for further information on caveats to this method. Although the analysis does not cover volume reduction, the RAA analysis has estimated the pollutant reduction necessary to meet compliance.

3.4.3.3 EXISTING TARGETED STRUCTURAL BMPS

The existing structural BMPs in place within the Watershed Group area, with the exception of the Hollydale Regional and Circle Parks project, have been included in the RAA model. Refer to Chapter 4 for more details. A summary of the Hollydale Regional and Circle Parks project is as follows:

HOLLYDALE REGIONAL AND CIRCLE PARKS – STATUS: COMPLETED IN 2013

The Hollydale Regional and Circle Parks were developed adjacent to the Los Angeles River in the city of South Gate in 2013. The parks include vegetated swales which treat stormwater runoff and runon. Since the project was recently completed in 2013, it is expected that the environmental benefits for this project have not yet been observed in past monitoring.

3.4.3.4 PLANNED TARGETED CONTROL MEASURES

The projects listed below have been planned to some extent by the Participating Agencies. A literature review was conducted of existing TMDL Implementation Plans, the existing IRWMP, and other planning documents to collect data. The extent of planning of these projects ranges from a roundtable discussion to being in preliminary phases of design.

[15] Stormwater: BMP Effectiveness for Nutrients, Bacteria, Solids, Metals, and Runoff Volume (2012). Retrieved online at: http://www.stormh2o.com/

[16] http://www.stormh2o.com/SW/Editorial/Voodoo_Hydrology_37.aspx

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CHITTICK FIELD PARK - STATUS: TRASH CAPTURE SYSTEMS INSTALLED

This park is located in the city of Long Beach at 1900 Walnut Avenue. The site is already equipped with a large number of full-capture trash systems. The park is located in a relatively flat area with a large surrounding developed area. The site is approximately 19.9 acres and in periods of heavy rainfall, it already functions as a detention basin.

Additional features under consideration, according to the IRWMP, include replacing the concrete lined "low flow" swales with vegetated swales for biofiltration, construction of a new underground "low flow" pipe network to convey treated water to the basin pump station, and replacing the existing pump station with a new low flow pump station.

Although not yet planned, this location is also seen to have potential for a future regional BMP. Assuming the entire site were enhanced to incorporate infiltration, the maximum area for which stormwater runoff could be diverted to the park is 289 acres, totaling the maximum potential design capture volume to be 23.8 acre-feet. Alternatively, the operations of the pump station will be investigated to determine if the site could be used for enhanced detention (enabling particular pollutants additional time to settle out).

MULTI-AGENCY, MULTI-WATERSHED PROJECT TO INCORPORATE LOW IMPACT DEVELOPMENT (LID) BMPS INTO MAJOR TRANSPORTATION CORRIDORS IN THE GATEWAY REGION OF LOS ANGELES

(GATEWAY PROP 84 PROJECT - **GRANT APPLICATION APPROVED**)

This project is a planned regional project within multiple cities to include the cities of Bell Gardens, Downey, Pico Rivera, Paramount, South Gate, and Lynwood. The Gateway Water Management Authority (GWMA) applied for funds through the Prop 84 Grant Round 2 program to put towards this project, which was approved in May 2014. The project is in the preliminary design phase and the information provided is subject to change.

The project seeks to prevent stormwater contamination of surface waters in three watersheds, to include the Los Angeles River. This will be accomplished by installing LID BMPs to treat stormwater runoff, and its associated pollutants. Table 3-12 lists the BMPs to be implemented within the Cities and Figures 3-17 to 3-20 show the project locations within each city.

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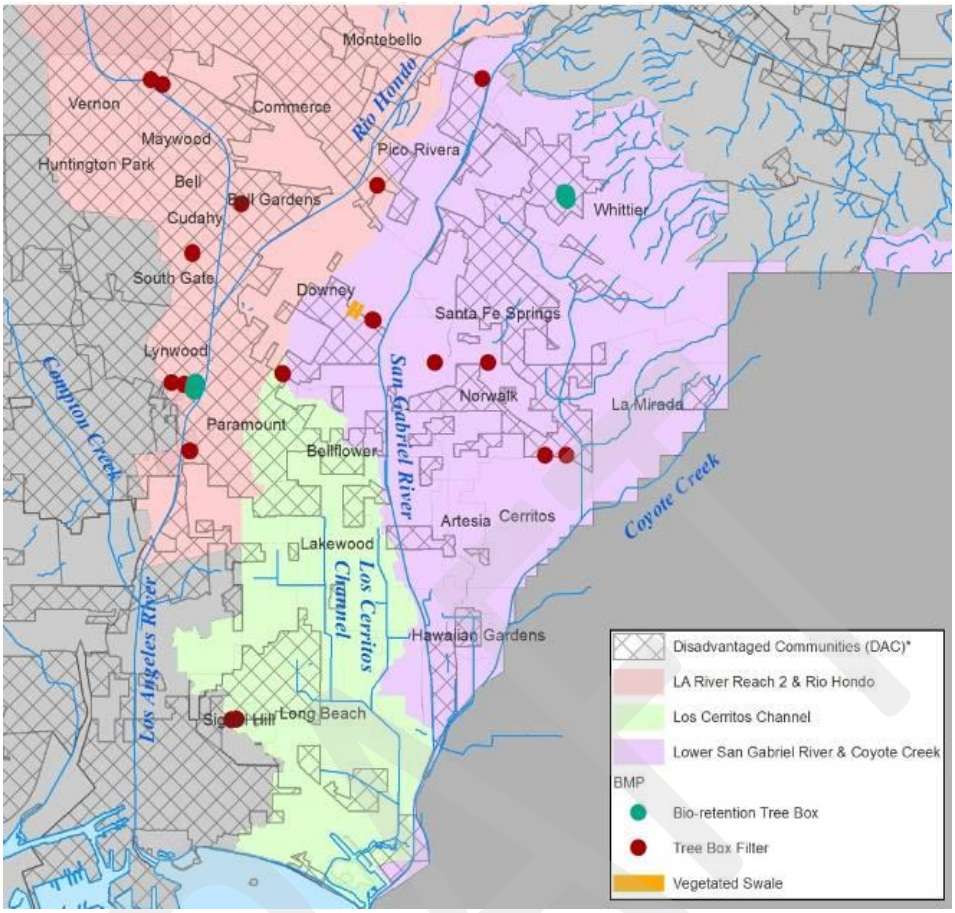


Figure 3-16: BMP Locations within the Gateway Prop 84 Project

Table 3-12: Proposed BMPs within the Gateway Prop 84 Project

City	LID BMPs	Location	Anticipated Treatment Volume[17]
Bell Gardens	(10) Bioretention Tree Wells	Locations to be determined	5,870 cf
	(3) Tree box filters	(1) Clark Street at Atlantic Avenue, (2) Clark Street at Wright Road	21,774 cf
Downey	(2) Tree box filters	(2) Alondra Boulevard west of Hunsaker Avenue	14,516 cf
Pico Rivera	(1) Tree box filters	(1) Slauson Avenue and Paramount Boulevard	7,258 cf
Paramount	(2) Tree box filters	(2) Alondra Boulevard west of Hunsaker Avenue	14,516 cf
South Gate	(2) Tree box filters	(2) Firestone Boulevard and Atlantic Avenue	14,516 cf
Lynwood	(2) Tree box filters	(2) Firestone Boulevard and Atlantic Avenue	14,516 cf

[17] Treatment volume calculations based on a 24-hour, 0.75 in storm, 6x6 tree box filter units and a 1200 LF swale.

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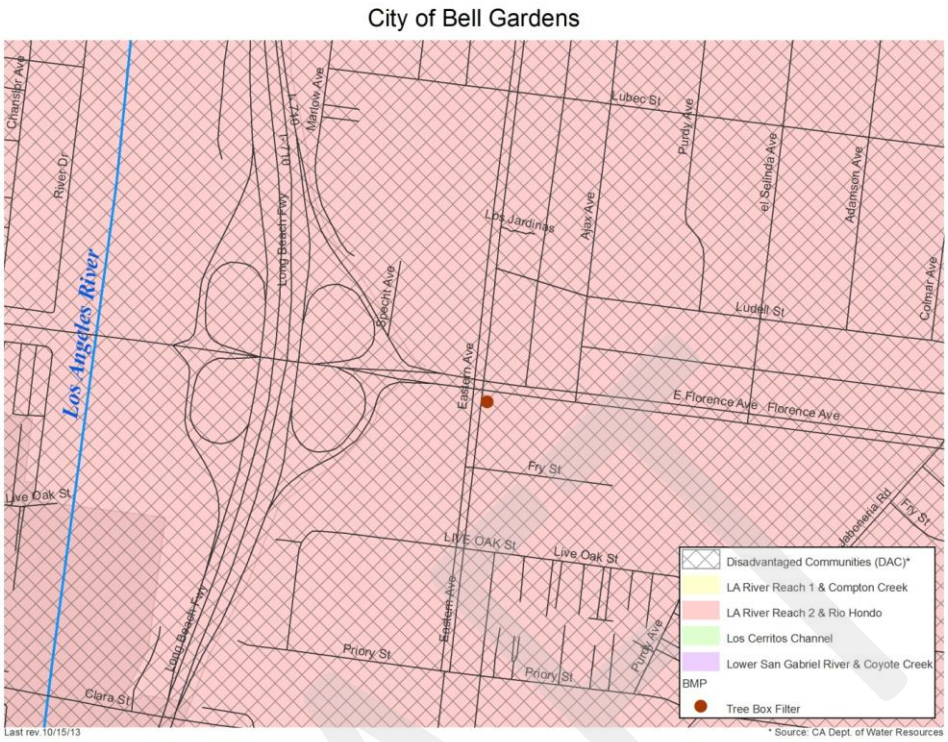


Figure 3-17: Gateway Prop 84 Project BMP locations proposed for the city of Bell Gardens



Figure 3-18: Gateway Prop 84 Project BMP locations proposed for the city of Downey

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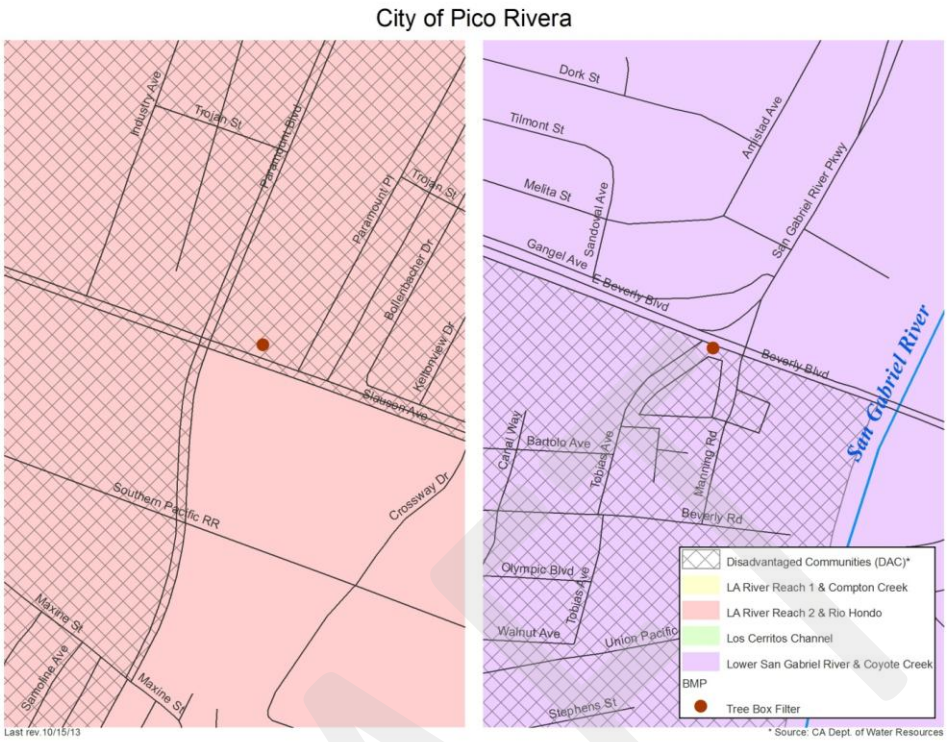


Figure 3-19: Gateway Prop 84 Project BMP locations proposed for the city of Pico Rivera

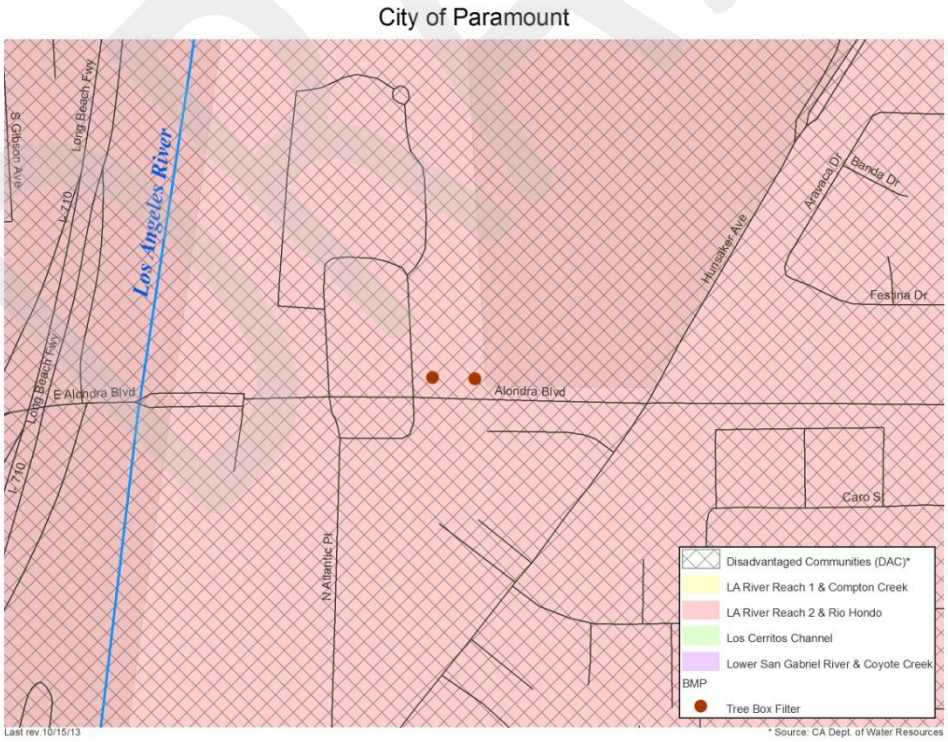


Figure 3-20: Gateway Prop 84 Project BMP locations proposed for the city of Paramount

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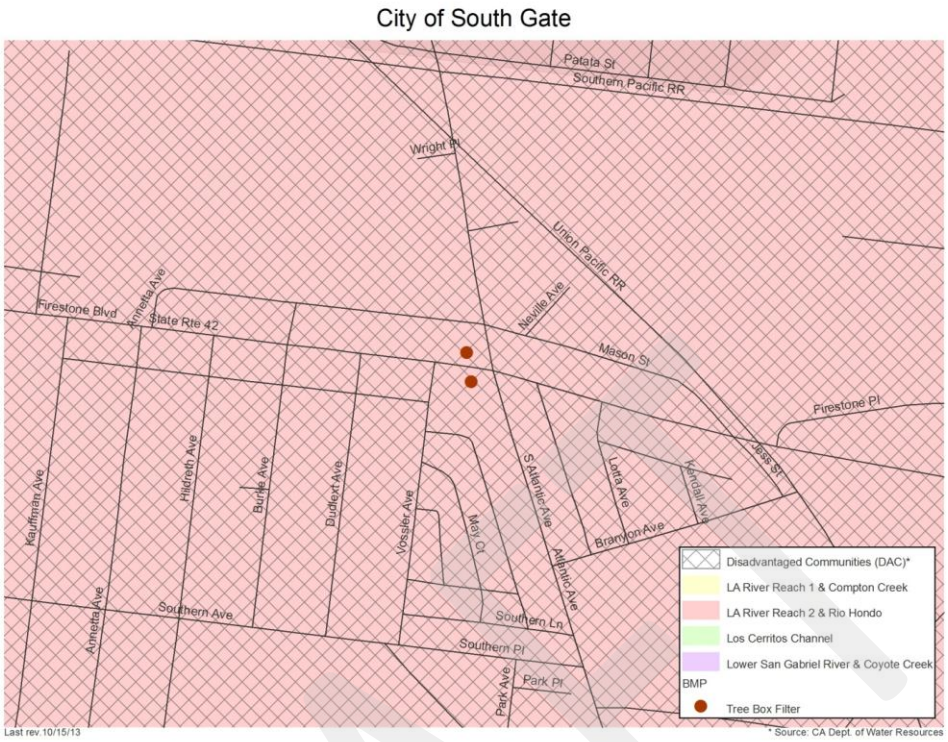


Figure 3-21: Gateway Prop 84 Project BMP locations proposed for the city of South Gate

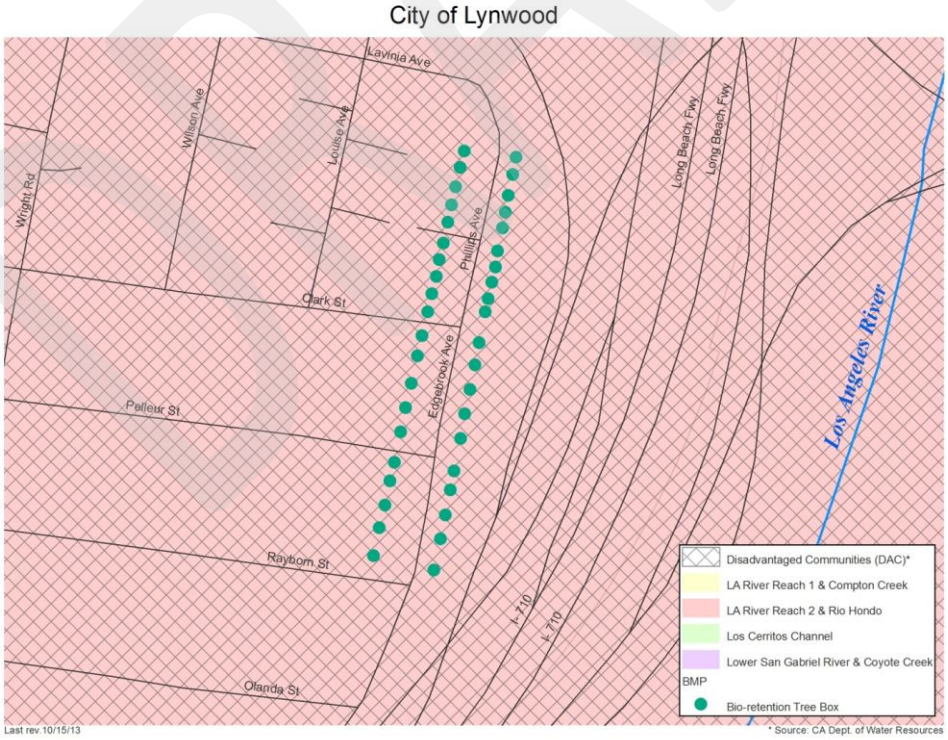


Figure 3-22: Gateway Prop 84 Project BMP locations proposed for the city of Lynwood

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IRWMP PROJECTS

The following project descriptions are from the Gateway Integrated Regional Watershed Management Plan (IRWMP). These projects have been discussed in detail with the Gateway Water Management Authority (GWMA) and are likely to be implemented once the required funding is acquired. Further details about each project can be found in the Gateway IRWMP documents.

FERNWOOD WATER IMPROVEMENT PARK

The Fernwood Water Improvement Park is a multi-benefit project that serves disadvantaged communities in the city of Lynwood while meeting IRWMP water management objectives. The project site is currently an empty 6.5 acre lot owned by the city of Lynwood located on a long stretch along Fernwood Avenue, between Atlantic Avenue and Long Beach Boulevard. The park will feature stormwater improvement elements such as infiltration areas and vegetated swales. The project also includes native shrubs and trees that will increase habitat for birds, butterfly species and mammals.

CONSTRUCT BIOSWALES/LANDSCAPING IN VARIOUS LOCATIONS IN LONG BEACH

This project will construct and/or reconstruct new and existing medians within the city of Long Beach to capture and treat stormwater runoff. The specific locations have not yet been identified; therefore, as this project progresses the RAA results will be taken into consideration in order to place the BMPs in locations with the highest potential for pollutant reduction.

FIRESTONE BOULEVARD MEDIAN PROJECT

This project is located in the city of South Gate and will enhance the Firestone corridor by installing a landscaped median that will utilize recycled water to irrigate the landscape. A reverse swale would also allow for stormwater runoff capture.

TREE WELL DRY WEATHER RUNOFF AND FIRST FLOW STORMWATER CAPTURE/TMDL PROJECT

This project will be located within the city of South Gate and will consist of the installation of tree wells designed to capture dry weather flows and first storm flows in tree wells along the curb before the flow reaches the storm drain.

PILOT PLANT FOR TREATMENT OF LOS ANGELES RIVER WATER

This project is proposed in the city of Long Beach. This project will provide a skid mounted treatment train capable of treating 20 GPM of water within the Los Angeles River and the engineering support to confirm the effluent will be suitable for potable use. The Pilot Plant is to be installed near West Del Amo Boulevard and Oregon Avenue. The pilot plant will be in operation for 4 months with the option to increase the time of study to 24 months after review of initial data.

LAR ESTUARY BACTERIA TMDL - SOUTHWEST AREA LOW FLOW DIVERSION

This project will construct a system that will divert low stormwater flows from an existing storm drain outfall that services approximately 40% the Los Angeles River watershed located within the city of Signal Hill's boundaries directly into the Alamitos Sanitary Sewer Lift Station for eventual treatment by the Los Angeles County Sanitation District. This project will prevent nonstormwater flows and "first flush" storm flows from ultimately being emptied into the Hamilton Bowl Stormwater Retention facility and ultimately pumped into the Los Angeles River Estuary. This project contributes to the Gateway IRWMP

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Goal and Objective of protecting and enhancing water quality through the attainment of required TMDL levels in accordance with State Water Quality Control Board MS4 Permit requirements. This project is anticipated to cost approximately $1.7 million with an annual operations and maintenance cost of $200,000 per year.

LAR Estuary Bacteria TMDL - Southeast Area Low Flow Diversion

This project will construct a system that will divert low stormwater flows from an existing storm drain outfall that services approximately 50% the Los Angeles River watershed located within the city of Signal Hill's boundaries directly into the sanitary collection main for eventual treatment by the Los Angeles County Sanitation District. This project will prevent summer nonstormwater flows and "first flush" storm low flows from being emptied into the Hamilton Bowl Stormwater Retention facility and ultimately pumped into the Los Angeles River Estuary. This project contributes to the Gateway IRWMP Goal and Objective of protecting and enhancing water quality through the attainment of required TMDL levels in accordance with State Water Quality Control Board MS4 Permit requirements. This project is anticipated to cost approximately $1.7 million with an annual operations and maintenance cost of $200,000 per year.

Long Beach Urban Runoff Recycling Facility (LBURRF)

This project will serve the cities of Long Beach, Signal Hill, Lynwood, and South Gate. This project proposes to construct a facility that would intercept and treat nonstormwater and initial stormwater runoff flow. After treatment, water would be recycle for irrigation use along the 710 Freeway and parks along the vicinity of the 710 Freeway.

Cha'wot Open Space Preservation and Stormwater Runoff Reduction

Located in the city of Signal Hill, this project proposes the purchase of available open space in the northerly hilltop area of Signal Hill to preserve existing nature and wildlife; provide walking, hiking, and recreational opportunities; naturally reduce stormwater runoff by preserving undeveloped open space; reduce the demand for potable water by reducing the amount of land available for development.

The details of this project do not currently incorporate water quality improvement strategies; however, it is recognized as a potential location for regional BMPs.

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3.4.3.5 POTENTIAL SITES FOR FUTURE TARGETED CONTROL MEASURES

A preliminary assessment has been performed for the Lower LAR Watershed to determine potential areas to locate regional BMPs. This was done with a preliminary GIS approach by screening areas within 660 feet (1/8 mile) of a waterbody and currently designated as open space as well as other potentially useful zoning designations. The overall size of each site was used to calculate the maximum amount of volume which could be stored at the site and the maximum amount of area that could be diverted to the site assuming the entire site were redeveloped to incorporate infiltration.

The equations used were derived from the Orange County Technical Guidance Document (OC TGD)[18] and can be found below:

$$\mathbf{DCV = CdA_{TRIBUTARY} \times \left(\frac{43560}{12}\right)}$$

Driving Equation No. 1

$$D_{MAX} = K_{DESIGN} T \times \left(\frac{1}{12}\right)$$

Assume K_{DESIGN} = 0.3 in/hr

0.3 in/hr is the lowest infiltration rate where infiltration is deemed feasible per the MS4 Permit.

$$D_{MAX} = 0.3 \times 48 \times \frac{1}{12} = 1.2 \text{ feet}$$

$$A_{BMP} = \frac{DCV}{D_{MAX}}$$

$$\mathbf{A_{TRIBUTARY} = \frac{A_{BMP} \times 1.2}{Cd \times \left(\frac{43560}{12}\right)}}$$

Driving Equation No. 2

$$C = (0.75 \times IMP) + 0.15 = 0.9$$

Assume 100% imperviousness

Assume d=1.1

1.1 inches is the highest depth on the LA County 85th Percentile Isohyetal Map for the watershed.

$$\mathbf{A_{TRIBUTARY} = \frac{A_{BMP} \times 1.2}{0.9 \times 1.1 \times \left(\frac{43560}{12}\right)}}$$

Final Equation No. 1

$$\mathbf{DCV = A_{BMP} \times 1.2}$$

Final Equation No. 2

A_{BMP} has been assumed to be the total site area to determine the maximum tributary area that can be diverted to the site and the maximum volume the site can treat.

Where:

DCV:	Design Capture Volume	$A_{TRIBUTARY}$:	Area Tributary to BMP	T:	Drawdown Time
C:	Runoff Coefficient	D_{MAX}:	Maximum Effective Depth	A_{BMP}:	Footprint Area of BMP
d:	Rainfall Depth	K_{DESIGN}:	Design Infiltration Rate	IMP:	Percent Impervious

[18] Orange County. Technical Guidance Document for the Preparation of Conceptual/Preliminary and/or Project Water Quality Management Plans (WQMPs). May 19, 2011.

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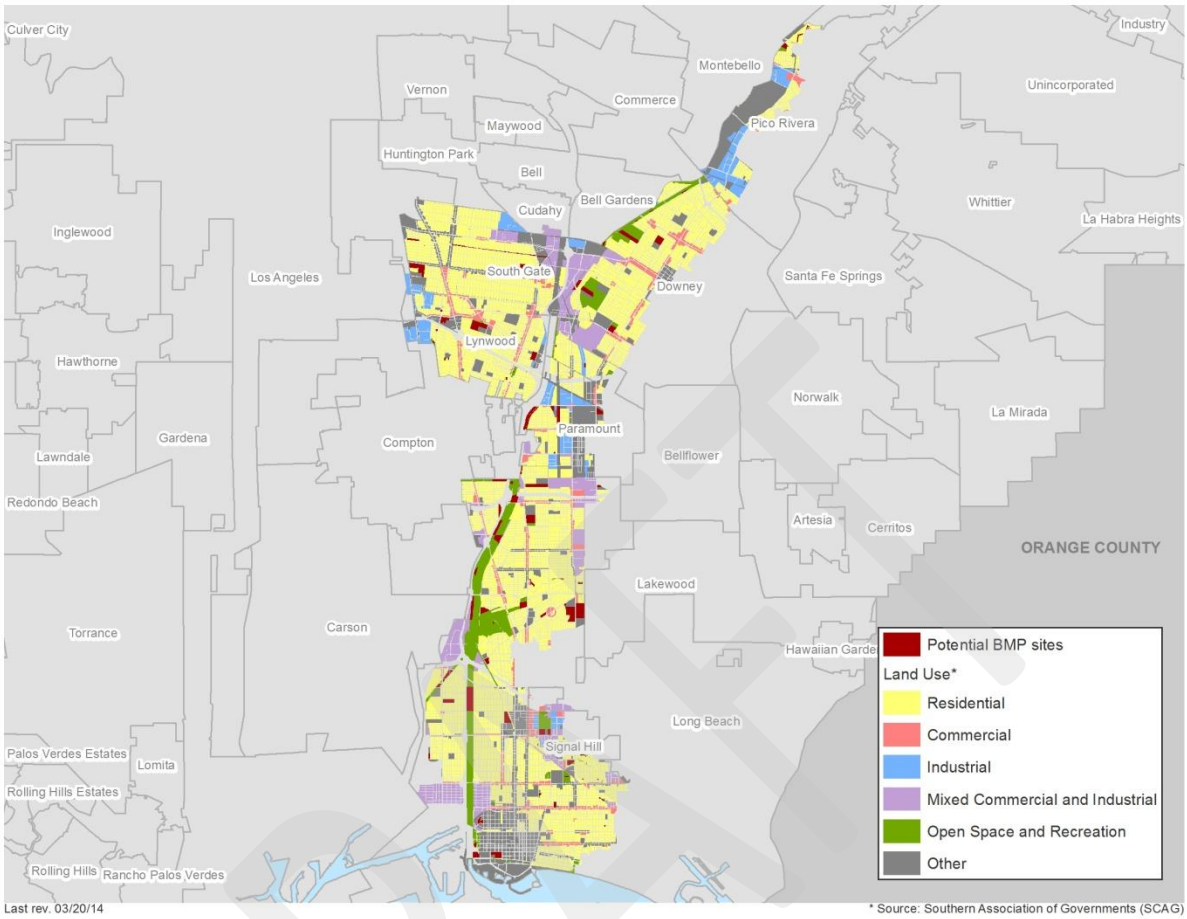


Figure 3-23: Potential Sites for Future Structural BMPs

Figure 3-21 and Table 3-13 indicate the locations of sites potentially available for future regional BMPs. These locations can serve as a starting point during the implementation phase of the WMP. They have been grouped by jurisdiction and listed in order by land use. The land use with the highest accessibility is listed first. Within each land use designation, the sites have been listed from largest to smallest. Note that with regional BMPs there are opportunities for multiple agencies to benefit from the same site. The land uses are ranked as follows:

OPEN SPACE AND RECREATION: Sites designated for open space, parks, and recreational activities were ranked with the highest potential for future regional BMPs. The reasoning being that these types of areas have the highest likeliness to be publically owned and not require land acquisition, generally have a high percentage of landscaped area available, and have a high opportunity for multiple benefits.

EDUCATIONAL USE: Sites designated for educational use were ranked with the second highest potential for future regional BMPs. The reasoning being that these types of areas although not city-

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owned could have an easier land acquisition process than privately owned land, generally have a high percentage of landscaped area available, and have a high opportunity for multiple benefits.

GOVERNMENT INSTITUTION[19]: Sites designated for educational use were ranked with the third highest potential for future regional BMPs. This is due to the institution being government owned presenting a higher chance of collaboration than a privately owned facility. Although this may be the case, many government institutions may not be willing to take on maintenance responsibilities which would result in the necessity of land acquisition or maintenance agreements.

GOLF COURSES/COUNTRY CLUBS: Sites designated for golf courses or country clubs were ranked with the fourth highest potential for future regional BMPs. The reasoning being that these types of areas generally have a high percentage of landscaped area available and have a high opportunity for multiple benefits. Although this may be the case, land acquisition for these sites is expected to be a difficult accomplishment.

COMMERCIAL USE: Sites designated for commercial areas were ranked with the fifth highest potential for future regional BMPs. The reasoning being that these types of areas generally have a high percentage of parking area available which could potentially be retrofitted for infiltration opportunities. Although this may be the case, land acquisition for these sites is expected to be a difficult accomplishment.

The available sites will be further assessed to determine the best location for a regional BMP. Note that the sites presented do not represent the only sites available for the Watershed Group. The ultimate site selection process should take into account the following characteristics:

LOCATION IN RELATION TO RAA RESULTS: The RAA provides an estimation of runoff reduction to be provided in each area in order to meet the water quality objectives. The sites should be selected taking this into consideration.

GIS DATA: GIS data should be further analyzed to screen projects based on criteria such as land use, topography, hydrologic features, streets and roads, existing storm drain infrastructure, and storm drain invert depth.

PROJECT BENEFITS: It is preferred that a project contains multiple benefits in order to increase the overall benefit and support for the project. Benefits to take into consideration include, but are not limited to, the following:

- Water quality benefits
- Water supply benefits
- Recreational use
- Multi-agency benefits
- Publically owned

[19] This land use is not in the current potential site list; however, it was included for future reference in the case that additional locations are gathered during the implementation or adaptive management process.

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- Storage availability
- Funding available
- Project readiness
- Flood control benefits
- Proximity to pollutant sources or impaired waters
- Adjacent to existing storm drain

PROJECT CONSTRAINTS: Not every project will be feasible; therefore, it is important to take into consideration any constraints that may result in project infeasibility. These constraints include, but are not limited to, the following:

- High groundwater
- Low infiltration rates
- Existing soil contamination/proximity to existing soil contamination
- Brownfields[20]
- Existing groundwater contamination/proximity to existing groundwater contamination
- Potential for soil instability (liquefaction zones, hillside areas)
- Existing private ownership (requires land acquisition)
- Cost Effectiveness
- Historical landmarks

DRAFT

[20] With certain legal exclusions and additions, the term "brownfield site" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant (*Environmental Protection Agency*).

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Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Downey	Open Space & Recreation	Furman Park	10419 Rives Ave.	33.9534	-118.1375	13.8	200	16.5
		open space	Guatemala Ave.	33.9681	-118.1283	13.4	195	16.1
		Apollo Park	12544 Rives Ave.	33.9267	-118.1546	11.0	160	13.2
		open space	Guatemala Ave.	33.9622	-118.1401	9.1	133	10.9
		open space	Sherry Ave.	33.9592	-118.1459	4.2	62	5.1
		Crawford Park	7000 Dinwiddie St.	33.9523	-118.1575	2.2	32	2.6
	Educational Use	Middle School	Excluded for privacy			22.0	320	26.4
		High School	Excluded for privacy			17.5	254	21.0
		Middle School	Excluded for privacy			14.9	217	17.9
		Elementary School	Excluded for privacy			7.2	105	8.7
		Elementary School	Excluded for privacy			6.4	93	7.7
		Elementary School	Excluded for privacy			6.1	89	7.3
		Elementary School	Excluded for privacy			5.8	85	7.0
		Elementary School	Excluded for privacy			4.8	70	5.8
		Elementary School	Excluded for privacy			2.1	30	2.5
	Golf Courses/ Country Clubs	Golf Course	Excluded for privacy			121.4	1,765	146
		Golf Club	Excluded for privacy			100.0	1,455	120
Lakewood	Open Space & Recreation	Cherry Cove Park	5159 Meadow Wood Ave.	33.8502	-118.1657	3.0	43	3.5
Long Beach	Open Space & Recreation	open space	710 Fwy	33.8669	-118.1958	46.3	674	55.6
		open space	710 Fwy	33.8536	-118.2036	40.9	595	49.1
		Houghton Park	6301 Myrtle Ave.	33.8695	-118.1838	23.3	338	27.9
		Scherer Park	4600 Long Beach Blvd.	33.8436	-118.1865	21.5	313	25.8
		open space	S. Sportsman Dr.	33.8804	-118.1906	16.3	237	19.5
		Veterans Memorial Park	101 E. 28th St.	33.8096	-118.1922	14.3	208	17.2
		open space	E. 208th St.	33.8425	-118.2049	14.2	206	17.0
		open space	Harbor St.	33.8193	-118.2168	14.1	205	16.9

[21] These numbers were generated using the Los Angeles County GIS Data Portal website (http://egis3.lacounty.gov/dataportal/) and the LA County Department of Public Works Spatial Information Library website (http://dpw.lacounty.gov/general/spatiallibrary/index.cfm?agree=agree). All areas may not be usable space for BMP retrofits.

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Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach	Open Space & Recreation	Hudson Park	2335 Webster Ave.	33.798	-118.2202	12.5	182	15.0
		Admiral Kidd Park	2125 Santa Fe Ave.	33.7958	-118.2156	11.0	160	13.2
		Silverado Park	1545 W. 31st St.	33.8146	-118.2132	10.5	153	12.6
		Wrigley Greenbelt	DeForest Ave. (Willow to 34th)	33.8153	-118.2055	10.0	145	11.9
		Cherry Park	1901 East 45th St.	33.8395	-118.1688	9.9	145	11.9
		open space	Inez St.	33.8796	-118.1796	9.5	138	11.4
		open space	Oregon Ave.	33.842	-118.2007	9.5	138	11.4
		open space	Lime Ave.	33.8796	-118.1836	8.3	120	9.9
		Coolidge Park	352 E. Neece St.	33.8722	-118.195	7.2	104	8.6
		Lincoln Park (Civic Center)	Pacific Ave. & Broadway St.	33.7684	-118.1955	7.0	101	8.4
		Martin Luther King Jr. Park	1950 Lemon Ave.	33.7926	-118.1769	6.8	98	8.1
		Santa Cruz Park	Cedar Ave. to Golden Ave.	33.7683	-118.2032	6.4	92	7.6
		Los Cerritos Park	3750 Del Mar Ave.	33.8267	-118.1994	6.2	90	7.4
		Drake Park	951 Maine Ave.	33.7785	-118.2018	6.0	87	7.1
		open space	E. 69th St.	33.8795	-118.1592	5.7	83	6.9
		Golden Park	Shoreline Dr.	33.7713	-118.2035	5.7	83	6.8
		open space	Baltic Ave.	33.8224	-118.2138	5.7	82	6.8
		Atlantic Plaza Park	1000 Via Wanda	33.8501	-118.1832	5.4	78	6.4
		Bixby Knolls Park	1101 San Antonio Dr.	33.8406	-118.1791	4.3	62	5.1
		Camp	Excluded for privacy	3.6	53	4.4		
		MacArthur Park	1321 Anaheim St.	33.7835	-118.1747	3.3	48	3.9
		open space	E. 72nd St.	33.8842	-118.1871	3.1	45	3.7
		Orizaba Park	1435 Orizaba Ave.	33.7851	-118.1579	2.7	39	3.2
		Jackson Park	1432 Jackson St.	33.8515	-118.1723	2.1	31	2.5
		open space	Caspian Ave.	33.8236	-118.2123	1.6	24	2.0
		Tanaka Park	1400 W. Wardlow Rd.	33.8235	-118.2134	1.4	20	1.7
		open space	Arlington St.	33.821	-118.215	1.2	17	1.4

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Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach	Open Space & Recreation	McBride Park (Cal Rec Center)	1550 Martin Luther King Ave.	33.7867	-118.1803	1.0	15	1.2
		Rose Park	8th St. & Orizaba Ave.	33.7772	-118.1568	0.8	11	0.9
	Educational Use	High School	Excluded for privacy			16.6	241	19.9
		High School	Excluded for privacy			14.0	204	16.8
		Middle School	Excluded for privacy			10.3	150	12.4
		Middle School	Excluded for privacy			10.2	148	12.2
		High School	Excluded for privacy			9.3	135	11.1
		Elementary School	Excluded for privacy			8.2	119	9.8
		Middle School	Excluded for privacy			8.0	116	9.6
		Elementary School	Excluded for privacy			6.4	92	7.6
		Elementary School	Excluded for privacy			6.3	91	7.5
		Middle School	Excluded for privacy			6.2	90	7.4
		School	Excluded for privacy			5.2	76	6.3
		Elementary School	Excluded for privacy			5.0	73	6.0
		School	Excluded for privacy			4.8	71	5.8
		Elementary School	Excluded for privacy			4.5	66	5.4
		Elementary School	Excluded for privacy			4.1	60	5.0
		Elementary School	Excluded for privacy			3.8	55	4.5
		Elementary School	Excluded for privacy			3.7	54	4.5
		Elementary School	Excluded for privacy			3.6	52	4.3
		Elementary School	Excluded for privacy			3.4	50	4.1
		Middle School	Excluded for privacy			3.1	45	3.8
		School	Excluded for privacy			3.1	45	3.7
		Elementary School	Excluded for privacy			2.9	42	3.5
		Elementary School	Excluded for privacy			2.6	37	3.1
		Elementary School	Excluded for privacy			2.6	37	3.1
		Elementary School	Excluded for privacy			2.4	35	2.9
		Elementary School	Excluded for privacy			2.1	30	2.5
		Middle School	Excluded for privacy			2.0	29	2.4
		Elementary School	Excluded for privacy			1.9	28	2.3

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Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach	Educational Use	Elementary School	Excluded for privacy			1.8	26	2.1
		School	Excluded for privacy			1.7	25	2.1
		Elementary School	Excluded for privacy			1.7	25	2.0
		Elementary School	Excluded for privacy			1.5	22	1.8
		Elementary School	Excluded for privacy			1.5	22	1.8
		Elementary School	Excluded for privacy			1.2	18	1.5
		High School	Excluded for privacy			1.1	15	1.3
		Academy	Excluded for privacy			0.7	10	0.8
	Golf Course/ Country Club	Country Club	Excluded for privacy			178.9	2,603	215
Lynwood	Open Space & Recreation	Lynwood City Park	11301 Bullis Rd.	33.9276	-118.203	10.0	145	12.0
		Yvonne Burke-John D. Ham Park	11832 Atlantic Ave.	33.9137	-118.1901	8.7	127	10.4
		Lynwood Meadows Park	State St. & Cedar Ave.	33.9227	-118.2189	1.5	21	1.8
		Rose Park	Flower St. & State St.	33.9263	-118.2178	1.5	21	1.7
		park	El Segundo Blvd.	33.9176	-118.2149	1.3	19	1.6
		Carnation Park	Los Flores Blvd. & State St.	33.9322	-118.2162	1.2	18	1.5
		open space	Atlantic Ave.	33.9134	-118.191	0.9	13	1.1
		park	El Segundo Blvd.	33.9177	-118.2135	0.8	12	1.0
	Educational Use	Lugo Park	Cortland St.	33.9185	-118.1828	5.1	74	6.1
		Lynwood High	Excluded for privacy			14.8	215	17.7
		Lynwood Middle	Excluded for privacy			7.6	111	9.1
		Marco Antonio Firebaugh High	Excluded for privacy			6.3	91	7.5
		Chavez Middle	Excluded for privacy			4.1	60	4.9
		Mark Twain Elementary	Excluded for privacy			3.8	55	4.5
		Lindbergh Elementary	Excluded for privacy			3.4	50	4.1
		Abbott Elementary	Excluded for privacy			3.1	46	3.8

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Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Lynwood	Educational Use	Will Rogers Elementary	Excluded for privacy			3.1	44	3.7
		Rosa Parks Elementary	Excluded for privacy			2.8	40	3.3
		Roosevelt Elementary	Excluded for privacy			2.7	39	3.2
		Hosler Middle	Excluded for privacy			2.5	37	3.0
		Wilson Elementary	Excluded for privacy			2.2	32	2.6
		Marshall Elementary	Excluded for privacy			2.1	31	2.5
		Helen Keller Elementary	Excluded for privacy			2.1	30	2.5
		Vista High	Excluded for privacy			1.9	28	2.3
		Washington Elementary	Excluded for privacy			1.5	21	1.8
		Lugo Elementary	Excluded for privacy			1.3	18	1.5
		Lincoln Elementary	Excluded for privacy			0.9	14	1.1
		Lynwood Community Adult	Excluded for privacy			0.9	13	1.1
	Commercial Use	Plaza	Excluded for privacy			11.89	173	12
Paramount	Open Space & Recreation	Ralph C. Dills Park	6500 San Juan St.	33.9001	-118.1843	14.9	217	17.9
		Paramount Park	14400 Paramount Blvd.	33.9018	-118.159	12.5	182	15.0
		Spane Park	14400 Gundry Ave.	33.9029	-118.1759	4.4	64	5.3
		Village Skate Park	7718 Somerset Blvd.	33.8959	-118.1649	0.7	10	0.9
		Meadows Park	15753 Gundry Ave.	33.8895	-118.1751	0.7	9	0.8
		open space	Somerset Blvd.	33.8965	-118.1837	0.4	5	0.4
	Educational Use	Elementary School	Excluded for privacy			8.1	117	9.7
		School	Excluded for privacy			4.3	62	5.1
		Elementary School	Excluded for privacy			3.3	49	4.0
		Elementary School	Excluded for privacy			3.2	46	3.8
		School	Excluded for privacy			2.8	41	3.4
		School	Excluded for privacy			2.0	30	2.5

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Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Paramount	Educational Use	High School	Excluded for privacy			1.8	27	2.2
		Elementary School	Excluded for privacy			1.7	25	2.1
		Elementary School	Excluded for privacy			1.5	21	1.8
Pico Rivera	Open Space & Recreation	Rio Hondo Park	8421 San Luis Potosi Pl.	34.0119	-118.0921	11.9	172	14.2
		park	Calico Ave.	34.0175	-118.084	1.4	21	1.7
	Educational Use	open space	Cope Dr.	34.0147	-118.087	3.1	45	3.8
		Elementary School	Excluded for privacy			2.0	29	2.4
Signal Hill	Open Space & Recreation	Signal Hill Park	2175 Cherry Ave.	33.7963	-118.1693	6.9	100	8.2
		Hillbrook Park	1865 Temple Ave.	33.7911	-118.1593	0.5	7	0.6
		Calibrisas Park	2451 California Ave.	33.8017	-118.1809	0.5	7	0.5
		Raymond Arbor Park	1881 Raymond Ave.	33.7912	-118.1647	0.3	5	0.4
	Educational Use	Middle School	Excluded for privacy			7.4	108	8.9
		Elementary School	Excluded for privacy			6.5	95	7.9
		Elementary School	Excluded for privacy			3.9	57	4.7
South Gate	Open Space & Recreation	South Gate Park	4900 Southern Ave.	33.9442	-118.1866	72.8	1,059	87.4
		Circle Park & open space	10129 Garfield Ave.	33.9398	-118.1672	32.3	469	38.7
		Cesar Chavez Park	2541 Southern Ave.	33.9535	-118.2265	4.0	58	4.8
		Hollydale Community Park	12221 Industrial Ave.	33.9158	-118.1642	1.3	19	1.6
		Triangle Park	Southern Ave. & Atlantic Blvd.	33.9459	-118.1805	0.8	11	0.9
		Stanford Park	2715 Illinois Ave.	33.9516	-118.2222	0.7	11	0.9
		Hollydale Regional Park	5400 Monroe Ave.	33.9216	-118.1748	29.7	431	35.6
		Middle School	Excluded for privacy			20.7	301	24.9
		Learning Center	Excluded for privacy			15.1	220	18.1

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Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
South Gate	Educational Use	High School	Excluded for privacy			11.2	163	13.4
		High School	Excluded for privacy			10.0	145	12.0
		Middle School	Excluded for privacy			7.3	106	8.7
		Middle School	Excluded for privacy			6.0	87	7.2
		Elementary School	Excluded for privacy			3.3	49	4.0
		Elementary School	Excluded for privacy			3.3	48	4.0
		Elementary School	Excluded for privacy			2.6	38	3.2
	Educational Use	Elementary School	Excluded for privacy			2.4	36	2.9
		Elementary School	Excluded for privacy			2.1	30	2.5
		Elementary School	Excluded for privacy			2.0	29	2.4
		Elementary School	Excluded for privacy			1.9	28	2.3
		Elementary School	Excluded for privacy			1.8	26	2.1
		Elementary School	Excluded for privacy			1.3	19	1.6
		Elementary School	Excluded for privacy			1.3	19	1.6
		Elementary School	Excluded for privacy			1.1	16	1.3
		Elementary School	Excluded for privacy			0.9	13	1.1
		Continuation School	Excluded for privacy			0.2	3	0.3

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3.4.4 RIGHT-OF-WAY BEST MANAGEMENT PRACTICES

Right-of-way BMPs are systems of multiple distributed BMPs placed within a street right-of-way. These BMPs are designed to reduce the volume of stormwater discharge into the MS4 and treat stormwater runoff from adjacent streets and developments. Common right-of-way BMPs include bioretention, biofiltration, and permeable pavement. See Section 3.3.2 for BMP descriptions. These BMPs can be implemented alone or in conjunction with one another.

A preliminary assessment has been performed to assess areas potentially available for right-of-way BMPs. This was done with a preliminary GIS approach by screening highways, arterial roads, and secondary (collector) roads located in non-residential areas within 200 feet of a catch basin location. The potential locations are indicated with grey circles on Figure 3-24.

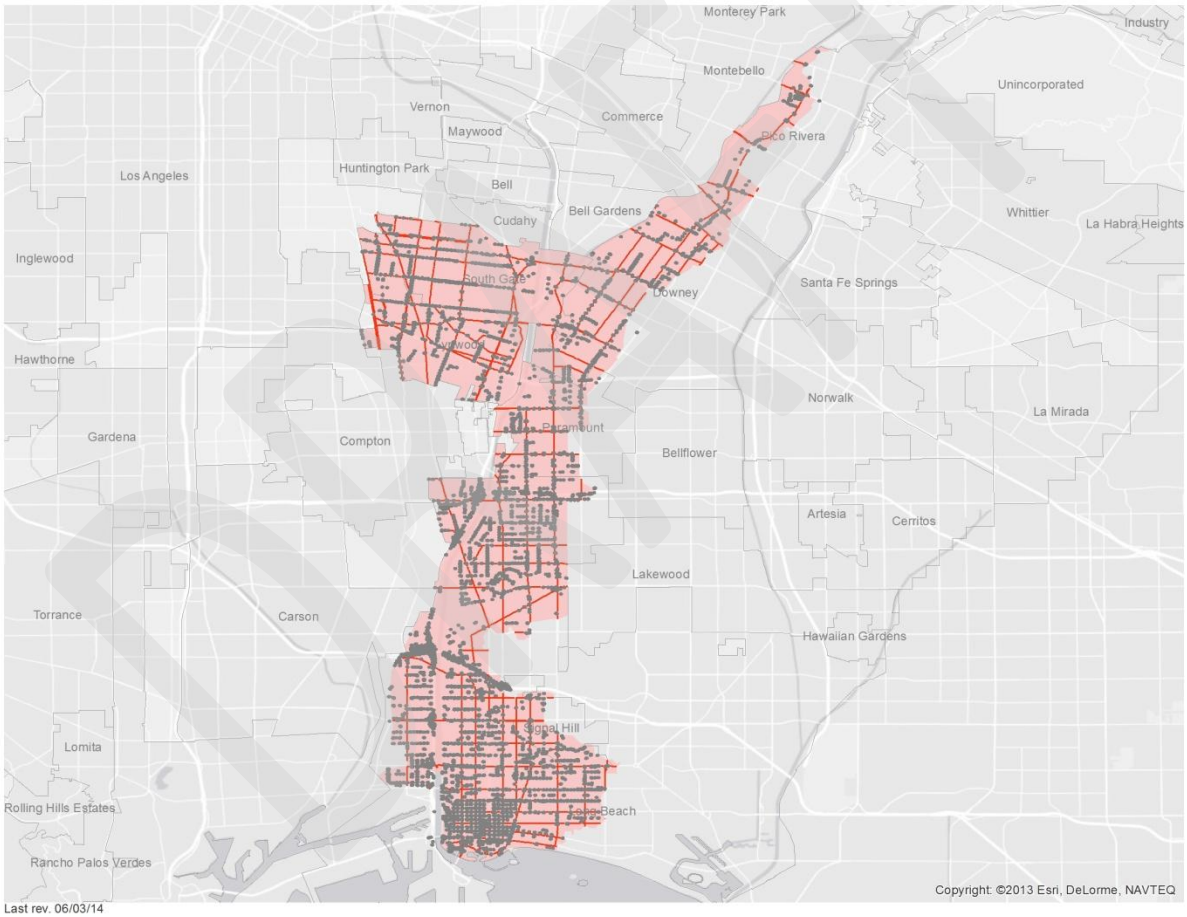


Figure 3-24: Areas potentially available for right-of-way BMPs

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4 REASONABLE ASSURANCE ANALYSIS

4.1 EXECUTIVE SUMMARY

A required element the WMP is the Reasonable Assurance Analysis (RAA). The MS4 Permit specifies the RAA use a watershed based computer modeling system to demonstrate:

> *"that the activities and control measures…will achieve applicable WQBELs and/or RWLs with compliance deadlines during the Permit term".*

There are three computer modeling systems approved by the MS4 Permit and the Watershed Management Modeling System (WMMS) was selected to develop this RAA. The Los Angeles County Flood Control District (LACFCD), through a joint effort with U.S. Environmental Protection Agency (USEPA), developed WMMS specifically to support informed decisions associated with managing stormwater.

While the Permits prescribes the RAA as a quantitative demonstration that control measures will be effective, the RAA also promotes a modeling process to identify and prioritize potential control measures to be implemented by the WMP. In other words, the RAA not only demonstrates the cumulative effectiveness of BMPs to be implemented, it also supports their selection. Furthermore, the RAA incorporates the applicable compliance dates and milestones for attainment of the WQBELs and RWLs, and therefore supports BMP scheduling. The ultimate goal of WMMS is to identify cost-effective water quality improvement projects through an integrated, watershed-based approach.

On March 25, 2014, the Los Angeles Regional Water Quality Control Board (Regional Board) issued "RAA Guidelines" (LARWQCB 2014) to provide information and guidance to assist Permittees in development of the RAA. Appendix A-4-1 provides appropriate documentation on the modeling assumptions that meet the RAA Guidelines.

The RAA describes the process for identifying milestones the current and next Permit periods, as well as final milestones to meet applicable TMDLs. Modeling was performed to quantify necessary load reductions to achieve the milestones. Based on these load reduction targets, a pollutant reduction plan was established that outlines the types and sequencing of BMPs for each jurisdiction to achieve milestones throughout the schedule. The RAA provides a detailed list of the capacities needed for BMPs over time, incorporating the existing BMPs and control measures identified in the WMP. These recommendations serve as goals for each jurisdiction to seek opportunities for implementation over time, but strategies may change as opportunities for more cost-effective BMPs are identified throughout the schedule.

The RAA has determined that the metal zinc will be the primary or "limiting" pollutant and that by implementing structural and non-structural measures to reduce zinc, the remaining pollutant goals will be achieved. Over the entire Lower Los Angeles River Watershed, the RAA projects a need for structural controls to be sized to capture and or treat 803.2 acre -feet.

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4.2 REASONABLE ASSURANCE ANALYSIS

The Reasonable Assurance Analysis for the Lower Los Angeles River Watershed is included in Appendix A-4-1.

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5 COMPLIANCE SCHEDULE

This Chapter provides the compliance schedule for each Participating Agency. The compliance schedule will be used to measure progress toward addressing the highest WQPs and achieving interim and final WQBELs and RWLs. The schedule is expressed as the needed structural BMP capacities over space and time. The Reasonable Assurance Analysis (RAA, Chapter 4) refines the capacity over space to the subwatershed level. The BMP capacities assume a 10% reduction over the MS4 Permit term through implementation of the nonstructural BMPs described in Chapter 3. The following section of this chapter includes the nonstructural BMP schedule.

Where deadlines are not specified within the MS4 Permit term, interim milestones are provided. Because zinc is the limiting pollutant in the RAA, compliance with WQPs not otherwise addressed by a TMDL is also achieved through the listed BMP capacities.

5.1 NONSTRUCTURAL BEST MANAGEMENT PRACTICES SCHEDULE

A 10% load reduction is assumed to result from the cumulative effect of nonstructural BMPs. These nonstructural BMPs consist of Minimum Control Measures, Nonstormwater Discharge Measures and Targeted Control Measures (MCMs, NSWD measures and TCMs) as described in Chapter 3. Their implementation over the MS4 Permit term is as follows:

5.1.1 NONSTRUCTURAL MINIMUM CONTROL MEASURES SCHEDULE

The MCMs will be implemented by the Participating Agencies upon approval of the WMP by the Regional Board Executive Officer or by the implementation dates provided in the MS4 Permit, where applicable. The scope of the MCM programs has expanded significantly from the prior third term MS4 Permit. This change is not entirely unexpected as a period of over ten years separates the adoption of the third and fourth term permits. Consequently significant pollutant reductions are anticipated through effective implementation of the new nonstructural MCMs. In particular, effective implementation of the Development Construction program will compliment the nonstructural TSS Reduction Strategy.

MCM provisions new to the Cities are described in WMP Section 3.2. Guidance documents have been prepared as an optional aid to Cities in MCM development/implementation – see Attachment 3.1.

5.1.2 NONSTRUCTURAL NON STORMWATER DISCHARGE MEASURES SCHEDULE

The NSWD measures will be implemented by the Participating Agencies upon approval of the WMP by the Regional Board Executive Officer or by the implementation dates provided in the MS4 Permit, where applicable. The scope of the NSWD measures has expanded from the prior third term MS4 Permit. In particular, NSWD source investigations are now tied into a robust outfall screening program required by the MS4 Permit Monitoring and Reporting Program and additional conditions have been placed on common exempt NSWDs, such as potable water discharges and irrigation runoff. Consequently significant pollutant reductions are anticipated through the resulting reductions in NSWD flows.

NSWD measures new to the Participating Agencies are described in WMP Section 3.3.

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5.1.3 NONSTRUCTURAL TARGETED CONTROL MEASURES SCHEDULE

The specific Participating Agencies implementing each TCM is included in Table 3-5 in Chapter 3. The table also lists whether the TCM is a *planned* or a *potential* control measure. Potential control measures are contingent upon unknown factors such as governing body approval and as such implementation within the MS4 Permit term cannot be guaranteed. Descriptions of each nonstructural TCM are included in WMP Section 3.4. Table 5-1 lists the corresponding implementation schedules.

Table 5-1: Nonstructural TCM Compliance Schedule

Nonstructural TCM	Chapter 3 ID	Effort	Start date
Prioritize facility inspections based on WQPs	TCM-ICF-1	J*	2015-2017
Copper reduction through implementation of SB 346	TCM-INI-1	W*	Ongoing
Lead reduction through implementation of SB 757	TCM-INI-2	W	Ongoing
Support zinc reduction in tires through safer consumer product regs	TCM-INI-3	W	Ongoing
Apply for grant funding for stormwater quality/capture projects	TCM-INI-4	W/J	Ongoing
Enhanced tracking through use of online GIS MS4 Permit database	TCM-MRP-1	J	2014-2015
Incentives for irrigation reduction practices	TCM-NSWD-1	J	Ongoing
Upgraded sweeping equipment	TCM-PAA-1	J	2015-2017
Sanitary Sewer Management Plan	TCM-PAA-2	J	Ongoing
Increased street sweeping frequency or routes	TCM-PAA-3	J	2015-2017
Refocused outreach to target audiences and WQPs	TCM-PIP-1	W/J	2015
Train staff to facilitate LID and Green Streets implementation	TCM-PLD-1	J	2014
Ordinance requires LID BMPs for projects below MS4 Permit thresholds	TCM-PLD-2	J	2014-2017
Encourage retrofitting of downspouts	TCM-RET-1	J	2015
Prepare guidance documents to aid implementation of MCMs	TCM-SWM-1	W/J	2014
Exposed soil ordinance	TCM-TSS-1	J	2014-2017
Erosion repair and slope stabilization on private property	TCM-TSS-2	J	2015-2017
Private parking lot sweeping ordinance	TCM-TSS-3	J	2015-2017
Sweeping of private roads and parking lots	TCM-TSS-4	J	2015-2017
Negotiations with regulated utilities for erosion control within ROW	TCM-TSS-5	W	Ongoing
Erosion repair and slope stabilization on public property	TCM-TSS-6	J	2015-2017

*W – Watershed Group effort, J – Jurisdictional effort

TSS REDUCTION STRATEGY

The expanded start-date ranges for the TSS Reduction Strategy (TCM-TSS-1 to 6) are set to accommodate the time needed to develop, adopt and implement model ordinances. The City of Signal Hill, which has an elevated level of exposed soil per unit area, is accelerating this process and is currently developing a TSS reduction ordinance (or ordinances, following TCM-TSS-1 and 3). Adoption is anticipated for 2015, with implementation and enforcement following the adoption. The remaining Cities will consider the Signal Hill ordinance as a template for their own TSS Reduction Strategy. A successfully implemented ordinance from the City of Whittier is also included in this WMP as Appendix A-3-2.

Complete implementation of this strategy throughout the Lower LAR watershed is not expected by the end of the MS4 Permit term. However, as discussed in WMP Section 3.4, appreciable pollutant reductions may be realized with only partial implementation.

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5.2 PLANNED PROJECT - PROPOSITION 84 GRANT AWARD

The cities of Bell Gardens, Downey, Pico Rivera, Paramount, South Gate, and Lynwood are participating in a regional multi-watershed project through the Gateway Water Management Authority (GWMA). This project applied for and was awarded funding though the Proposition 84 Grant. Initiation of this project will begin as soon as the grant contracts and funding are finalized which is expected to be in the fall of 2014. The BMPs include: thirteen (13) tree box filters and ten (10) bioretention tree wells. The project will install LID BMPs along transportation corridors to treat stormwater runoff and its associated pollutants.

The project is in the preliminary design phase. Installation of the BMPs is anticipated in 2016/2017. With the installation of these LID BMPs, this project is expected to reduce pollutant loads throughout the watershed. The full benefits of this project as it ties into interim and final compliance milestones will be determined during the adaptive management process.

5.3 STRUCTURAL BEST MANAGEMENT PRACTICE SCHEDULE

5.3.1 STRUCTURAL MINIMUM CONTROL MEASURE SCHEDULE

Significant pollutant reductions are anticipated through each City's effective implementation of the new structural LID BMP requirements of the Planning and Land Development Program. These new MCM provisions are described in WMP Section 3.2. Guidance documents have been prepared as an optional aid to Cities in MCM development/implementation – see Attachment 3.1.

The Planning and Land Development Program will be implemented by the Participating Cities no later than June 28, 2014.

5.3.2 STRUCTURAL TARGETED CONTROL MEASURE SCHEDULE

The RAA (see Chapter 4) demonstrates the cumulative effectiveness of BMPs to be implemented, supports BMP selection, and provides volume reduction goals optimized across the entire watershed. The results are summarized for volume reduction (represented in acre-feet) for interim and final compliance milestones.

The plan depicted in the RAA is considered a potential initial scenario. Through the adaptive management process, the participating agencies may select different types of BMPs (e.g. increase implementation of green streets and reduce implementation of regional BMPs) or substitute alternative BMPs altogether (e.g., implement dry wells instead of green streets).

The wet weather volume reductions necessary for each milestone (31%, 50% and Final) for each City show the combined total estimated BMP volume (acre-feet) for right-of-way (ROW) BMPs and regional Low Impact Development (LID) BMPs on public or private parcels. Specific green streets projects were not investigated during this initial analysis for potential BMPs, therefore, the City-specific summary lists potential regional LID BMPs that *could* be used to achieve the required interim milestones and targets. Since this WMP is a planning-level document, over time the Watershed Group will report and

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demonstrate that the summative effect of projects implemented add up to the required reductions for interim milestones and final targets.

Dry weather reductions are attained through a combination of non-structural practices and structural BMPs as they are implemented as part of the wet weather attainment of limits. As wet-weather BMPs are implemented, they serve to remove the dry-weather flows thus meeting the compliance set forth to achieve dry-weather reductions.

Where applicable, potential regional LID BMPs have been identified for the 31% and 50% milestones. Interim and final compliance dates identified in the RAA are the primary drivers for the structural targeted control measure schedule. As discussed in Section 3, several structural treatment project have already been completed and there are upcoming projects (e.g. Proposition 84 Grant). These projects constitute significant progress towards the 31% milestone by the 2017 target and the 50% milestone in 2024. Further implementation with feasibility studies of the projects identified within this WMP is subject to the financial strategy (See Chapter 6). Through implementation of the WMP and adaptive management there is the potential for the BMP capacity for the final compliance milestone to change, therefore, potential BMPs for final milestones were not identified.

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5.4 POLLUTANT REDUCTION PLAN TO ATTAIN INTERIM & FINAL LIMITS

The following pages describe the pollutant reduction plans for each City for drainage areas within the Los Angeles River. Figure 5-1 is an illustration of the total structural BMP capacity needed to comply with final WQBELs/RWLs within the Lower LAR Watershed.

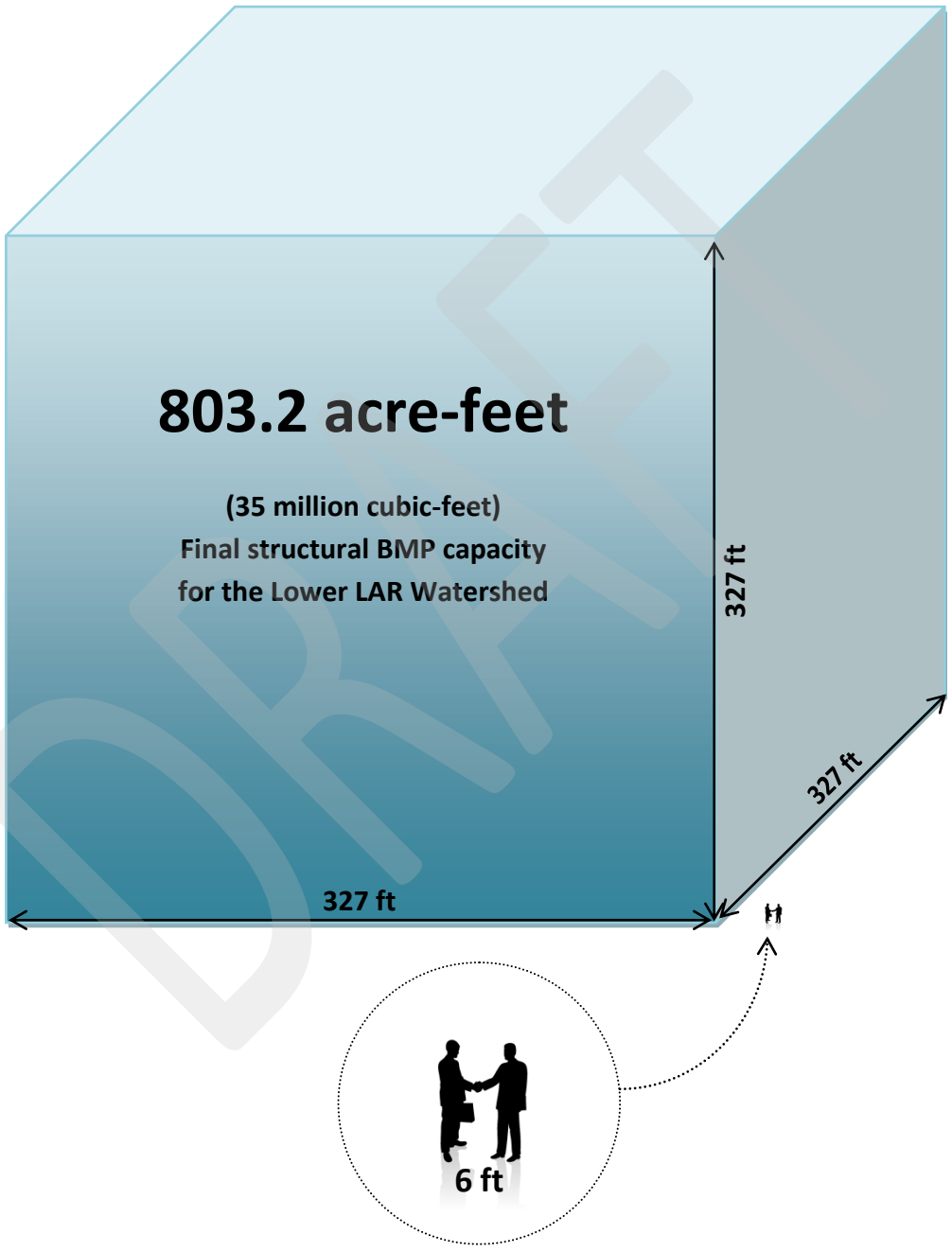


Figure 5-1: The Compliance Cube (total required BMP capacity for the Lower LAR Watershed)

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5.4.1 CITY OF DOWNEY

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN*	
		Total Estimated BMP Volume (acre-ft)**	
		Incremental	Cumulative
Downey	31%	20	20
	50%	13.2	33.2
	Final	46.3	79.6

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.
** Values attained after the city's existing distributed BMP volumes totaling 1.9 acre-feet were incorporated.

According to the RAA results, the city of Downey will need to capture and/or treat 20 acre-feet of stormwater by 2017 to meet the 31% interim compliance milestone, 13.2 acre-feet by 2024 to meet the 50% interim compliance milestone, and 79.6 acre-feet by 2028 to meet the final compliance milestone.

If Furman Park were transformed into an infiltration BMP, the park would have the potential of retaining 16.5 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 3.5 acre-feet to meet the 31% compliance milestone.

If Apollo Park were converted to an infiltration BMP, the park would have the potential of retaining 13.2 acre-feet of stormwater to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Furman Park	16.5
Right-of-Way BMPs	3.5
Total	20.0
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Apollo Park	13.2
Cumulative Total	33.2

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Downey	68,570	90%	90%	91.6%	---	---

[A] ARS partial capture systems are assigned 86% efficiency.
[B] Percentages are based on number of catch basins and number retrofitted.

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5.4.2 CITY OF LAKEWOOD

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Lakewood	31%	1.1	1.1
	50%	0.0	1.1
	Final	0.0	1.1

According to the RAA results, the city of Lakewood will need to capture and/or treat 1.1 acre-feet of stormwater by 2017 to meet the 31% and 50% interim compliance milestone as well as the final compliance milestone.

To achieve the 31% interim compliance milestone of 1.1 acre-feet, Right-of-Way BMPs could be used.

31% and 50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Right-of-Way BMPs	1.1
Total	1.1

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Lakewood	N/A	67%[C]	67%[C]	100	---	---

[A] ARS partial capture systems are assigned 86% efficiency .
[B] Percentages are based on number of catch basins and number retrofitted.
[C] 67 percent reported due to limitations of the Regional Board's reporting format. Lakewood has 6 catch basins within the Los Angeles River watershed, 2 of the 6 catch basins have ARS and CPS units, the other 4 do not as they drain to a retention basin.

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5.4.3 CITY OF LONG BEACH

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN* Total Estimated BMP Volume (acre-ft) Incremental	Cumulative
Long Beach	31%	1.0	1.0
	50%	72.5	73.5
	Final	245.7	319.1

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.

According to the RAA results, the city of Long Beach will need to capture and/or treat 1.0 acre-foot of stormwater by 2017 to meet the 31% interim compliance milestone, 73.5 acre-feet by 2024 to meet the 50% interim compliance milestone, and 319.1 acre-feet by 2028 to meet the final compliance milestone.

To achieve the 31% interim compliance milestone of 1.0 acre-feet, Right-of-Way BMPs could be used. If Houghton Park, Scherer, and Veterans Memorial Park were transformed into infiltration BMPs, the parks would have the potential of retaining 70.9 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 1.6 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Right-of-Way BMPs	1.0
Total	1.0
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Houghton Park	27.9
Scherer Park	25.8
Veterans Memorial Park	17.2
Right-of-Way BMPs	1.6
Cumulative Total	73.5

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Long Beach	149,759	NR[C]	NR[C]	92%	---	---

[A] ARS partial capture systems are assigned 86% efficiency .
[B] Percentages are based on number of catch basins and number retrofitted.
[C] NR report was not required by the MS4 Permit in effect at that time.

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5.4.4 CITY OF LYNWOOD

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Lynwood	31%	34.2	34.2
	50%	16.7	50.9
	Final	44.5	95.4

According to the RAA results, the city of Lynwood will need to capture and/or treat 34.2 acre-feet of stormwater by 2017 to meet the 31% interim compliance milestone, 50.9 acre-feet by 2024 to meet the 50% interim compliance milestone, and 95.5 acre-feet by 2028 to meet the final compliance milestone.

If Lynwood City Park and Yvonne Burke-John D. Ham Park were transformed into infiltration BMPs, the parks would have the potential of retaining 22.4 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 11.8 acre-feet to meet the 31% compliance milestone.

If Lynwood Meadows Park and Rose Park were transformed into infiltration BMPs, the parks would have the potential of retaining 2.5 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 13.2 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Lynwood City Park	12.0
Yvonne Burke-John D. Ham Park	10.4
Right-of-Way BMPs	11.8
Total	34.2
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Lynwood Meadows Park	1.8
Rose Park	1.7
Right-of-Way BMPs	13.2
Cumulative Total	50.9

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Lynwood	46,467	92%	92%	96%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

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5.4.5 CITY OF PARAMOUNT

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN* Total Estimated BMP Volume (acre-ft)** Incremental	Cumulative
Paramount	31%	20.9	20.9
	50%	8.5	29.3
	Final	47.2	76.5

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.
** Values attained after the city's existing distributed BMP volumes totaling 7.1 acre-ft were incorporated in the RAA

According to the RAA results, the city of Paramount will need to capture and/or treat 20.9 acre-feet of stormwater by 2017 to meet the 31% interim compliance milestone, 29.3 acre-feet by 2024 to meet the 50% interim compliance milestone, and 76.5 acre-feet by 2028 to meet the final compliance milestone.

If Ralph C. Dills Park was transformed into an infiltration BMP, the parks would have the potential of retaining 17.9 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 3.0 acre-feet to meet the 31% compliance milestone.

If Spane Park was transformed into an infiltration BMP, the parks would have potential of retaining 5.3 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 3.2 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Ralph C. Dills Park	17.9
Right-of-Way BMPs	3.0
Total	20.9
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Spane Park	5.3
Right-of-Way BMPs	3.2
Cumulative Total	29.3

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Paramount	44,490	94%	94%	94%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

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5.4.6 CITY OF PICO RIVERA

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Pico Rivera	31%	39.4	39.4
	50%	0.0	39.4
	Final	1.8	41.2

According to the RAA results, the city of Pico Rivera will need to capture and/or treat 39.4 acre-feet of stormwater by 2017 to meet the 31% and 50% interim compliance milestones, and 41.2 acre-feet by 2028 to meet the final compliance milestone.

If Rio Hondo Park was transformed into an infiltration BMP, the parks would have the potential of retaining 14.2 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 25.2 acre-feet to meet the 31% and 50% compliance milestones.

31% & 50% Interim Compliance Milestones	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Rio Hondo Park	14.2
Right-of-Way BMPs	25.2
Cumulative Total	39.4

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Pico Rivera	22,549	84%	84%	93.7%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

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5.4.7 CITY OF SIGNAL HILL

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)*	
		Incremental	Cumulative
Signal Hill	31%	1.2	1.2
	50%	13.8	15.0
	Final	7.1	22.1

*Values attained after the city's existing distributed BMP volumes totaling 0.2 acre-ft were incorporated

According to the RAA results, the city of Signal Hill will need to capture and/or treat 1.2 acre-feet of stormwater by 2017 to meet the 31% interim compliance milestone, 15 acre-feet by 2024 to meet the 50% interim compliance milestone, and 22.1 acre-feet by 2028 to meet the final compliance milestone.

Right-of-Way BMPs could be used for the 1.2 acre-feet to meet the 31% compliance milestone. These BMPs could be located within any city-owned street in order to avoid land acquisition.

If Signal Hill Park were transformed into infiltration BMPs, the park would have the potential of retaining 8.2 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 6.8 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Right-of-Way BMPs	1.2
Total	1.2
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Signal Hill Park	8.2
Right-of-Way BMPs	6.8
Cumulative Total	15.0

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Signal Hill	14,220	89%	89%	90.5%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

5.4.8 CITY OF SOUTH GATE

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN* Total Estimated BMP Volume (acre-ft)**	
		Incremental	Cumulative
South Gate	31%	30.6	30.6
	50%	28.4	59.1
	Final	109.1	168.1

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.
** Values attained after the city's existing distributed BMP volumes totaling 4.7 acre-ft were incorporated

According to the RAA results, the city of South Gate will need to capture and/or treat 30.6 acre-feet of stormwater by 2017 to meet the 31% interim compliance milestone, 59.1 acre-feet by 2024 to meet the 50% interim compliance milestone, and 168.1 acre-feet by 2028 to meet the final compliance milestone.

If Circle Park was transformed into an infiltration BMP, the park would have the potential of retaining 38.7 acre-feet of stormwater to meet the 31% compliance milestone.

If Cesar Chavez Park and Hollydale Community Park were transformed into infiltration BMPs, the parks would have potential of retaining 6.4 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 14 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Circle Park	38.7
Total	38.7
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Cesar Chavez Park	4.8
Hollydale Community Park	1.6
Right-of-Way BMPs	14.0
Cumulative Total	59.1

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
South Gate	72,333	86%	86%	92.5%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

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5.5 ESTIMATED COSTS OF STRUCTURAL BMPS

Future costs associated with regional and Right-of-Way BMPs were estimated by using costs associated with an existing regional project (Discovery Park) and estimated costs for potential regional projects. Potential regional project costs were obtained from Los Angeles County.[1] Table 5-2 includes the estimated total costs and cost per acre-foot for regional and Right-of-Way BMPs.

The cost estimates only represent permitting, material, construction, and operation and maintenance (O&M) cost - with the exception of Discovery Park which does not take into account O&M costs. The cost of land acquisition, which is estimated to be over $5,000,000 per acre, was not included since initial regional and Right-of-Way BMP projects are planned for public lands. Because of the preliminary nature of the projects, the estimates developed for the proposed BMPs on public property lie between the preliminary/order of magnitude and budget level estimates, with an expected accuracy of about minus 25 percent to plus 40 percent.[2]

Table 5-2: Existing or potential estimated structural BMP cost

Project Name	Total Estimated Cost	BMP Capacity (acre-feet)	Cost Per Acre Foot
Bethune Park	$570,000	0.9	$1,000,000
Enterprise Park	$1,240,000	3.9	$318,000
Reid Park	$1,400,000	0.6	$2,333,000
Belvedere Park	$3,700,000	13.8	$268,000
Discovery Park	$4,500,000 *	8.0	$562,500
Johnson Park	$5,060,000	20.0	$253,000
Charles White Park	$5,300,000	21.0	$252,380
Right-of Way BMPs**	-------	0.25	$250,000

* Cost does not include O&M.

** A specific project was not used for the cost estimate. Instead various projects were averaged.

Cost were derived by assuming approximately two-thirds of the projects implemented will be regional, with the remaining one-third being Right-of-Way projects. Using general assumptions for the projects above, the following costs are anticipated:

- A cost of $2,000,000 per acre foot is anticipated for projects treating less than 1 acre-foot
- A cost of $625,000 per acre foot is anticipated for projects treating between 1 and 10 acre-feet
- A cost of $260,000 per acre foot is anticipated for projects treating more than 10 acre-feet

[1] Multi-Pollutant TMDL Implementation for the Unincorporated County Area of Los Angeles River: Part 2

[2] Multi-Pollutant TMDL Implementation for the Unincorporated County Area of Los Angeles River: Part 2

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5.5.1 TOTAL ESTIMATED COSTS OF STRUCTURAL BMPS

The following tables include the total estimated costs of structural BMPs for each City.

CITY OF DOWNEY STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	19.9	19.9	$15,400,000 - $28,830,000
	50%	13.2	33.1	
	Final	45.9	79.2	

CITY OF LAKEWOOD STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	1.1	1.1	$516,000 - $962,500
	50%	0.0	1.1	
	Final	0.0	1.1	

CITY OF LONG BEACH STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	1.0	1.0	$62,230,000 - $116,160,000
	50%	72.5	73.5	
	Final	245.7	319.1	

CITY OF LYNWOOD STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	34.2	34.2	$18,600,000 - $34,770,000
	50%	16.7	50.9	
	Final	44.5	95.5	

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CITY OF PARAMOUNT STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	20.8	20.8	$14,900,000 - $27,850,000
	50%	8.5	29.3	
	Final	47.2	76.5	

CITY OF PICO RIVERA STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	39.4	39.4	$8,030,000 - $15,000,000
	50%	0.0	39.4	
	Final	1.8	41.2	

CITY OF SIGNAL HILL STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	1.2	1.2	$4,300,000 - $8,050,000
	50%	13.8	15.0	
	Final	7.1	22.1	

CITY OF SOUTH GATE STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	30.6	30.7	$32,800,000 - $61,200,000
	50%	28.4	59.1	
	Final	109.1	168.1	

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6 FINANCIAL STRATEGY

This section outlines the financial strategy to implement the Lower LAR WMP in accordance with the MS4 Permit. The cost estimates provided herein are preliminary and based on the best available information to date. The estimates are also subject to revision as new information becomes available, including as the Watershed Control Measures (WCMs) are refined over the implementation period.

Financing the implementation of the Lower LAR WMP is the greatest challenge confronting the Watershed Group. In the absence of stormwater utility fees, the Participating Agencies have no dedicated revenue stream to pay for implementation of the WMP. In addition to current uncertainties associated with costs and funding, there are multiple uncertainties associated with future risks. The first TMDL compliance dates for the Lower LAR Watershed Group will be the interim metals milestones of 2017, 2024, and the final compliance date of 2028. The final non-TMDL water quality standard compliance date is projected to be sometime in 2040. Thus, there will be many deadlines that must be met despite limited resources. The Watershed Group will need to set priorities and seek funding in order to meet the various compliance deadlines.

Therefore, to address the Lower LAR Water Quality Priorities (WQPs), the Watershed Group is going to pursue a multi-faceted financial strategy to match the multi-faceted Strategy for the Selection and Implementation of WCMs outlined in Chapter 3. In addition, the Watershed Group has coordinated the proposed compliance schedule (see Section 5) with the financial strategy.

The latest Los Angeles and Long Beach MS4 permits have greatly magnified the cost challenges associated with managing stormwater. The absence of a stable stormwater funding mechanism not tied to municipal General Funds is becoming ever more critical. For that reason, the City Manager Committees of the California Contract Cities Association and the League of California Cities, Los Angeles Division, formed a City Managers' Working Group (Working Group) to review stormwater funding options after the LA County proposed Clean Water, Clean Beaches funding initiative failed to move forward. The result was a Stormwater Funding Report that notes, "the Los Angeles region faces critical, very costly, and seriously underfunded stormwater and urban runoff water quality challenges." The Report found that funding stormwater programs is so complex and dynamic, and the water quality improvement measures so costly, that Permittees cannot depend on a single funding option at this time. The City Managers' report includes a variety of recommendations, including: organizational recommendations; education and outreach program recommendations; recommendations for legislation; Clean Water, Clean Beaches recommendations; local funding options; and recommendations for the Regional Water Board[1].

The Watershed Group has considered the recommendations in the Stormwater Funding Report in developing this financial strategy. A critical component of the report is the observation that moving forward with a regional stormwater fee vote (like the LA County Clean Water, Clean Beaches funding

[1]League of California Cities. (2014). Providing Sustainable Water Quality Funding in Los Angeles County. Prepared By City Managers Working Group. Los Angeles County Division May 21, 2014.

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initiative) would likely not occur until after June 2015, which means that the first funds would likely not be available until property tax payments are received in 2017. Assuming revenues of approximately $6 million per year available from a funding source based on the proposed Clean Water, Clean Beaches funding initiative, the Watershed Group could expect approximately $60 million to be available over 10 years[2]. However, these amounts may not be sufficient to pay for and maintain expensive stormwater capture and dry-weather low flow diversions to the sanitary sewer if the Watershed Group had to depend on such projects to come into compliance with receiving water limitations (RWLs) and water quality-based effluent limitations (WQBELs) specified in the MS4 Permit.

The Reasonable Assurance Analysis (RAA) for the Lower LAR WMP, indicates that the volume of water required to be captured within the Watershed to comply with RWLs and WQBELs is 803.2 acre-feet.

For cost estimation purposes, this WMP initially assumes that the Lower LAR Watershed could ultimately require the capacity to capture and infiltrate or use 803.2 acre-feet of water. Based on cost estimates for constructing regional and Right-of-Way BMPs, as discussed in Section 5.5, such a requirement could cost the watershed between $157 and $293 million for construction of these facilities (refer to Section 5.5 for more a detailed cost analysis).

The Watershed Group has been involved in the development of the financial strategy recommendations, and proposes to consider the recommendations of the City Managers Working Group to develop long-term solutions to stormwater quality funding. In the meantime, the Watershed Group will focus on the local funding options presented in the Stormwater Funding Report to secure the needed funding for initial implementation of the WMP.

During the early years of implementation, the Permittees anticipate having to depend largely on local fees such as commercial/industrial inspection fees, General Fund expenditures and, potentially, Clean Water State Revolving Fund program financing agreements to fund the implementation of the WCMs. The Watershed Group will seek opportunities to leverage the limited funds available. It will do this by financially supporting the efforts of others, such as the California Stormwater Quality Association (CASQA), to seek State approval of true source control measures such as implementation of the Safer Consumer Product Regulations adopted by the Department of Toxic Substances Control in 2013. The Group will also support programs to increase water conservation, reduce dry-weather discharges to the storm drain system, and reduce TSS during wet weather. Successfully accomplishing these efforts could reduce the money needed in the long term to capture and/or treat stormwater discharges to comply with TMDLs and address other WQPs.

Concurrently, the Watershed Group proposes to work with the California Contract Cities, the Los Angeles Division of the League of California Cities, and others to educate elected officials and voters about the water quality problems facing the region and the need to develop an equitable financing

[2] Based on numbers derived for Los Cerritos Channel (LCC) during the development of the LCC WMP using expected annual revenue from a pro rata distribution of funds allocated to the Cities in the LCC Watershed and a possible proportional allocation of funds from the Watershed Authority Groups.

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mechanism to fund the programs and facilities necessary to come into compliance with water quality regulations.

Legislative solutions will be necessary to clarify the application of Proposition 218 to fees for the capture and use of stormwater in light of a recent 6th Appellate Court decision and to ensure that any State water bond put on the ballot in fall 2014 contains funding for stormwater quality projects. The Group will also support local and statewide efforts to amend Proposition 218 to have stormwater fees treated in the same manner as water, sewage, and refuse fees. The Watershed Group and/or the Participating Agencies will also seek grants to implement rainwater capture and reuse or capture and infiltrate projects on publicly owned property.

In the long term, financing the WCMs for the Lower LAR Watershed will require establishing dependable revenue streams for local water quality programs. Accomplishing this formidable task will require the cooperation of many entities, including business and environmental organizations and the Regional Board.

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7 LEGAL AUTHORITY

MS4 Permit §VI.C.5.b.iv.6 (LA)/ §VII.C.5.h.vi (LB)

This section covers information such as documentation and references/links to water quality ordinances for each participating that demonstrates adequate legal authority to implement and enforce Watershed Control Measures (WCMs) identified in this plan and as required in Section VI.D.5.b.iv.6 of the MS4 Permit. The goal of these WCMs is to create an efficient program that focuses on the watershed priorities by meeting the following objectives:

- Prevent or eliminate non-storm water discharges to the MS4 that are a source of pollutants from the MS4 to receiving waters.
- Implement pollutant controls necessary to achieve all applicable interim and final water quality-based effluent limitations and/or receiving water limitations pursuant to corresponding compliance schedules.
- Ensure that discharges from the MS4 do not cause or contribute to exceedances of receiving water limitations.

The WCMs include the minimum control measures, nonstormwater discharge measures and targeted control measures (i.e. controls to address TMDL and 303(d) listings). As the requirement to incorporate these WCMs is an element of the MS4 Permits, the legal authority to implement them results from each agency's legal authority to implement the NPDES MS4 Permit.

A copy of each participating agency's legal authority certification from their chief legal counsel can be found in Appendix A-7-1. Table 7-1 includes the section that covers water quality ordinance for each agency with a reference link.

Table 7-1 Water quality ordinance language

City	Water Quality Ordinance	Reference
Downey	Article V- Sanitation, Chapter 7, Stormwater and Urban Runoff Pollution and Conveyance Controls	http://qcode.us/codes/downey/
Section 5701. Watershed Management Program - *Notwithstanding other provisions in the Downey Municipal Codes, the MS4 Permit requires the City of Downey to implement the Watershed Management Program (WMP), and any subsequent amendments, are hereby incorporated into this Ordinance by reference. (Added by Ord. 1142, adopted 02-11-03; amended by Ord. 1320, adopted 11-12-13).*		
Lakewood	Article 05 (V) - Sanitation-Health, Chapter 8, Stormwater and Urban Runoff Pollution Control	http://weblink.lakewoodcity.org/weblink8/
5800 - Adoption of the Los Angeles County Stormwater Runoff Pollution Control Ordinance - *Except as otherwise provided in this Chapter, the stormwater runoff pollution control ordinance of the County of Los Angeles contained in Chapter 12.80 of Title 12- Environmental Protection of the Los Angeles County Code relating to control of pollutants carried by stormwater and runoff adopted by the County of Los Angeles on June 9, 1998, is hereby adopted and made a part hereof as though set forth in full. The same shall hereafter constitute the Stormwater and Runoff Pollution Control Ordinance of the City of Lakewood relating to the control of pollutants carried by stormwater and runoff and discharging*		

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into receiving water of the United Stated.		
Long Beach	Volume II-Title 18-Building and Construction, Chapter 18.61, NPDES and SUSMP Regulations	http://library.municode.com/index.aspx?clientId=16115
18.61.010 Purpose - *The purpose of this chapter is to provide regulations and give legal effect to certain requirements of the National Pollutant Discharge Elimination System (NPDES) permit issued to the City of Long Beach, and the subsequent requirements of the Standard Urban Storm Water Mitigation Plan (SUMSP), mandated by the California Regional Water Quality Control Board, Los Angeles Region (RWQCB). The intent of these regulations is to effectively prohibit non-storm water discharges into the storm drain systems or receiving waters and to require source control BMP to prevent or reduce the discharge of pollutants into storm water to the maximum extent practicable.* *The City of Long Beach is a participant member of this watershed group but is under a different MS4 Permit. Certification of legal authority will be in accordance with its MS4 Permit timeline.*		
LACFCD	Flood Control District Code, Chapter 21 - Stormwater and Runoff Pollution Control	https://library.municode.com/index.aspx?clientId=16274
21.01 - Purpose and Intent - *The purpose and intent of this chapter is to regulate the stormwater and non-stormwater discharges to the facilities of the Los Angeles County Flood Control District for the protection of those facilities, the water quality of the waters in and downstream of those facilities, and the quality of the water that is being stored in water-bearing zones underground.*		
Lynwood	Chapter 14- Water and Sewer, 14-12, Stormwater and Urban Runoff Pollution Control	http://www.codepublishing.com/ca/lynwood/
14-12.3 Purpose and Intent - (b) -*The intent of this Section is to protect and enhance the quality of watercourses, water bodies, and wetlands within the City in a manner consistent with the Federal Clean Water Act, the California Porter-Cologne Water Quality Control Act, and the Municipal NPDES Permit.* *(c) This Section is also intended to provide the legal authority necessary for the City to control discharges to and from those portions of the Municipal Stormwater System over which it has jurisdiction as required by the Municipal NPDES Permit, and thereby comply with the terms of the Municipal NPDES Permit while the CSWMP and the WMAP are being developed by the permittees under the Municipal NPDES Permit, and thereafter to implement the CSWMP and WMAP, or other programs, developed under the Municipal NPDES Permit. (Ord. #1443, §1)*		
Paramount	Chapter 48 - Urban Stormwater Management	http://www.paramountcity.com/code.cfm?task=detail2&ID=20
Sec. 48-2.1. Purpose and intent - *The purpose of this chapter is to protect the health and safety of the residents of the city by protecting the beneficial uses of receiving waters within the city from pollutants carried by storm water and non-storm water discharges. The intent of this chapter is to enhance and protect the water quality of the receiving waters of the city and the United States, consistent with the Act. (Ord. No. 892)* Sec. 48-2.2. Applicability of this chapter - *The provisions of this chapter shall apply to the discharge, deposit or disposal of any storm water and/or runoff to the storm drain system and/or receiving waters within any incorporated area covered by a NPDES municipal storm water permit. (Ord. No. 892)*		
Pico Rivera	Title 16- Environment, Chapter 16.04, Stormwater and Urban Runoff Pollution Prevention	http://qcode.us/codes/picoriver a

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16.01.010 Purpose and Intent (4) - *Reducing pollutant loads in storm water and urban runoff, from land uses and activities identified in the municipal NPDES permit.* *The provisions of this chapter are adopted pursuant to the Federal Water Pollution Control Act, also known as the "Clean Water Act," codified and amended at 33 U.S.C 1251 et seq. The intent of this chapter is to enhance and protect the water quality of the receiving waters of the United States in a manner that is consistent with the Clean Water Act and acts amendatory thereof of supplementary thereto; applicable implementing regulations; the Municipal NPDES permit, and any amendment, revisions, or re-issuance thereof. (Ord. 989 § 1 (part), 2002).*		
Signal Hill	Chapter 12.16- Stormwater/ Urban Runoff	http://www.amlegal.com/library/ca/signalhill.shtml
12.16.020 Purpose and Intent - *The purpose of this chapter is to protect the public health, welfare and safety and to reduce the quantity of pollutants being discharged to the waters of the United States through: (D) The protection and enhancement of the quality of the waters of the United States in a manner consistent with the provisions of the Clean Water Act;*		
South Gate	Title 6 - Health and Sanitation, Section 6.67, Storm Drains	http://codepublishing.com/CA/southgate/
6.67.010 General Provisions, A- Purpose and Intent - *The purpose of this chapter is to protect the public health, welfare and safety and to reduce the quantity of pollutants being discharged to the waters of the United States. This chapter has the following objectives: 4. The protection and enhancement of the quality of the waters of the United States in a manner consistent with the provisions of the Clean Water Act (CWA);*		

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8 COORDINATED INTEGRATED MONITORING PROGRAM

The Participating Agencies have developed a customized coordinated integrated monitoring program (CIMP). The CIMP, based on the provisions set forth in Part IV of the MRP (Attachment E) of the MS4 Permit, assesses progress toward achieving the water quality-based effluent limitations and receiving water limitations per the compliance schedules, and progress toward addressing water quality priorities. The customized monitoring program is designed to address the Primary Objectives detailed in Attachment E, Part II.A of the MS4 Permit and includes the following program elements:

- Receiving Water Monitoring
- Storm Water Outfall Monitoring
- Non-Storm Water Outfall Monitoring
- New Development/Re-Development Effectiveness Tracking
- Regional Studies

The CIMP is included in Appendix A-8-1.

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9 ADAPTIVE MANAGEMENT PROCESS

Adaptive management is the process by which new information about the state of the watershed is incorporated into the WMP. The WMP is adaptively managed following the process described in Permit §IV.C.8. The process is implemented by the participating agencies every two years from the date of WMP approval by the Regional Water Board (or by the Executive Officer on behalf of the Regional Water Board). The purpose of the adaptive management process is to improve the effectiveness of the WMP based on – but not limited to – consideration of the following:

1. Progress toward achieving interim and/or final water quality-based effluent limitations and/or receiving water limitations in §VI.E and Attachments L through R of the MS4 Permit, according to established compliance schedules;
2. Progress toward achieving improved water quality in MS4 discharges and achieving receiving water limitations through implementation of the watershed control measures based on an evaluation of outfall-based monitoring data and receiving water monitoring data;
3. Achievement of interim milestones;
4. Re-evaluation of the water quality priorities identified for the Watershed Management Area (WMA) based on more recent water quality data for discharges from the MS4 and the receiving water(s) and a reassessment of sources of pollutants in MS4 discharges;
5. Availability of new information and data from sources other than the MS4 Permittees' monitoring program(s) within the WMA that informs the effectiveness of the actions implemented by the Permittees;
6. Regional Water Board recommendations; and
7. Recommendations for modifications to the Watershed Management Program solicited through a public participation process.

9.1 MODIFICATIONS

Based on the results of the adaptive management process, the participating agencies may find that modifications of the WMP are necessary to improve effectiveness. Modifications may include new compliance deadlines and interim milestones, with the exception of those compliance deadlines established in a TMDL.

9.1.1 REPORTING

Modifications are reported in the Annual Report, as required pursuant to Part XVIII.A.6 of the Permit Monitoring and Reporting Program (No. CI-6958), and as part of the Report of Waste Discharge (ROWD) required pursuant to Part II.B of Attachment D – Standard Provisions. The background and rational for these modifications are included by addressing the following points:

- Identify the most effective control measures and describe why the measures were effective and how other control measures will be optimized based on past experiences.

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- Identify the least effective control measures and describe why the measures were deemed ineffective and how the control measures will be modified or terminated.
- Identify significant changes to control measures during the prior year and the rationale for the changes.
- Describe all significant changes to control measures anticipated to be made in the next year and the rationale for the changes. Those changes requiring approval of the Regional Water Board or its Executive Officer shall be clearly identified at the beginning of the Annual Report.
- Include a detailed description of control measures to be applied to New Development or Re-development projects disturbing more than 50 acres.
- Provide the status of all multi-year efforts that were not completed in the current year and will continue into the subsequent year(s).

9.1.2 IMPLEMENTATION

Modifications are implemented upon approval by the Regional Water Board Executive Officer or within 60 days of submittal if the Regional Water Board Executive Officer expresses no objections.

9.2 RECEIVING WATER LIMITATIONS

The adaptive management process fulfills the requirements in MS4 Permit §V.A.4 to address continuing exceedances of receiving water limitations.

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10 REPORTING PROGRAM & ASSESSMENT

10.1 ANNUAL REPORT

PERMIT MRP §XV.A (LA/LB)

Each year on or before December 15th, the participating agencies will submit, either jointly or individually, an annual report to the Regional Water Board Executive Officer. The annual report will present a summary of information that will allow the Regional Board to assess implementation and effectiveness of the watershed management program[1].

The reporting process is intended to meet the following objectives:

- Each agency's participation in one or more Watershed Management Programs.
- The impact of each agency's storm water and non-storm water discharges on the receiving water.
- Compliance with receiving water limitations, numeric water quality-based effluent limitations, and non-storm water action levels.
- The effectiveness of control measures in reducing discharges of pollutants from the MS4 to receiving waters.
- Whether the quality of MS4 discharges and the health of receiving waters is improving, staying the same, or declining as a result watershed management program efforts, and/or TMDL implementation measures, or other Minimum Control Measures.
- Whether changes in water quality can be attributed to pollutant controls imposed on new development, re-development, or retrofit projects.

Annual Report will identify data collected and strategies, control measures and assessments implemented for each watershed within the participating agency's jurisdiction. The report will include summaries for each of the following seven sections as required by the MS4 Permit:

1) Stormwater Control Measures - Summary of New Development/Re-development Projects, actions to comply with TMDL provisions
2) Effectiveness Assessment of Stormwater Control Measures - Summary of rainfall data, provide assessment and compare water quality data, summary to whether or not water quality is improving
3) Non-Stormwater Control Measures - Summary of outfalls screening
4) Effectiveness Assessment of Non-Storm Water Control Measures - Summary of the effectiveness of control measures implemented
5) Integrated Monitoring Compliance Report - Report with summary of all identified exceedances of outfall-based stormwater monitoring data, we weather receiving water monitoring data, dry weather receiving water data and non-storm water outfall monitoring data
6) Adaptive Management Strategies - Summary of effective, less effective control measures

[1] Annual reports will cover summary from previous fiscal year beginning June 1st through July 30th.

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7) Supporting Data and Information - Monitoring data summary

The participating agencies will submit annual reports as required by the MS4 Permit. The Regional Board is currently preparing a reporting format. Once available, the reporting form will be incorporated into the WMP as an appendix.

10.1.1 DATA REPORTING

PERMIT MRP §XIV.L (LA/LB)

Analytical data reports will be submitted on a semi-annual basis. Data will be sent electronically to the Regional Water Board's Storm Water site at MS4stormwaterRB4@waterboards.ca.gov. These data reports will summarize:

- Exceedances of applicable WQBELs, receiving water limitations, or any available interim action levels or other aquatic toxicity thresholds.
- Basic information regarding sampling dates, locations, or other pertinent documentation.

10.1.2 CHRONIC TOXICITY REPORTING

PERMIT MRP §XII.K (LA/LB)

Aquatic toxicity monitoring results will be submitted to the Regional Board on an annual basis as part of the integrated monitoring compliance report as well as in the semi-annual basis data report submittal.

10.2 WATERSHED REPORT

PERMIT MRP §XVII.A (LA/LB)

The participating agencies will submit biennial watershed reports as required by the MS4 Permit to the Regional Water Board Executive Officer. This biennial report, which will be included in the annual report in odd years, will include information related to the following sections:

- Watershed Management Area
- Subwatershed (HUC-12) Description
- Permittees Drainage Area within the Subwatershed

Per MS4 Permit § XVII.B, the participating agencies may reference the Watershed Management Program (WMP) in the odd-year report, when the required information is already included or addressed in this WMP, to satisfy baseline information requirements.

The Regional Board is currently preparing a reporting format. Once available, the reporting form will be incorporated into the WMP as an appendix.

10.3 TMDL REPORTING

PERMIT MRP §XIX (LA/LB)

The participating agencies will also submit an annual report to the Regional Water Board Executive Officer regarding progress of TMDL implementation within the watershed.

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The TMDLs that will be addressed in the report are:

- Trash
- Nitrogen Compounds
- Metals
- Bacteria, and
- Harbor Toxics

The Regional Board is currently preparing a reporting format. Once available, the reporting form will be incorporated into the WMP as an appendix.

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RB-AR10316

Watershed Management Program Appendix 1

A-1-1 Definitions, Acronyms and Abbreviations

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DEFINITIONS, ACRONYMS AND ABBREVIATIONS

The following are definitions for terms in this Watershed Management Program:

Bacteria Total Maximum Daily Load (TMDL) Dry Weather: Defined in the Bacteria TMDLs as those days with less than 0.1 inch of rainfall and those days occurring more than 3 days after a rain.

Bacteria Total Maximum Daily Load (TMDL) Wet Weather: Defined in the Bacteria TMDLs as a day with 0.1 inch or more of rain and 3 days following the rain event.

Baseline Waste Load Allocation: The Waste Load Allocation assigned before reductions are required. The progressive reductions in the Waste Load Allocations are based on a percentage of the Baseline Waste Load Allocation. The Baseline Waste Load Allocation for each jurisdiction was calculated based on the annual average amount of trash discharged to the storm drain system from a representative sampling of land use areas, as determined during the Baseline Monitoring Program.

Basin Plan: The Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments.

Beneficial Uses: The existing or potential uses of receiving waters as designated by the Regional Board in the Basin Plan.

Best Management Practices (BMPs): BMPs are practices or physical devices or systems designed to prevent or reduce pollutant loading from and or volume of stormwater or nonstormwater discharges to receiving waters.

Commercial Development: Any development on private land that is not heavy industrial or residential. The category includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities; mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes.

Commercial Malls: Any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers.

Daily Generation Rate (DGR): The estimated amount of trash deposited within a representative drainage area during a 24hour period, derived from the amount of trash collected from streets and catch basins in the area over a 30-day period.

Disturbed Area: An area that is altered as a result of clearing, grading, and/or excavation.

Effluent Limitation: Any restriction imposed on quantities, discharge rates, and concentrations of pollutants, which are discharged from point sources to waters of the U.S.

Environmentally Sensitive Areas (ESAs): An area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments (California Public Resources Code § 30107.5). Areas subject to stormwater mitigation requirements are: areas designated as Significant Ecological Areas by the County of Los Angeles (Los Angeles County Significant Areas

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Study, Los Angeles County Department of Regional Planning (1976) and amendments); an area designated as a Significant Natural Area by the California Department of Fish and Game's Significant Natural Areas Program, provided that area has been field verified by the Department of Fish and Game; an area listed in the Basin Plan as supporting the "Rare, Threatened, or Endangered Species (RARE)" beneficial use; and an area identified by a Permittee as environmentally sensitive.

Estuaries: Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater.

Hillside: Property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes.

Hydrologic Unit Code (HUC): A standardized watershed classification system in which each hydrologic unit is identified by a unique hydrologic unit code (HUC).

Illicit Connection: Any man-made conveyance that is connected to the storm drain system without a permit, excluding roof drains and other similar type connections. Examples include channels, pipelines, conduits, inlets, or outlets that are connected directly to the storm drain system.

Illicit Discharge: Any discharge into the MS4 or from the MS4 into a receiving water that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations.

Industrial/Commercial Facility: Any facility involved and/or used in the production, manufacture, storage, transportation, distribution, exchange or sale of goods and/or commodities, and any facility involved and/or used in providing professional and non-professional services. This category of facilities includes, but is not limited to, any facility defined by either the Standard Industrial Classifications (SIC) or the North American Industry Classification System (NAICS). Facility ownership (federal, state, municipal, private) and profit motive of the facility are not factors in this definition.

Industrial Park: A land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry.

Institutional Controls: Programmatic control measures that do not require construction or structural modifications to the MS4. Examples include street sweeping, public education, and clean out of catch basins that discharge to storm drains.

Integrated Pest Management (IPM): An ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties.

Low Impact Development (LID): LID consists of building and landscape features designed to retain or filter stormwater runoff.

Low Impact Development (LID) Plan: See "SUSMP" definition.

Maximum Extent Practicable (MEP): The process in choosing effective BMPs and rejecting applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs would not be technically feasible, or the cost would be prohibitive.

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National Pollutant Discharge Elimination System (NPDES): The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA §307, 402, 318, and 405.

Natural Drainage System: A natural drainage system is a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

New Development: Land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision.

Nonstormwater Discharge: Any discharge into the MS4 or from the MS4 into a receiving water that is not composed entirely of stormwater.

Not Detected (ND): Sample results which are less than the laboratory's minimum detection level.

Nuisance: Anything that meets all of the following requirements: (1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; (2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.; (3) occurs during, or as a result of, the treatment or disposal of wastes.

Receiving Water: A "water of the United States" into which stormwater runoff is or may be discharged.

Receiving Water Limitation: Any applicable numeric or narrative water quality objective or criterion, or limitation to implement the applicable water quality objective or criterion.

Redevelopment: Land-disturbing activity that results in the creation, addition, or replacement of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of a routine maintenance activity; and land disturbing activities related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

Significant Ecological Areas (SEAs): An area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan.

Source Control BMP: Any schedules of activities, prohibitions of practices, maintenance procedures, managerial practices or operational practices that aim to prevent stormwater pollution by reducing the potential for contamination at the source of pollution.

SUSMP: The Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP shall address the Planning and Land Development conditions and requirements of the MS4 Permit.

Wet Season: The calendar period beginning October 1 through April 15.

Acronym/Abbreviation	Full Phrase/Definition
µg/L	micrograms per Liter
303(d) List	California's Clean Water Act Section 303(d) List
ASBS	Areas of Special Biological Significance
Basin Plan	Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties
BMP	Best Management Practices
Caltrans Permit	The State Board's Caltrans NPDES Permit, Order No. 2012-0011-DWQ
CASQA	California Stormwater Quality Association
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGP	The State Board's Construction General Permit Order No. 2009-0009-DWQ, or as amended.
CIMP	The Lower Los Angeles River Watershed Group Coordinated Integrated Monitoring Program.
Cities	The Lower Los Angeles River Watershed Group participating cities, only.
County	The LACFCD and the LA County DPW
CTR	California Toxics Rule
CWA	Clean Water Act
CWC	California Water Code
DC	Development Construction Program
ELRS	Equivalent Load Reduction Strategy
EPA	United States Environmental Protection Agency
GIS	Geographical Information System
gpd	gallons per day
GWMA	Gateway Water Management Authority
HUC	Hydrologic Unit Code
ICF	Industrial/Commercial Facilities Program
ICID	Illicit Connection and Illicit Discharge Elimination Program
IGP	The State Board's Industrial Storm Water General Permit Order No. 2014-0057-DWQ, or as amended.
INI	Initiatives (as defined in the WMP)
IPM	Integrated Pest Management
JSWMP	Jurisdictional Stormwater Management Program
LA	Load Allocations
LA County DPW	Los Angeles County Department of Public Works
LA MS4 Permit	The Los Angeles Regional Water Quality Control Board Order No. R4-2012-0175, only (excluding LB MS4 and Caltrans Permits).
LACFCD	Los Angeles County Flood Control District
LB MS4 Permit	The Los Angeles Regional Water Quality Control Board Order No. R4-2014-0024, only (excluding LA MS4 and Caltrans Permits).
LID	Low Impact Development
LID Plan	Low Impact Development Plan

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Acronym/Abbreviation	Full Phrase/Definition
Lower LAR Watershed	Lower Los Angeles River Watershed
MCM	Minimum Control Measure
MEP	Maximum Extent Practicable
mg/L	milligrams per Liter
MGD	Million Gallons Per Day
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
MS4 Permit	The Los Angeles Regional Water Quality Control Board Order No. R4-2012-0175 and Order No. R4-2014-0024.
NAICS	North American Industry Classification System
NPDES	National Pollutant Discharge Elimination System
NSWD	Nonstormwater Discharge
Ocean Plan	Water Quality Control Plan for Ocean Waters of California
PAA	Public Agency Activities Program
Participating Agencies	The Lower Los Angeles River Watershed Group participating agencies, excluding Caltrans.
PEP	Progressive Enforcement Policy
Permittees	The County of Los Angeles and 85 cities within the coastal watersheds of Los Angeles County
PIP	Public Information and Participation Program
PLD	Planning and Land Development Program
PMP	Pollutant Minimization Plan
POTW	Publicly Owned Treatment Works
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
RAA	Reasonable Assurance Analysis
RAP	Reasonable Assurance Program
REAP	Rain Event Action Plan
Regional Board	California Regional Water Quality Control Board, Los Angeles Region
RP	Responsible Party
SEA	Significant Ecological Area
SIC	Standard Industrial Classification
SMARTS	State Water Resources Control Board's Storm Water Multiple Application and Report Tracking System
SQMP	Stormwater Quality Management Programs
SSO	Sewer Leaks, sanitary sewer overflow
State Board	California State Water Resources Control Board
State Listing Policy	State Board's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List

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Acronym/Abbreviation	Full Phrase/Definition
SUSMP	Standard Urban Stormwater Mitigation Plan
SWPPP	Stormwater Pollution Prevention Plan
SWQDv	Stormwater Quality Design Volume
TAC	Technical Advisory Committee
TCM	Targeted Control Measure
TMDL	Total Maximum Daily Load
TRA	Training
TSS	Total Suspended Solids
WAG	Watershed Authority Group
WDID	Waste Discharge Identification
WLA	Waste Load Allocations
WMP	The Lower Los Angeles River Watershed Group Watershed Management Program
WQBEL	Water Quality Based Effluent Limitations
WQO	Water Quality Objective
WQP	Water Quality Priority
WRP	Water Reclamation Plant

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Watershed Management Program Appendix 2

A-2-1 2010 303(d) List

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Lower LA River Watershed 303(d) Listed Segments

REGION NAME	WATER BODY NAME	POLLUTANT	POLLUTANT CATEGORY	COMMENTS INCLUDED ON 303(d) LIST	POTENTIAL SOURCES	SOURCE CATEGORY
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Chlordane (sediment)	Pesticides	Historical use of pesticides and lubricants.	Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	DDT (sediment)	Pesticides	Historical use of pesticides and lubricants.	Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	PCBs (Polychlorinated biphenyls) (sediment)	Other Organics	Historical use of pesticides and lubricants.	Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Sediment Toxicity	Toxicity		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Ammonia	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Ammonia	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Cadmium	Metals/Metalloids		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Copper, Dissolved	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Copper, Dissolved	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Cyanide	Other Inorganics		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Diazinon	Pesticides		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Nutrients (Algae)	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Nutrients (Algae)	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Zinc, Dissolved	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Zinc, Dissolved	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	pH	Miscellaneous		Point Source	Unspecified Point Source

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Lower LA River Watershed 303(d) Listed Segments

Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	pH	Miscellaneous		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Ammonia	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Ammonia	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Copper	Metals/Metalloids		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Nutrients (Algae)	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Nutrients (Algae)	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Oil	Nuisance		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Compton Creek	Benthic-Macroinvertebrate Bioassessments	Miscellaneous		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Compton Creek	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Compton Creek	Copper	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Compton Creek	Copper	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Compton Creek	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	pH	Miscellaneous		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	pH	Miscellaneous		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Copper	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Copper	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Toxicity	Toxicity		Nonpoint Source	Unspecified Nonpoint Source

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Lower LA River Watershed 303(d) Listed Segments

Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Toxicity	Toxicity		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Zinc	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Zinc	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	pH	Miscellaneous		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	pH	Miscellaneous		Nonpoint Source	Unspecified Nonpoint Source

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Watershed Management Program Appendix 2

A-2-2 Mass Emission Station Monitoring Results

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WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	4.1	11.9	1.9	1.4	0	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.016	0	0.0763	0	0	0.051
pH	Comp	SM4500H B	0-14		8.85	7.01	7.44	7.09	8.44	9.87
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	14.2	8.34	7.6	6.74	8.6	5.04
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20	MPN/100ml	2200000	50000	900000	1300000	22000	500
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	1400000	30000	11000	800000	1100	20
Ratio Fecal Coliform/Total Coliform					0.64	0.6	0.012	0.62	0.05	0.04
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	700000	240000	230000	300000	500	700
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	170000	80000	80000	300000	500	300
General										
Chloride	Comp	EPA300.0	2	mg/L	111	6.73	10.9	13.2	121	108
Fluoride	Comp	EPA300.0	0.1	mg/L	0.48	0.11	0.24	0.15	0.49	0.6
Nitrate	Comp	EPA300.0	0.1	mg/L	29.9	2.99	3.84	2.52	1.45	3.6
Sulfate	Comp	EPA300.0	0.1	mg/L	123.8	9.42	13.8	22.6	147	124
Alkalinity	Comp	EPA310.1	4	mg/L	139	32	55	53.9	213	94
Hardness	Comp	EPA130.2	2	mg/L	210	48	52.8	76	340	230
COD	9i	EPA410.4	10	mg/L	101.9	21.8	93	34	176.3	110.5
TPH	Grab	EPA418.1	1	mg/L	1.6	0	4.3	1.5	0	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	996	133.2	175.1	212	1100	1146
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	572	96	108	146	732	780
Turbidity	Comp	EPA180.1	0.1	NTU	5.33	140	73.7	118.2	1.48	6.19
Total Suspended Solids	Comp	EPA160.2	2	mg/L	11	172	197	1045	105	97
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	10	20	14	10	42	44
MBAS	Comp	EPA425.1	0.05	mg/L	0.127	0	0.104	0.062	0.079	0.138
Total Organic Carbon	Comp	EPA415.1	1	mg/L	14.4	6.51	10.1	5.65	11.3	17.1
BOD	Comp	SM5210B	2	mg/L	65.86	16.2	12.2	7.6	62.9	198
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.684	0.087	0.37	0.181	0.78	0.288
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	0.774	0.441	0.491	0.193	0.809	0.356
NH3-N	Comp	EPA350.3	0.1	mg/L	2.34	0.184	0.373	0	1.47	3.59
Nitrate-N	Comp	SM4110B	0.5	mg/L	6.75	0.675	0.87	0.569	0.327	0.813
Nitrite-N	Comp	SM4110B	0.03	mg/L	0	0	0.63	0	0.609	1.34
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	4	0.135	3.26	12.5	1.98	3.9
Metals										
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	126	118	0	185	0	0
Dissolved Antimony	Comp	EPA200.8	5	ug/l	1.37	1.06	1	0.71	0.69	0.76
Total Antimony	Comp	EPA200.8	5	ug/l	1.37	1.09	1.05	0.86	0.69	0.77
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	2.06	2.61	1.25	0	3.43	0
Total Arsenic	Comp	EPA200.8	5	ug/l	2.06	5.84	1.32	1.48	3.43	0
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0.27	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	0.42	0	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	2.01	0.94	3.1	6.99	3.05	1.24
Total Chromium	Comp	EPA200.8	5	ug/l	3.15	11.8	4.64	9.47	12.5	2.63
Dissolved Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Total Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	14.1	5.21	5.51	7.07	4.77	10.4
Total Copper	Comp	EPA200.8	5	ug/l	25.9	19	12.9	9.56	10	14

RB-AR10329

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Dissolved Iron	Comp	EPA200.8	100	ug/l	0	276	679	0	0	0
Total Iron	Comp	EPA200.8	100	ug/l	306	375	686	404	206	166
Dissolved Lead	Comp	EPA200.8	5	ug/l	0.76	3.1	4.29	0	0.63	0
Total Lead	Comp	EPA200.8	5	ug/l	5.35	9.91	4.62	2.26	1.82	0.97
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	7.22	3.24	7.52	5.54	5.62	6.29
Total Nickel	Comp	EPA200.8	5	ug/l	10	16.1	8.61	6.84	21.8	6.99
Dissolved Selenium	Comp	EPA200.8	5	ug/l	4.07	0	0	0	2.04	0
Total Selenium	Comp	EPA200.8	5	ug/l	4.07	0	0	0	2.04	0
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	45.3	35	74	10	25.1	54
Total Zinc	Comp	EPA200.8	50	ug/l	54	50	83	46	25.1	85
Semi-Volatiles Organics (EPA 625)										
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dichloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dimethylpheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dinitropheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-chloro_3_methylpheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Pentachloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Dimethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0

DRAFT

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0	0	0.179	0.05	0.155	0.037

RB-AR10331

					Wet				Dry	
WEATHER CONDITION										
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

DRAFT

RB-AR10332

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	0	12	0	1.3	1.6	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.043	0	0.009	0	0	0.009
pH	Comp	SM4500H B	0-14		7.67	6.95	7.64	7.37	6.57	9.36
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	8.6	8.3	9.83	9.58	7.29	16.57
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20	MPN/100ml	1300000	170000	500000	170000	130000	2300
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	300000	80000	300000	80000	80000	40
Ratio Fecal Coliform/Total Coliform					0.23	0.47	0.6	0.47	0.62	0.017
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	500000	300000	240000	90000	300000	40
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	300000	80000	130000	90000	130000	40
General										
Chloride	Comp	EPA300.0	2	mg/L	15.7	4.56	17.5	759	27.2	90
Fluoride	Comp	EPA300.0	0.1	mg/L	0.33	0.11	0.21	0	0	0.3
Nitrate	Comp	EPA300.0	0.1	mg/L	7.03	4.79	5.04	7.06	23.7	14.2
Sulfate	Comp	EPA300.0	0.1	mg/L	20.2	9.17	17.5	12.8	12.1	87
Alkalinity	Comp	EPA310.1	4	mg/L	75	16	44	27.5	16.5	77
Hardness	Comp	EPA130.2	2	mg/L	110	40	119	40	20.8	210
COD	9i	EPA410.4	10	mg/L	101.1	29.9	113	117	25	67.9
TPH	Grab	EPA418.1	1	mg/L	1.1	1.2	1.1	0	1.2	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	395	122.3	209	160	93.3	912
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	224	86	116	98	64	556
Turbidity	Comp	EPA180.1	0.1	NTU	244	82.5	36.5	47.3	58.3	0.72
Total Suspended Solids	Comp	EPA160.2	2	mg/L	266	72	79	305	109	7
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	64	11	4.9	26	1	7
MBAS	Comp	EPA425.1	0.05	mg/L	0.156	0	0.056	0	0	0.055
Total Organic Carbon	Comp	EPA415.1	1	mg/L	27.9	5.11	8.79	4.39	4.74	5.89
BOD	Comp	SM5210B	2	mg/L	66.08	11.3	11.8	16	31.5	76.1
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.471	0.393	0.264	0.253		0.057
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	0.59	0.443	0.276	0.4		0.065
NH3-N	Comp	EPA350.3	0.1	mg/L	1.02	0.124	0	0		0.181
Nitrate-N	Comp	SM4110B	0.5	mg/L	1.59	1.08	1.14	1.29	5.352	3.21
Nitrite-N	Comp	SM4110B	0.03	mg/L	0.816	0	0.12	0	0	0.213
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	1.81	0.322	1.58	3.46	4.08	0.98
Metals										
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	335	182	123	140	484	117
Dissolved Antimony	Comp	EPA200.8	5	ug/l	2.53	0.89	1.16	0.64	0.6	0
Total Antimony	Comp	EPA200.8	5	ug/l	2.7	0.91	1.2	0.65	0.66	0
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	0	1.26	1.11	0	0	0
Total Arsenic	Comp	EPA200.8	5	ug/l	2.41	1.34	1.19	0	0	0
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	0.33	0	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	1.42	0.83	2.23	1.33	2.17	0.66
Total Chromium	Comp	EPA200.8	5	ug/l	3.25	11.8	6.05	5.81	9.44	2.15
Dissolved Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Total Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	19.9	4.43	12.3	4.78	5.9	3.51
Total Copper	Comp	EPA200.8	5	ug/l	34	10.7	19.3	11.6	12.1	5.58

RB-AR10333

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Dissolved Iron	Comp	EPA200.8	100	ug/l	1070	181	283	0	218	0
Total Iron	Comp	EPA200.8	100	ug/l	1070	401	392	564	620	131
Dissolved Lead	Comp	EPA200.8	5	ug/l	2.25	1.46	2.74	0	0	0
Total Lead	Comp	EPA200.8	5	ug/l	20	2.48	2.82	3.14	3.85	0.71
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	7.55	1.63	4.05	2.05	1.51	3.76
Total Nickel	Comp	EPA200.8	5	ug/l	8.04	14.9	9.26	5.89	5.2	4.75
Dissolved Selenium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Selenium	Comp	EPA200.8	5	ug/l	1.27	0	0	0	0	0
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	61.3	29	55	15	19	66
Total Zinc	Comp	EPA200.8	50	ug/l	128	86	68	39	53	76
Semi-Volatiles Organics (EPA 625)										
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dichloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dimethylpheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dinitropheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-chloro_3_methylpheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Pentachloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l		0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l		0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l		0	0	0	0	0
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l		0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l		0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l		0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l		0	0	0	0	0
Dimethyl phthalate	Comp	EPA625	0.5	ug/l		0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l		0	0	0	0	0

RB-AR10334

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l		0	0	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l		0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l		0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l		0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l		0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l		0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l		0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l		0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l		0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l		0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l		0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0.54	0	0.49	0.042	0.065	0

RB-AR10335

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

DRAFT

					Wet			Dry	
WEATHER CONDITION									
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units					
Conventional									
Oil and Grease	Grab	EPA413.1	1	mg/L	0	3.2	4.8	0	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.062	0.02	0.009	0.057	0.036
pH	Comp	SM4500H B	0-14		7.35	6.55	6.3	7.47	7.05
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	2.5	6.6	9.54	9.64	13.48
Indicator Bacteria									
Total Coliform	Grab	SM9230B	20	MPN/100ml	800000	240000	1700000	220000	230
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	170000	240000	1300000	28000	230
Ratio Fecal Coliform/Total Coliform					0.21	1	0.764705882	0.127272727	1
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	500000	300000	170000	8000	700
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	170000	300000	36000	5000	700
General									
Chloride	Comp	EPA300.0	2	mg/L	29	7.58	8.18	131	101
Fluoride	Comp	EPA300.0	0.1	mg/L	0.39	0.19	0	0.51	0.23
Nitrate	Comp	EPA300.0	0.1	mg/L	0	5.1	7.58	12.6	27.5
Sulfate	Comp	EPA300.0	0.1	mg/L	26.9	16	11.3	154	97.4
Alkalinity	Comp	EPA310.1	4	mg/L	79.2	43	34	141	141
Hardness	Comp	EPA130.2	2	mg/L	105	50	42	215	230
COD	9i	EPA410.4	10	mg/L	121	33.5	22.7	80.6	197
TPH	Grab	EPA418.1	1	mg/L	0	0	3.8	0	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	350	153.2	133.8	1095	774
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	216	124	92	620	524
Turbidity	Comp	EPA180.1	0.1	NTU	36.7	81	2.43	1.03	1.96
Total Suspended Solids	Comp	EPA160.2	2	mg/L	1339	355	113	11	6
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	265	89	25	4	3
MBAS	Comp	EPA425.1	0.05	mg/L	0.202	0.12	0.123	0.07	0.07
Total Organic Carbon	Comp	EPA415.1	1	mg/L	45.4	10.8	7.06	13.2	7.05
BOD	Comp	SM5210B	2	mg/L	94.4	25.1	15.5	8.13	80.4
Nutrients									
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.895	0.325	0.254	0.615	0.544
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	1.07	0.38	0.296	8.24	0.64
NH3-N	Comp	EPA350.3	0.1	mg/L	2.8	0	0	0	0
Nitrate-N	Comp	SM4110B	0.5	mg/L	0	1.15	1.71	2.845	6.21
Nitrite-N	Comp	SM4110B	0.03	mg/L	0	0.052	0.03	1.6	0.49
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	4.92	2.08	0.806	3.3	0.978
Metals									
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	14600	117	144	0	0
Dissolved Antimony	Comp	EPA200.8	5	ug/l	1.63	1.45	1.39	0.93	0.85
Total Antimony	Comp	EPA200.8	5	ug/l	7.24	1.5	1.43	0.97	0.88
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	2.01	1.64	1.18	2.81	1.32
Total Arsenic	Comp	EPA200.8	5	ug/l	6.28	1.68	1.27	2.81	1.86
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	4.7	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	2.75	1.6	2.65	13.1	2.83
Total Chromium	Comp	EPA200.8	5	ug/l	35.3	6.12	6.23	26.1	4.78
Dissolved Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0
Total Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	4.48	7.99	10.6	10	6.73
Total Copper	Comp	EPA200.8	5	ug/l	295	20.7	16.2	19.9	8.65
Dissolved Iron	Comp	EPA200.8	100	ug/l	476	171	144	0	0
Total Iron	Comp	EPA200.8	100	ug/l	28600	412	351	154	106
Dissolved Lead	Comp	EPA200.8	5	ug/l	2.34	2.35	3.22	0.92	0
Total Lead	Comp	EPA200.8	5	ug/l	1070	3.24	3.8	1.61	0.81
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	9.9	5.21	4.11	7.23	5.23
Total Nickel	Comp	EPA200.8	5	ug/l	38.8	6.35	7.3	7.39	7.47
Dissolved Selenium	Comp	EPA200.8	5	ug/l	1.49	0	0	2.48	1.41
Total Selenium	Comp	EPA200.8	5	ug/l	1.84	0	0	2.9	1.87
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	2.91	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	17.4	59	79	22.3	97
Total Zinc	Comp	EPA200.8	50	ug/l	1030	81	104	22.3	133
Semi-Volatiles Organics (EPA 625)									
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0
2,4-dichlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0
2,4-dimethylphenol	Comp	EPA625	2	ug/l	0	0	0	0	0
2,4-dinitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0
4-chloro_3_methylphenol	Comp	EPA625	3	ug/l	0	0	0	0	0
Pentachlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0

RB-AR10337

WEATHER CONDITION					Wet	Wet	Wet	Dry	Dry
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units					
Base/Neutral									
Acenaphthene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l	0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l	62	0	24.6	22.1	50.9
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l	0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0.9	0	0
Dimethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	1.6	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l	0	0	0	4.7	0
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l	0	0	5.2	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0
Chlorinated Pesticides									
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0
Polychlorinated Biphenyls									
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Organohosphate Pesticides									
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0	0	0	0	0
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0

RB-AR10338

					Wet			Dry	
WEATHER CONDITION									
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units					
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0
Herbicides									
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

LEAD

RB-AR10339

WEATHER CONDITION					Wet				Dry	
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	2/2/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	0	0	2	1.9	0	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0	0.01	0.01	0	0.025	0.005
pH	Comp	SM4500H B	0-14		7.01	6.49	6.51	6.95	7.72	6.49
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	10.7	7.97	9.58	8.56	10.21	9.64
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20	MPN/100ml	240000	500000	170000	130000	50000	3000
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	130000	500000	50000	17000	50000	1300
Ratio Fecal Coliform/Total Coliform					0.54	1.00	0.29	0.13	1.00	0.43
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	500000	170000	90000	170000	230	2400
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	300000	170000	13000	170000	230	2400
General										
Chloride	Comp	EPA300.0	2	mg/L	39.6	11.8	13.6	6.68	80.1	11.8
Fluoride	Comp	EPA300.0	0.1	mg/L	0.14	0.14	0.1	0	0.21	0.14
Nitrate	Comp	EPA300.0	0.1	mg/L	0	4.06	7.75	4.61	23.3	4.06
Sulfate	Comp	EPA300.0	0.1	mg/L	65.1	12.7	12.4	7.81	86.7	12.7
Alkalinity	Comp	EPA310.1	4	mg/L	116	43	39.6	31.9	99	43
Hardness	Comp	EPA130.2	2	mg/L	175	56	50.4	48	160	56
COD	9i	EPA410.4	10	mg/L	88.2	23.4	31.2	27.4	31.9	23.4
TPH	Grab	EPA418.1	1	mg/L	0	0	1.1	2.5	0	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	485	177.9	174.8	124.1	644	177.9
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	296	134	108	80	418	134
Turbidity	Comp	EPA180.1	0.1	NTU	5.5	74	12.6	102	0.75	74
Total Suspended Solids	Comp	EPA160.2	2	mg/L	1186	317	129	305	91	317
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	342	86	41	74	23	86
MBAS	Comp	EPA425.1	0.05	mg/L	0.195	0.078	0.114	0.092	0.099	0.078
Total Organic Carbon	Comp	EPA415.1	1	mg/L	14.4	7.03	8.42	8.62	8.23	7.03
BOD	Comp	SM5210B	2	mg/L	79.9	8.6	24.1	27.3	22.7	8.6
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.857	0.427	0.327	0.311	0.353	0.427
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	1.03	0.481	0.381	0.355	0.387	0.481
NH3-N	Comp	EPA350.3	0.1	mg/L	3.66	0	0	0.109	0.124	0
Nitrate-N	Comp	SM4110B	0.5	mg/L	0	0.917	1.75	1.04	5.26	0.917
Nitrite-N	Comp	SM4110B	0.03	mg/L	0.113	0.043	0	0	0.304	0.043
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	12.8	7	3.1	2.66	1.554	7
Metals										
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	750	0	0	0	107	0
Dissolved Antimony	Comp	EPA200.8	5	ug/l	1.41	1.09	1.78	1.05	1.62	1.09
Total Antimony	Comp	EPA200.8	5	ug/l	4.81	1.15	1.82	1.08	1.85	1.15
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	1.83	1.35	1.4	1.28	1.01	1.35
Total Arsenic	Comp	EPA200.8	5	ug/l	4.29	1.42	1.46	1.51	1.36	1.42
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	1.42	0	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	3.33	1.38	2.24	1.28	1.51	1.38
Total Chromium	Comp	EPA200.8	5	ug/l	15.5	5.72	2.72	1.9	5.49	5.72
Dissolved Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Total Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	6.63	8.2	12.1	11.2	12.1	8.2
Total Copper	Comp	EPA200.8	5	ug/l	123	21.2	14	12.4	23.9	21.2
Dissolved Iron	Comp	EPA200.8	100	ug/l	394	0	0	0	0	0
Total Iron	Comp	EPA200.8	100	ug/l	12500	301	174	110	165	301
Dissolved Lead	Comp	EPA200.8	5	ug/l	0.815	1.15	1.85	0.76	1.66	1.15
Total Lead	Comp	EPA200.8	5	ug/l	71.1	2.12	2.48	2.06	2.09	2.12
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	9.77	2.38	4.17	2.26	6.93	2.38
Total Nickel	Comp	EPA200.8	5	ug/l	21.8	4.07	4.96	2.58	11.6	4.07
Dissolved Selenium	Comp	EPA200.8	5	ug/l	1.86	0	0	0	1.04	0
Total Selenium	Comp	EPA200.8	5	ug/l	1.86	0	0	0	1.13	0
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	0.808	0	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	8.97	49	60	34	84	49
Total Zinc	Comp	EPA200.8	50	ug/l	395	68	86	50	87	68
Semi-Volatiles Organics (EPA 625)										
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dichlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dimethylphenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dinitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0

RB-AR10340

WEATHER CONDITION					Wet				Dry	
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	2/2/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units						
4-chloro_3_methylphenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Pentachlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l	48.2	35.6	20.8	0	29.5	35.6
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l	0	1.1	1.4	0	0.9	1.1
Dimethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l	0	0	4.3	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l	0	0	0.3	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0

RB-AR10341

WEATHER CONDITION					Wet				Dry	
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	2/2/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units						
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0.202	0	0	0	0	0
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

LEAD

RB-AR10342

Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
General Chemistry												
Cyanide	0.01	mg/L	0.004				0.013	1.200	0.009	0.005	0.055	0.024
pH	mg/L			6.5<pH<8.5			6.80	6.56	6.16	6.87	9.40	8.29
TPH	1						0.00	0.00	2.00	1.50	0.00	0.00
Oil and Grease	1	mg/L	75				1.70	0.00	2.20	1.60	0.00	0.00
Total Phenols	0.1	mg/L					0.00	9.60	0.00	0.00	0.00	0.00
Dissolved Oxygen	1	mg/L		<5			6.26		7.90	8.30	8.82	11.98
Calcium	1	mg/L					32.10	13.60	12.00	12.00	56.10	80.00
Magnesium	1	mg/L					4.86	3.40	2.43	3.04	13.40	34.00
Potassium	1	mg/L					9.40	2.88	3.12	1.96	11.10	6.96
Sodium	1	mg/L					18.50	13.40	12.30	12.40	95.10	63.00
Bicarbonate	2	mg/L					111.00	37.60	163.70		61.00	0.00
Carbonate	2	mg/L					0.00	0.00	0.00	0.00	66.00	0.00
Chloride	2	mg/L		150			21.30	9.89	6.39	6.28	111.00	60.50
Fluoride	0.1	mg/L		2.2			0.35	0.10	0.12	0.00	0.58	0.41
Sulfate	0.1	mg/L		350			28.90	14.30	10.40	12.30	134.00	181.00
Alkalinity	0.1	mg/L					91.30	30.80	134.20	30.80	105.00	174.00
Hardness	2	mg/L					100.0	48.0	40.0	42.5	195.0	340
COD	10	mg/L					112.70	19.40	41.90	34.95	43.00	62.10
Specific Conductance	1	umhos/cm					291	119	122	126	843	830
Total Dissolved Solids	2	mg/L		1500			186	78	74	74	582	546
Turbidity	0.1	NTU	225				211.00	30.00	1.63	17.60	1.79	1.93
Total Suspended Solids	2	mg/L					1075	551	85	146	23	35
Volatile Suspended Solids	1	mg/L					162	71	39	13	12	13
MBAS	0.05	mg/L					0.64	0.09	0.06	0.00	0.10	0.06
Total Organic Carbon	1	mg/L					38.90	7.35	6.70	7.38	12.10	5.38
BOD	2	mg/L					45.90	24.10	15.50	8.58	53.70	60.90
Nutrients												
Dissolved Phosphorus	0.05	mg/L					0.37	0.17	0.27	0.14	0.21	0.18
Total Phosphorus	0.05	mg/L					0.69	0.24	0.46	0.25	0.49	0.23
Ammonia	0.1	mg/L					4.02	0.00	1.02	0.11	1.11	1.01
NH3-N	0.1	mg/L					3.32	0.00	0.84	0.00	0.91	0.84
Nitrate	0.1	mg/L					0.00	4.77	2.66	3.55	18.10	7.23
Nitrate-N	0.5	mg/L		10			0.00	1.08	0.60	0.80	4.09	1.63
Nitrite-N	0.03	mg/L		1			0.00	0.00	0.04	0.00	1.36	0.56
Kjeldahl-N	0.1	mg/L					12.40	2.94	1.40	1.22	2.44	1.61
Indicator Bacteria												
Total Coliform	20	MPN/100ml		10,000			5,000,000	500,000	1,600,000	900,000	1,300	16,000
Fecal Coliform	20	MPN/100ml		400			240,000	50,000	500,000	160,000	170	16,000
Fecal Streptococcus	20	MPN/100ml					500,000	500,000	220,000	220,000	500	40
Enterococcus	20	MPN/100ml		104			300,000	500,000	220,000	220,000	500	40
Metals												
Dissolved Aluminum	100	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Aluminum	100	ug/l		1000			1,440	5,768	1,790	2,840	0	362
Dissolved Antimony	5	ug/l					2.68	1.25	1.43	0.65	2.11	0.57
Total Antimony	5	ug/l		6			3.25	2.55	1.78	1.14	2.11	0.59
Dissolved Arsenic	5	ug/l					2.71	1.32	1.32	0.00	1.76	1.76
Total Arsenic	5	ug/l	32	50			2.92	3.14	1.76	1.76	1.76	1.99
Dissolved Barium	10	ug/l					41.10	23.90	19.40	19.40	33.90	48.50
Total Barium	10	ug/l					77.90	152.00	50.80	64.80	37.20	56.80
Dissolved Berylium	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Beryllium	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Boron	100	ug/l					560	100	0	0	730	369
Total Boron	100	ug/l					950	1,590	0	199	1,490	618
Dissolved Cadmium	1	ug/l			1.2-3.8	1.6-8.8	0.00	0.00	0.00	0.00	0.00	0.00
Total Cadmium	1	ug/l			1.2-4.2	1.6-9.6	0.50	1.20	0.51	0.49	0.00	0.00

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
Dissolved Chromium	5	ug/l			30.9-113.0	259.1-948.2	2.00	0.76	1.09	0.85	1.60	0.76
Total Chromium	5	ug/l		50	97.7-357.7	819.9-3000.7	6.38	18.50	6.12	6.93	1.60	3.13
Dissolved Chromium +6	10	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Chromium +6	10	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Copper	5	ug/l			4.1-15.9	5.7-25.2	10.80	5.36	8.06	5.79	9.92	6.07
Total Copper	5	ug/l	12		4.3-16.5	5.9-26.2	41.50	50.60	35.20	31.10	25.50	14.50
Dissolved Iron	100	ug/l					452	0	0	159	0	0
Total Iron	100	ug/l					3,020	19,092	2,450	3,620	207	196
Dissolved Lead	5	ug/l			0.9-5.2	23.5-132.5	4.45	0.00	0.00	1.58	0.00	0.00
Total Lead	5	ug/l	8		1.0-7.44	25.4-191.1	33.90	65.00	23.80	23.40	3.60	2.40
Dissolved Manganese	30	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Manganese	30	ug/l					228	220	30	72.40	0.00	0.00
Dissolved Mercury	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Mercury	1	ug/l	0.16	2			0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Nickel	5	ug/l			24.0-91.6	215.7-823.8	15.80	3.30	3.40	2.67	5.34	4.70
Total Nickel	5	ug/l	20	100	24.0-91.8	216.1-825.5	18.30	15.40	8.79	7.59	6.11	5.36
Dissolved Selenium	5	ug/l					0.00	0.00	0.00	0.00	2.84	3.44
Total Selenium	5	ug/l	60	50			0.00	0.00	0.00	0.00	2.84	4.73
Dissolved Silver	1	ug/l				.7-10.9	0.00	0.00	0.00	0.00	0.00	0.00
Total Silver	1	ug/l	80			.8-12.8	0.00	0.71	0.00	0.00	0.00	0.00
Dissolved Thallium	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Thallium	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Zinc	50	ug/l			53.9-206.4	53.9-206.4	72.40	31.80	70.00	34.40	29.90	13.80
Total Zinc	50	ug/l			55.1-211.0	55.1-211.0	135.00	200.00	150.00	107.00	40.80	34.30
Semi-Volatiles												
Acenaphthylene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Acetophenone	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Anthracene	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Antracene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aminobiphenyl	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzidine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(a)anthracene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(b)fluoranthene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(k)flouranthene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(a)pyrene	0.1	ug/l		0.2			0.00	0.00	0.00	0.00	0.00	0.00
Butyl benzyl phthalate	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Bis(2-chloroethyl)ether	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Bis(2-Chloroethoxy) methane	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Bis(2-Ethylhexl) phthalate	1	ug/l					0.00	0.00	0.00	0.00	0.00	24.30
Bis(2-chlorisopropyl) ether	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Bromophenyl phenyl ether	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Chloroaniline	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1-Chloronaphthalene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Chloronaphthalene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Chlorophenyl phenyl ether	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Chrysene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dimethyl phthalate	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
7,12-Dimethyl-benz(a)-anthracene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
alpha,alpha-Dimethylphenethylamine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dibenz(a,j)acridine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dibenzo(a,h)anthracene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,3-Dichlorobenzene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2-Dichlorobenzene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,4-Dichlorobenzene	0.05	ug/l		5			0.00	0.00	0.00	0.00	0.00	0.00
3,3-Dichlorobenzidine	0.05	ug/l		600			0.00	0.00	0.00	0.00	0.00	0.00
Diethyl phthalate	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dimethyl phthalate	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
di-n-Butyl phthalate	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-Dinitrotoluene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,6-Dinitrotoluene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Diphenylamine	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2-Diphenylhydrazine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
di-n-Octyl phthalate	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Ethyl methanesulfonate	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Endrin ketone	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Fluoranthene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Fluorene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Hexachlorobenzene	0.5	ug/l		1			0.00	0.00	0.00	0.00	0.00	0.00
Hexachlorobutadiene	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Hexachloro-cyclopentadiene	3	ug/l		50			0.00	0.00	0.00	0.00	0.00	0.00
Hexachloroethane	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Indeno(1,2,3-cd)pyrene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Isophorone	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Methylcholanthrene	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Methylmethanesulfonate	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Naphthalene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1-Naphthylamine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Naphthylamine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Nitroaniline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
3-Nitroaniline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Nitroaniline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Nitrobenzene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-butyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-dimethyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-diphenyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-di-n-propyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitrosopiperidine	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pentachlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Phenacetin	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Phenanthrene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Picoline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pronamide	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pyrene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2,4,5-Tetra-chlorobenzene	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2,4-Trichlorobenzene	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzoic acid	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-chloro-3-methylphenol	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-chloro_3_methylphenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2- Chlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-dichlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,6-Dichlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-dimethylphenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-dinitrophenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4,6 Dinitro-2-methylphenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Methylphenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Metholphenol	3	ug/l					3.00	0.00	0.00	0.00	0.00	0.00
2-nitrophenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-nitrophenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pentachlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Phenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,3,4,6-Tetrachlorophenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4,5-Trichlorophenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4,6-trichlophenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
PCBs												
Aroclor-1016	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1221	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1232	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1242	0.5	ug/l		0.03	0.014		0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1248	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1254	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1260	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pesticides												
Aldrin	0.05	ug/l				3	0.00	0.00	0.00	0.00	0.00	0.00
alpha-BHC	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
beta-BHC	0.05	ug/l	0.008				0.00	0.00	0.00	0.00	0.00	0.00
delta-BHC	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
gamma-BHC (lindane)	0.05	ug/l		0.2		0.95	0.00	0.00	0.00	0.00	0.00	0.00
Chlordane	0.05	ug/l			0.0043	2.4	0.00	0.00	0.00	0.00	0.00	0.00
4,4'-DDD	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4,4'-DDE	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4,4'-DDT	0.1	ug/l			0.001	1.1	0.00	0.00	0.00	0.00	0.00	0.00
Dieldrin	0.1	ug/l			0.056	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan 1	0.1	ug/l			0.056	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan 2	0.1	ug/l	0.018		0.056	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan sulfate	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Endrin	0.1	ug/l	0.004	2	0.036	0.086	0.00	0.00	0.00	0.00	0.00	0.00
Endrin aldehyde	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Heptachlor	0.05	ug/l		0.01	0.0038	0.52	0.00	0.00	0.00	0.00	0.00	0.00
Heptachlor Epoxide	0.05	ug/l		0.01	0.0038	0.52	0.00	0.00	0.00	0.00	0.00	0.00
Methoxychlor	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Toxaphene	1	ug/l		3	0.0002	0.73	0.00	0.00	0.00	0.00	0.00	0.00
Diazinon	0.01	ug/l		0.08			0.070	0.030	0.083	0.00	0.06	0.00
Chlorpyrifos	0.05	ug/l		0.07			0.00	0.00	0.00	0.00	0.00	0.00
Diuron	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Malathion	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Prometryn	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Simazine	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Atrazine	2	ug/l		3			0.00	0.00	0.00	0.00	0.00	0.00
Cyanazine	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Molinate	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Thiobencarb	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Herbicides												
Carbofuran	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4,5-TP-Silvex	10	ug/l		70			0.00	0.00	0.00	0.00	0.00	0.00
2,4,5-TP	1	ug/l		50			0.00	0.00	0.00	0.00	0.00	0.00
Bentazon	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Glyphosate	25	ug/l		700			0.00	0.00	0.00	0.00	0.00	0.00

[1] CTR values for metals are hardness dependent; higher hardness gives higher WQO

[2] Values of 0 represent that the constituent was not detected above the PQL as defined in the Municipal Stormwater Permit. Results are presented in accordance with Method B of the permit.

RB-AR10346

					Wet				Dry	
WEATHER CONDITION										
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0506-01	0506-02	0506-03	0506-04	0506-01	0506-02
DATE					10/17/2005	12/31/2005	01/14/2006	02/17/2006	01/24/2006	04/25/2006
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	2.00	2.50	0	0	0	0
Total Phenols	Grab	EPA420.1	0.10	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.0052	0	0.019	0.035	0.040	0.057
pH	Comp	SM4500H B	0-14		7.32	7.19	7.42	7	8.24	8.29
Dissolved Oxygen	Grab	SM4500O G	1.00	mg/L	6.75	7.46	12.40	8.73	15.53	14.05
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20.00	MPN/100ml	90,000,000	90,000	160,000	160,000	5,000	220,000
Fecal Coliform	Grab	SM9230B	20.00	MPN/100ml	24,000,000	50,000	2,400	16,000	500	9,000
Ratio Fecal Coliform/Total Coliform					0.27	0.56	0.02	0.10	0.10	0.04
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	5,000,000	30,000	16,000	16,000	220	700
Enterococcus	Grab	SM9230B		MPN/100ml	2,400,000	30,000	16,000	16,000	220	500
General										
Chloride	Comp	EPA300.0	2.00	mg/L	7.26	9.97	32.90	31.90	113.00	102.00
Fluoride	Comp	EPA300.0	0.10	mg/L	0.13	0.13	0.26	0.15	0.41	0.42
Nitrate	Comp	EPA300.0	0.10	mg/L	5.88	3.88	5.65	5.92	10.4	11.8
Sulfate	Comp	EPA300.0	0.10	mg/L	13.60	16.80	49.10	45.90	169.00	206.00
Alkalinity	Comp	EPA310.1	4.00	mg/L	40.7	40.7	72.6	84.7	183.7	121
Hardness	Comp	EPA130.2	2.00	mg/L	52.5	45	105	130	290	300
COD	Comp	EPA410.4	10.00	mg/L	66.9	29.7799	74.127	139	65.8	159
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	2.3	3.5	0	0	0	0
Specific Conductance	Comp	EPA120.1	1.00	umhos/cm	149.9	167.2	372	407	988	1214
Total Dissolved Solids	Comp	EPA160.1	2.00	mg/L	104.00	98.00	224.00	248.00	618.00	680.00
Turbidity	Comp	EPA180.1	0.10	NTU	6.49	4.99	2.93	7.33	2.34	0.98
Total Suspended Solids	Comp	EPA160.2	2.00	mg/L	542	238	295	104	18	17
Volatile Suspended Solids	Comp	EPA160.4	1.00	mg/L	99	55	83	40	10	11
MBAS	Comp	EPA425.1	0.05	mg/L	0.5844	0.228	0.146	0.345	0.086	0.107
Total Organic Carbon	Comp	EPA415.1	1.00	mg/L	18.1	11.6	18.7	31.6	9.84	8.57
BOD	Comp	SM5210B	2.00	mg/L	25.9	22.9	36.6	52.5	68.3	48.6
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	0		0	0	0	0
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.057	0.239	0.194	0.437	0.392	0.1
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	0.3411	0.391	0.508	0.851	0.481	0.211
NH3-N	Comp	EPA350.3	0.10	mg/L	0.657	0.61317	0.572	2.77	4.879	1.05
Nitrate - N	Comp	SM4110B	0.50	mg/L	1.33	0.876	1.276	1.337	2.348	2.664
Nitrite - N	Comp	SM4110B	0.03	mg/L	0.134	0.094	0.335	0.371	1.093	1.6039
Kjeidahl-N	Comp	EPA351.4	0.10	mg/L	7.02	1.6156	3.383	11.5	5.88	2.04
Metals										
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	238	108	0	0	0	0
Total Aluminum	Comp	EPA200.8	100.00	ug/L	2,400	675	472	1,860	0	156
Dissolved Antimony	Comp	EPA200.8	5.00	ug/L	1.75	0.68	1.44	2.63	0	0.68
Total Antimony	Comp	EPA200.8	5.00	ug/L	2.76	1.31	2.11	3.19	0.60	0.8
Dissolved Arsenic	Comp	EPA200.8	5.00	ug/L	1.58	0	1.3	1.73	1.12	1.89
Total Arsenic	Comp	EPA200.8	5.00	ug/L	2.34	1.34	1.80	1.88	1.95	2.4
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	22.60	10.60	27.00	38.40	20.10	34.10
Total Barium	Comp	EPA200.8	10.00	ug/L	81.10	17.30	34.40	64.40	34.00	36.10
Dissolved Beryllium	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1.00	ug/L	0.60	0	0	0.47	0	0
Dissolved Chromium	Comp	EPA200.8	5.00	ug/L	0	2.02	2.48	1.8	1.44	4.37
Total Chromium	Comp	EPA200.8	5.00	ug/L	7.18	2.54	2.93	5.02	5.94	6.43
Dissolved Chromium +6	Comp	EPA200.8	10.00	ug/L	0	0	0	0	0	0
Total Chromium +6	Comp	EPA200.8	10.00	ug/L	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5.00	ug/L	10.60	7.18	14.60	10.4	6.76	5.72
Total Copper	Comp	EPA200.8	5.00	ug/L	51.20	12.00	16.40	43.8	8.80	19.3
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	386	0	0	357	0	0
Total Iron	Comp	EPA200.8	100.00	ug/L	3120	204	877	1400	115	284
Dissolved Lead	Comp	EPA200.8	5.00	ug/L	3.86	0	0.64	2.15	0.87	0
Total Lead	Comp	EPA200.8	5.00	ug/L	37.80	1.57	4.59	20.1	1.08	1.72
Dissolved Mercury	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5.00	ug/L	5.22	2.19	5.13	9.14	3.02	5.6
Total Nickel	Comp	EPA200.8	5.00	ug/L	11.80	4.21	7.30	10	5.34	36.5
Dissolved Selenium	Comp	EPA200.8	5.00	ug/L	0	0	1.14	0	2.51	3.08
Total Selenium	Comp	EPA200.8	5.00	ug/L	0	0	1.36	1.06	3.52	4.01
Dissolved Silver	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1.00	ug/L	0.26	0	0.28	0.48	0	0
Dissolved Thallium	Comp	EPA200.8	5.00	ug/L	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5.00	ug/L	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50.00	ug/L	33.00	20.90	75.00	63.5	23.40	21.9
Total Zinc	Comp	EPA200.8	50.00	ug/L	249.00	28.60	129.00	178	34.40	32.5
Semi-Volatiles Organics (EPA 625)										
2-Chlorophenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
Pentachlorophenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
Phenol	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0

RB-AR10347

					Wet				Dry	
WEATHER CONDITION										
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0506-01	0506-02	0506-03	0506-04	0506-01	0506-02
DATE					10/17/2005	12/31/2005	01/14/2006	02/17/2006	01/24/2006	04/25/2006
	Sample Type	EPA Method	PQL	Units						
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Benzidine	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Benzo(g,h,i)perylene	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
3,4 Benzofluoranthene	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Bis(2-Chloroethoxy)methane	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Bis(2-Chloroisopropyl)ether	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Bis(2-Chloroethyl)ether	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Bis(2-Ethylhexl)phthalate	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
2-Chloroethyl vinyl ether	Grab	EPA624	2.50	ug/L	0		0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Chrysene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
Dimethyl phthalate	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Fluorene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0.61
Naphthalene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Gamma-BHC (Lindane)	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/L						
gamma-chlordane	Comp	EPA625	0.05	ug/L						
Chlordane	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endosulfan I [alpha]	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endosulfan II [beta]	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endrin	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0

RB-AR10348

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0506-01	0506-02	0506-03	0506-04	0506-01	0506-02
DATE					10/17/2005	12/31/2005	01/14/2006	02/17/2006	01/24/2006	04/25/2006
	Sample Type	EPA Method	PQL	Units						
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/L	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/L	0	0	0	0	0	0
Prometryn	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Atrazine	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Simazine	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Malathion	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25.00	ug/L	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10.00	ug/L	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1.00	ug/L	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

LEAD

RB-AR10349

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2006-07Event03	2006-07Event07	2006-07Event08	2006-07Event02	2006-07Event15
DATE					12/09/2006	02/19/2007	02/22/2007	11/01/2006	04/09/2007
	Sample Type	EPA Method	PQL	Units					
Conventional									
Oil and Grease	Grab	EPA413.1	1	mg/L	1.100	1.500	-99	-99	-99
Total Phenols	Grab	EPA420.1	0.10	mg/L	-99	-99	-99	-99	-99
Cyanide	Grab	EPA335.2	0.01	mg/L	0.019	0.033	0.047	0.050	0.044
pH	Comp	SM4500H B	0-14		7.400	7.560	7.570	8.000	8.110
Dissolved Oxygen	Grab	SM4500O G	1.00	mg/L	5.780	8.160	8.430	15.580	17.000
Indicator Bacteria									
Total Coliform	Grab	SM9230B	20.00	MPN/100ml	2,800,000.000	1,700,000.000	50,000.000	8,000.000	3,000.000
Fecal Coliform	Grab	SM9230B	20.00	MPN/100ml	240,000.000	22,000.000	17,000.000	20.000	2,400.000
Ratio Fecal Coliform/Total Coliform					0.086	0.013	0.340	0.003	0.800
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	170,000.000	90,000.000	1,300.000	110.000	70.000
Enterococcus	Grab	SM9230B		MPN/100ml	170,000.000	90,000.000	1,300.000	40.000	70.000
General									
Chloride	Comp	EPA300.0	2.00	mg/L	56.200	35.000	36.700	106.000	116.000
Fluoride	Comp	EPA300.0	0.10	mg/L	0.310	0.271	0.250	0.470	0.590
Nitrate	Comp	EPA300.0	0.10	mg/L	3.380	-99	-99	19.800	-99
Sulfate	Comp	EPA300.0	0.10	mg/L	63.100	52.500	53.900	169.000	161.000
Alkalinity	Comp	EPA310.1	4.00	mg/L	157.300	71.500	71.500	185.900	199.100
Hardness	Comp	EPA130.2	2.00	mg/L	220.000	140.000	110.000	305.000	310.000
COD	Comp	EPA410.4	10.00	mg/L	578.000	51.220	42.910	64.240	35.606
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	1.800	1.300	-99	-99	-99
Specific Conductance	Comp	EPA120.1	1.00	umhos/cm	654.000	406.000	434.000	1180.000	1130.000
Total Dissolved Solids	Comp	EPA160.1	2.00	mg/L	374.000	224.000	240.000	644.000	640.000
Turbidity	Comp	EPA180.1	0.10	NTU	6.170	1.610	2.840	5.430	1.720
Total Suspended Solids	Comp	EPA160.2	2.00	mg/L	2162.000	219.000	113.000	67.000	20.000
Volatile Suspended Solids	Comp	EPA160.4	1.00	mg/L	608.000	56.000	25.000	34.000	18.000
MBAS	Comp	EPA425.1	0.05	mg/L	0.430	0.144	0.108	0.081	0.070
Total Organic Carbon	Comp	EPA415.1	1.00	mg/L	51.700	16.900	11.600	8.740	10.700
BOD	Comp	SM5210B	2.00	mg/L	46.400	70.000	17.800	95.400	72.400
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	-99	-99	-99	-99	-99
Nutrients									
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.911	0.290	0.289	0.253	-99
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	2.000	0.574	0.529	0.475	0.240
NH3-N	Comp	EPA350.3	0.10	mg/L	4.040	-99	-99	2.750	0.560
Nitrate - N	Comp	SM4110B	0.50	mg/L	0.760	-99	-99	4.471	-99
Nitrite - N	Comp	SM4110B	0.03	mg/L	0.400	0.122	0.040	1.449	0.560
Kjeidahl-N	Comp	EPA351.4	0.10	mg/L	30.680	4.900	2.320	5.820	3.080
Metals									
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	-99	-99	-99	-99	-99
Total Aluminum	Comp	EPA200.8	100.00	ug/L	10100.000	5200.000	3240.000	108.000	-99
Dissolved Antimony	Comp	EPA200.8	5.00	ug/L	1.590	1.970	1.720	0.880	0.720
Total Antimony	Comp	EPA200.8	5.00	ug/L	6.910	3.370	2.970	0.890	0.760
Dissolved Arsenic	Comp	EPA200.8	5.00	ug/L	1.530	1.480	1.380	2.890	1.610
Total Arsenic	Comp	EPA200.8	5.00	ug/L	7.990	2.800	2.050	3.160	1.760
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	60.000	29.700	29.300	42.600	38.300
Total Barium	Comp	EPA200.8	10.00	ug/L	544.000	106.000	74.700	43.800	42.100
Dissolved Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Dissolved Cadmium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Cadmium	Comp	EPA200.8	1.00	ug/L	5.170	0.940	0.270	-99	-99
Dissolved Chromium	Comp	EPA200.8	5.00	ug/L	3.000	1.810	4.570	4.610	2.370
Total Chromium	Comp	EPA200.8	5.00	ug/L	39.600	8.700	16.300	4.740	2.590
Dissolved Chromium +6	Comp	EPA200.8	10.00	ug/L	-99	-99	0.350	-99	-99
Total Chromium +6	Comp	EPA200.8	10.00	ug/L	-99	-99	0.350	-99	-99
Dissolved Copper	Comp	EPA200.8	5.00	ug/L	5.290	9.600	10.700	7.490	6.540
Total Copper	Comp	EPA200.8	5.00	ug/L	424.000	76.900	48.600	20.000	25.800
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	578.000	-99	-99	-99	-99
Total Iron	Comp	EPA200.8	100.00	ug/L	18500.000	3840.000	2770.000	271.000	-99
Dissolved Lead	Comp	EPA200.8	5.00	ug/L	2.420	-99	1.010	0.830	-99
Total Lead	Comp	EPA200.8	5.00	ug/L	240.000	25.900	19.300	3.170	1.930
Dissolved Mercury	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Mercury	Comp	EPA200.8	1.00	ug/L	0.447	-99	-99	-99	-99
Dissolved Nickel	Comp	EPA200.8	5.00	ug/L	7.710	5.410	4.780	4.890	4.060
Total Nickel	Comp	EPA200.8	5.00	ug/L	45.600	13.200	9.930	5.730	4.820
Dissolved Selenium	Comp	EPA200.8	5.00	ug/L	2.240	-99	-99	6.850	2.300
Total Selenium	Comp	EPA200.8	5.00	ug/L	4.120	1.280	-99	7.160	2.500
Dissolved Silver	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Silver	Comp	EPA200.8	1.00	ug/L	3.510	0.560	-99	-99	-99
Dissolved Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99
Total Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99
Dissolved Zinc	Comp	EPA200.8	50.00	ug/L	74.300	34.300	39.400	26.500	21.300
Total Zinc	Comp	EPA200.8	50.00	ug/L	2590.000	198.000	124.000	40.700	25.600
Semi-Volatiles Organics (EPA 625)									
2-Chlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
2-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
4-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
Pentachlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
Phenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99

RB-AR10350

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2006-07Event03	2006-07Event07	2006-07Event08	2006-07Event02	2006-07Event15
DATE					12/09/2006	02/19/2007	02/22/2007	11/01/2006	04/09/2007
	Sample Type	EPA Method	PQL	Units					
Base/Neutral									
Acenaphthene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Acenaphthylene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Anthracene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Benzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Benzo(a)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Benzo(g,h,i)perylene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
3,4 Benzofluoranthene	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
Benzo(k)flouranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Bis(2-Chloroethoxy)methane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Bis(2-Chloroisopropyl)ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Bis(2-Chloroethyl)ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Bis(2-Ethylhexl)phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
2-Chloroethyl vinyl ether	Grab	EPA624	2.50	ug/L	-99	-99	-99	-99	-99
2-Chloronaphthalene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Chrysene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
3,3-Dichlorobenzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
Diethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
Dimethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
di-n-Butyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
1,2-Diphenylhydrazine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
di-n-Octyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Fluoranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Fluorene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Hexachlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Hexachloro-cyclopentadiene	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
Hexachloroethane	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Isophorone	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Naphthalene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Nitrobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
N-Nitroso-dimethyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
N-Nitroso-diphenyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
Phenanthrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Pyrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
1,2,4-Trichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
Chlorinated Pesticides									
Aldrin	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
alpha-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
beta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
delta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Gamma-BHC (Lindane)	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
alpha-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
gamma-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Chlordane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4,4'-DDD	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4,4'-DDE	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4,4'-DDT	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Dieldrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endosulfan I [alpha]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endosulfan II [beta]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endosulfan sulfate	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endrin aldehyde	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Heptachlor	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Heptachlor Epoxide	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Toxaphene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Polychlorinated Biphenyls									
Aroclor-1016	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1221	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1232	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1242	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1248	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1254	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1260	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99

RB-AR10351

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2006-07Event03	2006-07Event07	2006-07Event08	2006-07Event02	2006-07Event15
DATE					12/09/2006	02/19/2007	02/22/2007	11/01/2006	04/09/2007
	Sample Type	EPA Method	PQL	Units					
Organohosphate Pesticides									
Chlorpyrifos	Comp	EPA507	0.05	ug/L	-99	-99	-99	-99	-99
Diazinon	Comp	EPA507	0.01	ug/L	-99	-99	-99	-99	-99
Prometryn	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Atrazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Simazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Cyanazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Malathion	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Herbicides									
Glyphosate	Comp	EPA547	25.00	ug/L	-99	-99	-99	-99	-99
2,4-D	Comp	EPA515.3	10.00	ug/L	-99	-99	-99	-99	-99
2,4,5-TP-SILVEX	Comp	EPA515.3	1.00	ug/L	-99	-99	-99	-99	-99
Other									
Ammonia	Comp	SM4500-NH3 F	0.1	mg/L	4.890	-99	-99	3.330	0.680
Endrin ketone	Comp	EPA625	0.1	ug/L	-99	-99	-99	-99	-99
Methoxychlor	Comp	EPA608	0.5	ug/L	-99	-99	-99	-99	-99

Note:
1) blank cell indicates sample was not analyzed
2) -99 indicates concentration below minimum detection leve
3) PQL = minimum level
4) Highlighted cells show exceedances

LEAD

WEATHER CONDITION					Wet					Dry	
STATION NO.					S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2007-08Event21	2007-08Event23	2007-08Event29	2007-08Event31	2007-08Event32	2007-08Event27	2007-08Event47
	Sample Type	EPA Method	PQL	Units							
Conventional											
Oil and Grease	Grab	EPA413.1	1	mg/L	1.10		1.60	1.60		-99	-99
Total Phenols	Grab	EPA420.1	0.10	mg/L	-99		0.12	0.11		-99	-99
Cyanide	Grab	EPA335.2	0.01	mg/L	0.0240		0.0130	-99		0.1090	0.0110
pH	Comp	SM4500H B	0-14		7.41	7.01	7.04	6.64	6.85	8.14	8.30
Dissolved Oxygen	Grab	SM4500O G	1.00	mg/L	7.97		8.31	6.04		15.04	15.70
Indicator Bacteria											
Total Coliform	Grab	SM9230B	20.00	MPN/100ml	90000		300000	90000		24000	270
Fecal Coliform	Grab	SM9230B	20.00	MPN/100ml	50000		300000	24000		9000	40
Ratio Fecal Coliform/Total Coliform											
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	17000		240000	220000		110	170
Enterococcus	Grab	SM9230B		MPN/100ml	17000		130000	220000		110	80
General											
Chloride	Comp	EPA300.0	2.00	mg/L	53.70	14.50	16.70	14.50	12.80	122	155
Fluoride	Comp	EPA300.0	0.10	mg/L	0.56	0.1350	0.2350	0.19	0.1690	0.5830	0.5940
Nitrate	Comp	EPA300.0	0.10	mg/L	-99	-99	-99	-99	-99	-99	-99
Sulfate	Comp	EPA300.0	0.10	mg/L	57.10	21	23.20	20.30	18.70	147	228
Alkalinity	Comp	EPA310.1	4.00	mg/L	167.20	53	39	36.30	35.20	171	165
Hardness	Comp	EPA130.2	2.00	mg/L	205	110	65	55	61	290	350
COD	Comp	EPA410.4	10.00	mg/L	123	40.40	72.40	38.50	45.43	119.70	85.60
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	-99		4.75	2.50		-99	-99
Specific Conductance	Comp	EPA120.1	1.00	umhos/cm	711	204	211	199	176	1056	1169
Total Dissolved Solids	Comp	EPA160.1	2.00	mg/L	472	112	122	122	102	694	738
Turbidity	Comp	EPA180.1	0.10	NTU	4.58	5.07	4.15	1.73	6.63	1.42	1.94
Total Suspended Solids	Comp	EPA160.2	2.00	mg/L	1990	975	193	65	124	142	9
Volatile Suspended Solids	Comp	EPA160.4	1.00	mg/L	429	154	49	18	20	35	9
MBAS	Comp	EPA425.1	0.05	mg/L	0.35	0.14	0.22	0.32	0.34	0.07	0.08
Total Organic Carbon	Comp	EPA415.1	1.00	mg/L	57.10	13.50	11.90	7.85	6.88	8.12	13.10
BOD	Comp	SM5210B	2.00	mg/L	128	16.80	27.80	17.40	12.90	25.20	15.40
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	-99		-99	-99		-99	-99
Nutrients											
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.6710	0.4760	0.13	0.31	0.22	0.21	0.25
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	1.72	1.72	0.38	0.32	0.24	0.26	0.31
NH_3-N	Comp	EPA350.3	0.10	mg/L	2.85	0.48	0.75	0.4010	0.4410	-99	1.05
Nitrate - N	Comp	SM4110B	0.50	mg/L	-99	-99	-99	-99	-99	-99	-99
Nitrite - N	Comp	SM4110B	0.03	mg/L	-99	0.03	0.08	0.03	-99	0.09	0.05
Kjeidahl-N	Comp	EPA351.4	0.10	mg/L	19.40	5.60	4.16	2.18	1.33	1.28	3.38
Metals											
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Aluminum	Comp	EPA200.8	100.00	ug/L	7900	21500	2830	895	5560	356	-99
Dissolved Antimony	Comp	EPA200.8	5.00	ug/L	2.70	3.77	2.04	1.47	1.48	0.64	0.75
Total Antimony	Comp	EPA200.8	5.00	ug/L	6.87	8.02	3.81	1.79	3.01	0.85	0.82
Dissolved Arsenic	Comp	EPA200.8	5.00	ug/L	2.20	2.23	1.76	1.24	1.21	1.79	2.10
Total Arsenic	Comp	EPA200.8	5.00	ug/L	6.39	5.60	2.41	1.27	2.06	1.89	2.13
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	59.70	35.60	27.80	20	20.40	41	35.90
Total Barium	Comp	EPA200.8	10.00	ug/L	327	396	84.20	35.50	83.30	54.60	41.20
Dissolved Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Dissolved Cadmium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Cadmium	Comp	EPA200.8	1.00	ug/L	3.69	4.57	0.76	0.27	0.69	0.30	-99
Dissolved Chromium	Comp	EPA200.8	5.00	ug/L	3.46	1.37	1.80	1.31	7.53	2.77	5.78
Total Chromium	Comp	EPA200.8	5.00	ug/L	46.70	37.90	9.16	3.19	21.60	3.72	6.10
Dissolved Chromium +6	Comp	EPA200.8	10.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Chromium +6	Comp	EPA200.8	10.00	ug/L	-99	-99	-99	0.27	8.54	0.25	-99
Dissolved Copper	Comp	EPA200.8	5.00	ug/L	4.86	8.54	18.90	9.64	7.93	6.81	5.80
Total Copper	Comp	EPA200.8	5.00	ug/L	123	255	57.60	25.90	43.80	14.70	21.50
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	857	187	186	-99	-99	-99	-99
Total Iron	Comp	EPA200.8	100.00	ug/L	14000	33200	2750	1300	3450	864	192
Dissolved Lead	Comp	EPA200.8	5.00	ug/L	7.35	5.63	5.70	1.36	1.84	-99	-99
Total Lead	Comp	EPA200.8	5.00	ug/L	142	393	50.20	15.70	50.80	4.68	1.46
Dissolved Mercury	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Mercury	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	0.1620	-99
Dissolved Nickel	Comp	EPA200.8	5.00	ug/L	11.20	4.97	7.61	3.45	3.13	4.13	6.16
Total Nickel	Comp	EPA200.8	5.00	ug/L	35.70	37.10	12.70	4.98	9.89	5.39	6.71
Dissolved Selenium	Comp	EPA200.8	5.00	ug/L	1.29	-99	-99	-99	-99	2.78	3.06
Total Selenium	Comp	EPA200.8	5.00	ug/L	1.82	1.04	-99	-99	-99	3.06	3.29
Dissolved Silver	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Silver	Comp	EPA200.8	1.00	ug/L	1.28	1.69	0.33	-99	0.26	-99	-99
Dissolved Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Dissolved Zinc	Comp	EPA200.8	50.00	ug/L	22.30	51.40	99.10	63.10	60	38.20	41.40
Total Zinc	Comp	EPA200.8	50.00	ug/L	657	1860	270	113	209	80.70	85
Semi-Volatiles Organics (EPA 625)											
2-Chlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99

RB-AR10353

WEATHER CONDITION					Wet					Dry	
STATION NO.					S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2007-08Event21	2007-08Event23	2007-08Event29	2007-08Event31	2007-08Event32	2007-08Event27	2007-08Event47
	Sample Type	EPA Method	PQL	Units							
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
4-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Pentachlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Phenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Base/Neutral											
Acenaphthene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Acenaphthylene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Anthracene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzo(a)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzo(g,h,i)perylene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
3,4 Benzofluoranthene	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzo(k)flouranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Chloroethoxy)methane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Chloroisopropyl)ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Chloroethyl)ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Ethylhexl)phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
2-Chloroethyl vinyl ether	Grab	EPA624	2.50	ug/L	-99		-99	-99		-99	-99
2-Chloronaphthalene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Chrysene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
1,3-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
1,4-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
3,3-Dichlorobenzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Diethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Dimethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
di-n-Butyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2-Diphenylhydrazine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
di-n-Octyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Fluoranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Fluorene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachloro-cyclopentadiene	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachloroethane	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Isophorone	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Naphthalene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Nitrobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
N-Nitroso-dimethyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
N-Nitroso-diphenyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
Phenanthrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Pyrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2,4-Trichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Chlorinated Pesticides											
Aldrin	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
alpha-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
beta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
delta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Gamma-BHC (Lindane)	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
alpha-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
gamma-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Chlordane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4,4'-DDD	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4,4'-DDE	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4,4'-DDT	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Dieldrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endosulfan I [alpha]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endosulfan II [beta]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endosulfan sulfate	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endrin aldehyde	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Heptachlor	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Heptachlor Epoxide	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Toxaphene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99

RB-AR10354

WEATHER CONDITION					Wet					Dry	
STATION NO.					S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2007-08Event21	2007-08Event23	2007-08Event29	2007-08Event31	2007-08Event32	2007-08Event27	2007-08Event47
	Sample Type	EPA Method	PQL	Units							
Polychlorinated Biphenyls											
Aroclor-1016	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1221	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1232	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1242	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1248	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1254	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1260	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Organohosphate Pesticides											
Chlorpyrifos	Comp	EPA507	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Diazinon	Comp	EPA507	0.01	ug/L	-99	-99	-99	-99	-99	-99	-99
Prometryn	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Atrazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Simazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Cyanazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Malathion	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Herbicides											
Glyphosate	Comp	EPA547	25.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-D	Comp	EPA515.3	10.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4,5-TP-SILVEX	Comp	EPA515.3	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Other											
Ammonia	Comp	SM4500-NH3 F	0.1	mg/L	3.45	0.58	0.91	0.4850	0.5340	-99	1.27
Endrin ketone	Comp	EPA625	0.1	ug/L	-99	-99	-99	-99	-99	-99	-99
Methoxychlor	Comp	EPA608	0.5	ug/L	-99	-99	-99	-99	-99	-99	-99

Note:

1) blank cell indicates DATA is NOT AVAILABLE

2) PQL = minimum level

3) Highlighted cells show exceedances

4) -99 indicates a reported value cannot be achieved

DRAFT

Mass Emission Monitoring

WEATHER CONDITION					Wet											Dry		
STATION NO.					S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE	Sample	EPA			2008-09Event03	2008-09Event06	2008-09Event09	2008-09Event10	2008-09Event11	2008-09Event18	2008-09Event21	2008-09Event22	2008-09Event23	2008-09Event24	2008-09Event26	2008-09Event15	2008-09Event30	2008-09Event36
DATE	Type	Method	POL[3]	Units	11/04/2008	11/25/2008	12/15/2008	12/21/2008	12/24/2008	01/23/2009	02/05/2009	02/08/2009	02/13/2009	02/16/2009	03/04/2009	01/12/2009	03/23/2009	05/11/2009
Conventional																		
Oil and Grease	Grab	EPA1664A / EPA413.1	1	mg/L	2.9	0.8	1.4				1.2		5.5			-99	0.8	1.2
Total Phenols	Grab	EPA420.1	0.10	mg/L	-99	-99	-99				-99		-99			-99	-99	-99
Cyanide	Grab	SM4500-CNE	0.01	mg/L	0.01	-99	-99				-99		-99			0.008	0.027	-99
pH	Comp	SM4500H B	0.00	NONE	7.51	6.88					7.8		7.02			8.24	9.17	8.91
Dissolved Oxygen	Grab	SM4500 (OG)	1.00	mg/L	6.47	8.88	10.95				9.08		9.78			17.5	13.7	13.5
Indicator Bacteria																		
Total Coliform	Grab	SM9221B/SM9221E	20.00	MPN/100ml	16000000	500000	240000				16000		300000			9000	9000	9000
Fecal Coliform	Grab	SM9221E/SM9221B	20.00	MPN/100ml	16000000	24000	240000				500		16000			1300	230	130
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	9000000	500000	24000				9000		160000			300	-99	2400
Enterococcus	Grab	SM9230B	20.00	MPN/100ml	9000000	240000	24000				9000		160000			130	-99	2400
General																		
Chloride	Comp	SM4110B	2.00	mg/L	57.6	13.2					22.8		18.1			111	111	137
Fluoride	Comp	SM4110B	0.10	mg/L	0.53	0.11					-99		-99			0.79	0.69	0.57
Nitrate	Comp	SM4110B	0.10	mg/L	11.8	4.58					3.82		4.03			7.47	5.34	3.21
Sulfate	Comp	SM4110B	1.00	mg/L	77.9	19.3					33.6		26			150	180	186
Alkalinity	Comp	SM2320B	1.00	mg/L	88	39					41		34			144	140	165
Hardness	Comp	SM2340C	2.00	mg/L	150	80					50		25			235	270	300
COD	Comp	SM5220D	10.00	mg/L	104	55.6					38.9		86.4			64	61.8	104
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	1.87	1.5	0.62				1.25		4.75			-99	-99	-99
Specific Conductance	Comp	SM2510B	1.00	umhos/cm	573	177					243		202			1039	1020	1240
Total Dissolved Solids	Comp	SM2540C	2.00	mg/L	384	114					144		134			674	668	754
Turbidity	Comp	SM2130B	0.10	NTU	4.44	20.1					27.2		11.8			1.62	2.42	1.6
Total Suspended Solids	Comp	SM25400D	1.00	mg/L	374	820		95	93	125	486	136	221	252	686	27	16	18
Volatile Suspended Solids	Comp	SM2540E	1.00	mg/L	87	142					65		47			8	8	7
MBAS	Comp	SM5540-C	0.05	mg/L	0.67	0.24					0.02		0.25			0.17	0.5	0.19
Total Organic Carbon	Comp	SM5310B / EPA415.1		mg/L	22.8	11.1					6.93		7.44			6.88	21.9	8.4
BOD	Comp	SM5210B	2.00	mg/L	30.9	19.8					6.99		14.1			30.5	26.1	34
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	-99	-99	-99				-99		-99			-99	-99	-99
Nutrients																		
Dissolved Phosphorus	Comp	SM4500-PE	0.05	mg/L	0.37	0.3					0.28		0.15			-99	0.23	0.27
Total Phosphorus	Comp	SM4500-PE	0.05	mg/L	0.71	0.42					0.64		0.33			-99	0.27	0.38
NH3-N	Comp	SM4500-NH3 F	0.10	mg/L	0.61	0.73					-99		0.26			0.14	0.52	0.1
Nitrate - N	Comp	SM4110B	0.50	mg/L	2.66	1.03					0.86		0.91			1.69	1.21	0.72
Nitrite - N	Comp	SM4110B	0.03	mg/L	0.07	0.05					-99		-99			0.15	0.14	0.2
Kjeidahl-N	Comp	SM4500-NHorg C	0.10	mg/L	6.48	2.72					0.86		1.33			1.22	2.52	1.48
Metals																		
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	-99	-99					-99		153			-99	-99	-99
Total Aluminum	Comp	EPA200.8	100.00	ug/L	530	1130					1710		1930			39.2	-99	50.3
Dissolved Antimony	Comp	EPA200.8	0.50	ug/L	2.42	1.58					0.86		1.16			0.56	1.52	0.79
Total Antimony	Comp	EPA200.8	0.50	ug/L	4.03	5.55					1.64		2.07			0.67	1.53	0.79
Dissolved Arsenic	Comp	EPA200.8	1.00	ug/L	2.14	1.23					1.01		0.91			1.35	1.86	2.1
Total Arsenic	Comp	EPA200.8	1.00	ug/L	3.58	3.99					2.83		1.47			1.54	1.86	2.18
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	36.2	25.4					21		20.8			36.8	47.2	38.7
Total Barium	Comp	EPA200.8	10.00	ug/L	117	218					146		69			46.7	55.2	45.7
Dissolved Beryllium	Comp	EPA200.8	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Beryllium	Comp	EPA200.8	0.50	ug/L	-99	0.38					0.31		0.13			-99	-99	-99
Dissolved Cadmium	Comp	EPA200.8	0.25	ug/L	0.14	-99					0.12		0.11			0.13	0.16	-99
Total Cadmium	Comp	EPA200.8	0.25	ug/L	0.98	1.93					1		0.47			0.16	0.22	0.18
Dissolved Chromium	Comp	EPA200.8	0.50	ug/L	2.23	1.38					1.67		2.3			1.49	1	3.23
Total Chromium	Comp	EPA200.8	0.50	ug/L	14.4	28.5					20.2		9.09			3.21	1.28	4.51
Dissolved Chromium +6	Comp	EPA218.6	0.25	ug/L	-99	0.3					0.48		0.71			0.39	0.31	-99
Total Chromium +6	Comp	EPA218.6	0.25	ug/L	-99	0.3					0.48		0.71			0.39	0.31	-99
Dissolved Copper	Comp	EPA200.8	0.50	ug/L	14.8	10.6					5.63		9.69			4.78	11.9	4.07
Total Copper	Comp	EPA200.8	0.50	ug/L	63.7	124					34.5		33.4			9.15	20.6	10.5
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	237	178					119		91.3			-99	-99	-99
Total Iron	Comp	EPA200.8	100.00	ug/L	4860	17900					15200		3190			316	113	115
Dissolved Lead	Comp	EPA200.8	0.50	ug/L	3.96	5.2					2.04		2.09			0.29	0.65	0.21
Total Lead	Comp	EPA200.8	0.50	ug/L	51.1	166					29.2		25			1.42	1.38	0.98
Dissolved Mercury	Comp	EPA245.1	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Mercury	Comp	EPA245.1	0.10	ug/L	-99	-99					-99		-99			0.04	-99	-99
Dissolved Nickel	Comp	EPA200.8	1.00	ug/L	8.71	4.05					2.28		2.75			4.78	6.9	5.26
Total Nickel	Comp	EPA200.8	1.00	ug/L	17.1	26.7					15.7		7.48			5.18	7.94	6.11
Dissolved Selenium	Comp	EPA200.8	1.00	ug/L	1.22	-99					-99		-99			2.14	2.61	3.2
Total Selenium	Comp	EPA200.8	1.00	ug/L	1.86	-99					-99		-99			2.34	2.69	3.32
Dissolved Silver	Comp	EPA200.8	0.25	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Silver	Comp	EPA200.8	0.25	ug/L	0.36	0.41					0.19		0.12			-99	-99	-99
Dissolved Thallium	Comp	EPA200.8	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Thallium	Comp	EPA200.8	0.50	ug/L	-99	-99					0.17		-99			-99	-99	-99
Dissolved Zinc	Comp	EPA200.8	10.00	ug/L	38.5	78.3					29.9		57.5			20.3	28.7	13.4
Total Zinc	Comp	EPA200.8	10.00	ug/L	264	936					140		147			43	31.5	25.7
Semi-Volatiles Organics (EPA 625)																		
2-Chlorophenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99

RB-AR10356

Mass Emission Monitoring

WEATHER CONDITION					Wet											Dry		
STATION NO.					S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE	Sample	EPA			2008-09Event03	2008-09Event06	2008-09Event09	2008-09Event10	2008-09Event11	2008-09Event18	2008-09Event21	2008-09Event22	2008-09Event23	2008-09Event24	2008-09Event26	2008-09Event15	2008-09Event30	2008-09Event36
DATE	Type	Method	POL[3]	Units	11/04/2008	11/25/2008	12/15/2008	12/21/2008	12/24/2008	01/23/2009	02/05/2009	02/08/2009	02/13/2009	02/16/2009	03/04/2009	01/12/2009	03/23/2009	05/11/2009
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Pentachlorophenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Phenol	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Base/Neutral																		
Acenaphthene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Acenaphthylene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Anthracene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzidine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzo(a)pyrene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzo(g,h,i)perylene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
3,4 Benzofluoranthene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzo(k)flouranthene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Chloroethoxy)methane	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Chloroisopropyl)ether	Comp	EPA625	2	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Chloroethyl)ether	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Ethylhexl)phthalate	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	-99	-99					-99		-99			-99	-99	-99
2-Chloroethyl vinyl ether	Comp	EPA624	2.50	ug/L	-99	-99	-99				-99		-99			-99	-99	-99
2-Chloronaphthalene	Comp	EPA625	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Chrysene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
1,3-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
1,4-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
3,3-Dichlorobenzidine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Diethyl phthalate	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Dimethyl phthalate	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
di-n-Butyl phthalate	Comp	EPA625	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-Dinitrotoluene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,6-Dinitrotoluene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2-Diphenylhydrazine	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
di-n-Octyl phthalate	Comp	EPA625	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Fluoranthene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Fluorene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachlorobenzene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachloro-cyclopentadiene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachloroethane	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Isophorone	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Naphthalene	Comp	EPA625	0.20	ug/L	-99	-99					-99		-99			-99	-99	-99
Nitrobenzene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
N-Nitroso-dimethyl amine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
N-Nitroso-diphenyl amine	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
N-Nitroso-di-n-propyl amine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Phenanthrene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Pyrene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2,4-Trichlorobenzene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Chlorinated Pesticides																		
Aldrin		EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
alpha-BHC	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
beta-BHC	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
delta-BHC	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Gamma-BHC (Lindane)	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
alpha-chlordane	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
gamma-chlordane	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Chlordane	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
4,4'-DDD	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
4,4'-DDE	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
4,4'-DDT	Comp	EPA608	0.01	ug/L	-99	-99					-99		-99			-99	-99	-99
Dieldrin	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endosulfan I [alpha]	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endosulfan II [beta]	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endosulfan sulfate	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endrin	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endrin aldehyde	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Heptachlor	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99

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Mass Emission Monitoring

WEATHER CONDITION					Wet											Dry		
STATION NO.					S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE	Sample	EPA			2008-09Event03	2008-09Event06	2008-09Event09	2008-09Event10	2008-09Event11	2008-09Event18	2008-09Event21	2008-09Event22	2008-09Event23	2008-09Event24	2008-09Event26	2008-09Event15	2008-09Event30	2008-09Event36
DATE	Type	Method	PQL[3]	Units	11/04/2008	11/25/2008	12/15/2008	12/21/2008	12/24/2008	01/23/2009	02/05/2009	02/08/2009	02/13/2009	02/16/2009	03/04/2009	01/12/2009	03/23/2009	05/11/2009
Heptachlor Epoxide	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Toxaphene	Comp	EPA608	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Polychlorinated Biphenyls																		
Aroclor-1016	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1221	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1232	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1242	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1248	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1254	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1260	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Organophosphate Pesticides																		
Chlorpyrifos	Comp	EPA507	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Diazinon	Comp	EPA507	0.01	ug/L	-99	-99					-99		-99			-99	-99	-99
Prometryn	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Atrazine	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Simazine	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Cyanazine	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Malathion	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Herbicides																		
Glyphosate	Comp	EPA547	25.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-D	Comp	EPA515.3	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4,5-TP-SILVEX	Comp	EPA515.3	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Other																		
Ammonia	Comp	SM4500-NH3 F	0.1	mg/l	0.74	0.88					-99		0.32			0.16	0.63	0.12
Endrin ketone	Comp	EPA625	1	ug/L	-99	-99					-99		-99			-99	-99	-99
Methoxychlor	Comp	EPA608	0.5	ug/L	-99	-99					-99		-99			-99	-99	-99

Note:
1) blank cell indicates sample was not analyzed
2) -99 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances
5) Wet weather suspension of fecal coliform objective applies to 2008-09Event06, 2008-09Event09, and 2008-09Event21

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Appendix B.2. 2009-2010 Annual Report Mass Emission and Tributary Dry Weather Concentration

Group	Parameter Code	Units	Analysis_Method	Los Angeles @ Wardlow S10 2009-10Event02 07/14/2009	Los Angeles @ Wardlow S10 2009-10Event12 09/15/2009	Los Angeles @ Wardlow S10 2009-10Event14 12/01/2009	Los Angeles @ Wardlow S10 2009-10Event28 03/23/2010
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	20	20	300	300
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	20	230	130	40
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	20	230	130	40
Bacteria	Total Coliform	MPN/100mL	SM9221B	20	20	2,400	800
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.01	<0.011	<0.011	<0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002	<0.002	<0.002
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Endrin ketone	ug/L	EPA625	<0	NS	NS	NS
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.003	<0.01	<0.01	<0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.04	<0.033	<0.033	<0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.04	<0.033	<0.033	<0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.006	<0.005	**0.027***	0.01
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	10.2	21.5	15.5	17.4
Conventionals	Oil and Grease	mg/L	EPA1664A	<0.4	<0.4	<1.44	<1.44
Conventionals	pH	pH units	SM4500H B	**9.25***	7.97	**8.54***	**9.4***
General	Alkalinity as CaCO3	mg/L	SM2320B	151	151	206	165
General	Ammonia	mg/L	SM4500-NH3 F	0.16	0.218	0.448	0.23
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	24.4	31.5	21.6	24
General	Chemical Oxygen Demand	mg/L	SM5220D	234	71.3	64.5	63.2
General	Chloride	mg/L	SM4110B	131	149	114	118
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.25	0.19	0.39	0.06
General	Fluoride	mg/L	SM4110B	0.43	0.507	0.892	0.479
General	Hardness as CaCO3	mg/L	SM2340C	260	255	300	290
General	Kjeldahl-N	mg/L	SM4500-NHorg C	6.18	1.6	1.98	1.08
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4	<1	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	>0.01&<0.5	>0.01&<0.5	>0.01&<0.5	>0.01&<0.5
General	NH3-N	mg/L	SM4500-NH3 F	0.13	0.18	0.37	0.19
General	Nitrate (NO3)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate (NO3)	mg/L	SM4110B	1.07	5.49	15.7	2.35
General	Nitrate-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate-N	mg/L	SM4110B	>0.03&<0.5	1.24	3.55	0.53
General	Nitrite (NO2)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	SM4110B	<0.03	0.17	0.0502	0.0766
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	0.5	0.21	0.52	0.07
General	Specific Conductance	umhos/cm	SM2510B	1011	1020	1040	980
General	Sulfate	mg/L	EPA300.1	NS	NS	NS	NS
General	Sulfate	mg/L	SM4110B	149	168	134	197
General	Total Dissolved Phosphate	mg/L	AM4500-PE	NS	NS	NS	NS
General	Total Dissolved Solids	mg/L	SM2540C	690	664	696	662
General	Total Organic Carbon	mg/L	SM5310B	14	NS	NS	NS
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	NS	10.9	7.84	20.8
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<0.4	<0.4	<1.5	<1.5
General	Total Phosphate	mg/L	SM4500-PE	NS	NS	NS	NS
General	Total Suspended Solids	mg/L	SM2540D	135	14	110	38
General	Turbidity	NTU	SM2130B	5.5	2.53	4.07	4.48
General	Volatile Suspended Solids	mg/L	SM2540E	66	11	39	15

Appendix B.2. 2009-2010 Annual Report Mass Emission and Tributary Dry Weather Concentration

Group	Parameter Code	Units	Analysis_Method	Los Angeles @ Wardlow S10 2009-10Event02 07/14/2009	Los Angeles @ Wardlow S10 2009-10Event12 09/15/2009	Los Angeles @ Wardlow S10 2009-10Event14 12/01/2009	Los Angeles @ Wardlow S10 2009-10Event28 03/23/2010
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.07	<0.067	<0.067	<0.067
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	<5	<5	<5	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	<50	<50	<50	<50
Metals	Dissolved Antimony	ug/L	EPA200.8	0.82	<0.2	0.932	0.887
Metals	Dissolved Arsenic	ug/L	EPA200.8	2.25	2.4	4.31	2.14
Metals	Dissolved Barium	ug/L	EPA200.8	38.3	<1	45.2	41.2
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	<0.1	0.689	0.275
Metals	Dissolved Chromium	ug/L	EPA200.8	1.54	<0.5	2.05	1.57
Metals	Dissolved Chromium +6	ug/L	EPA218.6	0.37	<0.25	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	6.17	<0.5	5.25	6.72
Metals	Dissolved Iron	ug/L	EPA200.8	<50	<50	<50	<50
Metals	Dissolved Lead	ug/L	EPA200.8	0.55	<0.2	1.27	<0.2
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	7.27	<0.5	4.81	4.5
Metals	Dissolved Selenium	ug/L	EPA200.8	2.6	<0.5	5.84	2.67
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	15.7	<1	39.6	27.6
Metals	Aluminum	ug/L	EPA200.8	282	<50	1200	1100
Metals	Antimony	ug/L	EPA200.8	0.82	0.948	1.05	1.13
Metals	Arsenic	ug/L	EPA200.8	2.38	2.56	4.31	2.57
Metals	Barium	ug/L	EPA200.8	48.2	44.6	62.4	63.1
Metals	Beryllium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	<0.1	>0.1&<0.25	0.783	0.34
Metals	Chromium	ug/L	EPA200.8	1.61	0.807	3.01	2.11
Metals	Chromium +6	ug/L	EPA218.6	<0.25	<0.25	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	13.8	10.5	12.3	16.7
Metals	Iron	ug/L	EPA200.8	556	>50&<100	979	1170
Metals	Lead	ug/L	EPA200.8	2.64	0.803	8.5	6.07
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	8.2	4.84	6.03	6.43
Metals	Selenium	ug/L	EPA200.8	2.75	2.23	**5.94***	2.88
Metals	Silver	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	66.1	108	95.3	75.3
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.7	<0.667	<0.667	<0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.7	<0.667	<0.667	<0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.4	<0.33	<0.67	<0.33
Organophosphate Pesticides	Malathion	ug/L	EPA625	NS	NS	NS	NS
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.7	<0.67	<0.67	<0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.7	<0.67	<0.67	<0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<0.4	<3.3	<3.3	<3.3
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1

Appendix B.2. 2009-2010 Annual Report Mass Emission and Tributary Dry Weather Concentration

Group	Parameter Code	Units	Analysis_Method	Los Angeles @ Wardlow S10 2009-10Event02 07/14/2009	Los Angeles @ Wardlow S10 2009-10Event12 09/15/2009	Los Angeles @ Wardlow S10 2009-10Event14 12/01/2009	Los Angeles @ Wardlow S10 2009-10Event28 03/23/2010
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<0.03	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.2	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.2	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.2	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.7	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.7	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.4	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.7	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<0.4	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<0.04	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.7	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<0.2	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.7	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.7	<1.67	<1.67	9.9
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<0.1	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.7	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.04	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.7	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.02	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.04	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.7	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.02	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.7	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.7	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.07	<0.067	<0.067	<0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.4	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.02	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.02	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.4	NS	NS	NS
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.4	NS	NS	NS

Values reported with a "< "are not detected (ND) at the method detection level, and reported as <MDL

Values reported with a "<" and a ">" were detected but not quantified (DNQ) between the method detection limit and reporting limit, they are

QNS = Quantity Not Sufficient

Appendix B.1. 2009-2010 Annual Report Wet Weather Mass Emission and Tributary Stations Concentrations

Group	Parameter Code	Units	Analysis_Method	Los Angeles River @ Wardlow S10 2009-10Event13 10/13/2009	Los Angeles River @ Wardlow S10 2009-10Event15 12/07/2009	Los Angeles River @ Wardlow S10 2009-10Event16 12/11/2009	Los Angeles River @ Wardlow S10 2009-10Event19 01/17/2010
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	**900,000***	230	**300,000***	24,000**
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	2,400,000	1,300	900,000	280,000
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	2,400,000	1,300	900,000	280,000
Bacteria	Total Coliform	MPN/100mL	SM9221B	3,000,000	50,000	900,000	5,000,000
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.011	<0.011	<0.011	<0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002	<0.002	<0.002
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Endrin ketone	ug/L	EPA625	NS	NS	NS	NS
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.033	<0.033	<0.033	<0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.033	<0.033	<0.033	<0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	<0.005	**0.06***	0.007	0.01
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	7.73	9.13	10.7	8.03
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	>1.44&<5	>1.44&<5	>1.44&<5
Conventionals	pH	pH units	SM4500H B	7.45	**6.41***	6.66	7.34
General	Alkalinity as CaCO3	mg/L	SM2320B	69	34	41	69
General	Ammonia	mg/L	SM4500-NH3 F	1.91	0.79	0.364	0.446
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	19.3	24.7	9.01	9.61
General	Chemical Oxygen Demand	mg/L	SM5220D	76.4	79.9	154	29.3
General	Chloride	mg/L	SM4110B	22	11.3	7.38	11.4
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.42	0.33	0.24	0.22
General	Fluoride	mg/L	SM4110B	0.247	0.276	0.104	0.164
General	Hardness as CaCO3	mg/L	SM2340C	90	60	50	50
General	Kjeldahl-N	mg/L	SM4500-NHorg C	4.1	1.86	1.07	2
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<1	<1	<1	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.7	0.51	>0.01&<0.5	>0.01&<0.5
General	NH3-N	mg/L	SM4500-NH3 F	1.58	0.653	0.301	0.369
General	Nitrate (NO3)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate (NO3)	mg/L	SM4110B	2.38	4.62	2.39	3.34
General	Nitrate-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate-N	mg/L	SM4110B	0.5	1.04	0.54	0.754
General	Nitrite (NO2)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	SM4110B	<0.01	<0.01	<0.01	<0.01
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	1.13	0.93	0.77	0.23
General	Specific Conductance	umhos/cm	SM2510B	286	153	129	1310
General	Sulfate	mg/L	EPA300.1	NS	NS	NS	NS
General	Sulfate	mg/L	SM4110B	29.9	14.9	12.1	16
General	Total Dissolved Phosphate	mg/L	AM4500-PE	NS	NS	NS	NS
General	Total Dissolved Solids	mg/L	SM2540C	188	106	88	86
General	Total Organic Carbon	mg/L	SM5310B	NS	NS	NS	NS
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	24.5	18.7	6.21	9.7
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	<1.5	>1.5&<5	>1.5&<5
General	Total Phosphate	mg/L	SM4500-PE	NS	NS	NS	NS
General	Total Suspended Solids	mg/L	SM2540D	892	446	172	440
General	Turbidity	NTU	SM2130B	5.57	33.4	28.9	36.8
General	Volatile Suspended Solids	mg/L	SM2540E	138	79	70	76
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.067	<0.067	<0.067	<0.067
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015	<0.015	<0.015

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Appendix B.1. 2009-2010 Annual Report Wet Weather Mass Emission and Tributary Stations Concentrations

Group	Parameter Code	Units	Analysis_Method	Los Angeles River @ Wardlow S10 2009-10Event13 10/13/2009	Los Angeles River @ Wardlow S10 2009-10Event15 12/07/2009	Los Angeles River @ Wardlow S10 2009-10Event16 12/11/2009	Los Angeles River @ Wardlow S10 2009-10Event19 01/17/2010
Herbicides	Glyphosate	ug/L	EPA547	<5	<5	<5	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	<50	<50	142	<50
Metals	Dissolved Antimony	ug/L	EPA200.8	2.63	1.67	1.28	1.15
Metals	Dissolved Arsenic	ug/L	EPA200.8	1.98	1.42	1.03	1.51
Metals	Dissolved Barium	ug/L	EPA200.8	27	22.7	18.2	22.2
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Chromium	ug/L	EPA200.8	1.71	1.21	0.894	0.876
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	<0.25	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	**15.6***	**9.45***	6.41	6.06
Metals	Dissolved Iron	ug/L	EPA200.8	219	156	127	131
Metals	Dissolved Lead	ug/L	EPA200.8	2.63	2.8	1.45	1.97
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	7.85	4	2.13	>0.5&<1
Metals	Dissolved Selenium	ug/L	EPA200.8	1.23	<0.5	<0.5	1.7
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	63.2	58.8	58.3	44.5
Metals	Aluminum	ug/L	EPA200.8	136	13500	7350	7650
Metals	Antimony	ug/L	EPA200.8	2.7	5.16	2.58	2.96
Metals	Arsenic	ug/L	EPA200.8	2.01	3.92	2.66	3.26
Metals	Barium	ug/L	EPA200.8	30.6	196	109	150
Metals	Beryllium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	<0.1	1.41	0.666	1.02
Metals	Chromium	ug/L	EPA200.8	2.25	17.7	9.78	14.3
Metals	Chromium +6	ug/L	EPA218.6	<0.25	<0.25	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	21.5	82.4	47.7	49.2
Metals	Iron	ug/L	EPA200.8	307	15800	10100	11400
Metals	Lead	ug/L	EPA200.8	3.12	97.6	40.8	53.4
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	8.77	20.5	11.2	13.3
Metals	Selenium	ug/L	EPA200.8	1.39	<0.5	<0.5	1.7
Metals	Silver	ug/L	EPA200.8	<0.1	0.422	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	64.4	492	185	290
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.667	<0.667	<0.667	<0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.667	<0.667	<0.667	<0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.67	<0.67	<0.33	<0.33
Organophosphate Pesticides	Malathion	ug/L	EPA625	NS	NS	NS	NS
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.67	<0.67	<0.67	<0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.67	<0.67	<0.67	<0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<3.3	<3.3	<3.3	<3.3
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33

Appendix B.1. 2009-2010 Annual Report Wet Weather Mass Emission and Tributary Stations Concentrations

Group	Parameter Code	Units	Analysis_Method	Los Angeles River @ Wardlow S10 2009-10Event13 10/13/2009	Los Angeles River @ Wardlow S10 2009-10Event15 12/07/2009	Los Angeles River @ Wardlow S10 2009-10Event16 12/11/2009	Los Angeles River @ Wardlow S10 2009-10Event19 01/17/2010
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.33	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.67	<1.67	<1.67	8.86
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.033	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.017	<0.017	<0.017	0.503
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.033	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.017	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.067	<0.067	<0.067	<0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.017	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.017	<0.017	<0.017	0.413

Values reported with a "< "are not detected (ND) at the method detection level, and reported as <MDL

Values reported with a "<" and a ">" were detected but not quantified (DNQ) between the method detection limit and reporting limit, they are re

QNS = Quantity Not Sufficient

* Exceedance of Water Quality Objective

** Not an exceedance due to the High Flow Suspension Basin Plan Amendment (LARQCB 2003).

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	300000*	<20
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	2400	130
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	2400	130
Bacteria	Total Coliform	MPN/100mL	SM9221B	300000	230
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.011	<0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.033	<0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.033	<0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.017	0.018
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	13.2	17.2
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	<1.44
Conventionals	pH	pH units	SM4500H B	8.97*	8.65*
General	Alkalinity as CaCO3	mg/L	SM2320B	138	154
General	Ammonia	mg/L	SM4500-NH3 F	0.375	0.823
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	32.2	12.3
General	Chemical Oxygen Demand	mg/L	SM5220D	47.4	41.5
General	Chloride	mg/L	SM4110B	120	106
General	Dissolved Phosphorus	mg/L	SM4500-PE	<0.05	0.13

RB-AR10365

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
General	Fluoride	mg/L	SM4110B	0.677	0.573
General	Hardness as CaCO3	mg/L	SM2340C	220	270
General	Kjeldahl-N	mg/L	SM4500-NHorg C	1.38	3.36
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	>0.01&<0.5	>0.01&<0.5
General	NH3-N	mg/L	SM4500-NH3	0.31	0.68
General	Nitrate (NO3)	mg/L	SM4110B	5.65	7.64
General	Nitrate-N	mg/L	SM4110B	1.28	1.72
General	Nitrite-N	mg/L	SM4110B	0.117	<0.01
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	0.06	0.15
General	Specific Conductance	umhos/cm	SM2510B	949	852
General	Sulfate	mg/L	SM4110B	137	162
General	Total Dissolved Solids	mg/L	SM2540C	604	590
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	7.58	16.9
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	<1.5
General	Total Suspended Solids	mg/L	SM2540D	47	63
General	Turbidity	NTU	SM2130B	2.13	2.62
General	Volatile Suspended Solids	mg/L	SM2540E	25	28
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.067	<0.067
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	8.2	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	<50	123
Metals	Dissolved Antimony	ug/L	EPA200.8	0.845	<0.2
Metals	Dissolved Arsenic	ug/L	EPA200.8	<0.2	<0.2
Metals	Dissolved Barium	ug/L	EPA200.8	36.5	<1
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	1.05
Metals	Dissolved Chromium	ug/L	EPA200.8	0.713	<0.5
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	12.7	<0.5
Metals	Dissolved Iron	ug/L	EPA200.8	163	164
Metals	Dissolved Lead	ug/L	EPA200.8	2.1	<0.2
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	4.81	<0.5

RB-AR10366

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Metals	Dissolved Selenium	ug/L	EPA200.8	2	<0.5
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	66.9	91.6
Metals	Aluminum	ug/L	EPA200.8	337	428
Metals	Antimony	ug/L	EPA200.8	1.14	<0.2
Metals	Arsenic	ug/L	EPA200.8	2.3	<0.2
Metals	Barium	ug/L	EPA200.8	45.8	<1
Metals	Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	<0.1	1.31
Metals	Chromium	ug/L	EPA200.8	3.09	<0.5
Metals	Chromium +6	ug/L	EPA218.6	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	18.8	<0.5
Metals	Iron	ug/L	EPA200.8	448	675
Metals	Lead	ug/L	EPA200.8	2.6	<0.2
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	6.67	<0.5
Metals	Selenium	ug/L	EPA200.8	2.17	<0.5
Metals	Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	75.6	102
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.667	<0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.667	<0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.33	<0.33
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.67	<0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.67	<0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	Phenolics-Total Recoverable	mg/L	EPA625	<0.03	<0.03
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	<2.5	<2.5
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(b)flouranthene	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.067	<0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.33	<3.33

Values reported with a "< "are not detected at the method detection level, and reported as <MDL
Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL
NS = Not Sampled

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	9000000*	500000*	300000*	500000**	3000*
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	240000	900000	9000	1600000	16000
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	240000	900000	9000	1600000	16000
Bacteria	Total Coliform	MPN/100mL	SM9221B	9000000	5000000	300000	9000000	300000
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.011	NS	<0.011	<0.011	<0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	NS	<0.002	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	NS	<0.05	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	NS	<0.006	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	NS	<0.003	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	NS	<0.5	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	NS	<0.24	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.033	NS	<0.033	<0.033	<0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	NS	<0.005	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	NS	<0.005	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.033	NS	<0.033	<0.033	<0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.036*	0.009	0.02	0.005	<0.005
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	11.6	5.48	13.2	9.01	10.5
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	7.29	<1.44	>1.44&<5	>1.44&<5
Conventionals	pH	pH units	SM4500H B	7.02	NS	6.95	6.23*	6.55
General	Alkalinity as CaCO3	mg/L	SM2320B	138	NS	49.5	30.8	41.8
General	Ammonia	mg/L	SM4500-NH3 F	1.89	NS	1.25	0.278	1.55
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	172	NS	12.5	7.94	18.7
General	Chemical Oxygen Demand	mg/L	SM5220D	126	NS	28.1	<10	49
General	Chloride	mg/L	SM4110B	44	NS	21.9	8.35	23.4
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.53	NS	0.23	0.16	0.227
General	Fluoride	mg/L	SM4110B	0.488	NS	0.262	0.157	0.312
General	Hardness as CaCO3	mg/L	SM2340C	140	NS	85	45	75
General	Kjeldahl-N	mg/L	SM4500-NHorg C	3.84	NS	5.08	0.88	15
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4	<0.4	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.96	NS	>0.01&<0.5	>0.01&<0.5	0.6
General	NH3-N	mg/L	SM4500-NH3	1.56	NS	1.03	0.23	1.28
General	Nitrate (NO3)	mg/L	SM4110B	5.06	NS	5.09	2.81	4.25
General	Nitrate-N	mg/L	SM4110B	1.14	NS	1.15	0.634	0.958
General	Nitrite-N	mg/L	SM4110B	0.076	NS	<0.03	<0.01	0.0422
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	0.59	NS	0.34	0.2	0.234
General	Specific Conductance	umhos/cm	SM2510B	456	NS	267	122	234
General	Sulfate	mg/L	SM4110B	50.7	NS	30.2	13.6	36.1
General	Total Dissolved Solids	mg/L	SM2540C	316	NS	182	70	134
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	31	NS	35	37.4	8.6
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	>1.5&<5	<1.5	<1.5	<1.5
General	Total Suspended Solids	mg/L	SM2540D	2280	413	288	243	125

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
General	Turbidity	NTU	SM2130B	26.3	NS	6.73	32	8.91
General	Volatile Suspended Solids	mg/L	SM2540E	463	NS	57	32	60
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.067	NS	<0.067	<0.067	<0.067
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	NS	<0.015	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	8.52	NS	<5	<5	15.4
Metals	Dissolved Aluminum	ug/L	EPA200.8	1280	NS	1160	2250	625
Metals	Dissolved Antimony	ug/L	EPA200.8	<0.2	NS	<0.2	<0.2	<0.2
Metals	Dissolved Arsenic	ug/L	EPA200.8	2.65	NS	2.36	<0.2	<0.2
Metals	Dissolved Barium	ug/L	EPA200.8	189	NS	<1	<1	<1
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Chromium	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	NS	<0.25	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Dissolved Iron	ug/L	EPA200.8	3290	NS	2050	1900	735
Metals	Dissolved Lead	ug/L	EPA200.8	46.8	NS	20.3	20.8	13.2
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	15.2	NS	<0.5	<0.5	<0.5
Metals	Dissolved Selenium	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	346*	NS	194*	129*	183*
Metals	Aluminum	ug/L	EPA200.8	23900	NS	3900	6850	1730
Metals	Antimony	ug/L	EPA200.8	7.72	NS	<0.2	<0.2	<0.2
Metals	Arsenic	ug/L	EPA200.8	7.36	NS	2.91	<0.2	<0.2
Metals	Barium	ug/L	EPA200.8	495	NS	110	<1	<1
Metals	Beryllium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	5.03	NS	<0.1	<0.1	<0.1
Metals	Chromium	ug/L	EPA200.8	34.4	NS	11.7	11.4	<0.5
Metals	Chromium +6	ug/L	EPA218.6	<0.25	NS	<0.25	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	260	NS	52.3	<0.5	<0.5
Metals	Iron	ug/L	EPA200.8	30500	NS	8250	8150	2730
Metals	Lead	ug/L	EPA200.8	213	NS	30.8	33.4	19.8
Metals	Mercury	ug/L	EPA245.1	<0.1	NS	<0.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	42.7	NS	12.7	12.5	<0.5
Metals	Selenium	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Silver	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	1590	NS	316	180	184
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.667	NS	<0.667	<0.667	<0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	NS	<0.02	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.667	NS	<0.667	<0.667	<0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	NS	<0.003	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.33	NS	<0.33	<0.33	<0.33
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.67	NS	<0.67	<0.67	<0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.67	NS	<0.67	<0.67	<0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	Phenolics-Total Recoverable	mg/L	EPA 420.1	<0.03	<0.03	<0.03	<0.03	<0.03
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	<2.5	<2.5	<2.5	<2.5	<2.5
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(b)flouranthene	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.033	NS	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.033	NS	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.067	NS	<0.067	<0.067	<0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33

Values reported with a "< "are not detected at the method detection level, and reported as <MDL
Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL
NS = Not Sampled
*Exceedance of Water Quality Objective
**Not an exceedance due to the High Flow Suspension Basin Plan Amendment (LARQCB 2003).

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Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	3000000**	**240000***	9000000**	16000**	50000**
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	2200000	50000	1700000	160000	300000
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	2800000	50000	1700000	240000	300000
Bacteria	Total Coliform	MPN/100mL	SM9221B	16000000	900000	16000000	300000	160000
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002	<0.002	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.015	<0.015	<0.015	<0.015	<0.015
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006	<0.006	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003	<0.003	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24	<0.24	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.003	<0.003	<0.003	<0.003	<0.003
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.04	<0.04	<0.04	<0.04	<0.04
Conventionals	Cyanide	mg/L	SM4500-CNE	0.019	0.009	0.016	0.015	0.006
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	7.2	10.2	10.5	9.24	8.71
Conventionals	Oil and Grease	mg/L	EPA1664A	>1.44&<5	>1.44&<5	>1.44&<5	>1.44&<5	>1.44&<5
Conventionals	pH	pH units	SM4500H B	7.34	7.36	7.88	7.11	7.78
General	Alkalinity as $CaCO_3$	mg/L	SM2320B	44	49.5	41.8	42.9	68.2
General	Ammonia	mg/L	SM4500-NH3 D	1.96	0.944	0.387	1.09	0.315
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	28.4	22.4	11.3	19.8	15.9
General	Chemical Oxygen Demand	mg/L	SM5220D	52.5	36	22	25	32
General	Chloride	mg/L	EPA300.0	15.4	19.3	15	10.5	23.1
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.355	0.33	0.22	0.25	0.2
General	Fluoride	mg/L	EPA300.0	0.341	0.29	0.205	0.193	0.244
General	Hardness as $CaCO_3$	mg/L	SM2340C	90	85	60	60	90
General	Kjeldahl-N	mg/L	SM4500-NHorg C	3.88	3.66	1.24	6.56	1.3
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4	<0.4	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.56	0.637	>0.01&<0.5	0.717	0.606
General	NH_3-N	mg/L	SM4500-NH3	1.62	0.78	0.32	0.9	0.26
General	Nitrate (NO_3)	mg/L	EPA300.0	7.39	5.87	4.77	4.1	3.59
General	Nitrate-N	mg/L	EPA300.0	1.67	1.32	1.08	0.926	0.81
General	Nitrite-N	mg/L	EPA300.0	0.151	0.0435	>0.01&<0.03	0.0523	<0.01
General	Phosphorus - Total (as P)	mg/L	SM4500-PE	0.39	0.46	0.24	0.31	0.24
General	Specific Conductance	umhos/cm	SM2510 B	214	248	116	153	252
General	Sulfate	mg/L	EPA300.0	23.9	29.1	20.1	16.5	27.1
General	Total Dissolved Solids	mg/L	SM2540C	176	160	98	100	166
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	23.4	17.9	8.92	10.1	1.56
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	>1.5&<5	<1.5	<1.5	>1.5&<5	<1.5

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Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
General	Total Suspended Solids	mg/L	SM2540D	458	112	1160	276	704
General	Turbidity	NTU	SM2130B	46.9	11.5	39.1	14.5	13.9
General	Volatile Suspended Solids	mg/L	SM2540E	150	23	197	76	162
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.07	<0.07	<0.07	<0.07	<0.07
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015	<0.015	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	6.5	8.59	<5	14.1	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	3900	600	4750	900	1060
Metals	Dissolved Antimony	ug/L	EPA200.8	2.35	2.08	2.22	1.25	1.62
Metals	Dissolved Arsenic	ug/L	EPA200.8	2.25	1.43	2.21	1.25	1.82
Metals	Dissolved Barium	ug/L	EPA200.8	106	37.9	136	51.8	69.1
Metals	Dissolved Beryllium	ug/L	EPA200.8	>0.1&<0.5	<0.1	>0.1&<0.5	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	1.14	0.303	1.27	0.456	0.612
Metals	Dissolved Chromium	ug/L	EPA200.8	5.94	2.2	7.28	2.34	3.06
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	>0.25&<5	>0.25&<5	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	**56.2***	**25.7***	**57.2***	**27.7***	**36.9***
Metals	Dissolved Iron	ug/L	EPA200.8	3830	770	3500	1190	1630
Metals	Dissolved Lead	ug/L	EPA200.8	**61.5***	11.6	**82***	18	26.1
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	10.2	5.7	10.7	5.31	7.07
Metals	Dissolved Selenium	ug/L	EPA200.8	>0.5&<1	>0.5&<1	>0.5&<1	<0.5	>0.5&<1
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	**471***	**147***	**380***	**189***	**254***
Metals	Aluminum	ug/L	EPA200.8	6850	1830	8700	3000	3330
Metals	Antimony	ug/L	EPA200.8	5.7	3.18	6.04	2.92	3.6
Metals	Arsenic	ug/L	EPA200.8	3.12	1.6	3.71	1.57	2.45
Metals	Barium	ug/L	EPA200.8	163	51.3	216	81.5	100
Metals	Beryllium	ug/L	EPA200.8	>0.1&<0.5	<0.1	>0.1&<0.5	<0.1	>0.1&<0.5
Metals	Cadmium	ug/L	EPA200.8	1.4	0.329	1.43	0.594	0.727
Metals	Chromium	ug/L	EPA200.8	16.2	4.71	21.9	7.18	9.37
Metals	Chromium +6	ug/L	EPA218.6	<0.25	>0.25&<5	>0.25&<5	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	76.6	34.1	75.6	46	52.7
Metals	Iron	ug/L	EPA200.8	10100	2820	16600	4280	5780
Metals	Lead	ug/L	EPA200.8	79.5	15.6	116	23.1	36.4
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	15.8	8.4	19	8.7	11.3
Metals	Selenium	ug/L	EPA200.8	1.21	>0.5&<1	>0.5&<1	>0.5&<1	>0.5&<1
Metals	Silver	ug/L	EPA200.8	0.48	>0.1&<0.25	0.499	>0.1&<0.25	>0.1&<0.25
Metals	Thallium	ug/L	EPA200.8	>0.1&<1	<0.1	>0.1&<1	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	505	188	396	314	322
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02	<0.02	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003	<0.003	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.4	<0.4	<0.4	<0.4	<0.4
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065

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Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	Phenolics - Total recoverable	mg/L	EPA420.1	<0.03	<0.03	>0.03&<0.1	<0.03	<0.03
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2	<0.2	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2	<0.2	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2	<0.2	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA624	<0.83	<0.83	<0.83	<0.83	<0.83
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.4	<3.4	<3.4	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo[b]fluoranthene	ug/L	EPA625	<3.33	<3.33	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.04	<0.04	<0.04	<0.04	<0.04
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.04	<0.04	<0.04	<0.04	<0.04

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Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.07	<0.07	<0.07	<0.07	<0.07
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.4	<3.4	<3.4	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.4	<3.4	<3.4	<3.4	<3.4

Values reported with a "< "are not detected at the method detection level, and reported as <MDL

Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL

NS = Not Sampled

*Exceedance of Water Quality Objective

**Not an exceedance due to the High Flow Suspension Basin Plan Amendment (LARQCB 2003).

^Method detection level exceeds the waer quality benchmark.

DRAFT

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Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	80	130
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	<20	80
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	<20	80
Bacteria	Total Coliform	MPN/100mL	SM9221B	300	500
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.05	<0.05
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.015	<0.015
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.003	<0.003
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.04	<0.04
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.04	<0.04
Conventionals	Cyanide	mg/L	SM4500-CNE	0.007	0.022
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	22.2	18.3
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	<1.44
Conventionals	pH	pH units	SM4500H B	**9.14***	**9.31***
General	Alkalinity as $CaCO_3$	mg/L	SM2320B	105	184
General	Ammonia	mg/L	SM4500-NH3 D	0.303	0.121
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	12	20.8
General	Chemical Oxygen Demand	mg/L	SM5220D	28.8	26
General	Chloride	mg/L	EPA300.0	117	111
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.062	0.2
General	Fluoride	mg/L	EPA300.0	0.672	0.64
General	Hardness as $CaCO_3$	mg/L	SM2340C	190	280
General	Kjeldahl-N	mg/L	SM4500-NHorg C	1.52	1
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	>0.01&<0.5	>0.01&<0.5
General	NH_3-N	mg/L	SM4500-NH3	0.25	0.1
General	Nitrate (NO_3)	mg/L	EPA300.0	2.19	6.89
General	Nitrate-N	mg/L	EPA300.0	>0.03&<0.5	1.55
General	Nitrite-N	mg/L	EPA300.0	0.0517	0.214
General	Phosphorus - Total (as P)	mg/L	SM4500-PE	0.084	0.24
General	Specific Conductance	umhos/cm	SM2510 B	892	942
General	Sulfate	mg/L	EPA300.0	163	151
General	Total Dissolved Solids	mg/L	SM2540C	522	606
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	7.25	8.12

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Appendix B.2. 2011-2012 Dry Weather Concentrations

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	<1.5
General	Total Suspended Solids	mg/L	SM2540D	22	12
General	Turbidity	NTU	SM2130B	3.68	1.48
General	Volatile Suspended Solids	mg/L	SM2540E	21	8
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.07	<0.07
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	<5	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	>50&<100	<50
Metals	Dissolved Antimony	ug/L	EPA200.8	0.726	0.866
Metals	Dissolved Arsenic	ug/L	EPA200.8	>0.2&<1	1.23
Metals	Dissolved Barium	ug/L	EPA200.8	37	36
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	>0.1&<0.25
Metals	Dissolved Chromium	ug/L	EPA200.8	0.935	2.03
Metals	Dissolved Chromium +6	ug/L	EPA218.6	>0.25&<5	>0.25&<5
Metals	Dissolved Copper	ug/L	EPA200.8	11.3	9.38
Metals	Dissolved Iron	ug/L	EPA200.8	109	165
Metals	Dissolved Lead	ug/L	EPA200.8	2.3	1.07
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	4.41	3.95
Metals	Dissolved Selenium	ug/L	EPA200.8	2.44	2.21
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	94.4	69.2
Metals	Aluminum	ug/L	EPA200.8	179	107
Metals	Antimony	ug/L	EPA200.8	1.06	1.08
Metals	Arsenic	ug/L	EPA200.8	1.72	1.52
Metals	Barium	ug/L	EPA200.8	45.5	40.8
Metals	Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	>0.1&<0.25	0.343
Metals	Chromium	ug/L	EPA200.8	4.4	3.25
Metals	Chromium +6	ug/L	EPA218.6	>0.25&<5	>0.25&<5
Metals	Copper	ug/L	EPA200.8	13	12.9
Metals	Iron	ug/L	EPA200.8	233	301
Metals	Lead	ug/L	EPA200.8	4.12	1.43
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	6.21	5.47
Metals	Selenium	ug/L	EPA200.8	3.3	2.97
Metals	Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	103	73.2
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.7	<0.7
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.7	<0.7
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.4	<0.4
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.7	<0.7
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.7	<0.7
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065

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Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	Phenolics - Total recoverable	mg/L	EPA420.1	<0.03	>0.03&<0.1
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA624	<0.83	<0.83
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo[b]fluoranthene	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.04	<0.04
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.02	<0.02

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Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.04	<0.04
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.07	<0.07
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.4	<3.4

Values reported with a "< "are not detected at the method detection level, and reported as <MDL

Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL

NS = Not Sampled

*Exceedance of Water Quality Objective

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Watershed Management Program Appendix 3

A-3-1 MCM Guidance

DRAFT

Public Information and Participation Program

Introduction

Permit §VI.D.5.a (LA)/ §VII.F.1 (LB)

Each participating city is required to develop and implement a Public Information and Participation Program (PIPP) that includes the requirements listed in Permit §VI.D.5.a (LB §VII.F). This document provides guidance that the participating cities can follow to implement a PIPP in compliance with the Permit.

The objectives of the PIPP are to:

- Measurably increase the knowledge of the target audiences about the MS4, the adverse impacts of stormwater pollution on receiving waters and potential solutions to mitigate the impacts.
- Measurably change the waste disposal and stormwater pollution generation behavior of target audiences by developing and encouraging the implementation of appropriate alternatives.
- Involve and engage a diversity of socio-economic groups and ethnic communities in Los Angeles County to participate in mitigating the impacts of stormwater pollution.

PIPP Implementation

Permit §VI.D.5.b (LA)/§VII.F.2 (LB)

The PIPP is implemented using the following approaches:

- By participating in a County-wide PIPP,
- By participating in one or more Watershed Group sponsored PIPPs, and
- individually within its jurisdiction.

Cities participating in a County-wide or Watershed Group PIPP provide contact info for their staff responsible for stormwater public education activities to the designated PIPP coordinator. Changes in contact information are provided within 30 days of the date that the change occurred.

Public Participation

Permit §VI.D.5.c (LA)/§VII.F.3 (LB)

Public Reporting

The means for public reporting of clogged catch basin inlets and illicit discharges/dumping, faded or missing catch basin labels, and general stormwater and non-stormwater pollution prevention information is provided through the use of the countywide 888-CLEAN-LA hotline. In addition, each participating city:

- Includes the reporting information – updated when necessary – in public information and the government pages of the telephone book as they are developed or published.
- Identifies staff or departments who will serve as the contact person(s) and will make this information available on its website.
- Provides current, updated hotline contact information to the general public within its jurisdiction.

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Events

Events are organized to target residents and population subgroups. The purpose of the events is to educate and involve the community in stormwater and non-stormwater pollution prevention activities, such as education seminars, clean-ups, and community catch basin stenciling.

Residential Outreach Program

Permit §VI.D.5.d (LA)/§VII.F.4 (LB)

With the exception of item 5, which is no longer an element of the countywide PIP Program, each city implements the following activities for the Residential Outreach Program as part of a countywide program:

1. Conduct stormwater pollution prevention public service announcements and advertising campaigns
2. Prepare public education materials that include information on the proper handling (i.e., disposal, storage and/or use) of:
    a. Vehicle waste fluids
    b. Household waste materials (i.e., trash and household hazardous waste, including personal care products and pharmaceuticals)
    c. Construction waste materials
    d. Pesticides and fertilizers (including integrated pest management (IPM) practices to promote reduced use of pesticides)
    e. Green waste (including lawn clippings and leaves)
    f. Animal wastes
3. Distribute activity specific stormwater pollution prevention public education materials at the following points of purchase:
    a. Automotive parts stores
    b. Home improvement centers / lumber yards / hardware stores/paint stores
    c. Landscaping / gardening centers
    d. Pet shops / feed stores
4. Maintain stormwater websites or provide links to stormwater websites via each participating city's website. This includes educational material and opportunities for the public to participate in stormwater pollution prevention and clean-up activities listed in Part VI.D.4 of the Permit.
5. Provide independent, parochial, and public schools within each participating city's jurisdiction with materials to educate school children (K-12) on stormwater pollution. Material may include videos, live presentations and other information. A useful source of materials to work with, or leverage, is other statewide agencies and associations. These associations include the State Water Board's "Erase the Waste" educational program and the California Environmental Education Interagency Network (CEEIN) to implement this requirement.
6. When implementing the above activities, use effective strategies to educate and involve ethnic communities in stormwater pollution prevention through culturally effective methods.

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Industrial/Commercial Facilities Program

Each participating city is required to implement an industrial/commercial facilities program that includes the provisions listed in Permit § VI.D.6 (LB §VII.G). This document provides guidance that the participating cities can follow to implement an industrial/commercial facilities program in compliance with the Permit.

Introduction

Permit § VI.D.6.a (LA)/ §VII.G.1 (LB)

The Industrial/Commercial Facilities Program is designed to prevent illicit discharges into the MS4 and receiving waters, reduce industrial/commercial discharges of stormwater to the maximum extent practicable, and prevent industrial/commercial discharges from the MS4 from causing or contributing to a violation of receiving water limitations. The program consists of the following components:

- Track,
- Educate,
- Inspect and
- Ensure compliance with municipal ordinances at industrial/commercial facilities determined to be critical sources of pollutants in stormwater.

Track Critical Industrial/Commercial Sources

Permit § VI.D.6.b (LA)/ §VII.G.2 (LB)

The critical sources to be tracked are listed in Table ICF-1.

Table ICF-1: Critical Sources

Facility Category	Facility	
Commercial Facilities	Restaurants	
	Automotive service facilities (including those located at automotive dealerships)	
	Retail Gasoline Outlets	
	Nurseries and Nursery Centers (Merchant Wholesalers, Nondurable Goods, and Retail Trade)	
Industrial Facilities	USEPA "Phase I" Facilities[1]	
	Other federally-mandated facilities[2]	Municipal landfills
		Hazardous waste treatment, disposal, and recovery facilities
		Industrial facilities subject to § 313 "Toxic Release Inventory" reporting requirements of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)[3]
General Facilities	All other commercial or industrial facilities determined to potentially contribute a substantial pollutant load to the MS4.	

[1] as specified in 40 CFR §122.26(b)(14)(i)-(xi)
[2] as specified in 40 CFR §122.26(d)(2)(iv)(C)
[3] 42 U.S.C. § 11023

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Critical source facilities are tracked in an electronic database management system. The information stored for each critical source in the inventory is listed in Table ICF-2.

Table ICF-2: Inventory Information for Critical Sources

Information Category		Information
General	Name	Facility Name
	Location	Facility address
		Facility latitude and longitude coordinates
		Receiving water
	Contact	Owner/operator name
		Mailing address
		Phone number
		Email (if available)
Business Type		Standard Industrial Classification (SIC) code and/or North American Industry Classification System (NAICS) code
		Narrative description of the activities performed and/or principal products produced
Water quality		Status of exposure of materials to stormwater
		Pollutants generated by facility activities (A-ICF-1)
		Identification of whether the facility is tributary to a waterbody segment with impairments[4] for pollutants that are also generated by the facility.
Prioritization		High, medium or low. The default priority is medium.
NPDES Permit		For applicable facilities, identify coverage under the State Water Board's General NPDES Permit for the Discharge of Stormwater Associated with Industrial Activities (Industrial General Permit) or other individual or general NPDES permits or any waiver issued by the Regional or State Water Board pertaining to stormwater discharges.
		For Industrial General Permit facilities, identify whether the facility has filed a No Exposure Certification with the State Water Board.

Update Inventory

The critical sources inventory is updated at least annually. The update is accomplished through the collection of new information from sources such as field activities and readily available inter/intra-agency records (e.g. business licenses, pretreatment permits, sanitary sewer connection permits and the State Water Resources Control Board's Storm Water Multiple Application and Report Tracking System (SMARTS)).

[4] CWA § 303(d) listed or subject to a TMDL

Prioritization

Prioritizing facilities by their potential water quality impact provides an excellent opportunity to optimize the effectiveness of the Industrial/Commercial Facilities Program. The three inventory fields under the "Water Quality" category of Table ICF-2 provide information that allows for such a facility prioritization. Based on these fields, the following tables establish a method to prioritize all industrial/commercial facilities into three graded tiers – High, Medium and Low. The City may follow an alternative prioritization method provided it results in a similar three-tiered scheme. In order to maintain a minimum inspection frequency equivalent to the mandates of the MS4 Permit, a condition must be applied to the prioritization process. This condition is explained on the following page.

Prioritization factors

Factor	Description
A	Status of exposure of materials and industrial/commercial activities to stormwater
B	Identification of whether the facility is tributary to a waterbody segment with impairments[5] for pollutants that are also generated by the facility
C	Other factors determined by the City, such as size of facility, presence of exposed soil or history of stormwater violations

Utilizing these factors, follow steps 1, 2 and 3 below:

1. Collect necessary information to evaluate factors

Factor	Initial method	Subsequent method
A	Satellite imagery	Results of stormwater inspection
B	Cross reference Table ICF-4 or 5 with tributary TMDL/ 303(d) pollutants*	Cross reference inspection results with tributary TMDL/ 303(d) pollutants
C	Varies	

* See Pages ICF-9 and 10.

2. Evaluate factors

Factor	Result	Score
A	Low or no exposure	0
	Moderate exposure	½
	Significant exposure	1
B	No**	0
	Yes***	1
C	Low	0
	Medium	½
	High	1

** No pollutant generation/impairment matches
*** ≥ 1 pollutant generation/impairment matches

3. Prioritize facilities

		C Score		
		0	**½**	**1**
A×B Score	**0**	Low	Medium	High
	½	Medium	High	High
	1	High	High	High

This method serves only as a guide to prioritization. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C.

Figure ICF-1: Industrial/Commercial Facility Prioritization Scheme

[5] CWA § 303(d) listed or subject to a TMDL

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Step 3 may also be expressed by the relationships A·B + C ≥ 1 → High, 1 > A·B + C > 0 → Medium and A·B + C = 0 → Low. The purpose of multiplying A and B is to scale the impact of the presence of the pollutants at a facility (B) by the likelihood that they will be discharged to the MS4 (A). Factor C quantifies water quality concerns that are independent of A or B and as such is incorporated through addition. The purpose of this numerical approach is to provide consistency to the prioritization process. It is intended solely as a guide. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C as listed in Figure ICF-1.

Prioritization Condition

The facility prioritization impacts the inspection frequency. In fact the main objective of prioritizing the facilities is to adjust the inspection schedule to focus efforts on water quality priorities. The intent is not to reduce the total number of inspections. In order to maintain a total number of inspections in line with the expectations of the MS4 Permit (i.e. result in the same number of average inspections per year as a semi-quinquennial frequency), one additional condition must be imposed:

> ***The total number of low priority facilities is less than or equal to 3 times the number of high priority facilities.***
>
> *Prioritization condition*

Prioritization Frequency

The default priority for a facility is Medium. Prioritization and reprioritization may be conducted at any time based on the discretion of the City. Figure ICF-2 is a flowchart of the prioritization process.

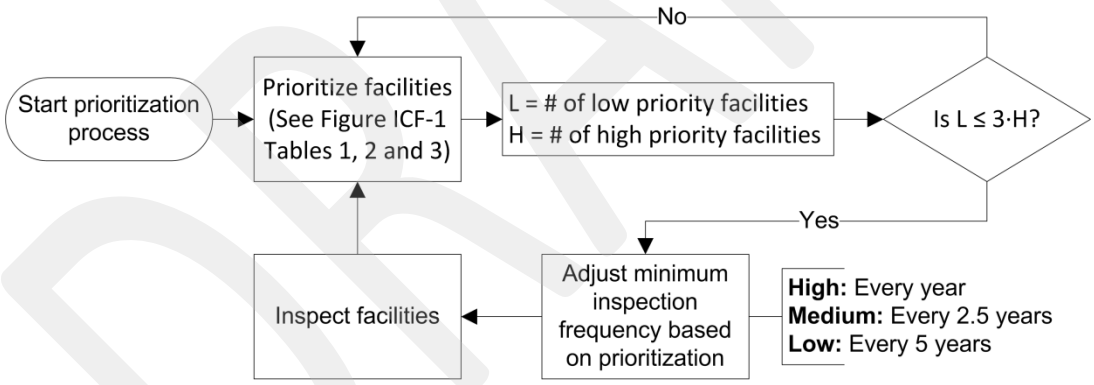


Figure ICF-2: Prioritization Process

Educate Industrial/Commercial Sources

Permit § VI.D.6.c (LA)/ §VII.G.3 (LB)

At least once during the five-year period of the MS4 Permit, the owner/operator of each of the inventoried critical sources is notified of the BMP requirements applicable to the facility/source.

Business Assistance Program

The Business Assistance Program provides technical information to businesses to facilitate their efforts to reduce the discharge of pollutants in stormwater. Assistance is targeted to select business sectors or small businesses upon a determination that their activities may be contributing substantial pollutant loads to the MS4 or receiving water. Assistance may include technical guidance and provision of educational materials. The Program includes at least one of the following components:

- **Technical Guidance** – Provide on-site technical assistance, telephone, or e-mail consultation regarding the responsibilities of businesses to reduce the discharge of pollutants, procedural requirements, and available guidance documents. Guidance methods include but are not limited to:
    - Technical guidance through the critical source inspection program. During an inspection the inspector provides to the business owner/operator 1) on-site technical assistance and 2) contact information for continued consultation. The inspector may also refer staff to relevant fact sheets from the *CASQA Industrial and Commercial BMP Handbook*.
    - Technical guidance initiated with businesses through an informational letter, email, webpage or social media. The notice provides contact information of relevant stormwater staff for business assistance as well as hyperlinks to available guidance documents such as the *CASQA Industrial and Commercial BMP Handbook*.
- **Educational Materials** – Distribute stormwater pollution prevention educational materials to operators of 1) auto repair shops, car wash facilities, restaurants and 2) mobile sources including automobile/equipment repair, washing, or detailing, power washing services, mobile carpet, drape, or upholstery cleaning services, swimming pool, water softener, and spa services, portable sanitary services and commercial applicators and distributors of pesticides, herbicides and fertilizers, if present. Material sources and distribution methods include but are not limited to:
    - Distribution method – The presence of these businesses within an agency's jurisdiction may be determined through business licenses or other readily available inter/intra-agency records.
    - Material sources – Educational materials are available at USEPA's Nonpoint Source (NPS) Outreach Toolbox at http://cfpub.epa.gov/npstbx/index.html. The toolbox is a database of nationwide public education materials that is intended for use by state and local campaigns. The toolbox contains a variety of resources to help develop an effective and targeted outreach campaign.

Inspect Critical Industrial/Commercial Sources

Modified from Permit §VI.D.6.d-e (LA)/ §VII.G.4-5(LB)

Frequency of Inspections

Following the facility prioritization method described in this guidance document, the City will inspect high priority facilities annually, medium priority facilities semi-quinquennially (once every 2.5 years) and low priority facilities quinquennially (once every five years). The frequencies may be altered by the exclusions defined in the following section. The prioritization condition on Page ICF-4 ensures at least the same average number of inspections conducted per year as the semi-quinquennial frequency defined in the MS4 Permit.

The City will conduct the first compliance inspection of industrial/commercial facilities within one year of the approval of the Watershed Management Program by the Executive Officer. There will be a minimum interval of six months between the first and the second mandatory compliance inspections.

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Exclusions to the Frequency of Industrial Inspections

Exclusion of Facilities Previously Inspected by the Regional Water Board

The State Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS) database[6] is reviewed at defined intervals to determine if an industrial facility has recently been inspected by the Regional Water Board. The first interval is two years after the effective date of the MS4 Permit (LA: December 28, 2014, LB: March 28,, 2016) and the second interval is four years after the effective date (LA: December 28, 2016, LB: March 28, 2018). If it is determined through the review that the Regional Water Board conducted an inspection of a facility within the prior 24 month period, then the facility does not require an inspection.

No Exposure Verification

The initial inspection identifies those facilities that have filed a No Exposure Certification with the State Water Board. Three to four years after the effective date of the MS4 Permit, a second inspection is performed for at least 25% of the facilities identified to have filed a No Exposure Certification. The purpose of this inspection is to verify the continuity of the no exposure status.

Scope of Inspections

A template inspection form is included as Attachment ICF-A.

Scope of Commercial Inspections

Commercial critical source facilities are inspected to confirm that stormwater and non-stormwater BMPs are effectively implemented in compliance with municipal ordinances. At each facility, inspectors verify that the operator is implementing effective source control BMPs for each corresponding activity. The implementation of additional BMPs is required where stormwater from the MS4 discharges to a significant ecological area (SEA), a water body subject to TMDL provisions[7], or a CWA §303(d) listed impaired water body. For those BMPs that are not adequately protective of water quality standards, additional site-specific controls may be required.

Scope of Mandatory Industrial Facility Inspections

At each industrial critical source the inspector confirms that the facility

- Has a current Waste Discharge Identification (WDID) number for coverage under the Industrial General Permit, and that a Storm Water Pollution Prevention Plan (SWPPP) is available on-site; or
- Has applied for, and has received a current No Exposure Certification for facilities subject to this requirement;
- Is effectively implementing BMPs in compliance with municipal ordinances. Facilities must implement the source control BMPs identified in Table ICF-3, unless the pollutant generating activity does not occur. Additional BMPs must be implemented where stormwater from the MS4 discharges to a water body subject to TMDL Provisions in Part VI.E of the MS4 Permit, or a CWA § 303(d) listed impaired water body. If the specified BMPs are not adequately protective of water quality standards, additional site-specific controls may be required. For critical sources that discharge to MS4s that discharge to SEAs, operators must implement additional pollutant-specific controls to reduce pollutants in stormwater runoff that are causing or contributing to

[6] SMARTS is accessible at https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp
[7] As described in Part VI.E of the MS4 Permit

exceedances of water quality standards.

- Applicable industrial facilities identified as not having either a current WDID or No Exposure Certification are notified that they must obtain coverage under the Industrial General Permit and will be referred to the Regional Water Board per the Progressive Enforcement Policy procedures identified in Part VI.D.2 of the MS4 Permit.

Source Control BMPs

Permit § VI.D.6.f (LA)/ §VII.G.6 (LB)

Effective source control BMPs for the activities listed in Table ICF-3 are implemented at commercial and industrial facilities, unless the pollutant generating activity does not occur:

Significant Ecological Areas (SEAs)

Permit § VI.D.6.g (LA)/ §VII.H (LB)

For critical sources that discharge to MS4s that discharge to SEAs, each Permittee will require operators to implement additional pollutant-specific controls to reduce pollutants in stormwater runoff that are causing or contributing to exceedances of water quality standards.

Progressive Enforcement

Permit § VI.D.6.h (LA)/ §VII.I (LB)

Each Permittee will implement its Progressive Enforcement Policy to ensure that Industrial / Commercial facilities are brought into compliance with all stormwater requirements within a reasonable time period. See Part VI.D.2 of the MS4 Permit for requirements for the development and implementation of a Progressive Enforcement Policy.

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Table ICF-3: Source Control BMPs at Commercial and Industrial Facilities

Pollutant-Generating Activity	BMP Description	BMP Fact Sheet*
Unauthorized Non-Storm water Discharges	Effective elimination of non-stormwater discharges	SC-10
Accidental Spills/ Leaks	Implementation of effective spills/ leaks prevention and response procedures	SC-11
Vehicle/ Equipment Fueling	Implementation of effective fueling source control devices and practices	SC-20
Vehicle/ Equipment Cleaning	Implementation of effective equipment/vehicle cleaning practices and appropriate wash water management practices	SC-21
Vehicle/ Equipment Repair	Implementation of effective vehicle/ equipment repair practices and source control devices	SC-22
Outdoor Liquid Storage	Implementation of effective outdoor liquid storage source controls and practices	SC-31
Outdoor Equipment Operations	Implementation of effective outdoor equipment source control devices and practices	SC-32
Outdoor Storage of Raw Materials	Implementation of effective source control practices and structural devices	SC-33
Storage and Handling of Solid Waste	Implementation of effective solid waste storage/ handling practices and appropriate control measures	SC-34
Building and Grounds Maintenance	Implementation of effective facility maintenance practices	SC-41
Parking/ Storage Area Maintenance	Implementation of effective parking/ storage area designs and housekeeping/ maintenance practices	SC-43
Stormwater Conveyance System Maintenance	Implementation of proper conveyance system operation and maintenance protocols	SC-44
Pollutant-Generating Activity	**BMP Description from Regional Water Board Resolution No. 98-08**	
Sidewalk Washing	1. Remove trash, debris, and free standing oil/grease spills/leaks (use absorbent material, if necessary) from the area before washing; and 2. Use high pressure, low volume spray washing using only potable water with no cleaning agents at an average usage of 0.006 gallons per square feet of sidewalk area.	
Street Washing	Collect and divert wash water to the sanitary sewer – publically owned treatment works (POTW). Note: POTW approval may be needed.	

* Source: CASQA Industrial and Commercial Stormwater BMP Handbook, 2003

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Table ICF-4: Potential Pollutants from Industrial Activities*

Activity or Facility Type	Potential Pollutants								
	Sediments	Nutrients	Metals	Organics and Toxicants**	Floatable Materials	Oxygen-Demanding Substances	Oil and Grease	Bacteria	Pesticides
Vehicle & Equipment Fueling			X	X					
Vehicle & Equipment Washing and Steam Cleaning	X	X	X	X		X	X		
Vehicle & Equipment Maintenance and Repair			X	X			X		
Outdoor Loading & Unloading of Materials	X	X	X	X	X	X	X		
Outdoor Container Storage of Liquids		X	X	X		X	X		X
Outdoor Process Equipment Operations and Maintenance	X		X	X			X		
Outdoor Storage of Raw Materials, Products, and Byproducts	X	X	X	X	X	X	X		
Waste Handling & Disposal			X	X	X	X	X	X	
Contaminated or Erodible Surface Areas	X	X	X	X	X	X	X	X	
Building and Grounds Maintenance	X	X	X		X	X		X	X
Building Repair, Remodeling, and Construction	X		X		X	X			
Parking/Storage Area Maintenance			X	X	X		X		

* Source: CASQA Industrial and Commercial Stormwater BMP Handbook, 2003

** This includes all toxic pollutants other than pesticides

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Table ICF-5: Potential Pollutants by Industrial/Commercial Facility Type*

Activity or Facility Type	Potential Pollutants								
	Sediments	Nutrients	Metals	Organics and Toxicants**	Floatable Materials	Oxygen-Demanding Substances	Oil and Grease	Bacteria	Pesticides
Vehicle mechanical repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Airplane mechanical repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Boat mechanical repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Equipment repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Automobile and other vehicle body repair or painting			X	X			X		
Mobile automobile or other vehicle washing	X	X	X			X	X		
Automobile (or other vehicle) parking lots and storage			X		X		X		
Retail or wholesale fueling			X	X	X		X		
Pest control services									X
Eating or drinking establishments		X		X	X	X	X	X	X
Mobile carpet, drape or furniture cleaning	X			X					
Cement mixing or cutting	X								
Masonry	X								
Painting and coating			X	X			X		
Botanical or zoological gardens and exhibits	X	X			X	X		X	X
Landscaping	X	X			X	X		X	X
Nurseries and greenhouses	X	X			X	X		X	X
Golf courses, parks and other recreational areas/facilities	X	X			X	X		X	X
Cemeteries	X	X			X	X		X	X
Pool and fountain cleaning		X	X	X	X	X		X	
Marinas			X	X	X	X	X	X	
Port-a-Potty servicing		X			X	X		X	

* Source: Orange County Drainage Area Management Plan, 2003

** This includes all toxic pollutants other than pesticides

RB-AR10394

Planning and Land Development Program

The Cities are required to implement a Planning and Land Development program that includes the provisions listed in the MS4 Permit (LA MS4 Permit §VI.D.7, LB MS4 Permit §VII.J). This document provides guidance that the participating cities can follow to implement a Planning and Land Development program in compliance with the MS4 Permit.

Introduction

Permit §VI.D.7.a (LA)/§VII.J.1 (LB)

The Planning and Land Development Program for all New Development and Redevelopment projects subject to the MS4 Permit includes measures to:

- Lessen the water quality impacts of development by using smart growth practices such as compact development, directing development towards existing communities via infill or redevelopment, and safeguarding of environmentally sensitive areas.
- Minimize the adverse impacts from stormwater runoff on the biological integrity of Natural Drainage Systems and the beneficial uses of water bodies in accordance with requirements under CEQA (Cal. Pub. Resources Code §21000 et seq.).
- Minimize the percentage of impervious surfaces on land developments by minimizing soil compaction during construction, designing projects to minimize the impervious area footprint, and employing Low Impact Development (LID) design principles to mimic pre-development hydrology through infiltration, evapotranspiration and rainfall harvest and use.
- Maintain existing riparian buffers and enhance riparian buffers when possible.
- Minimize pollutant loadings from impervious surfaces such as roof tops, parking lots, and roadways through the use of properly designed, technically appropriate BMPs (including Source Control BMPs such as good housekeeping practices), LID Strategies, and Treatment Control BMPs.
- Properly select, design and maintain LID and Hydromodification Control BMPs to address pollutants that are likely to be generated, reduce changes to pre-development hydrology, assure long-term function, and avoid the breeding of vectors.[1]
- Prioritize the selection of BMPs to remove stormwater pollutants, reduce stormwater runoff volume, and beneficially use stormwater to support an integrated approach to protecting water quality and managing water resources in the following order of preference:
    - On-site infiltration, bioretention and/or rainfall harvest and use.
    - On-site biofiltration, off-site groundwater replenishment, and/or off-site retrofit.

[1] Treatment BMPs when designed to drain within 96 hours of the end of rainfall minimize the potential for the breeding of vectors. See California Department of Public Health *Best Management Practices for Mosquito Control in California* (2012) at http://www.westnile.ca.gov/resources.php

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Applicability *Permit §VI.D.7.b (LA)/§VII.J.2-3 (LB)*

New Development Projects

The New Development and Redevelopment categories below will require a Standard Urban Stormwater Mitigation Plan (SUSMP), also known as a Low Impact Development (LID) Plan, containing stormwater mitigation measures in compliance with MS4 Permit requirements. Development projects subject to conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s), are listed below:

1. All development projects (including single family hillside homes) equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area
2. Industrial parks with 10,000 square feet or more of surface area
3. Commercial malls with 10,000 square feet or more surface area
4. Retail gasoline outlets with 5,000 square feet or more of surface area
5. Restaurants (SIC 5812) with 5,000 square feet or more of surface area
6. Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces
7. Automotive service facilities (SIC 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) with 5,000 square feet or more of surface area
8. Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA), where the development will:
    a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and
    b. Create 2,500 square feet or more of impervious surface area
9. Redevelopment projects in subject categories that meet Redevelopment thresholds identified below

Redevelopment Projects

Redevelopment projects subject to agency conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s), are:

1. Land-disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on development categories identified above.
2. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.
3. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire

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development.

4. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency Redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.
5. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

Special Provisions

1. Street and road construction of 10,000 square feet or more of impervious surface area
    a. These projects will follow an approved green streets manual to the maximum extent practicable. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects. The Cities will require a Standard Urban Mitigation Plan (SUSMP), also known as a Low Impact Development (LID) Plan, containing stormwater mitigation measures in compliance with the approved green streets manual requirements.
2. Single family hillside homes will require a less extensive plan. To the extent that an agency may lawfully impose conditions, mitigation measures or other requirements on the development or construction of a single-family home in a hillside area as defined in the applicable agency's Code and Ordinances, the Cities will require that during the construction of a single-family hillside home, the following measures are implemented:
    a. Conserve natural areas
    b. Protect slopes and channels
    c. Provide storm drain system stenciling and signage
    d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability
    e. Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

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New Development/ Redevelopment Project Performance Criteria *Permit §VI.D.7.c (LA)/§VII.J.4 (LB)*

Integrated Water Quality/Flow Reduction/Resources Management Criteria

All New Development and Redevelopment projects identified above will control pollutants, pollutant loads, and runoff volume emanating from the project site by: (1) minimizing the impervious surface area and (2) controlling runoff from impervious surfaces through infiltration, bioretention and/or rainfall harvest and use.

Projects will retain on-site the Stormwater Quality Design Volume (SWQDv) defined as the runoff from the 0.75-inch, 24-hour rain event or the 85th percentile, 24-hour rain event, as determined from the Los Angeles County 85th percentile precipitation isohyetal map[2], *whichever is greater*. Exceptions include technical infeasibility, opportunity for regional groundwater replenishment, local ordinance equivalence, or hydromodification, as described in the sections below.

When evaluating the potential for on-site retention, the Cities will consider the maximum potential for evapotranspiration from green roofs and rainfall harvest and use.

Alternative Compliance for Technical Infeasibility or Opportunity for Regional Groundwater Replenishment

In instances of technical infeasibility or where a project has been determined to provide an opportunity to replenish regional groundwater supplies at an offsite location, the Cities may allow projects to comply with the MS4 Permit through the alternative compliance measures as described below:

1. To demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use, and that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect. Conditions where technical infeasibility may result including those indicated in

[2] Found at <http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf>

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2. Table PLD- **1** below. To utilize alternative compliance measures to replenish groundwater at an offsite location, the project applicant will demonstrate *(i)* why it is not advantageous to replenish groundwater at the project site, *(ii)* that groundwater can be used for beneficial purposes at the offsite location, and *(iii)* that the alternative measures will also provide equal or greater water quality benefits to the receiving surface water than the Water Quality/Flow Reduction/Resource Management Criteria.

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Table PLD- 1: Technical Infeasibility Criteria

1.	The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv on-site.
2.	Locations where seasonal high groundwater is within 5 to 10 feet of the surface,
3.	Locations within 100 feet of a groundwater well used for drinking water,
4.	Brownfield development sites where infiltration poses a risk of causing pollutant mobilization,
5.	Other locations where pollutant mobilization is a documented concern. Pollutant mobilization is considered a documented concern at or near properties that are contaminated or store hazardous substances underground.
6.	Locations with potential geotechnical hazards
7.	Smart growth and infill or Redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the on-site volume retention requirement.

Alternative Compliance Measures

When a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site, or is proposing an alternative offsite project to replenish regional groundwater supplies, the agency will require one of the following mitigation options:

1. On-site Biofiltration

   If using biofiltration due to demonstrated technical infeasibility, then the project must biofiltrate 1.5 times the portion of the SWQDv that is not reliably retained on-site, as calculated by Equation 1 below.

   $$B_v = 1.5 * [SWQD_v - R_V]$$ *Equation 1*

   Where:

   Bv = biofiltration volume

   SWQDv = the stormwater runoff from a 0.75 inch, 24-hour storm or the 85th percentile storm[3], *whichever is greater*.

   Rv = volume reliably retained on-site

   The MS4 Permit does not mention flowrate based biotreatment BMPs; however, proprietary biotreatment systems are often sized using flowrate rather than volume. Additionally, in cases where a pump is needed prior to entering the biotreatment BMP, the system requires sizing based on the controlled flow from the pump. Therefore, if it is infeasible to size a biotreatment BMP with volume-based calculations, the flowrate may be substituted in lieu of volume. Similarly, the flow rate must be determined using the design storm of 0.75 inch, 24-hour storm event or the 85th percentile storm[1], whichever is greater.

   Conditions for On-site Biofiltration include the following:

   a. Biofiltration systems will meet the design specifications provided in Attachment H to the MS4 Permit unless otherwise approved by the Regional Water Board Executive Officer.

[3] Found at <http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf>

b. Biofiltration systems discharging to a receiving water that is included on the Clean Water Act section 303(d) list of impaired water quality-limited water bodies due to nitrogen compounds or related effects will be designed and maintained to achieve enhanced nitrogen removal capability. See Attachment H of the MS4 Permit for design criteria for underdrain placement to achieve enhanced nitrogen removal.

2. Offsite Infiltration

Offsite infiltration when implemented will use infiltration or bioretention BMPs to intercept a volume of stormwater runoff equal to the SWQDv, less the volume of stormwater runoff reliably retained on-site, at an approved offsite project and provide pollutant reduction (treatment) of the stormwater runoff discharged from the project site in accordance with the Water Quality Mitigation Criteria. The required offsite mitigation volume will be calculated by Equation 2 below.

$$M_v = 1.0 * [SWQD_v - R_v] \qquad \textit{Equation 2}$$

Where:

M_v = mitigation volume

$SWQD_v$ = runoff from the 0.75 inch, 24-hour storm event or the 85th percentile storm[4], *whichever is greater*

R_v = the volume of stormwater runoff reliably retained on-site.

3. Groundwater Replenishment Projects

Regional projects to replenish regional groundwater supplies at offsite locations may be proposed, provided the groundwater supply has a designated beneficial use in the Basin Plan. Regional groundwater replenishment projects must use infiltration, groundwater replenishment, or bioretention BMPs to intercept a volume of stormwater runoff equal to the SWQDv for New Development and Redevelopment projects, subject to conditioning and approval for the design and implementation of post-construction controls, within the approved project area. The projects must provide pollutant reduction (treatment) of the stormwater runoff discharged from development projects, within the project area, subject to conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution in accordance with the Water Quality Mitigation Criteria.

Regional groundwater replenishment projects being implemented in lieu of onsite controls will mitigate the volume as calculated using Equation 2 above.

Regional groundwater replenishment projects will be located in the same sub-watershed (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) as the New Development or Redevelopment projects which did not implement on-site retention BMPs. Locations outside of the HUC-12 but within the HUC-10 subwatershed area may be considered if there are no opportunities within the HUC-12 subwatershed or if greater pollutant reductions and/or groundwater

[4] Found at <http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf>

replenishment can be achieved at a location within the expanded HUC-10 subwatershed. *The use of a mitigation, groundwater replenishment, or retrofit project outside of the HUC-12 subwatershed is subject to the approval of the Executive Officer of the Regional Water Board*.

4. Offsite Project -Retrofit Existing Development

   Use infiltration, bioretention, rainfall harvest and use and/or biofiltration BMPs to retrofit an existing development, with similar land uses as the New Development or land uses associated with comparable or higher stormwater runoff event mean concentrations (EMCs) than the new development. Comparison of EMCs for different land uses will be based on published data from studies performed in southern California. The retrofit plan will be designed and constructed to:

   a. Intercept a volume of stormwater runoff equal to the mitigation volume (Mv) as described above in Equation 2, except biofiltration BMPs will be designed to meet the biofiltration volume or flowrate as described in Equation 1, and

   b. Provide pollutant reduction (treatment) of the stormwater runoff from the project site as described in the Water Quality Mitigation Criteria.

5. Conditions for Offsite Projects

   Project applicants seeking to utilize these alternative compliance provisions may propose other offsite projects, which the agency in which the project is located may approve if they meet the requirements of this subpart.

   a. Location of offsite projects. Offsite projects will be located in the same sub-watershed (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) as the New Development or Redevelopment project. Locations outside of the HUC-12 but within the HUC-10 subwatershed area may be considered if there are no opportunities within the HUC-12 subwatershed or if greater pollutant reductions and/or groundwater replenishment can be achieved at a location within the expanded HUC-10 subwatershed. *The use of a mitigation, groundwater replenishment, or retrofit project outside of the HUC-12 subwatershed is subject to the approval of the Executive Officer of the Regional Water Board.*

   b. Project applicant must demonstrate that equal benefits to groundwater recharge can be met on the project site.

   c. A prioritized list of potential offsite mitigation, groundwater replenishment and/or retrofit projects will be developed within each agency, and when feasible, the mitigation will be directed to the highest priority project within the same HUC-12 or if approved by the Regional Water Board Executive Officer, the HUC-10 drainage area, as the New Development project.

   d. Infiltration/bioretention will be the preferred LID BMP for offsite mitigation or groundwater replenishment projects. Offsite retrofit projects may include green streets, parking lot retrofits, green roofs, and rainfall harvest and use. Biofiltration BMPs may be considered for retrofit projects when infiltration, bioretention or rainfall harvest and use is technically infeasible.

   e. The agency in which the project is located will develop a schedule for the completion of offsite projects, including milestone dates to identify, fund, design, and construct the projects. Offsite

projects will be completed as soon as possible, and at the latest, within 4 years of the certificate of occupancy for the first project that contributed funds toward the construction of the offsite project, unless a longer period is otherwise authorized by the Executive Officer of the Regional Water Board. For public offsite projects, the agency in which the project is located must provide in their annual reports a summary of total offsite project funds raised to date and a description (including location, general design concept, volume of water expected to be retained, and total estimated budget) of all pending public offsite projects. Funding sufficient to address the offsite volume must be transferred to the agency (for public offsite mitigation projects) or to an escrow account (for private offsite mitigation projects) within one year of the initiation of construction.

f. Offsite projects must be approved by the agency in which the project is located and may be subject to approval by the Regional Water Board Executive Officer, if a third-party petitions the Executive Officer to review the project. Offsite projects will be publicly noticed on the Regional Water Board's website for 30 days prior to approval.

g. The project applicant must perform the offsite projects as approved by either the agency or the Regional Water Board Executive Officer or provide sufficient funding for public or private offsite projects to achieve the equivalent mitigation stormwater volume.

6. Regional Stormwater Mitigation Program

An agency or agency group may apply to the Regional Water Board for approval of a regional or sub-regional stormwater mitigation program to substitute in part or wholly for New and Redevelopment requirements for the area covered by the regional or sub-regional stormwater mitigation program. Upon review and a determination by the Regional Water Board Executive Officer that the proposal is technically valid and appropriate, the Regional Water Board may consider for approval such a program if its implementation meets all of the following requirements:

a. Retains the runoff from the 85th percentile, 24-hour rain event or the 0.75 inch, 24-hour rain event, whichever is greater;

b. Results in improved stormwater quality;

c. Protects stream habitat;

d. Promotes cooperative problem solving by diverse interests;

e. Is fiscally sustainable and has secure funding; and

f. Is completed in five years including the construction and start-up of treatment facilities.

7. Water Quality Mitigation Criteria

All New Development and Redevelopment projects that have been approved for offsite mitigation or groundwater replenishment projects will also provide treatment of stormwater runoff from the project site. These projects will design and implement post-construction stormwater BMPs and control measures to reduce pollutant loading as necessary to:

a. Meet the pollutant specific benchmarks listed in Table PLD2 at the treatment systems outlet or prior to the discharge to the MS4, and

b. Ensure that the discharge does not cause or contribute to an exceedance of water quality standards at the agency's downstream MS4 outfall.

The project proponent may be allowed to install flow-through modular treatment systems including sand filters, or other proprietary BMP treatment systems with a demonstrated efficiency at least equivalent to a sand filter. The sizing of the flow through treatment device will be based on a rainfall intensity of 0.2 inches per hour, or the one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, *whichever is greater*.

Table PLD- 2: Benchmarks Applicable to New Development Treatment BMPs.

Conventional Pollutants					
Pollutant	Suspended Solids mg/L	Total P mg/L	Total N mg/L	TKN mg/L	
Effluent Concentration	14	0.13	1.28	1.09	
Metals					
Pollutant	Total Cd µg/L	Total Cu µg/L	Total Cr µg/L	Total Pb µg/L	Total Zn µg/L
Effluent Concentration	0.3	6	2.8	2.5	23

New developments and redevelopments will not cause or contribute to an exceedance of applicable water quality-based effluent limitations established in the MS4 Permit pursuant to Total Maximum Daily Loads (TMDLs).

8. Hydromodification (Flow/ Volume/ Duration) Control Criteria

All New Development and Redevelopment projects located within natural drainage systems will implement hydrologic control measures, to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. The purpose of the hydrologic controls is to minimize changes in post-development hydrologic stormwater runoff discharge rates, velocities, and duration. This will be achieved by maintaining the project's pre-project stormwater runoff flow rates and durations.

Description

Hydromodification control in natural drainage systems will be achieved by maintaining the Erosion Potential (Ep) in streams at a value of 1, unless an alternative value can be shown to be protective of the natural drainage systems from erosion, incision, and sedimentation that can occur as a result of flow increases from impervious surfaces and prevent damage to stream habitat in natural drainage system tributaries[5]. Hydromodification mitigation approaches should meet the criteria below:

a. Hydromodification control may include one, or a combination of on-site, regional or sub-regional hydromodification control BMPs, LID strategies, or stream and riparian buffer restoration measures. Any in-stream restoration measure shall not adversely affect the beneficial uses of the natural drainage systems.

b. Natural drainage systems that are subject to the hydromodification assessments and controls,

[5] See Attachment J of the MS4 Permit, "*Determination of Erosion Potential*"

as described in this section, include all drainages that have not been improved (e.g., channelized or armored with concrete, shotcrete, or rip-rap) or drainage systems that are tributary to a natural drainage system, except as provided in Exemptions to Hydromodification Controls, see below. The clearing or dredging of a natural drainage system does not constitute an "improvement."

c. Until the State Water Board or the Regional Water Board adopts a final Hydromodification Policy or criteria, the Hydromodification Control Criteria described in this section will be implemented to control the potential adverse impacts of changes in hydrology that may result from New Development and Redevelopment projects located within natural drainage systems.

Exemptions to Hydromodification Controls

New Development and Redevelopment projects may be exempt from implementation of hydromodification controls where assessments of downstream channel conditions and proposed discharge hydrology indicate that adverse hydromodification effects to beneficial uses of Natural Drainage Systems are unlikely. Conditions for exemptions include the following:

a. Projects involving replacement, maintenance or repair of an agency's existing flood control facility, storm drain, or transportation network.

b. Redevelopment Projects in the center of urban areas that do not increase the effective impervious area or decrease the infiltration capacity of pervious areas compared to the pre-project conditions.

c. Projects that have any increased discharge directly or via a storm drain to a sump, lake, area under tidal influence, into a waterway that has a 100-year peak flow (Q100) of 25,000 cfs or more, or other receiving water that is not susceptible to hydromodification impacts.

d. Projects that discharge directly or via a storm drain into concrete or otherwise engineered (not natural) channels (e.g., channelized or armored with rip rap, shotcrete, etc.), which, in turn, discharge into receiving water that is not susceptible to hydromodification impacts.

e. LID BMPs implemented on single family homes are sufficient to comply with hydromodification criteria.

Hydromodification Control Criteria

The Hydromodification Control Criteria to protect natural drainage systems are as follows:

a. Except for exemptions described above, projects disturbing an area greater than 1 acre but less than 50 acres within natural drainage systems will be presumed to meet pre-development hydrology if one of the following demonstrations is made:

    i. The project is designed to retain on-site, through infiltration, evapotranspiration, and/or harvest and use, the stormwater volume from the runoff of the 95th percentile, 24-hour storm, or

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ii. The runoff flow rate, volume, and velocity for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour rainfall event and the duration for the post-development condition is not less than the pre-development condition for the 2-year, 24-hour rainfall event. This condition may be substantiated by simple screening models, including those described in Hydromodification Effects on Flow Peaks and Durations in Southern California Urbanizing Watersheds (Hawley et al., 2011) or other models acceptable to the Executive Officer of the Regional Water Board, or

The MS4 Permit states projects will meet Hydromodification Control Criteria if "*The...duration for the post-development condition **do[es] not exceed** the pre-development condition for the 2-year, 24-hour rainfall event*." The runoff duration (Tc) is generally associated with longer values resulting in lower concern for hydromodification impacts. Implementation of LID BMPs generally results in runoff not immediately (or not at all) discharging from the site, increasing the time of concentration. Thus, the interpretation presented herein is that Hydromodification Control Criteria would be met if the runoff duration for the post-development condition is **not less than** the pre-development condition for the 2-year, 24-hour rainfall event.

iii. The Erosion Potential (Ep) in the receiving water channel will approximate 1, as determined by a Hydromodification Analysis Study and the equation presented in Attachment J of the MS4 Permit. Alternatively, agencies can opt to use other work equations to calculate Erosion Potential with Executive Officer approval.

b. Projects disturbing 50 acres or more within natural drainage systems will be presumed to meet pre-development hydrology based on the successful demonstration of one of the following conditions:

i. The site infiltrates on-site at least the runoff from a 2-year, 24hour storm event, or

ii. The runoff flow rate, volume, and velocity for the post-development condition does not exceed the pre-development condition for the 2-year, 24-hour rainfall event and the duration for the post-development condition is not less than the pre-development condition for the 2-year, 24-hour rainfall event. These conditions must be substantiated by hydrologic modeling acceptable to the Regional Water Board Executive Officer, or

iii. The Erosion Potential (Ep) in the receiving water channel will approximate 1, as determined by a Hydromodification Analysis Study and the equation presented in Attachment J of the MS4 Permit.

Alternative Hydromodification Criteria

The requirement for Hydromodification Controls will be satisfied by implementing the hydromodification requirements in the County of Los Angeles Low Impact Development Manual (2009) for all projects disturbing an area greater than 1 acre within natural drainage systems.

3. Watershed Equivalence

Regardless of the methods through which applicants implement alternative compliance measures,

the subwatershed-wide (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) result of all development must be at least the same level of water quality protection as would have been achieved if all projects utilizing these alternative compliance provisions had complied with the Integrated Water Quality/Flow Reduction/Resource Management Criteria, described herein.

4. Annual Report

   Annual Reports will be provided to the Regional Water Board to include a list of mitigation project descriptions and estimated pollutant and flow reduction analyses (compiled from design specifications submitted by project applicants, as approved. Within 4 years of the MS4 Permit adoption, the Annual Reports will include a comparison of the expected aggregate results of alternative compliance projects to the results that would otherwise have been achieved by retaining on site the SWQDv.

Implementation *Permit §VI.D.7.d (LA)/§VII.J.5 (LB)*

Local Ordinance Equivalence

Alternative requirements in the local ordinances for the agencies of this WMP will provide equal or greater reduction in stormwater discharge pollutant loading and volume as would have been obtained through strict conformance with the Integrated Water Quality/Flow Reduction Resources Management Criteria, Alternative Compliance Measures for Technical Infeasibility, or Opportunity for Regional Groundwater Replenishment sections herein and, if applicable, the Hydromodification (Flow/Volume Duration) Control Criteria section herein.

Project Coordination

A process for effective approval of post-construction stormwater control measures will be developed to include:

a. Detailed LID site design and BMP review including review of BMP sizing calculations, BMP pollutant removal performance, and municipal approval; and

b. An established structure for communication and delineated authority between and among municipal departments that have jurisdiction over project review, plan approval, and project construction through memoranda of understanding or an equivalent agreement.

Maintenance Agreement and Transfer

Prior to issuing approval for final occupancy, the Cities will require that all New Development and Redevelopment projects subject to post-construction BMP requirements, with the exception of simple LID BMPs implemented on single family residences, provide an operation and maintenance plan, monitoring plan, where required, and verification of ongoing maintenance provisions for LID practices, Treatment Control BMPs, and Hydromodification Control BMPs including but not limited to: final map conditions, legal agreements, covenants, conditions or restrictions, CEQA mitigation requirements, conditional use permits, and/ or other legally binding maintenance agreements (see Attachments PLD-A and PLD-B for MCA and MCA Termination sample templates, respectively). Agencies will require maintenance records be kept on site.

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Verification at a minimum will include the developer's signed statement accepting responsibility for maintenance until the responsibility is legally transferred; and either:

a. A signed statement from the public entity assuming responsibility for BMP maintenance; or

b. Written conditions in the sales or lease agreement, which require the property owner or tenant to assume responsibility for BMP maintenance and conduct a maintenance inspection at least once a year; or

c. Written text in project covenants, conditions, and restrictions (CCRs) for residential properties assigning BMP maintenance responsibilities to the Home Owners Association; or

d. Any other legally enforceable agreement or mechanism that assigns responsibility for the maintenance of BMPs.

All development projects subject to post-construction BMP requirements will provide a plan for the operation and maintenance of all structural and treatment controls. The plan will be submitted for examination of relevance to keeping the BMPs in proper working order. Where BMPs are transferred to agency for ownership and maintenance, the plan will also include all relevant costs for upkeep of BMPs in the transfer. Operation and Maintenance plans for private BMPs will be kept on-site for periodic review by agency inspectors.

A tracking system and an inspection and enforcement program will be maintained for New Development and Redevelopment post-construction stormwater as shown in Table PLC-3. Enforcement action will be taken per the established Progressive Enforcement Policy as appropriate based on the results of the inspection. See Section for requirements for the development and implementation of a Progressive Enforcement Policy (Appendix A-3-1_PEP).

Table PLD-3: Tracking, Inspection, and Enforcement Program Components

Program	Description	Components	
GIS or other Electronic System	A GIS or other electronic system will be implemented for tracking projects that have been conditioned for post-construction BMPs.	– Municipal Project ID – State WDID No. – Project Acreage – BMP Type and Description – BMP Location (coordinates) – Date of Maintenance Agreement – Date of Acceptance	– Maintenance Records – Inspection Date and Summary – Corrective Action – Date Certificate of Occupancy Issued – Replacement or Repair Date
Inspections[6]	Inspect all development sites upon completion of construction and prior to the issuance of occupancy	Proper installation of: – LID measures, – Structural BMPs,	

[6] The inspection may be combined with other inspections provided it is conducted by trained personnel.

	certificates.	– Treatment control BMPs, and – Hydromodification control BMPs.
Operation and Maintenance[7]	Verify proper operation and maintenance of post-construction BMPs. Inspection at least once every 2 years after project completion.	– Follow a Post-construction BMP Maintenance Inspection checklist (See Attachment PLD-C) – Assess operation and maintenance conditions relating to post-construction BMPs, including BMP repair, replacement, or re-vegetation.

Plan Certification

Each SUSMP/LID Plan should contain proper certifications. The following approach is suggested for SUSMP/LID Plan submittals:

- Form signed by the property owner/applicant stating the category in which the project falls under to easily define the NPDES requirements (see Attachment PLD-D for Form PC sample template).
- Form signed by the property owner/applicant certifying that the BMPs will be implemented, monitored, and maintained per SUSMP/LID Plan requirements (see Attachment PLD-E for Form P1 sample template).
- Form signed and stamped by a California registered civil engineer stating the proposed structural BMPs and certifying the methods and requirements are in compliance with the MS4 Permit requirements (see Attachment PLD-F for Form P2 sample template).

[7] For post-construction BMPs operated and maintained by parties other than the agency in which the BMP(s) is located, the agency will require the other parties to document proper maintenance and operations.

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Development Construction Program

The Cities are required to develop, implement and enforce a construction program that includes the provisions listed in MS4 Permit §VI.D.8 (LB §VII.K). This document provides guidance to assist the Cities in implementing a construction program in compliance with the MS4 Permit.

Objectives

Permit §VI.D.8.a (LA)/§VII.K.1 (LB)

The objectives of the construction program are to:

- Prevent illicit construction-related discharges of pollutants into the MS4 and receiving waters.
- Implement and maintain structural and non-structural BMPs to reduce pollutants in stormwater runoff from construction sites.
- Reduce construction site discharges of pollutants to the MS4 to the MEP.
- Prevent construction site discharges to the MS4 from causing or contributing to a violation of water quality standards.

Erosion and Sediment Control Ordinance

Permit §VI.D.8.b (LA)/ §VII.K.1 (LB)

The construction program requires an established, enforceable erosion and sediment control ordinance for all construction sites that disturb soil.

Applicability

Permit §VI.D.8.c (LA)/ §VII.K.1.v (LB)

The construction program addresses construction activity as defined in Table DC-1.

Table DC-1: Definitions

Construction Activity	
Definition	Any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that results in land disturbance.
Examples	Grading, vegetation clearing, soil compaction, paving, repaving and linear underground/overhead projects (LUPs) that result in land disturbance.
Exclusions	Emergency construction required to immediately protect public health and safety, *routine maintenance* as defined below and agricultural activities.
Routine Maintenance (construction program exclusion)	
Definition	Projects required to maintain the integrity of structures, including but not limited to the following:
Examples	Maintaining the original line and grade, hydraulic capacity, or original purpose of the facility.
	Performing restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.
	Performing road shoulder work, regrading dirt/gravel roadways/shoulders and cleaning out ditches.
	Update existing lines (includes replacing with new materials or pipe) and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
	Repair leaks
Exclusion	New lines (i.e. not associated with existing facilities and not part of a project to update or replace existing lines) or facilities constructed to comply with applicable codes, standards and regulations.

The greater part of the construction program is dedicated to construction sites that disturb one acre or more of soil (with the exception of agricultural activities). This coincides with the size threshold for coverage under the State Water Resources Control Board's NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. The program provisions exclusive to sites less than one acre are addressed first.

Construction Sites Less than One Acre

Permit §VI.D.8.d (LA)/§VII.K.1.vi (LB)

BMPs (< 1 acre)

Through the use of the erosion and sediment control ordinance and/or building permit, construction sites are required have in place an effective combination of erosion and sediment control BMPs from Table DC-2 to prevent erosion and sediment loss and the discharge of construction wastes.

Table DC-2: Applicable Set of BMPs for All Construction Sites

BMP Type	BMP
Erosion Controls	Scheduling
	Preservation of Existing Vegetation
Sediment Controls	Silt Fence
	Sand Bag Barrier
	Stabilized Construction Site Entrance/Exit
Nonstormwater Management	Water Conservation Practices
	Dewatering Operations
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management
	Concrete Waste Management
	Sanitary/Septic Waste Management

Inventory (< 1 acre)

All construction sites with soil disturbing activities that require a permit, regardless of size, are identified and stored in an inventory. Existing permit databases or other tracking systems may be used to file this information. The list of permitted sites is provided to the Regional Water Board upon request.

Inspections (< 1 acre)

Construction sites are inspected on as needed based on the evaluation of the factors that are a threat to water quality. In evaluating the threat to water quality, the following factors are considered: soil erosion potential, site slope, project size and type, sensitivity of receiving water bodies, proximity to receiving water bodies, nonstormwater discharges, past record of noncompliance by the operators of the construction site and any water quality issues relevant to the particular MS4.

Enforcement (< 1 acre)

The Progressive Enforcement Policy (MS4 Permit §VI.D.2) is implemented to ensure that construction sites are brought into compliance with the erosion and sediment control ordinance within a reasonable time period.

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Construction Sites One Acre or Greater

Operators of public and private construction sites within a city's jurisdiction are required to select, install, implement, and maintain BMPs that comply with the erosion and sediment control ordinance.

Construction Site Inventory / Electronic Tracking System *Permit §VI.D.8.g (LA)/§VII.K.1.ix (LB)*

An electronic system is used to inventory all issued grading permits, encroachment permits, demolition permits, building permits, or construction permits (and any other municipal authorization to move soil and/ or construct or destruct that involves land disturbance). A database management system or GIS system is recommended. This inventory is continuously updated as new sites are permitted and sites are completed. The inventory / tracking system contains at a minimum the items listed in Table DC-3.

Table DC-3: Inventory Information for Constructions Sites

Information Type		Information
General	Name	Project Name
	Location	Site address and/or latitude and longitude coordinates
		Receiving water
	Contact	Names of owner and contractor
		Mailing addresses of owner and contractor
		Phone numbers of owner and contractor
		Emails (if available) of owner and contractor
Status		Start and end dates
		Permit approval date and anticipated completion date
		Erosion and Sediment Control Plan (ESCP) approval date
		Status of NOI submittal and CGP coverage
		Current construction phase (where feasible)
Size		Size of project and area of disturbance
Water quality		Proximity to waterbodies listed as impaired[1] by sediment related pollutants
		Proximity to waterbodies for which a sediment-related TMDL has been adopted and approved by USEPA
		Status as a significant threat to water quality (based on a consideration of factors listed in Appendix 1 to the CGP)
Inspection		Inspection frequency
Post construction		List of post-construction structural BMPs subject to O&M requirements

Construction Plan Review and Approval Procedures *Permit §VI.D.8.h (LA)/§VII.K.1.x (LB)*

Plan review procedures are developed and implemented such that the following minimum requirements are met:

- Prior to issuing a grading or building permit, each operator of a construction activity within the city's jurisdiction of which the project is located is required to prepare and submit an ESCP prior to the disturbance of land for review and written approval. The construction site operator is prohibited from commencing construction activity prior to receipt of written approval by the city of which the project is located. An ESCP is not approved unless it contains appropriate site-

[1] CWA §303(d) listed or subject to a TMDL

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specific construction site BMPs that meet the minimum requirements of the erosion and sediment control ordinance.

- ESCPs must include the elements of a Storm Water Pollution Prevention Plan (SWPPP). SWPPPs prepared in accordance with the requirements of the Construction General Permit can be accepted as ESCPs.
- At a minimum, the ESCP must address the following elements:
    - Methods to minimize the footprint of the disturbed area and to prevent soil compaction outside of the disturbed area.
    - Methods used to protect native vegetation and trees.
    - Sediment/Erosion Control.
    - Controls to prevent tracking on and off the site.
    - Nonstormwater controls (e.g., vehicle washing, dewatering, etc.).
    - Materials Management (delivery and storage).
    - Spill Prevention and Control.
    - Waste Management (e.g., concrete washout/waste management; sanitary waste management).
    - Identification of site Risk Level as identified per the requirements in Appendix 1 of the Construction General Permit.
- The ESCP must include the rationale for the selection and design of the proposed BMPs, including quantifying the expected soil loss from different BMPs.
- The ESCP must be developed and certified by a Qualified SWPPP Developer (QSD).
- All structural BMPs must be designed by a licensed California Engineer.
- The landowner or the landowner's agent must sign a statement on the ESCP as follows (see Attachment DC-A for sample OC-1 template):

  "I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law."

- Prior to issuing a grading or building permit, the city of which the project is located verifies that the construction site operators have existing coverage under applicable permits, including, but not limited to the State Water Board's Construction General Permit, and State Water Board 401 Water Quality Certification.
- A checklist is used to conduct and document review of each ESCP (see Attachment DC-B for the ESCP Checklist sample template).

BMP Implementation Level *Permit §VI.D.8.i (LA)/§VII.K.1.xi (LB)*

The Cities will implement technical standards for the selection, installation and maintenance of construction BMPs for all construction sites within its jurisdiction.

The BMP technical standards require:

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- The use of BMPs that are tailored to the risks posed by the project. Sites are ranked from Low Risk (Risk 1) to High Risk (Risk 3). Project risks are calculated based on the potential for erosion from the site and the sensitivity of the receiving water body. Receiving water bodies that are listed on the Clean Water Act (CWA) Section 303(d) list for sediment or siltation are considered High Risk. Likewise, water bodies with designated beneficial uses of SPWN, COLD, and MIGR are also considered High Risk. The combined (sediment/receiving water) site risk is calculated using the methods provided in Appendix 1 of the Construction General Permit. At a minimum, the BMP technical standards include requirements for High Risk sites as defined in Table DC-7.
- The use of BMPs for all construction sites, sites equal or greater to 1 acre, and for paving projects per Table DC-6 and Table DC-8.
- Detailed installation designs and cut sheets for use within ESCPs.
- Maintenance expectations for each BMP, or category of BMPs, as appropriate.

Permittees are encouraged to adopt respective BMPs from latest versions of the California BMP Handbook, Construction or Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual and addenda. Alternatively, Permittees are authorized to develop or adopt equivalent BMP standards consistent for Southern California and for the range of activities presented in Tables DC-5 through DC-8.

The local BMP technical standards are readily available to the development community and are clearly referenced within the Cities' stormwater or development services websites, ordinances, permit approval processes and/or ESCP review forms. The local BMP technical standards are also readily available to the Regional Water Board upon request.

Local BMP technical standards are available for the BMPs listed in Tables DC-5 through DC-8.

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Table DC-4: Minimum Set of BMPs for All Construction Sites

BMP Type	BMP
Erosion Controls	Scheduling
	Preservation of Existing Vegetation
Sediment Controls	Silt Fence
	Sand Bag Barrier
	Stabilized Construction Site Entrance/Exit
Nonstormwater Management	Water Conservation Practices
	Dewatering Operations
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management
	Concrete Waste Management
	Sanitary/Septic Waste Management

Table DC-5: Additional BMPs Applicable to Construction Sites Disturbing 1 Acre or More

BMP Type	BMP
Erosion Controls	Hydraulic Mulch
	Hydroseeding
	Soil Binders
	Straw Mulch
	Geotextiles and Mats
	Wood Mulching
Sediment Controls	Fiber Rolls
	Gravel Bag Berm
	Street Sweeping and/ or Vacuum
	Storm Drain Inlet Protection
	Scheduling
	Check Dam
Additional Controls	Wind Erosion Controls
	Stabilized Construction Entrance/ Exit
	Stabilized Construction Roadway
	Entrance/ Exit Tire Wash
Non-Storm Management	Vehicle and Equipment Washing
	Vehicle and Equipment Fueling
	Vehicle and Equipment Maintenance
Waste Management	Material Delivery and Storage
	Spill Prevention and Control

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Table DC-6: Additional Enhanced BMPs for High Risk Sites

BMP Type	BMP
Erosion Controls	Hydraulic Mulch
	Hydroseeding
	Soil Binders
	Straw Mulch
	Geotextiles and Mats
	Wood Mulching
	Slope Drains
Sediment Controls	Silt Fence
	Fiber Rolls
	Sediment Basin
	Check Dam
	Gravel Bag Berm
	Street Sweeping and/or Vacuum
	Sand Bag Barrier
	Storm Drain Inlet Protection
Additional Controls	Wind Erosion Controls
	Stabilized Construction Entrance/Exit
	Stabilized Construction Roadway
	Entrance/Exit Tire Wash
	Advanced Treatment Systems*
Nonstormwater Management	Water Conservation Practices
	Dewatering Operations (Ground water dewatering only under NPDES Permit No. CAG994004)
	Vehicle and Equipment Washing
	Vehicle and Equipment Fueling
	Vehicle and Equipment Maintenance
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management

*Applies to public roadway projects.

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Table DC-7: Minimum Required BMPs for Roadway Paving or Repair Operation (For Private or Public Projects)

#	BMP
1.	Restrict paving and repaving activity to exclude periods of rainfall or predicted rainfall unless required by emergency conditions.
2.	Install gravel bags and filter fabric or other equivalent inlet protection at all susceptible storm drain inlets and at manholes to prevent spills of paving products and tack coat.
3.	Prevent the discharge of release agents including soybean oil, other oils, or diesel to the stormwater drainage system or receiving waters.
4.	Minimize non stormwater runoff from water use for the roller and for evaporative cooling of the asphalt.
5.	Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage and dispose of properly.
6.	Collect liquid waste in a container, with a secure lid, for transport to a maintenance facility to be reused, recycled or disposed of properly.
7.	Collect solid waste by vacuuming or sweeping and securing in an appropriate container for transport to a maintenance facility to be reused, recycled or disposed of properly.
8.	Cover the "cold-mix" asphalt (i.e., pre-mixed aggregate and asphalt binder) with protective sheeting during a rainstorm.
9.	Cover loads with tarp before haul-off to a storage site, and do not overload trucks.
10.	Minimize airborne dust by using water spray or other approved dust suppressant during grinding.
11.	Avoid stockpiling soil, sand, sediment, asphalt material and asphalt grindings materials or rubble in or near stormwater drainage system or receiving waters.
12.	Protect stockpiles with a cover or sediment barriers during a rain.

Construction Site Inspection *Permit §VI.D.8.j (LA)/§VII.K.1.xii (LB)*

The Cities' legal authority is used to implement procedures for inspecting public and private construction sites. The inspection procedures are implemented as follows:

Inspection Frequency

- Inspect the public and private construction sites as specified in Table DC-8.
- All phases of construction are inspected as follows:
    - Prior to Land Disturbance – Prior to allowing an operator to commence land disturbance, each Permittee shall perform an inspection to ensure all necessary erosion and sediment structural and non-structural BMP materials and procedures are available per the erosion and sediment control plan.
    - During Active Construction, including Land Development[2] and Vertical Construction[3] – In accordance with the frequencies specified in Table DC-8, inspections are performed to ensure all necessary erosion and sediment structural and non-structural BMP materials and procedures are available per the erosion and sediment control plan throughout the construction process.
    - Final Landscaping / Site Stabilization[4] – At the conclusion of the project and as a condition of approving and/or issuing a Certificate of Occupancy, the constructed site is inspected to ensure that all graded areas have reached final stabilization and that all

[2] Activities include cuts and fills, rough and finished grading; alluvium removals; canyon cleanouts; rock undercuts; keyway excavations; stockpiling of select material for capping operations; and excavation and street paving, lot grading, curbs, gutters and sidewalks, public utilities, public water facilities including fire hydrants, public sanitary sewer systems, storm sewer system and/or other drainage improvement.

[3] The build out of structures from foundations to roofing, including rough landscaping.

[4] All soil disturbing activities at each individual parcel within the site have been completed.

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trash, debris, and construction materials, and temporary erosion and sediment BMPs are removed.

- Based on the required frequencies above, each construction project is inspected a minimum of three times.

Table DC-8: Inspection Frequencies for Sites One Acre or Greater

Site	Inspection Frequency Shall Occur
All sites 1 acre or larger that discharge to a tributary listed by the state as an impaired water for sediment or turbidity under the CWA §303(d)	(1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA[5], (2) within 48 hours of a ½-inch rain event and at (3) least once every two weeks
Other sites 1 acre or more determined to be a significant threat to water quality[6]	
All other construction sites with 1 acre or more of soil disturbance not meeting the criteria above	At least monthly

Inspection Standard Operating Procedures

Standard operating procedures are implemented, and revised as necessary, that identify the inspection procedures followed by the Cities' inspectors (see Attachment DC-C for suggested standard operating procedures). Inspections of construction sites – and the standard operating procedures – include, but are not limited to:

1. Verification of active coverage under the Construction General Permit for sites disturbing 1 acre or more, or that are part of a planned development that will disturb 1 acre or more and a process for referring non-filers to the Regional Water Board.
2. Review of the applicable ESCP and inspection of the construction site to determine whether all BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions (see Attachment DC-B for the ESCP Checklist sample template).
3. Assessment of the appropriateness of the planned and installed BMPs and their effectiveness.
4. Visual observation and record keeping of nonstormwater discharges, potential illicit discharges and connections, and potential discharge of pollutants in stormwater runoff.
5. Development of a written or electronic inspection report generated from an inspection checklist used in the field (see Attachment DC-D and DC-E for the Large Site and Small Site[7] Inspection Forms, respectively).
6. Tracking of the number of inspections for the inventoried construction sites throughout the reporting period to verify that the sites are inspected at the minimum frequencies listed in Table DC-8.

Enforcement *Permit §VI.D.8.k (LA)/§VII.K.1.xiii (LB)*

The Progressive Enforcement Policy is implemented to ensure that construction sites are brought into compliance with all stormwater requirements within a reasonable time period.

[5] www.srh.noaa.gov/forecast

[6] In evaluating the threat to water quality, the following factors shall be considered: soil erosion potential; site slope; project size and type; sensitivity of receiving water bodies; proximity to receiving water bodies; nonstormwater discharges; past record of non-compliance by the operators of the construction site; and any water quality issues relevant to the particular MS4.

[7] A "large site" refers to a site greater than or equal to 1 acre while a "small site" refers to a site less than one acre.

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Permittee Staff Training *Permit §VI.D.8.l(LA)/§VII.K.1.xiv(LB)*

Staff whose primary job duties are related to implementing the construction stormwater program are adequately trained.

The Cities may conduct in-house training or contract with consultants. Training is provided to the following staff positions of the MS4:

- Plan Reviewers and Permitting Staff – Staff and consultants are trained as qualified individuals, knowledgeable in the technical review of local erosion and sediment control ordinance, local BMP technical standards, ESCP requirements, and the key objectives of the State Water Board QSD program. The training is provided either internally to staff or staff is required to obtain QSD certification.
- Erosion Sediment Control/Stormwater Inspectors – Inspectors are either 1) knowledgeable in inspection procedures consistent with the State Water Board sponsored program QSD, 2) a Qualified SWPPP Practitioner (QSP) or 3) a designated person on staff trained in the key objectives of the QSD/QSP programs supervises inspection operations. The training is provided either provided internally to staff or staff is required to obtain QSD/QSP certification. Each inspector is knowledgeable of the local BMP technical standards and ESCP requirements.
- Third-Party Plan Reviewers, Permitting Staff, and Inspectors – If outside parties are utilized to conduct inspections and/or review plans, these staff are trained per the requirements listed above. Outside contractors can self-certify, providing they certify they have received all applicable training required in MS4 Permit §VI.D.8 and have documentation to that effect.

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Public Agency Activities Program

Each participating city is required to develop and implement a program for public agency facilities and activities that includes the requirements listed in MS4 Permit §VI.D.9 (LB §VII.L). This document provides guidance to assist the Cities in implementing a public agency activities program in compliance with the MS4 Permit.

Objectives

Permit §VI.D.9.a (LA)/§VII.L.1 (LB)

The objectives of the Public Agency Activities program are to:

- Minimize stormwater pollution impacts from Permittee-owned or operated facilities.
- Minimize stormwater pollution impacts from public agency activities.
- Identify opportunities to reduce stormwater pollution impacts from areas of existing development.

MS4 Permit requirements for Public Agency Facilities and Activities consist of the following components which will be discussed in more detail in the sections below:

- Public Construction Activities Management
- Public Facility Inventory
- Inventory of Existing Development for Retrofitting Opportunities
- Public Facility and Activity Management
- Vehicle and Equipment Wash Areas
- Landscape, Park, and Recreational Facilities Management
- Storm Drain Operation and Maintenance
- Streets, Roads, and Parking Facilities Maintenance
- Emergency Procedures
- Municipal Employee and Contractor Training

1. Public Construction Activities Management

Permit §VI.D.9.b (LA)/§VII.L.2 (LB)

Each participating city is required to develop and implement a Development Construction Program that meets the requirements the Development Construction Section of this WMP, and Part VI.D.8 of the LA MS4 Permit at municipally owned or operated (i.e., public or Permittee sponsored) construction projects. In addition, each participating city is required to develop and implement a Planning and Land Development Program that meets the requirements in the Planning and Land Development Section of this WMP, and the MS4 Permit at municipally owned or operated (i.e., public or Permittee sponsored) construction projects.

2. Public Facility Inventory

Permit §VI.D.9.c (LA)/§VII.L.3 (LB)

The Public Agency Activities Program requires the maintenance of an inventory of all Permittee-owned or operated (i.e., public) facilities that are potential sources of stormwater pollution. The incorporation of facility information into a GIS is recommended. Sources that are tracked include but are not limited to the following:

- Animal control facilities
- Chemical storage facilities
- Composting facilities

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- Equipment storage and maintenance facilities (including landscape maintenance-related operations)
- Fueling or fuel storage facilities (including municipal airports)
- Hazardous waste disposal facilities
- Hazardous waste handling and transfer facilities
- Incinerators
- Landfills
- Materials storage yards
- Pesticide storage facilities
- Fire stations
- Public restrooms
- Public parking lots
- Public golf courses
- Public swimming pools
- Public parks
- Public works yards
- Public marinas
- Recycling facilities
- Solid waste handling and transfer facilities
- Vehicle storage and maintenance yards
- Stormwater management facilities (e.g., detention basins)
- All other Permittee-owned or operated facilities or activities that are determined to contribute a substantial pollutant load to the MS4.

The following minimum fields of information are included in the inventory for each Permittee-owned or operated facility:

- Name of facility
- Name of facility manager and contact information
- Address of facility (physical and mailing)
- A narrative description of activities performed and potential pollution sources.
- Coverage under the Industrial General Permit or other individual or general NPDES permits or any applicable waiver issued by the Regional or State Water Board pertaining to stormwater discharges.

The inventory is updated at least once during the 5-year MS4 Permit term. The update are accomplished through collection of new information obtained through field activities or through other readily available inter and intra-agency informational databases (e.g., property management, land-use approvals, accounting and depreciation ledger account, and similar information).

3. Inventory of Existing Development for Retrofit Opportunities

Permit §VI.D.9.d (LA)/§VII.L.4 (LB)

The Public Agency Activities Program requires the development of an inventory of retrofitting opportunities. Retrofit opportunities are identified within the public right-of-way or in coordination with a TMDL implementation plan(s). The goals of the existing development retrofitting inventory are to address the impacts of existing development through regional or sub-regional retrofit projects that

reduce the discharges of stormwater pollutants into the MS4 and prevent discharges from the MS4 from causing or contributing to a violation of water quality standards as defined in the MS4 Permit.

Existing areas of development are screened to identify candidate areas for retrofitting using watershed models or other screening level tools. The areas of existing development identified during the screening process are then evaluated and ranked to prioritize retrofitting candidates. Criteria for this evaluation may include, but is not limited to the following:

- Feasibility, including general private and public land availability;
- Cost effectiveness;
- Pollutant removal effectiveness;
- Tributary area potentially treated;
- Maintenance requirements;
- Landowner cooperation;
- Neighborhood acceptance;
- Aesthetic qualities;
- Efficacy at addressing concern; and
- Potential improvements to public health and safety.

The results of this evaluation are considered in the following programs:

- Highly feasible projects expected to benefit water quality are given a high priority to implement source control and treatment control BMPs in the WMP.
- High priority retrofit projects are considered as candidates for off-site mitigation projects per LA MS4 Permit §VI.D.7.c.iii(4)(d) (LB §VII.J.4.iii(4)).
- Where feasible, the existing development retrofit program is coordinated with flood control projects and other infrastructure improvement programs per LA MS4 Permit §VI.D.9.e.ii(2) (LB §VII.L.5.ii(2)).

Site specific retrofit projects are encouraged through cooperation with private landowners. The following practices are considered in cooperating with private landowners to retrofit existing development:

- Demonstration retrofit projects;
- Retrofits on public land and easements that treat runoff from private
- developments;
- Education and outreach;
- Subsidies for retrofit projects;
- Requiring retrofit projects as enforcement, mitigation or ordinance compliance;
- Public and private partnerships;
- Fees for existing discharges to the MS4 and reduction of fees for retrofit implementation.

4. Public Facility and Activity Management

Permit §VI.D.9.e (LA)/§VII.L.5 (LB)

4.1. Industrial General Permitted Facilities

Permit §VI.D.9.e.i & §VI.D.9.e.v (LA)/§VII.L.5.i (LB)

All Permittee owned or operated facilities where industrial activities are conducted that require coverage are required to obtain coverage under the Industrial General Permit by submitting a Notice of Intent (NOI) to the State Water Resources Control Board (State Board) and preparing a Stormwater

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Pollution Prevention Plan (SWPPP). Facilities that may require coverage are listed by category in 40 Code of Federal Regulations (CFR) Section 122.26(b)(14), and include:

- Facilities subject to stormwater effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards (40 CFR Subchapter N)
- Manufacturing facilities
- Mining and oil and gas facilities
- Hazardous waste treatment, storage, or disposal facilities
- Landfills, land application sites, and open dumps that receive industrial waste
- Recycling facilities
- Steam electric generating facilities
- Transportation facilities
- Sewage treatment plants
- Certain facilities if materials are exposed to stormwater

Municipally owned or operated facilities that have obtained coverage under the IGP implement and maintain BMPs consistent with the associated SWPPP, and are therefore not required to implement and maintain the activity specific BMPs as described in the sections below.

4.2. Flood Management Projects *Permit §VI.D.9.e.ii (LA)/§VII.L.5.ii (LB)*

The following measures are implemented for municipally owned or operated flood management projects:

- Procedures are developed to assess the impacts of flood management projects on the water quality of receiving water bodies;
- Existing structural flood control facilities area evaluated to determine if retrofitting the facility to provide additional pollutant removal from stormwater is feasible.

4.3. Contracted Public Agency Activities *Permit §VI.D.9.e.iv (LA)/§VII.L.5.iv (LB)*

Any contractors hired to conduct Public Agency Activities, including, but not limited to the following must be contractually obligated to implement and maintain the activity specific BMPs outlined in the sections below:

- Storm and/or sanitary sewer system inspection and repair,
- Street sweeping,
- Trash pick-up and disposal, and
- Street and right-of-way construction and repair

It is the responsibility of each Permittee to ensure that these BMPs are being properly implemented and maintained through oversight of contracted activities. Example contractor/lessor contract language is provided in attachment PA-A.

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4.4. BMPS for Municipal Activities

Permit §VI.D.9.e.iii & Permit §VI.D.9.e.vi (LA)/§VII.L.5.iii & VII.L.5.vi (LB)

Municipal maintenance and field staff are the ones responsible for implementing effective source control BMPs[1], such as those described in Table PA-1 (or an equivalent set of BMPs) when such activities occur at municipally owned or operated facilities and field operations (i.e. project sites). These sites include, but are not limited to the facility types identified in the Public Facility Inventory, and at any area that includes the activities described in Table PA-1, or that have the potential to discharge pollutants in stormwater. The Caltrans Stormwater Quality Handbook Maintenance Staff Guide (Caltrans Handbook)[2] is an additional resource that describes BMPs to prevent the stormwater-related pollutants most likely to come from common maintenance facility operations and field activities. It provides a straightforward working-level approach to implementing BMPs for common maintenance activities by categorizing these activities into Families, and associating each Family with certain types of BMPs in Activity Cut Sheets. The activities described in Sections 5-10 below are representative of typical municipal operations, and correspond to the activities and BMPs listed in Table PA-1. Where appropriate, each section will identify the appropriate Maintenance Activity Family and corresponding Caltrans Activity Cut Sheets from this table for ease of reference.

Although Table PA-1 and the CalTrans Handbook are excellent references for selecting BMPs for some of the most common municipal activities, they may not represent a comprehensive inventory of activities encountered by maintenance staff and field personnel. Likewise, for those BMPs that are not adequately protective of water quality standards, additional site-specific BMPS may be needed. For example, the implementation of additional BMPs is required where stormwater from the storm drain system discharges to a water body subject to a TMDL, a Clean Water Act §303(d) listed water body, or a significant ecological area (SEA). Attachment PA-B contains a map of SEAs in LA County and Attachment K of the LA MS4 Permit contains a matrix of Permittees and TMDLs.

[1] BMP is defined by the California Stormwater Quality Association as "*any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution*". Source Control BMPs are operational practices that prevent pollution by reducing potential pollutants at the source. They typically do not require maintenance or construction, and may consist of programmatic controls such as street sweeping. Treatment Control BMPs are methods of treatment to remove pollutants from stormwater, and can include constructed treatment devices such as an infiltration basin.

[2] The handbook is available at http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/management_ar_rwp/CTSW-RT-02-057.pdf and may also be found by entering the words "Caltrans Stormwater Quality Handbook Maintenance Staff Guide" in a web search engine.

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Table PA-1: General and Activity Specific BMPs and Their Associated Caltrans Handbook Activity Cut Sheet

Maintenance Activity Family	BMP	Caltrans Activity Cut Sheet Number
General BMPs	Scheduling and Planning	B-4
	Spill Prevention and Control	
	Sanitary/Septic Waste Management	
	Material Use	
	Safer Alternative Products	
	Vehicle/Equipment Cleaning, Fueling and Maintenance	
	Illicit Connection Detection, Reporting and Removal	
	Illegal Spill Discharge Control	
	Maintenance Facility Housekeeping Practices	
Flexible Pavement	Asphalt Cement Crack and Joint Grinding/ Sealing	B-9
	Asphalt Paving	B-10
	Structural Pavement Failure (Digouts) Grinding and Paving	B-11
	Emergency Pothole Repairs	B-13
	Sealing Operations	B-14
Rigid Pavement	Portland Cement Crack and Joint Sealing	B-15
	Mudjacking and Drilling	B-16
	Concrete Slab and Spall Repair	B-17
Slope/ Drains/ Vegetation	Shoulder Grading	B-19
	Nonlandscaped Chemical Vegetation Control	B-21
	Nonlandscaped Mechanical Vegetation Control/Mowing	B-23
	Nonlandscaped Tree and Shrub Pruning, Removal	B-24
	Fence Repair	B-25
	Drainage Ditch and Channel Maintenance	B-26
	Drain and Culvert Maintenance	B-28
	Curb and Sidewalk Repair	B-30
Litter/ Debris/ Graffiti	Sweeping Operations	B-32
	Litter and Debris Removal	B-33
	Emergency Response and Cleanup Practices	B-34
	Graffiti Removal	B-36
Landscaping	Chemical Vegetation Control	B-37
	Manual Vegetation Control	B-39
	Landscaped Mechanical Vegetation Control/ Mowing	B-40
	Landscaped Tree and Shrub Pruning, Removal	B-41
	Irrigation Line Repairs	B-42
	Irrigation (Watering), Potable and Nonpotable	B-43
Environmental	Storm Drain Stenciling	B-44
	Roadside Slope Inspection	B-45
	Roadside Stabilization	B-46
	Stormwater Treatment Devices	B-48
	Traction Sand Trap Devices	B-49
Public Facilities	Public Facilities	B-50
Bridges	Welding and Grinding	B-52
	Sandblasting, Wet Blast with Sand Injection, Hydroblasting	B-54
	Painting	B-56
	Bridge Repairs	B-57
Other Structures	Pump Station Cleaning	B-59
	Tube and Tunnel Maintenance and Repair	B-61
	Tow Truck Operations	B-63
	Toll Booth Lane Scrubbing Operations	B-64
Electrical &	Sawcutting for Loop Installation	B-65
Traffic Guidance	Thermoplastic Striping and Marking	B-67
	Paint Striping and Marking	B-68
	Raised/ Recessed Pavement Marker Application/Removal	B-70

	Sign Repair and Maintenance	B-71
	Median Barrier and Guard Rail Repair	B-73
	Emergency Vehicle Energy Attenuation Repair	B-75
Storm Maintenance	Minor Slides and Slipouts Cleanup/ Repair	B-78
Management and Support	Building and Grounds Maintenance	B-80
	Storage of Hazardous Materials (Working Stock)	B-82
	Material Storage Control (Hazardous Waste)	B-84
	Outdoor Storage of Raw Materials	B-85
	Vehicle and Equipment Fueling	B-86
	Vehicle and Equipment Cleaning	B-87
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5. Vehicle and Equipment Wash Areas

Permit §VI.D.9.f (LA)/§VII.L.6 (LB)

This section corresponds to Maintenance Activity Family Management and Support and corresponding Caltrans Activity Cut Sheet B-87.

Vehicle and equipment cleaning at a municipal facility may introduce a number of potential pollutants into the storm drain system. Municipal maintenance and field staff are responsible for implementing and maintaining the activity specific BMPs listed in Table PA-1 for all fixed vehicle and equipment washing; including fire fighting and emergency response vehicles. In addition, maintenance and field staff are responsible for preventing discharges of wash water from entering the storm drain system. Table PA-2 shows the potential pollutants associated with vehicle and equipment cleaning.

Table PA-2: Potential Pollutants Generated from Cleaning Activities

Activity	**Potential Pollutants**					
Vehicle and Equipment Cleaning	Sediment	Nutrients	Trash	Metals	Oil & Grease	Organics

Discharges of wash waters to the storm drain system are prevented by implementing the following measures at existing facilities with vehicle or equipment wash areas:

- Wash water is self-contained and hauled away for proper disposal offsite.
- Wash areas are equipped with a clarifier, or an alternative pre-treatment device, and water is plumbed to the sanitary sewer in accordance with applicable waste water provider regulations.
- Wastewater from all new vehicle and equipment wash facilities, or redeveloped or replaced existing facilities is prevented from discharging to the MS4 by equipping the facility with a clarifier, or an alternative pre-treatment device, and plumbing water to the sanitary sewer in accordance with applicable waste water provider regulations, or by self-containing all water water/wash water and hauling to a point of legal disposal.

6. Landscape, Park, and Recreational Facilities Management

Permit §VI.D.9.g (LA)/ §VII.L.7 (LB)

This section corresponds to multiple Activity Cut Sheets within the Slope/Drains/Vegetation, Landscape, Environmental, and Management and Support Families.

Maintenance practices at parks and recreational facilities generally include fertilizer and pesticide applications, vegetation maintenance and disposal, irrigation, swimming pool chemical maintenance and draining, and trash and debris management. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. Municipal maintenance and field staff are responsible for implementing and maintaining the activity specific BMPs listed in Table PA-1for all public right-of-

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ways, flood control facilities and open channels, lakes and reservoirs, and landscape, park, and recreational facilities and activites. Table PA-3 shows the potential pollutants associated with recreational facilities..

Table PA-3: Potential Pollutants Generated from Recreational Facilities

Activity	Potential Pollutants				
Vehicle and Equipment Cleaning	Sediment	Nutrients	Trash	Bacteria	Pesticides

6.1 Model Integrated Pest Management Program

Permit §VI.D.9.g.ii & VI.D.9.g.iii (LA)/§VII.L.7.ii & VII.L.7.iii (LB)

An IPM policy is in place to minimize pesticide and fertilizer use, and encourage the use of IPM techniques for Public Agency facilities and activities. The attached IPM Program template (Attachment PA-C), adapted from the Orange County Drainage Area Management Plan (DAMP) IPM Policy developed by the University of California, Division of Agriculture and Natural Resources, provides an example of an effective IPM program. This IPM Program template is based on regulations, management guidelines, and research-based recommendations established by federal, state and local agencies and universities with particular expertise in pest management.

As part of the IPM policy, a commitment and schedule to reduce the use of pesticides that cause impairment t of surface waters is implemented through the following procedures:

- An inventory of all pesticides used by municipal departments, divisions, and operational units is prepared and updated annually.
- Pesticides used by staff and hired contractors are quantified.
- The use of IPM alternatives is demonstrated, where feasible, to reduce pesticide use.

Municipal maintenance and field staff applying pesticides are certified in the appropriate category by the California Department of Pesticide Regulation, or are under the direct supervision of a pesticide applicator certified in the appropriate category.

7. Storm Drain Operation and Maintenance

Permit §VI.D.9.h (LA)/ §VII.L.8 (LB)

This section corresponds to the Litter/Debris/Graffiti Family: Litter and Debris Removal Cut Sheet, pg. B-33, and the Environmental Family: Storm Drain Stenciling Cut Sheet, pg. B-44

The storm drain system functions primarily to collect and convey surface runoff to receiving waters during storms in order to prevent flooding. It is a common municipal activity to maintain the storm drain system so that it functions hydraulically as intended during storms. Municipal maintenance and field staff are responsible for implementing and maintaining the activity specific BMPs listed in Table PA-1 for storm drain operation and maintenance, and ensuring that all material removed from the MS4 does not reenter the system by dewatering solid material in a contained area and disposing of liquid material in accordance with any of the following measures:

- Self-containing and hauling off for legal disposal; or
- Applying to the land without runoff; or
- Equipping with a clarifier or alternative pre-treatment device and plumbing to the sanitary sewer in accordance with applicable waste water provider regulations.

Table PA-4 shows potential pollutants generated during storm drain operation and maintenance.

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Table PA-4: Potential Pollutants Generated from Storm Drain Operation and Maintenance

Activity	Potential Pollutants								
	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances
Inspection and Cleaning of Conveyance Structures	×	×	×		×		×		×
Controlling Illicit Connections and Discharges	×	×	×	×	×	×	×	×	×
Controlling Illegal Dumping	×	×	×	×	×	×	×	×	×
Maintenance of Inlet and Outlet Structures	×		×		×	×			

7.1 Catch Basin Cleaning

Permit §VI.D.9.h.iii (LA)/ §VII.L.8.iii (LB)

There is no preferred method for cleaning catch basins as long as the method used is successful in removing accumulated sediment and debris. The methods used are determined in the field with the goal of minimizing the amount of escaped material, and preventing this material from entering the storm drain system. A template catch basin cleaning log is provided in Attachment PA-D.

7.1.1 Catch Basins Cleaning in Areas not Subject to a Trash TMDL

In areas that are not subject to a trash TMDL, catch basin inlets are prioritized based on the amount of trash generated, and inspected according to the schedule in Table PA-5.

Table PA-5: Inspection Frequencies for Catch Basin Inlets

Trash Generating Frequency	Priority	Inspection Frequency
Consistently generates the highest volumes of trash and/or debris	A	A minimum of three times during the wet season (October-April) and once during the dry season every year
Consistently generates moderate volumes of trash and/or debris	B	A minimum of once during the wet season and once during the dry season every year
Generates low volumes of trash and/or debris	C	A minimum of once per year

An inventory of catch basins is maintained and updated regularly. This inventory includes the following components:

- GPS coordinates of each catch basin
- Priorities for inspection
- Rationale or data to support catch basin priority designations
- Inspection and cleaning records

Catch basins are cleaned as necessary based on the inspections conducted. At a minimum, catch basins determined to be at least 25% full of trash are cleaned out.

7.1.2 Catch Basin Cleaning in Areas Subject to a Trash TMDL

In areas subject to a Trash TMDL, all applicable provisions of LA MS4 Permit Section VI.E (LB Part Part VIII) in conformance with the appropriate TMDL implementation schedule, are implemented. This includes an effective combination of full capture, partial capture, institutional controls, or minimum frequency of assessment and collection as described in LA MS4 Permit Section VI.E (LB Part Part VIII).

7.2 Catch Basin Labels and Open Channel Signage

Permit §VI.D.9.h.vi (LA)/ §VII.L.8.vi (LB)

All municipally owned storm drain inlets are labeled with a "No Dumping, Drains to Ocean" message, and inspected for legibility prior to the wet season (October-April) every year. Catch basins with illegible labels are recorded and re-stenciled or re-labeled within 180 days of inspection. In addition, signs referencing local code(s) that prohibit littering and illegal dumping are posted at designated public access points to open channels, creeks, urban lakes, and other relevant water bodies.

7.3 Trash Management

Permit §VI.D.9.h.iv-v & Permit §VI.D.9.h.vii (LA)/§VII.L.8.iv-v (LB)

The following Trash Management BMPs described below are employed to mitigate the impacts of anthropogenic trash on receiving waters.

7.3.1 Trash Management at Public Events

The following measures are implemented for any event in the public right of way or wherever it is foreseeable that substantial quantities of trash and litter may be generated, including events located in areas that are subject to a trash TMDL:

- Proper management of trash and litter generated; and
- Arrangement for temporary screens to be placed on catch basins; or
- Provide clean out of catch basins, trash receptacles, and grounds in the event area within one business day subsequent to the event.

7.3.2 Trash Receptacles

Covered trash receptacles are located in areas identified as high trash generation areas and maintained and cleaned out as necessary to prevent trash overflow. Examples of areas that may be considered high trash generating areas include:

- High vehicle or pedestrian traffic areas
- Commercial areas
- Industrial areas
- Construction areas
- High density residential areas
- Areas adjacent to vacant lots

7.3.3 Additional Trash Management Practices

In areas that are not subject to a trash TMDL, additional trash management practices will be employed no later than five years after the effective date of the LA MS4 Permit (4 years after the effective date of the LB MS4 Permit). Trash excluders or equivalent devices must be installed on or in catch basins or outfalls to prevent the discharge of trash to the MS4 or receiving waters, unless the installation of such BMP(s) alone will cause flooding (not due to lack of maintenance). Alternatively, additional trash BMPs

that provide substantially equivalent removal of trash may be implemented. Additional BMPs may include, but are not limited to:

- Increased street sweeping
- Adding trash cans near trash generation sites
- Prompt enforcement of trash accumulation
- Increased trash collection on public property
- Increased litter prevention messages or trash nets within the MS4

The BMPs chosen will provide equivalent trash removal performance as excluders, and will be demonstrated though the annual report. When outfall trash capture is provided, revision of the schedule for inspection and cleanout of catch basins will also be reported in the annual report.

The State Water Resources Control Board (State Water Board) is considering the adoption of amendments to the Water Quality Control Plans for Ocean Waters of California and for the Inland Surface Water, Enclosed Bays, and Estuaries of California for Trash (Trash Amendments) citing a strong need for statewide consistency in trash management. The proposed Trash Amendments will include five elements: (1) Water Quality Objective, (2) Prohibition of Discharge, (3) Implementation, (4) Compliance Schedule, and (5) Monitoring, which will outline NPDES Permittee requirements for trash management. The development of the Trash Amendments will continue to be monitored, and any additional required trash management practices in areas not subject to a trash TMDL will be implemented per the guidance provided by these amendments.

7.4 Storm Drain Maintenance

Permit §VI.D.9.h.viii (LA)/ §VII.L.8.viii (LB)

The following BMPs constitute the Storm Drain Maintenance Program:

- Municipally-owned open channels and drainage structures are visually inspected for debris at least annually.
- Trash and debris from is removed from open channel storm drains a minimum of once per year, before the storm season.
- The discharge of contaminants is minimized during MS4 maintenance and clean outs;
- Material removed is properly disposed of by containing and hauling away for legal disposal

7.5 Infiltration from Sanitary Sewer to MS4/Preventive Maintenance

Permit §VI.D.9.h.ix (LA)/§VII.L.8.ix (LB)

Thorough, routine, preventive surveys and maintenance of both municipally owned and operated Storm Drain Systems as well as Sanitary Sewer Systems infiltration and seepage of contaminants from the sanitary sewer system into the storm drain system is prevented. Sanitary Sewer System routine preventative maintenance is described in the Sewer System Management Plan (SSMP), which is a component of the Statewide General Waste Discharge Requirements (WDR) for Sanitary Sewer Systems.

Where necessary, controls implemented to limit infiltration of seepage from sanitary sewers to the MS4 include:

- Adequate plan checking for construction and new development;
- Incident response training for its municipal employees that identify sanitary sewer spills;
- Code enforcement inspections;
- MS4 maintenance and inspections;
- Interagency coordination with sewer agencies; and

- Proper education of its municipal staff and contractors conducting field operations on the MS4 or its municipal sanitary sewer (if applicable).

7.6 Permittee Owned Treatment Control BMPs *Permit §VI.D.9.h.x (LA)/§VII.L.8.x (LB)*

All municipally owned treatment control BMPs, including post-construction BMPs, are regularly inspected and maintained to ensure their proper operation.
Any residual water generated during BMP maintenance is disposed of using one of the following procedures:

- Hauled away and legally disposed of; or
- Applied to the land without runoff; or
- Discharged to the sanitary sewer system; or
- Treated or filtered to remove bacteria, sediments, nutrients, and meet the limitations set in Table PA-6 below prior to discharge to the storm drain system.

Table PA-6: Discharge Limitations for Dewatering Treatment BMPs

Parameter	Units	Limitation
Total Suspended Solids	Mg/L	100
Turbidity	NTU	50
Oil and Grease	Mg/L	10

8. Streets, Roads, and Parking Facilities Maintenance

Permit §VI.D.9.i(LA)/§VII.L.9 (LB)

This section corresponds to multiple Activity Cut Sheets within the Flexible Pavement, Rigid Pavement, Litter/Debris/Graffiti, Traffic Guidance, and Management and Support Families.

Streets and roads may collect litter and debris from nearby activities, as well as from vehicular traffic. They also require routine maintenance that may generate waste materials. Table PA-7 shows potential pollutants generated from street, road, and parking facilities maintenance.

Table PA-7: Potential Pollutants Generated from Street, Road, and Parking Facility Maintenance

Activity	Potential Pollutants						
	Sediment	Trash	Metals	Bacteria	Oil & Grease	Organics	Oxygen Demanding Substances
Street and Road Maintenance	×	×	×		×	×	
Parking Facility Maintenance	×	×	×	×	×	×	×

8.1 Street Sweeping *Permit §VI.D.9.i.i-ii(LA)/§VII.L.9.i-ii (LB)*

Streets and/or street segments are swept according to the following designations:

- Priority A: Streets and/or street segments that are designated as consistently generating the highest volumes of trash and/or debris should be swept at least two times per month.
- Priority B: Streets and/or street segments that are designated as consistently generating moderate volumes of trash and/or debris should be swept at least once per month.
- Priority C: Streets and/or street segments that are designated as generating low volumes of trash and/or debris shall be swept as necessary but in no case less than once per year.

8.2 Road Reconstruction *Permit §VI.D.9.iii (LA)/§VII.L.9.iii (LB)*

Projects that include roadbed or street paving, repaving, patching, digouts, or resurfacing roadbed surfaces implement the following BMPS:

- Restricting paving and repaving activities to exclude periods of rainfall or predicted rainfall unless required by emergency conditions.
- Installing sand bags or gravel bags and filter fabric at all susceptible storm drain inlets and at manholes to prevent spills of paving products and tack coat;
- Preventing the discharge of release agents including soybean oil, other oils, or diesel into the MS4 or receiving waters.
- Preventing non-stormwater runoff from water use for the roller and for evaporative cooling of the asphalt.
- Cleaning equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage and dispose of properly.
- Collecting liquid waste in a container, with a secure lid, for transport to a maintenance facility to be reused, recycled or disposed of properly.
- Collecting solid waste by vacuuming or sweeping and securing in an appropriate container for transport to a maintenance facility to be reused, recycled or disposed of properly.
- Covering the “cold-mix” asphalt (i.e., pre-mixed aggregate and asphalt binder) with protective sheeting during a rainstorm.
- Covering loads with tarp before haul-off to a storage site, and not overloading trucks.
- Minimizing airborne dust by using water spray during grinding.
- Avoiding the stockpiling of soil, sand, sediment, asphalt material and asphalt grindings materials or rubble in or near MS4 or receiving waters.
- Protecting stockpiles with a cover or sediment barriers during a rain.

8.3 Parking Facilities Maintenance *Permit §VI.D.9.iv (LA)/ §VII.L.9.iv (LB)*

Municipally owned parking lots that are uncovered and exposed to stormwater are kept clear of debris and excessive oil buildup by inspecting lots at least 2 times per month and cleaning at least once per month.

9. Emergency Procedures *Permit §VI.D.9.j (LA)/ §VII.L.10 (LB)*

Participating Agencies may conduct repairs of essential public service systems and infrastructure in emergency situations with a self-waiver of the provisions of the MS4 Permit as follows:

- Cities will abide by all other regulatory requirements, including notification to other agencies as appropriate.
- Where the self-waiver has been invoked, Cities will submit to the Regional Water Board Executive Officer a statement of the occurrence of the emergency, an explanation of the

circumstances, and the measures that were implemented to reduce the threat to water quality, no later than 30 business days after the situation of emergency has passed.

Minor repairs of essential public service systems and infrastructure in emergency situations (that can be completed in less than one week) are not subject to the notification provisions. Appropriate BMPs to reduce the threat to water quality will be implemented.

10. Municipal Employee and Contractor Training *Permit §VI.D.9.k (LA)/Permit §VII.L.11 (LB)*

An annual training program on the requirements of the overall stormwater management program is implemented for all municipal field staff whose interactions, jobs, and activities affect stormwater quality prior to June 30 every year. The Cities also ensure that contractors performing privatized/contracted municipal services have appropriate training in the stormwater management program. The goals of the annual training are to:

- Promote a clear understanding of the potential for municipal activities to pollute stormwater
- Identify opportunities to require, implement, and maintain appropriate BMPs in their line of work

In addition to the annual stormwater program training, the Cities implement an annual training program to train all of their employees and contractors who use or have the potential to use pesticides or fertilizers (whether or not they normally apply these as part of their work). Training programs address:

- The potential for pesticide-related surface water toxicity
- Proper use, handling, and disposal of pesticides
- Least toxic methods of pest prevention and control, including IPM
- Reduction of pesticide use

Outside contractors can self-certify, providing they certify they have received all applicable training required in the MS4 Permit and have documentation to that effect.

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Illicit Connections & Illicit Discharges Elimination Program

Each participating city is required to develop and implement an Illicit Connections & Illicit Discharge Elimination (IC/ID) Program that includes the requirements listed in Permit §VI.D.10.a (LB §VII.M). This document provides guidance to assist the Cities in implementing an IC/ID program in compliance with the Permit.

Introduction *Permit §VI.D.10.a (LA)/§VII.M.1 (LB)*

Illicit connections and illicit discharges (IC/IDs) as defined in Table ICID-1 are potential significant sources of pollutants into and from the MS4. The Illicit Connection and Illicit Discharge (IC/ID) Program provides a comprehensive process for detecting, investigating and eliminating IC/IDs in an efficient and timely manner. The program consists of the following components:

- Procedures for conducting source investigations for IC/IDs
- Procedures for eliminating the source of IC/IDs
- Procedures for public reporting of illicit discharges
- Spill response plan and
- IC/ID education and training for City staff.

The purpose of this program is to effectively prohibit illicit discharges into the MS4.

Table ICID-1: IC/IDs Defined

Prohibition	Definition	Examples
Illicit Connections	Any man-made conveyance that is connected to the MS4 without a permit, excluding roof drains and other similar type connections.	Unpermitted channels, pipelines, conduits, inlets or outlets that are connected directly to the MS4.
Illicit Discharges	Any discharge into the MS4 or from the MS4 into a receiving water that is prohibited under local, state, or federal statutes, ordinances, codes or regulations. This includes any non-stormwater discharge, except those authorized in MS4 Permit §III.A.10.2.	Sanitary wastewater, Vehicle wash water, wash-down from grease traps, motor oil, antifreeze and fuel spills into or from the MS4.

Legal Authority

Adequate Legal Authority is required to prohibit IC/IDs to the MS4 and enable enforcement capabilities to eliminate the sources of IC/IDs.

Illicit Discharge Source Investigation and Elimination *Permit §VI.D.10.b (LA)/ §VII.M.2 (LB)*

The purpose of the IC/ID Program is accomplished in part by developing clear, step-by-step written procedures for conducting investigations of illicit discharges.

Investigation

Standardized procedures for conducting investigations to identify the source of all suspected illicit discharges are included in as an attachment (Illicit Discharge Investigation and Elimination Guidance). Procedures include the following:

- **Initiation** – Investigate the source of all observed discharges. After becoming aware of an illicit discharge, conduct an investigation to identify and locate the source within 72 hours.
- **Prioritization** – Investigate illicit discharges suspected of being sanitary sewage and/or significantly contaminated first.
- **Tracking** – Track all investigations and document the information listed in Table ICID-2.

Table ICID-2: Recorded Information for Illicit Discharge Investigations

Item	Information
1	Date(s) the illicit discharge was observed
2	Results of the investigation
3	Follow-up of the investigation
4	Date the investigation was closed

Elimination

Standardized procedures to eliminate illicit discharges once the sources are located are included as an attachment. Procedures include the following:

- **Notification** – Immediately notify the responsible party (RP)/parties of the problem and require the responsible party to initiate all necessary corrective actions to eliminate the illicit discharge.
    - If it is determined that an illicit discharge originates within an upstream jurisdiction, notify the upstream jurisdiction and the Regional Board. The Notification is conducted within 30 days of determination and information is collected regarding combined efforts to identify the source.
- **Spill response** – The Spill Response Plan is implemented when the source for illicit discharges cannot be traced to a suspected RP. Permanent solutions to such discharges are described in the following section (Flow Diversion).
- **Follow-up** – Conduct and document follow-up investigations upon notification that an illicit discharge has been eliminated to verify that it has been satisfactorily eliminated and cleaned-up.
- **Enforcement** – Enforcement procedures are included in the Progressive Enforcement Policy. The Progressive Enforcement Policy includes a list of enforcement actions.

Progressive Enforcement Policy

The Progressive Enforcement Policy is implemented to ensure that illicit discharges/ illicit connections are eliminated within a reasonable time period. The procedures are followed when the source of the nature of the discharges is known. Procedures typically include:

- Written warnings for minor violations
- Formal notice of violation with specific actions and time frames for compliance
- Compensation from the RP for any costs related to remediation, inspection, investigation, clean-up and oversight activities
- Cease and desist orders

- Civil penalties (infractions), or referral for criminal penalties or further legal action.

Flow Diversion

In the event that an ongoing illicit discharge cannot be eliminated (following the full execution of legal authority and in accordance with the Progressive Enforcement Policy) or the RPs cannot be identified, the discharge is either treated or diverted to the sanitary sewer. In either instance, the Regional Board is notified within 30 days of such determination. Notification includes the following information:

- Written plan that describes the efforts that have been undertaken to eliminate the discharge.
- Description of actions to be undertaken.
- Anticipated cost and
- Schedule for completion.

Identification and Response to Illicit Connections *Permit §VI.D.10.c (LA)/§VII.M.3 (LB)*

Illicit connections can be concentrated sources of pollutants either through direct discharge or infiltration of sewage or other prohibited discharges into the MS4. To reduce this source of pollutants, the following program is implemented for the identification of illicit connections. Key components of this program include investigating and responding in order to actively prevent and eliminate illicit connections.

Investigation

Standardized procedures for identifying illicit connections are included as an attachment (Illicit Connection Investigation Guidance). Procedures include the following:

- **Initiation** – Investigate within 21 days from the discovery or upon receiving a report of a suspected illicit connection. The elements of the investigation are listed in Table ICID-3.
- **Tracking** – Track all investigations and document the information listed in Table ICID-3.

Response

If the source investigation concludes that a connection to the MS4 is both 1) permitted or documented and 2) discharging only stormwater or nonstormwater allowed under WMP NSWD SECTION or other individual or general NPDES Permits/WDRs, then the investigation is closed and no further action is taken. Upon confirmation of a connection to the MS4 is illicit, one of two options is taken:

1. **Permit or document the connection.** The permitted or documented connection may only discharge stormwater and nonstormwater allowed under WMP NSWD SECTION or other individual or general NPDES Permits/WDRs. Retaining a record of the connection and its investigation qualifies as documentation.
2. **Eliminate the connection.** The connection is eliminated within 180 days of completion of the investigation, using formal enforcement authority if necessary.

Table ICID-3: Recorded Information for Illicit Connection Investigations

Item	Information
1	Any relevant illicit discharge information from Table ICID-2
2	Source of the connection
3	Nature and volume of the discharge through the connection
4	RP for the connection (if identified)
5	Response including any formal enforcement taken

Public Reporting of Non-Stormwater Discharges and Spills *Permit §VI.D.10.d (LA)/§VII.M.4 (LB)*

Central Point of Contact

Public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s through a central contact point are promoted, publicized, and facilitated. This includes phone numbers and an internet site for complaints and spill reporting. The reporting hotline is provided to staff to leverage the field staff that has direct contact with the MS4 in detecting and eliminating illicit discharges.

The LACFCD, in collaboration with the County, provides the central point of contact and through the 888-CLEAN-LA reporting hotline and internet site.

Open Channels

Signage is posted adjacent to open channels (see MS4 Permit IV.D.9.h.vi.(4)). The signage includes information regarding dumping prohibitions and public reporting of illicit discharges.

Complaints

Written procedures are maintained that document how complaint calls are received, and tracked to ensure that all complaints are adequately addressed in the attached form (Record Keeping & Documentation). Following the adaptive management process outlined in the MS4 Permit, the procedures are periodically evaluated to determine whether changes or updates are needed to ensure that the procedures accurately document the employed methods. After the evaluation, any identified changes will be made to the procedures.

Documentation is maintained for all complaint calls. This includes recording the location of the reported spill or IC/ ID and the actions undertaken in response the complaint, including referrals to other agencies.

Spill Response Plan *Permit §VI.D.10.e (LA)/§VII.M.5 (LB)*

A spill response plan (Attachment ICID-E) is implemented for all sewage and other spills that may discharge into its MS4. The spill response plan identifies agencies responsible for spill response and cleanup, telephone numbers and e-mail address for contacts, and contains the following:

- **Agency Coordination** – Coordinate with spill response teams throughout all appropriate departments, programs and agencies so that maximum water quality protection is provided.
- **Spill Response** – Respond to spills for containment within 4 hours of becoming aware of the

spill, except where such spills occur on private property, in which case respond within 2 hours of gaining legal access to the property. Initiate investigation of all public and employee spill complaints within one business day of receiving the complaint to assess validity.

- **Reporting** – Spills that may endanger health or the environment are reported to appropriate public health agencies and the California Emergency Management Agency (Cal EMA).

Illicit Connection and Illicit Discharge Education and Training *Permit §VI.D.10.f (LA)/§VII.M.6 (LB)*

A training program regarding the identification of IC/IDs is implemented for all municipal field staff, who, as part of their normal job responsibilities (e.g., street sweeping, storm drain maintenance, collection system maintenance, road maintenance), may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. Contact information, including the procedure for reporting an illicit discharge, is readily available to field staff.

Applicable Staff

Table ICID-4 is a list of field programs where program staff may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. Appropriate field staff, supervising staff and contractors involved in these programs require training in IC/ID identification and reporting following the schedule provided in Table ICID-5.

Contracted Staff

Contractors that provide these municipal services may attend city training or certify to the participating city and retain documentation that staff has received applicable training. Otherwise this provision is accomplished through a contractual requirement for contracted staff to receive the training.

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Table ICID-4: Municipal Field Programs

Main Field Program Types	Sub-Category Types/Activities
Lake Management	Fertilizer & Pesticide Management
	Mowing, Trimming/Weeding, Planting
	Managing Landscape Waste
	Controlling Litter
	Erosion Control
	Controlling Illegal Dumping
	Bacteria Control
	Monitoring
Landscape Maintenance	Mowing, Trimming/Weeding, Planting
	Irrigation
	Fertilizer & Pesticide
	Managing Landscape Waste
	Erosion Control
Roads, Streets, and Highways Operations and Maintenance	Sweeping & Cleaning
	Street Repair & Maintenance
	Bridge & Structure Maintenance
Fountains, Plazas, and Sidewalk Maintenance and Cleaning	Surface Cleaning
	Graffiti Cleaning
	Sidewalk Repair
	Controlling Litter
	Fountain Maintenance
Solid Waste Handling	Solid Waste Collection
	Waste Reduction & Recycling
	Hazardous Waste Collection
	Litter Control
Water and Sewer Utility O&M	Water Line Maintenance
	Sanitary Sewer Maintenance
	Spill/Leak/Overflow Control
Fire Department Activities	Emergency/Post-Emergency Fire Fighting Activities
	Fire Fighting Training
	Fire Station Activities

Training Schedule

The training schedule for all applicable staff is listed in Table ICID-5.

Table ICID-5: IC/ID Program Training Schedule

Category	Schedule
Current Staff	Twice during the term of the MS4 Permit
New Staff	Within 180 days of starting employment

Training Elements

The IC/ID elements addressed by the training program are listed in Table ICID-6.

Table ICID-6: Minimum IC/ID Training Program Elements

Item	Information
1	IC/ID identification, including definitions and examples
2	Investigation
3	Elimination
4	Clean-up
5	Reporting
6	Documentation

Documentation

Documentation of training program activities and training modules are retained and made available for review by the Regional Board.

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PROGRESSIVE ENFORCEMENT POLICY

2014

Stormwater Enforcement Guide

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Insert City Seal

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PROGRESSIVE ENFORCEMENT POLICY

STORMWATER ENFORCEMENT GUIDE

INTRODUCTION

This Stormwater Progressive Enforcement Policy (PEP) provides procedures to enforce provisions of the Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4 Order No. R4-2012-0175. Pursuant to Section VI.D.2.a of the Order, Permittees are required to develop and implement a PEP to ensure that (1) regulated Industrial/ Commercial facilities, (2) construction sites, (3) development and redevelopment sites with post-construction controls, and (4) illicit discharges are each brought into compliance with all storm water and non-storm water requirements. The PEP provides the City with a guidance for enforcing the MS4 Permit Provisions and identifies enforcement procedures designed to encourage a timely response.

PROGRESSIVE ENFORCEMENT

Progressive enforcement is an escalating series of actions that allows for the efficient and effective use of enforcement. In some situations, an informal response (written warning/inspection report) is sufficient to inform the responsible party that there is a deficiency and to require the responsible party to return to compliance. If violations continue, the enforcement response should be quickly escalated to increasingly more formal and serious actions until compliance is achieved. Progressive enforcement is not appropriate in all circumstances. For example, where there is a situation needing immediate response, immediate issuance of a cleanup and abatement order may be appropriate.

COMPLIANCE CRITERIA

The City conducts on-site compliance inspections and conducts investigations, in response to complaints, under their authority provided in their municipal code and ordinances to verify compliance. Typical noncompliance issues related to stormwater may include:

- Prohibited discharges to the storm drain system.
- Site's existing condition is likely to result in exposure of pollutants to stormwater contact and possible pollutant discharge to the storm drain system such as:
    - Poor housekeeping activities that results in pollutant exposure.
    - Unattended spills and leaks.
    - Uncovered or improperly stored wastes, materials, or other items of concern.
    - Open waste receptacles such as tallow bins, compactors, and trash bins.
    - Leaky or contaminated equipment stored or used outdoors.
    - Track-out of dirt and sediment or other materials to street or outdoor areas.
- Illicit connections to the storm drain system.
- Best Management Practices (BMPs) are not in place to address pollutant generating activities, which may include erosion and sediment controls and post construction controls.

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Complaint Response

The City may receive complaints regarding stormwater ordinance from their staff members, public, local agencies, or the Regional Water Board. The City initiates, within one business day,[1] investigation of complaints from facilities within its jurisdiction. The initial investigation includes, at minimum, a limited inspection of the facility to confirm validity of the complaint and to determine if the facility is in compliance with municipal storm water ordinance and, if necessary, to oversee corrective action. Emergency complaints are investigated immediately.

PROGRESSIVE ENFORCEMENT GUIDELINES

Informal Enforcement

The City implements professional judgment regarding the circumstances surrounding an enforcement action and chooses to resolve routine noncompliance quickly and efficiently through informal means that are not accompanied by sanctions (e.g., civil charges or penalties). When deemed appropriate, the City employs the procedures described below to correct noncompliance informally.

Written Warning/ Inspection Report

Under circumstances where an inspection reveals routine noncompliance that can be corrected within a reasonably short time, staff may choose to issue a written warning/inspection report that describes the minor deficiencies/violations and includes a schedule for correcting the noncompliance[2]. The purpose of the written warning is to give the responsible party an opportunity to comply voluntarily and thus avoid sanctions that might be imposed by an escalated enforcement response.

For residential zones, the City employs an informal enforcement process and escalates to formal enforcement actions for those residents that do not comply with stormwater regulations.

Formal Enforcement / Administrative Enforcement

In the event that the City determines, based on an inspection or illicit discharge investigation conducted, that a responsible party has failed to adequately comply with the informal enforcement process within the required timeframe, the City may initiate administrative enforcement actions or will implement enforcement actions as established through authority in its municipal code. The City's goal is to achieve compliance through an extensive inspection program, educational outreach efforts and, if necessary, the initiation of appropriate enforcement action(s). The goal of any enforcement action is to: (1) return the facility to compliance in a timely manner; (2) eliminate economic benefit realized by the noncompliant facility; and (3) punish violators and prevent future noncompliance.

Notice of Violations

Under circumstances where the responsible party has failed to comply with the informal enforcement process or where the violations are significant, the City may choose to issue a Notice of Violation (NOV). The purpose of an NOV is to inform the responsible party of the observed violations, the applicable stormwater municipal codes that the responsible party has failed to comply with and the

[1] The City may comply with the Permit by taking initial steps (such as logging, prioritizing, and tasking) to "initiate" the ingestigation within that one business day. However, the Regional Water Board would expect that the initial investigation, including a site visit, to occur within four business days (per MS4 Order No.R4-2012-0175 Section VI.D.2.b)
[2] The City may choose to issue/write inspection report on site or provide to the responsible party at a later time.

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potential consequences of failing to correct the violations. The NOV also gives the responsible party an opportunity to correct the violations described in the NOV within a specified time. Under circumstances where the responsible party fails to adequately respond to the NOV by failing to address or correct the violations noted in the NOV, the severity of the enforcement response will continue to escalate as described below.

Failure to Return to Compliance/ Second Notice of Violation

The City's municipal code stormwater ordinance authorizes assessment of administrative penalties which can be carried out by issuing a Failure to Return to Compliance Notice or second NOV . The second NOV is a stronger enforcement option which may be used in circumstances where the responsible party has failed to comply with the requirements as indicated on the first NOV.

Cease and Desist Order

In the event the City's municipal code stormwater ordinance authorizes a Cease and Desist Order (CDO), the City may issue a CDO, as an alternative to the second NOV, when immediate action by the responsible party is necessary to eliminate a continuing or threatened serious violation of the stormwater ordinance.

Misdemeanors

The City's may escalate enforcement when evidence of noncompliance indicates that the violator of the stormwater ordinance has acted intentionally with intent to cause, allow to continue or conceal a discharge in violation of the ordinance.

Issuance of Citation/Infractions

At the discretion of the City's, and as established through authority in its municipal code, the City may issue citations and/or infractions.

Cost Recovery

In the event that a complaint response or violation requires clean-up and or extensive investigation, the City has the authority, as established in the municipal code, to require the responsible party to reimburse the city or County for all costs incurred by the related violation. Cost recovery fees that may be collected include, but are not limited to, investigation, enforcement, compliance assistance, damage, control, and clean-up.

Abatement

When a responsible party fails to cease or control a nuisance condition that results in or is likely to result in further or continuing violations, the City's may request abatement of conditions on private property if necessary, or in the event of imminent danger to public safely or the environment, the City itself may abate the nuisance condition.

Permit Revocation

Sites violating the stormwater permit may be subject to permit revocation procedures as authorized in the City's municipal code.

City's/District Attorney

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Severe or continuing violations should be referred to the City's or District Attorney for consideration of criminal charges.

TIMEFRAMES FOR CORRECTING DEFICIENCIES/VIOLATIONS

Depending upon the nature of the deficiencies/violations observed, City's may specify compliance deadlines for the responsible party in the inspection report or NOV.

- Prohibited discharges: discharges are to be stopped immediately and up to two weeks. The City may require the responsible party to provide a written description of correction, long-term compliance plan.
- Illicit connection: discharge via the illicit connection are to be stopped immediately and up to two weeks. The City may require the responsible party to provide proof that connection was permanently terminated. Re-inspection typically is required.
- Pollutant exposure/prohibited conditions violations: Up to two weeks to correct violations. The City may require the responsible party to provide proof of compliance for the observed violations.

EXTENSIONS OF COMPLIANCE DEADLINES

There are instances when a responsible party is not able to comply with requirements within the time frame specified. The City may grant a reasonable extension to the responsible party if the City determines that an extension is warranted, as follows:

- A request for extension must be received in writing (mail, e-mail, fax, hand delivered, etc.) by the City no later than the last day of the initial specified compliance deadline date.
- The extension request must explain why the extension is needed and warranted, as well as include a summary of actions taken to date by the responsible party to comply with requirements of the NOV.
- No more time is provided than should reasonably be needed for the responsible party to competently correct the noted deficiencies/violations. The City grants shorter extensions during the wet season.

Appropriate reasons to grant an extension may include, but are not limited to:

- Confirmed delays due to contractor or other service provider outside of responsible party's control.
- Extensive corrections involving work that would conceivably take longer than the time frame provided.
- In general, extensions should not be granted to allow the continuation of unauthorized non-storwater discharges.

The City may require an action plan or statement to be submitted by the responsible party within the initial compliance time frame, as a condition of granting an extension. The action plan or statement should specify the corrections that are to be made and specify an anticipated time frame for completion. The action plan or statement should be signed and dated by the responsible party.

REFERRALS TO THE REGIONAL BOARD

The City may refer violations of its municipal storm water ordinance and/or California Water Code section 13260 by industrial and commercial facilities and construction site operators to the Regional Water Board provided that the City has made a good faith effort of applying enforcement procedures to achieve compliance with its own ordinance. At a minimum, the City's good faith effort must be documented with:

- Two follow-up inspections, and
- Two warning letters or notices of violation.

Referral of Violations of the General Industrial/Construction Permits

For those facilities or site operators in violation of municipal stormwater ordinances and subject to the Industrial and/or Construction General Permits (IGP/CGP), the City may escalate referral of such violations to the Regional Water Board (promptly via telephone or electronically) after one inspection and one written notice of violation (copied to the Regional Water Board) to the facility or site operator regarding the violation. In making such referrals, the City shall include, at a minimum, the following documentation:[3]

- Name of the facility or site,
- Operator of the facility or site,
- Owner of the facility or site,
- WDID Number (if applicable),
- Records of communication with the facility/site operator regarding the violation, which shall include at least one inspection report,
- The written notice of violation (copied to the Regional Water Board),
- For industrial sites, the industrial activity being conducted at the facility that is subject to the Industrial General Permit, and
- For construction sites, site acreage and Risk Factor rating.

RECORDS RETENTION

City shall maintain records, per their existing record retention policies, and make them available on request to the Regional Water Board, including inspection reports, warning letters, notices of violations, and other enforcement records, demonstrating a good faith effort to bring facilities into compliance.[4]

[3] Pursuant to Order No. R4-2012-0175 Section VI.D.2.a.v
[4] Pursuant to Order No. R4-2012-0175 Section VI.D.2.a.iii

RB-AR10447

Sources

Los Angeles County Stormwater Quality Management Program (2001)

Orange County Municipal Storm Water Drainage Area Management Plan (2003)

Sacramento County Environmental Management Department. Inspection & Enforcement Policy - Commercial/Industrial Stormwater Compliance Program (2012).

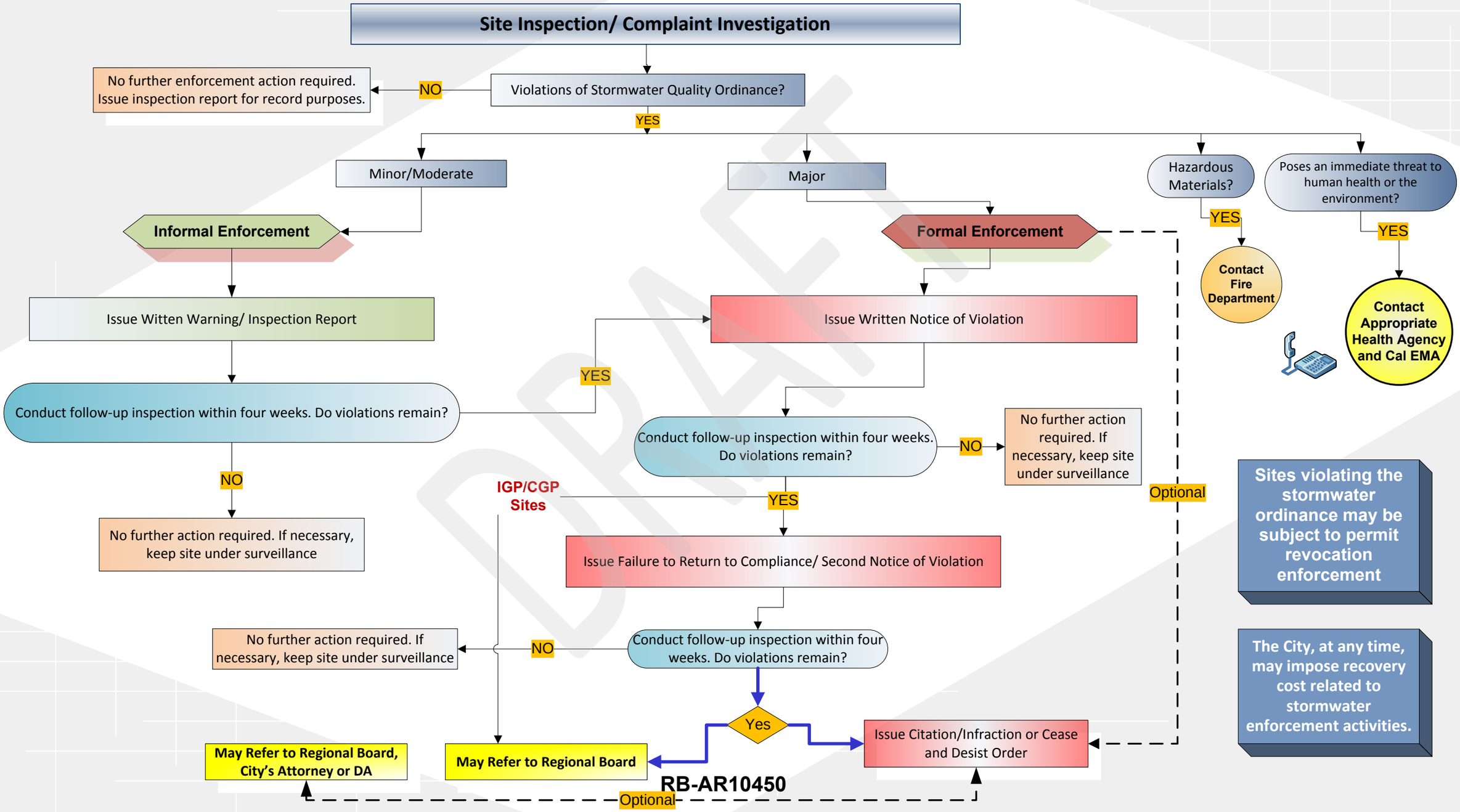
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Deficiencies/ Violation Degrees

Minor	Moderate	Major
Typically involves conditions that threaten to result in pollutant discharge to the storm system and/or waterways, if not corrected. The immediate threat to human health or the environment is low. **Examples:** **1.** Unattended automotive fluid drips and spills likely to result in moderate discharges to the storm drain system. **2.** Discharge of a moderate amount of car body wet sanding effluent from a single vehicle to outdoor pavement that has not yet impacted the storm drain system. **3.** Unattended spilled restaurant grease on outdoor pavement. Spill appears to be recent, is less than a quart, has not yet impacted the storm drain system and poor housekeeping do not appear to be habitual. **4.** Oily, uncovered engines, or other oily, possibly leaky items stored outside. **5.** Open and missing dumpster and tallow bin lids.	Typically involves less significant pollutant discharges to the storm system and/or receiving waters or conditions that threaten to result in minor to moderate pollutant discharges to the storm system and/or receiving waters. May include small or incidental discharges of hazardous or toxic substances. The violation does not present a major threat to human health and safety, but is likely to result in degradation of receiving water quality. **Examples:** **1.** Discharge of moderate amounts of automotive fluids to storm drain system results from neglected spills and poor housekeeping. **2.** Discharge of moderate amount (less than 20 gallons of diluted effluent) of auto body wet sanding effluent to storm drain system. **3.** More than a quart of spilled restaurant grease on outdoor pavement is neglected, possibly getting tracked out of trash enclosure. Neglect appears to be habitual but so far, impact to storm drain is moderate. **4.** Moderate amount of Oil/fluids leaking from improperly stored engines and parts discharge to storm drain system. **5.** Repeat minor violations may be considered moderate.	Includes significant pollutant discharges to the storm system and/or receiving waters as well as creation of conditions that threaten imminent discharge of significant pollutants to the storm system and/or receiving waters. This also includes, but is not limited to, significant discharges of hazardous or toxic substances. Major violations have the potential to present a major threat to human health or safety and/or the environment. The intent of the violator should be considered: Patterns of willful disregard for safety and the environment, recalcitrance, and repeat violations should contribute to designation of a violation as major, but are not necessary. **Examples:** **1.** Intentional discharge of waste oil to the storm drain. **2.** Discharge of significant volumes of auto body wet sanding effluent to storm drain from work on multiple vehicles, as practice. Especially where repeat violations or evidence of habitual discharge is evident. **3.** Significant amount of spilled restaurant grease is intentionally washed into storm drain, especially if hazardous degreasing agent is used. **4.** Significant amount of Oil/fluids leaking from improperly stored engines and parts discharge to storm drain system, especially if repeat violation. **5.** Repeat moderate violations may be considered major.

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PROGRESSIVE ENFORCEMENT FLOW CHART



Watershed Management Program Appendix 3

Attachments to MCM Guidance

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Insert City Seal

CITY STORMWATER PROGRAM INDUSTRIAL/COMMERCIAL FACILITY INSPECTION REPORT

Facility:	Address:
Contact:	Title:
Email:	Phone:
Inspector:	Date:
Inspection Type: ☐ Routine ☐ Follow-up ☐ Response to Complaint	BMP materials provided and explained: ☐ Yes ☐ No
SIC/NAICS code and/or business type:	

Industrial Facilities Only

(1) Covered under IGP (WDID is current) or other NPDES Permit: ☐ Yes ☐ No	(2) NEC filed: ☐ Yes ☐ No	SWPPP on-site: ☐ Yes ☐ No
If (1) and (2) above are "No", notified contact of need for IGP coverage and will refer facility to Regional Board: ☐ Yes ☐ No		

CHECKLIST FOR STORMWATER BMP (BEST MANAGEMENT PRACTICE) COMPLIANCE

	BMP	Yes	No	N/A
Vehicle & Equipment Maintenance	**Fueling** - Effective fueling source control devices & practices	☐	☐	☐
	Cleaning – Effective cleaning practices & wash water management practices	☐	☐	☐
	Repair – Effective repair practices & source control devices	☐	☐	☐
Equipment Operations	**Outdoor equipment operations** – Effective source control devices & practices	☐	☐	☐
Storage & Handling	**Outdoor liquids** – Effective source controls & practices	☐	☐	☐
	Outdoor raw materials – Effective source control practices & structural devices	☐	☐	☐
	Solid waste – Effective storage & handling practices & appropriate control measures	☐	☐	☐
Facility Maintenance	**Building & grounds maintenance** – Effective maintenance practices	☐	☐	☐
	Parking & storage area maintenance – Effective designs & housekeeping/maintenance practices	☐	☐	☐
	Stormwater conveyance system maintenance – Proper operation & maintenance protocols	☐	☐	☐
	Sidewalk washing – Remove debris & free standing oil/grease. Use high pressure/low volume spray washing with potable water, no cleaning agents & average rate of 0.006 gal/ft^2.	☐	☐	☐
Spills, Leaks & Discharges	**Accidental spills/leaks** – Effective spill/leak prevention & response procedures	☐	☐	☐
	Unauthorized nonstormwater discharges – Effective elimination	☐	☐	☐

COMMENTS AND CORRECTIVE ACTIONS (IF REQUIRED)
Include description of activities performed and/or principal products produced

ENFORCEMENT: ☐ **None required** ☐ **Corrective Action Notice (complete section below)** ☐ **Other (see comments)**

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If corrective actions have been noted above, then the responsible party (facility owner, occupant or person responsible) is in noncompliance with the City's Stormwater Quality Ordinance. The responsible party may be subject to enforcement actions under this ordinance if the corrective actions are not implemented by:

_____
Corrective Action Due Date

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____	_____	_____
Site Representative Signature	Printed Name	Date

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Recording requested by and mail to:

Name: City of [Insert City]
Department of Public Works
ATTN: Director of Public Works

Address: [Insert City Address Line1]
[Insert City Address Line2]

Insert City Seal

********** Space Above This Line For Recorder's Use **********

MASTER COVENANT AND AGREEMENT

REGARDING ON-SITE BMP MAINTENANCE

The undersigned hereby certifies I am (we are) the owner(s) of the hereinafter legally described real property located in the City of [Insert City], County of Los Angeles, State of California (please give legal description: assessor's ID, tract no., lot no., etc.):

_____

Site Address _____

Owner(s) do hereby covenant and agree to and with the City of [Insert City]to maintain all on-site structural Best Management Practices (BMPs) in accordance with the Site Map and the Operations & Maintenance (O&M) Plan set forth in Attachment 1 hereto and incorporated herein by this reference. The specific structural BMPs are listed as follows:

_____

_____

Owner(s) shall maintain the listed drainage devices above on the property indicated and as shown on plans permitted by the City of [Insert City]in a good and functional condition to safeguard the property owners and adjoining properties from damage and pollution.

Owner(s) hereby consent to inspection of the Property by an inspector authorized by the City Manager, or his or her designee, for the purpose for verifying compliance with the provisions of this Agreement.

Owner(s) shall provide printed educational materials with any sale of the property which provide information on what stormwater management facilities are present, the type(s) and location(s) of maintenance signs that are required, and how the necessary maintenance can be performed.

Owner(s) shall provide actual notice of this Agreement and its terms to any respective successor(s) in interest to the Property prior to transfer of said interest to such successor(s) in interest. This covenant and agreement shall run with the land and shall be binding upon any future owners, encumbrances, their successors, heirs or assigns and shall continue in effect until the City of [Insert City] approves its termination.

_____ _____
(Print Name of Property Owner) (Print Name of Property Owner)

_____ _____
(Signature of Property Owner) (Signature of Property Owner)

Dated this _____ day of _____ 20 _____.

********** Space Below This Line For Notary's Use **********

ALL PURPOSE ACKNOWLEDGEMENT

State of _____ }
}
County of _____ }

On _____ before me, _____ personally appeared
(Insert Name of Notary Public and Title)
_____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf on which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

DRAFT

Recording requested by and mail to:

Name: City of [Insert City]
Public Works Department
ATTN: Director of Public Works

Address: [Insert City Address Line1]
[Insert City Address Line2]

Insert City Seal

********** Space Above This Line For Recorder's Use **********

MASTER TERMINATION OF COVENANT AND AGREEMENT

REGARDING ON-SITE BMP MAINTENANCE

The undersigned hereby certifies I am (we are) the owner(s) of the hereinafter legally described real property located in the City of [Insert City], County of Los Angeles, State of California (please give legal description: assessor's ID, tract no, lot not, etc.):

_____

Site Address _____

We do hereby, with approval of the City of [Insert City], Engineering Division, terminate the covenant and agreement entered into with the City of [Insert City]as recorded on the _____ day of _____20_____, as Document No.

_____

_____

This covenant and agreement is terminated for the reason that:

_____

_____

_____ _____
(Print Name of Property Owner) (Print Name of Property Owner)

_____ _____
(Signature of Property Owner) (Signature of Property Owner)

Dated this _____ day of _____ 20 _____.

Termination approved by: _____ Date: _____
(Authorized City Representative)

********** Space Below This Line For Notary's Use **********

ALL PURPOSE ACKNOWLEDGEMENT

State of _____ }
}
County of _____ }

On _____ before me, _____ personally appeared
(Insert Name of Notary Public and Title)
_____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf on which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

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Insert City Seal

City of [Insert City]NPDES Program

POST-CONSTRUCTION BMP VERIFICATION & INSPECTION FORM

PROJECT INFORMATION	
Facility/Project Name:	Inspection Date:
Address:	Inspector:
Contact Name:	Contact Phone:

Project Category

☐ Priority Project ☐ Small Site LID Project ☐ Single Family Residence ☐ Green Street
☐ Public Project ☐ Private Project

Project Type:

☐ Commercial ☐ Industrial ☐ Residential ☐ Multi-Use
☐ Road/Street ☐ Parking Lot ☐ Automotive repair ☐ Restaurant ☐ Other:

Operation/Maintenance:

☐ Reviewed ☐ Not Reviewed ☐ Not Available
Preparer's Name: Preparer's Title:
Address: City: Zip: Phone:

Inspection Type

☐ Prior to Certificate of Occupancy ☐ Special Investigation ☐ Response to Complaint
☐ Routine Inspection (Annual) ☐ Follow-up Inspection

CHECKLIST FOR ROUTINE SOURCE CONTROL BMPs

Requirement	No. of BMPs (if Applicable)	BMP in place per approved LID Plan/SUSMP?	Corrective Action Required
Storm Drain System Stenciling/Signage		☐ Yes ☐ No	☐ Yes ☐ No
Outdoor Material Storage Areas		☐ Yes ☐ No	☐ Yes ☐ No
Trash Storage Areas		☐ Yes ☐ No	☐ Yes ☐ No
Efficient Irrigation Systems & Landscape Design		☐ Yes ☐ No	☐ Yes ☐ No
Protect Slopes & Channels		☐ Yes ☐ No	☐ Yes ☐ No
Loading Dock Areas		☐ Yes ☐ No	☐ Yes ☐ No
Maintenance Bays		☐ Yes ☐ No	☐ Yes ☐ No
Vehicle Wash Areas		☐ Yes ☐ No	☐ Yes ☐ No
Outdoor Process Areas		☐ Yes ☐ No	☐ Yes ☐ No
Equipment Wash Areas		☐ Yes ☐ No	☐ Yes ☐ No
Fueling Areas		☐ Yes ☐ No	☐ Yes ☐ No
Hillside Landscaping		☐ Yes ☐ No	☐ Yes ☐ No
Wash-water Controls for Food Prep Areas		☐ Yes ☐ No	☐ Yes ☐ No
Community Car Wash Racks		☐ Yes ☐ No	☐ Yes ☐ No

CHECKLIST FOR STRUCTURAL BMPs

Requirement	No. of BMPs (if Applicable)	BMP in place per approved LID Plan/SUSMP?	Corrective Action Required
Infiltration Trench/Basin		☐ Yes ☐ No	☐ Yes ☐ No
Infiltration Well/Dry Well		☐ Yes ☐ No	☐ Yes ☐ No
Detention Basin		☐ Yes ☐ No	☐ Yes ☐ No
Porous Pavement		☐ Yes ☐ No	☐ Yes ☐ No
Bio-infiltration		☐ Yes ☐ No	☐ Yes ☐ No
Vegetated Swale		☐ Yes ☐ No	☐ Yes ☐ No
Bio-filtration		☐ Yes ☐ No	☐ Yes ☐ No
Proprietary Control Measure (describe):		☐ Yes ☐ No	☐ Yes ☐ No
Media Filtration		☐ Yes ☐ No	☐ Yes ☐ No
Filter Insert		☐ Yes ☐ No	☐ Yes ☐ No
Regional or Watershed BMPs		☐ Yes ☐ No	☐ Yes ☐ No
Other (describe):		☐ Yes ☐ No	☐ Yes ☐ No

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INSPECTION RESULTS:

- ☐ Visible / No Apparent Problems
- ☐ BMP Failure
- ☐ Significant Engineering / Design Flaws
- ☐ Unauthorized Modifications
- ☐ BMP Missing / Removed / Not Located
- ☐ Trash / Debris Exceeding Cap. (bypass)
- ☐ Evidence of Pollution / Dumping
- ☐ Vector Control Issues (Mosquitoes)
- ☐ Inadequate Maintenance

DESCRIPTION OF CORRECTIVE ACTION(S) REQUIRED:

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If any corrective actions have been noted above, then based on this verification inspection, you are in noncompliance with Municipal Code Chapter [-]. You must implement the required corrective action(s) by:

_____
Corrective Action Due Date

After this date, your facility will be re-inspected to verify that all necessary corrective measures have been taken. FAILURE TO IMPLEMENT THE CORRECTIVE ACTION(S) WILL SUBJECT YOU TO ELEVATED ENCORCEMENT, WHICH CAN INCLUDE INFRACTION OR MISDEMEANOR PENALTIES.

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____	_____	_____
Contact Signature	Printed Name	Date

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Insert City Seal

STORMWATER PLANNING PROGRAM PRIORITY PROJECT CHECKLIST

FORM PC

Project Name	Owner Name	Developer Name
Project Address	Owner Address	Developer Address
Plan Check #	Owner Phone	Developer Phone

TYPE OF PROJECT

Does the proposed project fall into one of the following categories? Please check Yes/No	YES	NO
PRIORITY PROJECTS		
1. A new project equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious* surface area		
2. A new industrial park with 10,000 square feet or more of surface area		
3. A new commercial mall with 10,000 square feet or more surface area		
4. A new retail gasoline outlet with 5,000 square feet or more of surface area		
5. A new restaurant (SIC 5812) with 5,000 square feet or more of surface area		
6. A new parking lot with either 5,000 ft^2 or more of impervious* surface or with 25 or more parking spaces		
7. A new automotive service facility (SIC 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) with 5,000 square feet or more of surface area		
8. Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA)*, where the development will: a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and b. Create 2,500 square feet or more of impervious surface area		
9. Redevelopment*		
SPECIAL PROVISION PROJECTS		
10. Green street* project		
11. Single family hillside* home		

If checked YES, numerical criteria will apply to items 1,2,6-9 and items 3-5 (for project areas of 5,000 ft^2 or more of surface area.) If any of the boxes are checked YES, this project will require the preparation of a Low Impact Development (LID) Plan and a Maintenance Agreement Transfer*

* Defined on back.

Applicant Name

Applicant Signature

Applicant Title

Date

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DEFINITIONS:

Impervious are those surfaces that do not allow stormwater runoff to percolate into the ground. Typical impervious surfaces include: concrete, asphalt, roofing materials, etc. However, some specially designed concrete/asphalt do allow water to percolate (pervious).

Hillside means property where the slope is 25% or greater and where grading contemplates cut or fill slopes. Single family hillside homes will require a less extensive plan. During the construction of a single-family hillside home, the following measures are implemented:

a. Conserve natural areas

b. Protect slopes and channels

c. Provide storm drain system stenciling and signage

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability

e. Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

Green Streets means any street and road construction of 10,000 square feet or more of impervious surface area

a. These projects will follow an approved green streets manual to the maximum extent practicable. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects. Stormwater mitigation measures must be in compliance with the approved green streets manual requirements.

Redevelopment means land-disturbing activities that result in the creation, addition, or replacement of 5,000 ft^2 or more of impervious surface area on an already developed site.

Redevelopment does not include routine maintenance activities that are conducted to maintain the original line and grade, hydraulic capacity, or original purpose of facility, nor does it include modifications to existing single family structures, or emergency construction activities required to immediately protect public health and safety.

Significant Ecological Area means an area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and would be disturbed or degraded by human activities and developments. Also, an area designated by the City as approved by the Regional Water Quality Control Board.

Maintenance Agreement and Transfer: All developments subject to LID and site specific plan requirements provide verification of maintenance provisions for Structural and Treatment Control BMPs, including but not limited to legal agreements, covenants, CEQA mitigation requirements, and/or conditional use permits. Verification at a minimum shall include:

- The developer's and/or owner's signed statement accepting responsibility for maintenance until the responsibility is legally transferred; and
- A signed statement from the public entity assuming responsibility for Structural or Treatment Control BMP maintenance and conduct a maintenance inspection at least once a year; or
- Written conditions in the sales or lease agreement, which requires the recipient to assume responsibility for maintenance and conduct a maintenance inspection at least once a year; or
- Written text in project conditions, covenants and restrictions (CCRs) for residential properties assigning maintenance responsibilities to the Home Owners Association for maintenance of the Structural and Treatment Control BMPs; or
- Any other legally enforceable agreement that assigns responsibility for the maintenance of post-construction Structural or Treatment Control BMPs.

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STORMWATER PLANNING PROGRAM
PRIORITY DEVELOPMENT & REDEVELOPMENT PROJECTS
PLAN CHECK # _____

FORM P1

Project Name _____	**GENERAL PROJECT CERTIFICATION**
Project Location _____	
Company Name _____	A completed original of this form must accompany all LID Plan submittals.
Address _____	
Contact Name / Title _____	
Phone / FAX / Email _____	

Best Management Practices (BMPs) have been incorporated into the design/maintenance/construction of this project to accomplish the following:

1. Minimize impacts from stormwater runoff on the biological integrity of Natural Drainage Systems and water bodies in accordance with requirements under CEQA (Cal. Pub. Resources Code § 21100), CWC § 13369, CWA § 319, CWA § 402(p), CWA § 404, CZARA § 6217(g), ESA § 7, and local government ordinances.
2. Maximize the percentage of pervious surfaces to allow more percolation of stormwater into the ground.
3. Minimize the amount of stormwater directed to impermeable surfaces and to the MS4.
4. Minimize pollution emanating from parking lots through the use of appropriate Treatment Control BMPs and good housekeeping practices.
5. Minimize breeding of Vectors
6. Reduce pollutant loads in stormwater from the development site.

I certify that this Low Impact Development Plan and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered/evaluated the information submitted.

Post Construction / Maintenance Certification

As the responsible party, I certify that the proposed BMPs will be implemented, monitored and maintained to ensure their continued effectiveness. In the event of a property transfer, the new owner/lessee will be notified of the BMPs in use at this site and I will include written conditions in the sales or lease agreement, which requires the new owner (or lessee) to assume responsibility for maintenance and conduct a maintenance inspection at least once a year. The information contained herein is, to the best of my knowledge and belief, true, accurate, and complete.

In consideration of the execution of City of [Insert City] approval of the proposed Low Impact Development (LID) Plan including any proposed treatment system, the applicant hereby agrees to indemnify, save and keep the City of [Insert City], its officers, agents and employees free and harmless from and against any and all claims for injury, damage, loss, liability, cost and expense of any nature whatsoever, which the City of [Insert City], its officers, agents, or employees may suffer, sustain, incur, pay out as a result of any and all actions, suits, proceedings, claims and demands which may be brought, made, or filed against the City of [Insert City], its officers, agents or employees by reason of or arising out of, or in any manner connected with any and all operations permitted by this approval. This indemnification extends to further agree that the City of [Insert City]is not responsible for any additional requirements or restrictions due to changes in regulations, policies or enforcement practices of the California Regional Water Quality Control Board, or any other applicable regulatory agencies.

Property Owner Name	Property Owner Signature
Applicant Title	Date

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PLANNING BEST MANAGEMENT PRACTICES

BMP Name	BMP Identification Number and Name	✓ if to be used
Car Wash Facility	SC-21: Vehicle and Equipment Cleaning	
Constructed Wetlands	MP-20: Wetlands	
Control of Impervious Runoff	-N/A-	
Efficient Irrigation	-N/A-	
Energy Dissipaters	EC-10: Velocity Dissipation Devices	
Extended Detention Basins	TC-22: Extended Detention Basin	
Infiltration Basins	TC-11: Infiltration Basins	
Infiltration Trenches	TC-10: Infiltration Trenches	
Inlet Trash Racks	-N/A-	
Landscape Design	EC-2: Preservation of Existing Vegetation EC-4: Hydro seeding EC-6 & EC-8: Straw & Wood Mulching	
Linings for Urban Runoff Conveyance Channels	-N/A-	
Materials Management	SC-30: Outdoor Loading/Unloading	
Media Filtration	TC-40: Media Filter	
Motor Fuel Concrete Dispensing Areas	SC-20: Vehicle and Equipment Fueling	
Motor Fuel Dispensing Area Canopy	SC-20: Vehicle and Equipment Fueling	
Water Quality Inlets	TC-50: Water Quality Inlet	
Outdoor Storage	SC-31: Outdoor Liquid Container Storage SC-33: Outdoor Storage of Raw Materials	
Porous Pavement and/or Alternative Surfaces	-N/A-	
Protect Slopes and Channels	EC-11: Slope Drains EC-12: Streambank Stabilization	
Self-Contained Areas for Vehicle or Equipment Washing, Steam Cleaning, Maintenance, Repair, or Material Processing	SC-21: Vehicle and Equipment Cleaning SC-22: Vehicle and Equipment Repair SC-32: Outdoor Equipment Operations	
Storm Drain System Stenciling and Signage	SC-34: Waste Handling and Disposal (Signage Section)	
Trash Container Areas	SC-34: Waste Handling and Disposal	
Vegetated Swales and Strips	TC-32: Bioretention	
Wet Ponds	TC-20: Wet Ponds	
Other:	• • • • •	

Please refer to the California Storm Water Best Management Practice Handbooks for more information.

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STORMWATER TREATMENT CERTIFICATION

FORM P2

SITE NAME and ADDRESS

_____

_____

_____

_____

_____

Plan Check #_____

Planning #_____

APPROXIMATE PROJECT CHARACTERISTICS

Roofed Area	_____	ft^2
Roadway/Parking Area (exposed)	_____	ft^2
Landscaped/Vegetation	_____	ft^2
Other Ground Level Impervious Areas (Ex: Outdoor work or storage areas)	_____	ft^2
Other: _____	_____	ft^2
TOTAL	_____	ft^2

STRUCTURAL/TREATMENT BMPs

(attach additional sheets as necessary) or see back

Area Designation (must correspond with plans)	**Tributary Area** (ft^2)	**Average Impervious Factor**	**Estimated Flow Rate or Volume***	**Anticipated Potential Pollutants**	**Type of BMP** (include size, make, and model, if any)	**BMP Location** (briefly describe)	**Design Treatment Flow Rate or Volume Capacity**

By stamping this form, I acknowledge that each treatment BMP is provided with adequate bypass or overflow so as not to contribute to localized flooding or soil instability.

*Flow rates and volumes based on the 0.75 inch, 24-hour rain event or the 85th percentile, 24-hour rain event, whichever is greater.

I certify that I am a Professional Civil Engineer registered in the State of California, and that the treatment methods and capacities herein comply with the requirements established by the California Regional Water Quality Control Board, Los Angeles Region, and the State Water Resources Control Board for Low Impact Development (LID) Plans.

Affix Registered Engineer Wet Ink Stamp Here:

Print Name _____ **Signature** _____ **Date** _____

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STRUCTURAL/TREATMENT BMPs

(attach additional sheets as necessary)

Area Designation (must correspond with plans)	**Tributary Area** (ft^2)	**Average Impervious Factor**	**Estimated Flow Rate or Volume***	**Anticipated Potential Pollutants**	**Type of BMP** (include size, make, and model, if any)	**BMP Location** (briefly describe)	**Design Treatment Flow Rate or Volume Capacity**

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OWNER'S CERTIFICATION
MINIMUM BMPS FOR ALL CONSTRUCTION SITES

FORM OC1

PLAN CHECK #_____

Project Name	_____	BUILDING/GRADING PERMIT NUMBER	
Project Location	_____		
Owner Name	_____	Contractor Name	_____
Address	_____	Address	_____
Phone	_____	Phone	_____
FAX/Email	_____	FAX/Email	_____

The National Pollutant Discharge Elimination System (NPDES) is the portion of the Clean Water Act that applies to the protection of receiving waters. Under permits from the Los Angeles Regional Water Quality Control Board (RWQCB), certain activities are subject to RWQCB enforcement. To meet the requirements of the Los Angeles County Municipal Stormwater Permit (CAS004001), minimum requirements for sediment control, erosion control and construction activities must be implemented on each project site. Minimum requirements include:

- **EROSION CONTROL:** Erosion from slopes and channels shall be controlled by implementing an effective combination of BMPs, such as the limiting of grading activities during the wet season; inspecting graded areas during rain events; planting and maintenance of vegetation on slopes; and covering erosion susceptible slopes.
- **SEDIMENT CONTROL:** Eroded sediments from areas disturbed by construction and from stockpiles of soil shall be retained on site to minimize sediment transport from the site to streets, drainage facilities and/or adjacent properties via runoff, vehicle tracking or wind.
- **NON-STORMWATER MANAGEMENT:** Non-stormwater runoff from equipment and vehicle washing and any other activity shall be contained at the project site.
- **WASTE MANAGEMENT:** Construction related materials, wastes, spills or residues shall be retained on site to minimize transport from the site to streets, drainage facilities or adjoining properties by wind or runoff. Runoff from equipment and vehicle washing shall be contained at construction sites unless treated to remove sediment and pollutants.

Examples of Minimum BMPs include: (1) Soil piles must be covered with tarps or plastic, (2) leaking equipment must be repaired immediately, (3) refueling must be conducted away from catch basins, (4) catch basins must be protected when working nearby, (5) vacuum all concrete saw cutting, (6) never wash concrete waste into the street, (7) keep the site clean, sweep the gutters at the end of each working day and keep a trash receptacle on site.

As the architect/engineer of record, I have selected appropriate BMPs to effectively minimize the negative impacts of this project's construction activities on stormwater quality. The project owner and contractor are aware that the selected BMPs shall be installed, monitored, and maintained to ensure their effectiveness. The BMPs not selected for implementation are redundant or deemed not applicable to the proposed construction activity.

Architect/Engineer of Record Name	Architect/Engineer of Record Signature
Title	Date

I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law.

Landowner or Landowner's Agent Name	Landowner or Landowner's Agent Signature
Title	Date

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EROSION AND SEDIMENT CONTROL PLAN (ESCP) REVIEW CHECKLIST

These requirements apply to all activities involving soil disturbance with the exception of agricultural activities. Applicable activities include but are not limited to grading, vegetation clearing, soil compaction, paving, re-paving and linear underground/overhead projects (LUPs).

Prior to issuing a grading or building permit, each operator of a construction activity within its jurisdiction must prepare and submit an ESCP prior to the disturbance of land.

Contact Name:	Tracking #:
Contact Title:	Site Name:
Company Name:	Site Address:
Mailing Address:	Type of Facility:
City, State, Zip:	Submittal Date:
Phone Number:	Plan Return Date:
Fax Number:	Disturbed Area:

First Review
ESCP Received on:

Review Completed on:

Second Review
ESCP Received on:

Review Completed on:

Third Review
ESCP Received on:

Review Completed on:

Fourth Review
ESCP Received on:

Review Completed on:

Fifth Review
ESCP Received on:

Review Completed on:

Sixth Review
ESCP Received on:

Review Completed on:

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ESCP REQUIREMENT	SATISFACTION			COMMENTS
	YES	NO	N/A	
General Information				
Contact information (e.g., name, address, phone, email, etc.) provided for the owner and contractor.	☐	☐	☐	
Basic site information including location, status, size of the project and area of disturbance is provided.	☐	☐	☐	
Proof of existing coverage under applicable permits, including, but not limited to the State Water Board's Construction General Permit, and State Water Board 401 Water Quality Certification.	☐	☐	☐	
Meets the minimum requirements of the jurisdictional erosion and sediment control ordinance.	☐	☐	☐	
Includes the elements of a Storm Water Pollution Prevention Plan (SWPPP) prepared in accordance with the requirements of the Construction General Permit.	☐	☐	☐	
Developed and certified by a Qualified SWPPP Developer (QSD).	☐	☐	☐	
Identifies the proximity all water bodies, water bodies listed as impaired by sediment-related pollutants, and water bodies for which a sediment-related TMDL has been adopted and approved by the USEPA.	☐	☐	☐	
Identifies any significant threat to water quality status, based on consideration of factors listed in Appendix 1 to the Construction General Permit.	☐	☐	☐	
The project start date and anticipated completion date is provided.	☐	☐	☐	
Includes Identification of site Risk Level as identified per the requirements in Appendix 1 of the Construction General Permit.	☐	☐	☐	
Contains a language signed by the landowner or the landowner's agent stating as follows: *"I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law."*	☐	☐	☐	

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ESCP REQUIREMENT	SATISFACTION			COMMENTS
	YES	NO	N/A	
Best Management Practices				
All structural BMPs are designed by a licensed California Engineer.	☐	☐	☐	
Includes Sediment/Erosion Control.	☐	☐	☐	
Includes controls to prevent tracking on and off the site.	☐	☐	☐	
Includes non-stormwater controls (e.g., vehicle washing, dewatering, etc.).	☐	☐	☐	
Includes Materials Management (delivery and storage).	☐	☐	☐	
Includes Spill Prevention and Control.	☐	☐	☐	
Includes Waste Management (e.g., concrete washout/waste management; sanitary waste management).	☐	☐	☐	
Includes methods to minimize the footprint of the disturbed area and to prevent soil compaction outside of the disturbed area.	☐	☐	☐	
Includes methods used to protect native vegetation and trees.	☐	☐	☐	
Includes the rationale for the selection and design of the proposed BMPs, including quantifying the expected soil loss from different BMPs.	☐	☐	☐	
Post-Construction Structural BMPs subject to Operation and Maintenance Requirements are identified.	☐	☐	☐	
Site Plan				
Full sized plans showing the site with all proposed BMPs and water quality notes have been signed and stamped with wet ink application by the appropriate individual.	☐	☐	☐	
Plan includes a title block containing at least the project name, address, and owner.	☐	☐	☐	
All figures, maps, plot plans, etc. have a legend, including a North arrow and scale.	☐	☐	☐	
All facilities are labeled for the intended function.	☐	☐	☐	
All areas of outdoor activity are labeled.	☐	☐	☐	
All structural BMPs are indicated.	☐	☐	☐	
Drainage flow information depicted.	☐	☐	☐	
Project location shown.	☐	☐	☐	
Site boundary indicated.	☐	☐	☐	

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Agency Standard Operating Procedures

Each agency will use the suggested language below to develop, implement, and revise as necessary agency-specific Standard Operating Procedures (SOPs) that identify the procedures each agency will follow.

CGP Coverage Verification

- Verification of active coverage under the Construction General Permit for sites disturbing 1 acre or more, or that are part of a planned development that will disturb 1 acre or more and a process for referring non-filers to the Regional Water Board.

Prior to releasing any permits relating to and/or allowing for construction activities on a site resulting in one (1) acre or more of soil disturbance, a Notice of Intent (NOI), a Storm Water Pollution Prevention Plan (SWPPP), and all other Permit Registration Documents (PRDs) must be filed with the Regional Water Resources Control Board (Regional Board) through the State Water Board's Storm water Multi-Application and Report Tracking System (SMARTS) website and a Waste Discharge ID (WDID) number must be obtained from the Regional Board. This requirement will be included as a condition of approval. In cases where construction activities have commenced on a qualifying site and the project has not yet filed all PRDs (along with an explanation for filing late) with the Regional Board, a Notice of Violation (NOV) will be sent to the responsible person. Any work orders released will be stopped and fines may be enforced. The Regional Board will be notified of the discharger's non-compliance. Work will not be allowed to commence until the NOI has been accepted by the Regional Board and WDID number issued.

ESCP Review

- Review of the applicable ESCP and inspection of the construction site to determine whether all BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions.

Prior to issuing a grading or building permit, each operator of a construction activity within its jurisdiction must prepare and submit an Erosion and Sediment Control Plan (ESCP) prior to the disturbance of land. The ESCP Requirement Checklist will be used to ensure required information is submitted by the responsible person. These requirements apply to all activities involving soil disturbance with the exception of agricultural activities. Applicable activities include but are not limited to grading, vegetation clearing, soil compaction, paving, re-paving and linear underground/overhead projects (LUPs).

BMP Assessment

- Assessment of the appropriateness of the planned and installed BMPs and their effectiveness.

Prior to releasing any permits relating to and/or allowing for construction activities on a site resulting in one (1) acre or more of soil disturbance a Qualified SWPPP Practitioner (QSP) must be identified by the developer. Prior to beginning any construction activities, the QSP must review the ESCP and determine if the following requirements are being met:

1. Erosion and sediment controls are incorporated to provide effective reduction or elimination of sediment related pollutants in stormwater discharges and authorized non-stormwater discharges from the site.

2. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water.
3. Non-stormwater control BMPs are selected to control sediment on the construction site.
4. Materials and waste management pollution control BMPs are incorporated to minimize stormwater contact with construction materials, wastes and service areas; and to prevent materials and wastes from being discharged off-site.

If the QSP identifies potential problematic areas of the ESCP, a revision to the ESCP must be submitted for review and approval.

Once the BMPs are installed, inspections must be conducted at the frequency identified in the Watershed Management Program (WMP). All BMPs not functioning as intended must be repaired, replaced, or changed to a more effective BMP. Inspection and maintenance procedures must be in accordance with the CASQA handbook.

Discharge Reporting

- Visual observation and record keeping of non-stormwater discharges, potential illicit discharges and connections, and potential discharge of pollutants in stormwater runoff.

Any non-stormwater discharges, potential illicit discharges and connections, and potential discharge of pollutants in stormwater runoff will be tracked and kept on record.

Public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s within this jurisdiction will be conducted. Multiple modes of communication are in place to allow for complaints and spill reporting. When a complaint is received it will be documented and tracked to ensure that all complaints are adequately addressed.

A Spill Response Plan will be implemented for all sewage and other spills that may discharge into the MS4 within this jurisdiction. Coordination with spill response teams will be observed throughout all appropriate departments, programs, and agencies so that maximum water quality protection is provided. All spill complaints will be investigated within one business day of receiving the complaint and a response to spills for containment will be conducted within 4 hours of becoming aware of the spill, except where such spills occur on private property, in which case the response should be within 2 hours of gaining legal access to the property. Spills that may endanger health or the environment will be reported to appropriate public health agencies and the Office of Emergency Services (OES).

A training program regarding the identification of illicit connections/illicit discharges (IC/IDs) for all municipal field staff, who, as part of their normal job responsibilities (e.g., street sweeping, storm drain maintenance, collection system maintenance, road maintenance), may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4 will be provided.

Construction Inspection Reporting and Tracking

- Development of a written or electronic inspection report generated from an inspection checklist used in the field.
- Tracking of the number of inspections for the inventoried construction sites throughout the reporting period to verify that the sites are inspected at the minimum frequencies required.

Inspections will be conducted at a frequency listed in the Watershed Management Program (WMP). Inspection checklists and/or reports will be utilized to determine and keep record of whether or not all

BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions. These checklists/reports will be retained for at least three (3) years following NOT approval.

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(CITY NAME) STORMWATER INSPECTION REPORT FOR CONSTRUCTION SITES

SITES ONE ACRE OR GREATER

Project Name:		Address:	
Area disturbed:		WDID:	SWPPP on-site: ☐ Yes ☐ No
Risk level: ☐ Low (Risk 1) ☐ Medium (Risk 2) ☐ High (Risk 3)		Erosion & Sediment Control Plan (ESCP) on-site: ☐ Yes ☐ No	
Phase: ☐ Prior to Land Disturbance ☐ Active construction ☐ Site stabilization			
Developer/Contractor:		Phone number:	
Contact:		Title:	
Inspector:		Date:	
Inspection: ☐ Routine (monthly and for each phase of construction) ☐ Follow-up ☐ Response to complaint		*For sites discharging to a waterbody impaired for sediment/turbidity*[i] ☐ *Routine biweekly* ☐ *Predicted rainfall* ☐ *Recent rainfall*	

CHECKLIST FOR STORMWATER BMP (BEST MANAGEMENT PRACTICE) COMPLIANCE

PHASE 1 AND 2: PRIOR TO LAND DISTURBANCE AND DURING ACTIVE CONSTRUCTION

	Comment	Yes	No	N/A
Erosion Control	1. Erosion controls are implemented in accordance with the ESCP	☐	☐	☐
	2. Erosion observed	☐	☐	☐
Sediment Control	3. Sediment controls are implemented in accordance with the ESCP	☐	☐	☐
	4. Sediment discharge observed	☐	☐	☐
Additional Controls	5. Tracking controls (tire washout, stabilized entrances, exits and roadways) are implemented in accordance with the ESCP	☐	☐	☐
	6. Sediment in roads observed	☐	☐	☐
	7. Wind erosion controls are implemented in accordance with the ESCP	☐	☐	☐
	8. Wind erosion observed	☐	☐	☐
Waste Management	9. Effective material delivery and storage practices are implemented	☐	☐	☐
	10. Spill prevention and control practices are implemented	☐	☐	☐
	11. Stockpile controls are implemented in accordance with the ESCP	☐	☐	☐
	12. Solid waste controls are implemented in accordance with the ESCP	☐	☐	☐
Nonstormwater Management	13. Vehicle and equipment washing, fueling and maintenance controls are implemented in accordance with the ESCP	☐	☐	☐
	14. Nonstormwater discharges observed	☐	☐	☐
	15. Dewatering operations covered under NPDES Permit CAG994004	☐	☐	☐
	16. Water conservation practices are implemented	☐	☐	☐

PHASE 3: FINAL LANDSCAPING/SITE STABILIZATION

Comment	Yes	No	N/A	Comment	Yes	No	N/A
1. Graded areas have reached final stabilization	☐	☐	☐	3. Temporary erosion and sediment BMPs are removed	☐	☐	☐
2. Trash, debris and construction materials are removed	☐	☐	☐	4. Post-construction BMPs are installed	☐	☐	☐

COMMENTS AND CORRECTIVE ACTIONS (IF REQUIRED):

ENFORCEMENT: ☐ **None required** ☐ **Corrective Action Notice (complete section below)** ☐ **Other (see comments)**

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If corrective actions have been noted above, then the responsible party (facility owner, occupant or person responsible) is in noncompliance with the City's Stormwater Quality Ordinance. The responsible party may be subject to enforcement actions under this program if the corrective actions are not implemented by:

_____
Corrective Action Due Date

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____ Site Representative Signature

_____ Printed Name

_____ Date

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[i] For sites discharging to a tributary listed by the state as an impaired waterbody for sediment or turbidity under CWA § 303(d), or determined to be a threat to water quality, inspections must be conducted (1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA and (2) within 48 hours of a ½-inch rain event and (3) at least once every two weeks.

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CITY STORMWATER QUALITY PROGRAM
CONSTRUCTION SITE INSPECTION REPORT

FOR SITES LESS THAN ONE ACRE

Project:	Address:
Contact:	Title:
Contractor:	Phone:
Inspector:	Date:

CHECKLIST FOR STORMWATER BMP (BEST MANAGEMENT PRACTICE) COMPLIANCE

	Question	Yes	No	N/A
Erosion Control	1. Effective erosion controls implemented.	☐	☐	☐
	2. Erosion observed.	☐	☐	☐
Sediment Control	3. Effective sediment controls implemented.	☐	☐	☐
	4. Sediment discharge observed.	☐	☐	☐
Non-Stormwater Management	5. Water conservation practices are implemented.	☐	☐	☐
	6. Dewatering operations covered under NPDES Permit CAG994004	☐	☐	☐
Waste Management	7. Effective material delivery/storage practices and spill prevention/control practices are implemented.	☐	☐	☐
	8. Effective waste management controls are implemented.	☐	☐	☐

COMMENTS AND CORRECTIVE ACTIONS (IF REQUIRED):

ENFORCEMENT: ☐ **None required** ☐ **Corrective Action Notice (complete section below)** ☐ **Other (see comments)**

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If corrective actions have been noted above, then the responsible party (facility owner, occupant or person responsible) is in noncompliance with the City's Stormwater Quality Ordinance. The responsible party may be subject to enforcement actions under this program if the corrective actions are not implemented by:

_____
Corrective Action Due Date

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____ Site Representative Signature

_____ Printed Name

_____ Date

DRAFT

Example Lease Language for Fixed Facilities

The following is example language that can be inserted into municipal leases:

The Los Angeles Regional Water Quality Control Board (RWQCB) has issued permits which govern stormwater and non-stormwater discharges resulting from municipal activities performed by or for the Coastal Watersheds of Los Angeles County, including the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the coastal watersheds of Los Angeles County with the exception of Long Beach (collectively referred to as Permittees). The RWQCB Permit is a National Pollutant Discharge Elimination System (NPDES) Permit No. R4-2023-0175. A Copy of the RWQCB Permit is available for review.

In order to comply with the Permit requirements, the Permittees have developed a Watershed Management Program (WMP) which contains Public Agency Facilities and Activities Maintenance Procedures (Maintenance Procedures) with Best Management Practices (BMPs) adopted from the Caltrans Storm Water Quality Handbook Maintenance Staff Guide (Caltrans Handbook) that parties leasing municipally owned properties must adhere to. These Maintenance Procedures contain pollution prevention and source control techniques to minimize the impact of those activities upon dry-weather urban runoff, stormwater runoff, and receiving water quality.

Activities performed at the facility leased under this agreement shall conform to the RWQCB NPDES Permit, the WMP, and the CalTrans Handbook, and must be performed as described within all applicable Maintenance Procedures. The holder of this agreement shall fully understand the Maintenance Procedures applicable to activities conducted at the facility leased under this agreement prior to conducting them and maintain copies of the Maintenance Procedures at the leased facility throughout the agreement duration. The applicable Maintenance Procedures are included as Exhibit ___ of this agreement.

Evaluation of activities subject to WMP requirements performed at the facility leased under this agreement will be conducted by the city to verify compliance with Maintenance Procedures, and may be required through lessor self-evaluation as determined by the city.

Example Contract Language for Field Programs

The following is example language that can be inserted into municipal field program contracts:

The Los Angeles Regional Water Quality Control Board (RWQCB) has issued permits which govern stormwater and non-stormwater discharges resulting from municipal activities performed by or for the Coastal Watersheds of Los Angeles County, including the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the coastal watersheds of Los Angeles County with the exception of Long Beach (collectively referred to as Permittees). The RWQCB Permit is a National Pollutant Discharge Elimination System (NPDES) Permit No. R4-2023-0175. A Copy of the RWQCB Permit is available for review.

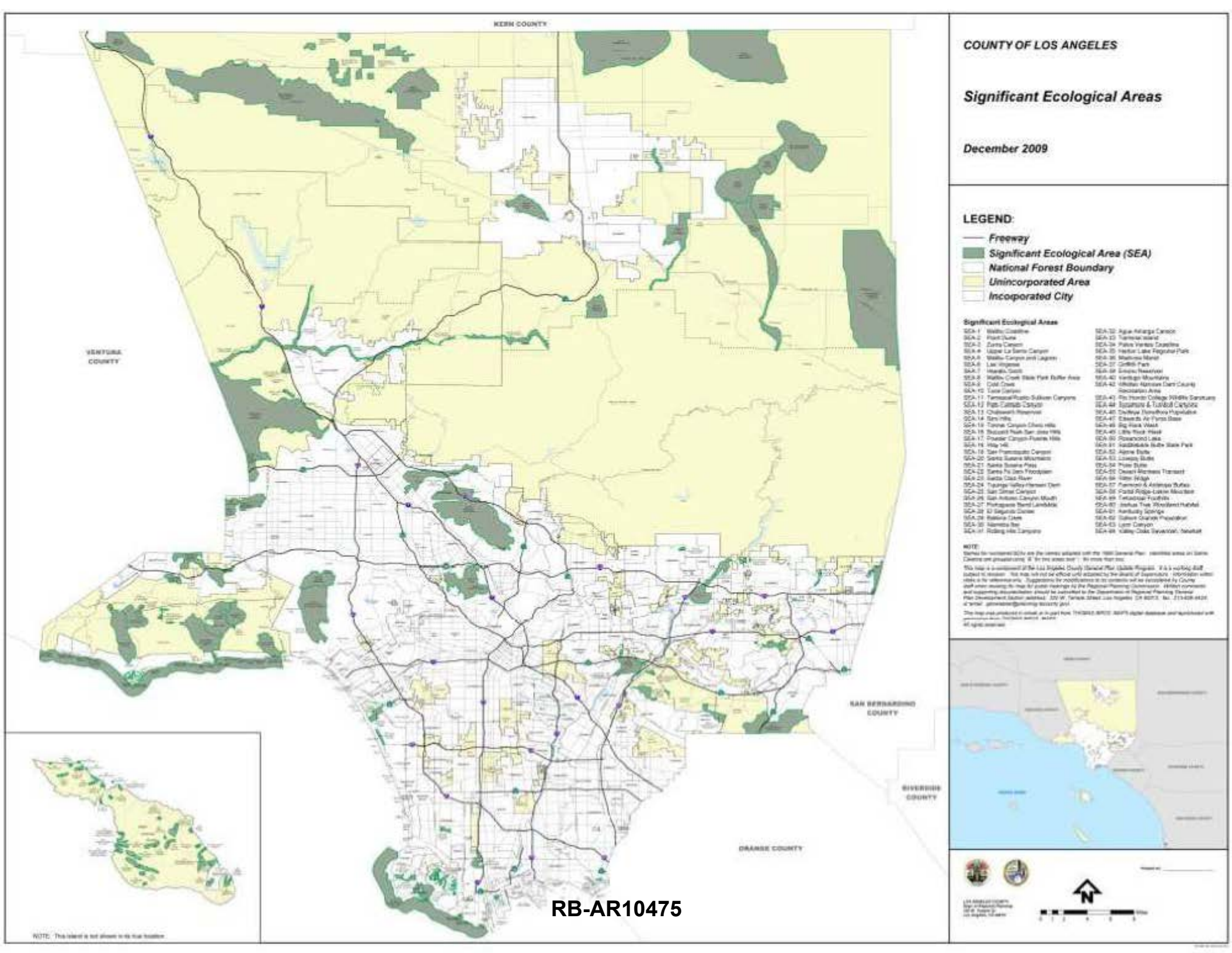
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In order to comply with the Permit requirements, the Permittees have developed a Watershed Management Program (WMP) which contains Public Agency Facilities and Activities Maintenance Procedures (Maintenance Procedures) with Best Management Practices (BMPs) adopted from the Caltrans Storm Water Quality Handbook Maintenance Staff Guide (Caltrans Handbook) that parties leasing municipally owned properties must adhere to. These Maintenance Procedures contain pollution prevention and source control techniques to minimize the impact of those activities upon dry-weather urban runoff, stormwater runoff, and receiving water quality.

Work performed under this CONTRACT shall conform to the RWQCB NPDES Permit, the WMP, and the CalTrans Handbook, and must be performed as described within all applicable Maintenance Procedures. The CONTRACTOR shall fully understand the Maintenance Procedures applicable to activities that are being conducted under this CONTRACT prior to conducting them and maintain copies of the Maintenance Procedures throughout the CONTRACT duration. The applicable Model Maintenance Procedures are included as Exhibit ___ of this CONTRACT.

Evaluation of activities subject to WMP requirements performed under this CONTRACT will be conducted to verify compliance with the Maintenance Procedures, and may be required through CONTRACTOR self-evaluation as determined by the city.

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COUNTY OF LOS ANGELES

Significant Ecological Areas

December 2009

LEGEND:

- Freeway
- Significant Ecological Area (SEA)
- National Forest Boundary
- Unincorporated Area
- Incoporated City

Significant Ecological Areas

SEA-1 Malibu Coastline
SEA-2 Point Dume
SEA-3 Zuma Canyon
SEA-4 Upper La Sierra Canyon
SEA-5 Malibu Canyon and Lagoon
SEA-6 Las Virgenes
SEA-7 Hidden Oaks
SEA-8 Malibu Creek State Park Buffer Area
SEA-9 Cold Creek
SEA-10 Liano Canyon
SEA-11 Tarmaquel/Pacific Sullivan Canyons
SEA-12 Palo Comado Canyon
SEA-13 Chatsworth Reservoir
SEA-14 Simi Hills
SEA-15 Towsley Canyon-Oliveo Hills
SEA-16 Rockpile/Peak San Jose Hills
SEA-17 Powder Canyon-Puente Hills
SEA-18 Hillary Hill
SEA-19 San Francisquito Canyon
SEA-20 Santa Susana Mountains
SEA-21 Aliso Bonita Area
SEA-22 Santa Fe Dam Floodplain
SEA-23 Santa Clara River
SEA-24 Tujunga Valley-Hansen Dam
SEA-25 San Gabriel Canyon
SEA-26 San Antonio Canyon Mouth
SEA-27 Portuguese Bend/Landslide
SEA-28 El Segundo Dunes
SEA-29 Ballona Creek
SEA-30 Marsh Bar
SEA-31 Rolling Hills Canyons
SEA-32 Agua Amarga Canyon
SEA-33 Tonner Island
SEA-34 Palos Verdes Coastline
SEA-35 Harbor Lake Regional Park
SEA-36 Madrona Marsh
SEA-37 Griffith Park
SEA-38 Encino Reservoir
SEA-40 Verdugo Mountains
SEA-42 Whittier Narrows Dam/County Recreation Area
SEA-43 Rio Hondo College Wildlife Sanctuary
SEA-44 Sycamore & Turnbull Canyons
SEA-45 Dalliage Donaldina Hypsaltone
SEA-47 Edwards Air Force Base
SEA-48 Big Rock Wash
SEA-49 Little Rock Wash
SEA-50 Rosamond Lake
SEA-51 Saddleback Butte State Park
SEA-52 Alpine Butte
SEA-53 Lowboy Butte
SEA-54 Pirate Butte
SEA-55 Desert Wilderness Transect
SEA-56 Kiler Ridge
SEA-57 Fremont & Antelope Buttes
SEA-58 Portal Ridge-Liebre Mountain
SEA-59 Tehachapi Foothills
SEA-60 Joshua Tree Woodland Habitat
SEA-61 Kentucky Springs
SEA-62 Sullivan Grande Precipitation
SEA-63 Lyon Canyon
SEA-64 Valley-Oaks Savannah, Newhall

NOTE:

This map is a component of the Los Angeles County General Plan Update Program. It is a working draft subject to revision. This map will not be effective until adopted by the Board of Supervisors. Information within inset is for reference only. Suggestions for modifications to its contents will be considered by County staff when preparing the maps for public hearings by the Regional Planning Commission. Written comments and supporting documentation should be submitted to the Department of Regional Planning General Plan Development Section addressed: 320 W. Temple Street Los Angeles, CA 90012, fax: 213-626-0434, or e-mail: generalplan@planning.lacounty.gov.

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2014

Integrated Pest Management Program



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Developed for the City of

_____

RB AR10476

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INTEGRATED PEST MANAGEMENT (IPM) PROGRAM IMPLEMENTATION GUIDELINES[1] FOR THE CITY OF _____

General IPM Policy

For the past few decades, the trend in pest management has been to increasingly rely on synthetic chemical pesticides. This management strategy results in the increased use of dangerous chemicals, an increase in the number of pests that can become resistant to the pesticides, as well as lead to new organisms becoming pests. Additionally, some pesticides used for terrestrial pest management have been found in waterways causing problems in the aquatic environment.

Pest control managers are now moving away from their reliance on pesticides and toward an integrated approach that combines limited pesticide use with more environmentally friendly pest control techniques. This system is known as integrated pest management (IPM), a strategy that focuses on the long-term prevention of pests through a combination of techniques, including preventative, cultural, mechanical, environmental, biological, and chemical control tactics (**Figure 1**). Multiple IPM techniques can be utilized simultaneously to control pest populations in the most effective manner possible.

A comprehensive IPM Program and Approach allows for primary focus on pollution prevention by monitoring and preventing pests as well as minimizing heavy pest infestations, which reduces the need for chemicals and/or multiple applications. The goal of the IPM Program is not to eliminate all pests, but to keep their populations at tolerable levels. In an IPM program, pesticides should be applied only when it is determined that pests are approaching damaging levels. Because this requires early detection of the pests, IPM programs utilize monitoring techniques and economic thresholds to determine when to implement control strategies. If possible, a person should be trained and assigned to scout the sites on a regular basis. Pesticides may be part of an IPM program, but they should preferably be used only after pests exceed established thresholds and applied only to the affected area (in the case of disease prevention, some modifications may be allowed). In general, all pest control strategies should be those that are least disruptive to biological control organisms (natural enemies), least hazardous to humans and the environment (including non-target organisms), and have the best likelihood of long-term effectiveness.

[1]Adapted from the Orange County Drainage Area Management Plan Integrated Pest Management Policy Developed by the University of California, Division of Agriculture and Natural Resources

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IPM practices are encouraged over the sole use of pesticides as the primary means of pest management (**Table 1**). As a part of their Municipal Activities Program, public agencies and their contractors evaluate the ability to use non-chemical IPM techniques before intensive use of pesticides. This IPM Program template outlines baseline IPM procedures that are required by the Los Angeles County Municipal Separate Storm System Permit (MS4 Permit)[2] along with additional optional IPM techniques that can be employed to implement an effective IPM program.

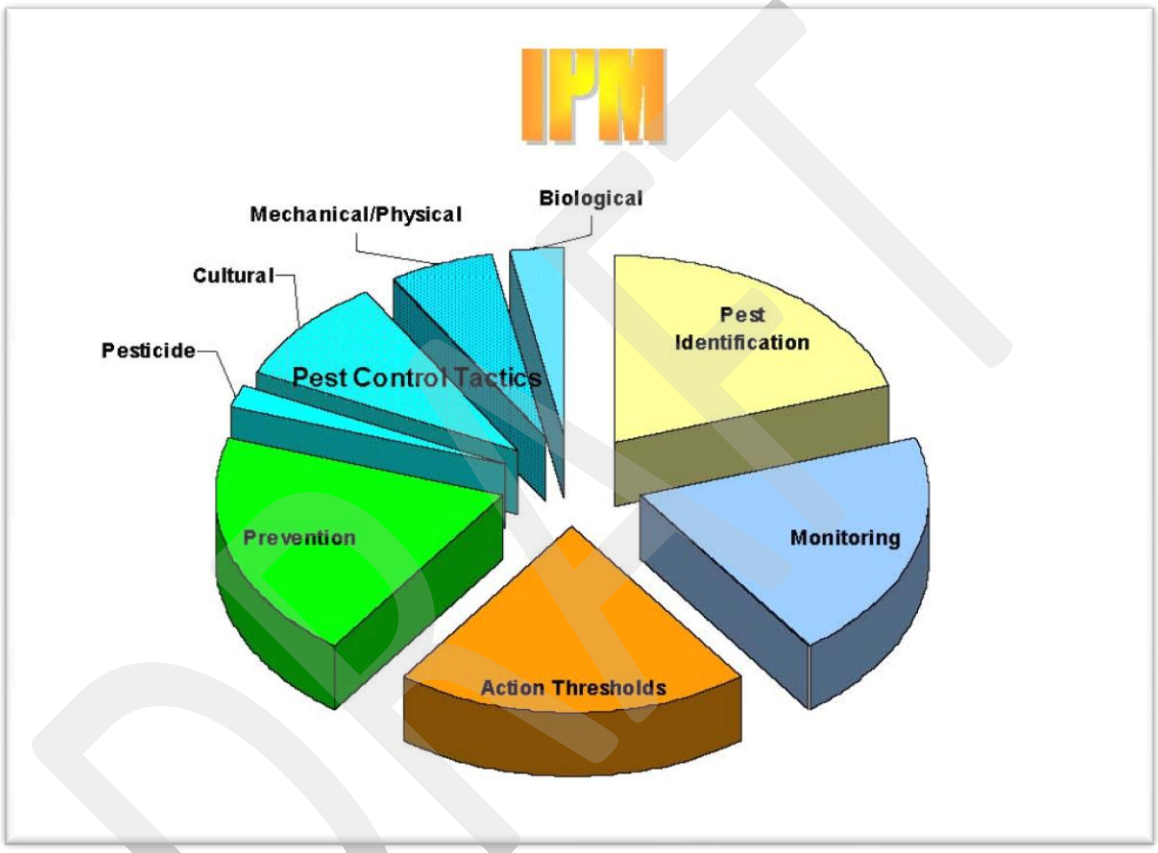


Figure 1 Components of an Integrated Pest Management Program

[2]California Regional Water Quality Control Board Los Angeles Region. 2012. Order No. R4-2012-0175 NPDES Permit No. CAS004001 Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4.

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Table 1 Advantages and Disadvantages of a Pesticide-Based Program Versus An IPM-Based Pest Control Program

Pesticide Based Pest Control		IPM Based Pest Control	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Quick suppression of pests	Not long-term	Long-term control	It may take longer to see results
	Pest control is reactive	Can be proactive in pest control actions.	Must establish thresholds
	Loss of natural controls. Often get outbreaks of other pests	Reduces disruption of natural enemies	
		Pesticides can be used (only used as a last resort)	Must have knowledge of pesticides and their effects on other organisms.
Labor is only for spraying	Extra work in cleanup	Staff becomes more knowledgeable of pests and injury symptoms	Labor is required for monitoring and regular scouting Training is required to identify pests and natural enemies
Not much preparation or follow-up needed	Need a PCA recommendation	Pest management is more organized	Must maintain a record-keeping system.
	Pesticide safety issues for applicators, public, animals More pesticides in environment Contamination of water bodies from runoff	Less exposure to pesticides Safer to the environment Reduces contamination from runoff	

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Implementation Guidelines

Enter Designated IPM Coordinator or IPM Contact Information in Box Below:

IPM Coordinator: Contact Info:

Personnel responsible for the care and maintenance of facilities under the City of _____ agree to implement a suite of basic integrated pest management procedures to meet MS4 Permit requirements[3]. The fundamental basis for the IPM program must include the following as outlined in Permit Part VI.D.9.g:

1. **Pesticides are to be used if monitoring indicates they are needed, and pesticides are applied according to applicable permits and established guidelines.**
2. **Treatments are made with the goal of removing only the target organism.**
3. **Pest controls are selected and applied in a manner that minimizes risks to human health, beneficial non-target organisms, and the environment.**
4. **The use of pesticides, including Organophosphates and Pyrethroids, does not threaten water quality.**
5. **Partnerships with other agencies and organizations are established to encourage the use of IPM.**
6. **A standardized protocol is to be used for the routine and non-routine application of pesticides (including pre-emergents), and fertilizers.**
7. **There is to be no application of pesticides or fertilizers (1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA34, (2) within 48 hours of a ½-inch rain event, or (3) when water is flowing off the area where the application is to occur. This requirement does not apply to the application of aquatic pesticides or pesticides which require water for activation.**
8. **No banned or unregistered pesticides are stored or applied.**
9. **All staff applying pesticides are certified in the appropriate category by the California Department of Pesticide Regulation, or are under the direct supervision of a pesticide applicator certified in the appropriate category.**
10. **Procedures to encourage the retention and planting of native vegetation to**

[3] In addition to MS4 Permit compliance, there are extensive federal and state laws and regulations that all public agencies must be in compliance with at all times, including the California Food and Agricultural Code (FAC) and the California Code of Regulations, Title 3 (3CCR).

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reduce water, pesticide and fertilizer needs are implemented; and

11. **Pesticides and fertilizers are stored indoors or under cover on paved surfaces, or use secondary containment.**
    a. **The use, storage, and handling of hazardous materials are reduced to decrease the potential for spills.**
    b. **Storage areas are regularly inspected.**

In order to implement the above required minimum practices, the following section describes components of an effective IPM Program that can be employed:

- Pest and Symptom Identification
- Prevention
- Monitoring
- Injury Levels and Action Thresholds
- Pest Control Tactics

A number of useful IPM techniques are outlined under each component and further described in Appendix A. These techniques are known to be effective and methods can be selected from each component as necessary to achieve the IPM goals and meet MS4 Permit requirements.

Additional information on the latest IPM techniques including management of new pests in the landscape can be obtained from local UC Cooperative Extension Advisors, UC IPM Regional Advisor, or the Statewide UC IPM Web Site at www.ipm.ucdavis.edu.

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Components of an Effective IPM Program

An IPM program is a long-term, multi-faceted system to manage pests (**Figure 1**). Use of pesticides is a short-term solution to pest problems, and should be used only when the other components fail to maintain the pests or their damage below an acceptable level. Successful IPM practitioners are knowledgeable about the biology of the plants and pests, and successful IPM programs primarily use combinations of cultural practices as well as a combination of physical, mechanical and biological controls.

Pest Identification

It is important to learn to identify all stages of common pests at each site. For example, if you can identify weed seedlings, you can control them before they become larger and more difficult to control and before they flower, disseminating seeds throughout the site. It is also important to be sure that a pest is actually causing the problem. Often damage such as wilting is attributed to root disease but may actually be caused by under watering or wind damage. Appendix A lists specific techniques that can be employed to identify pests.

Prevention

Good pest prevention practices are critical to any IPM program, and can be very effective in reducing pest incidence. Numerous practices can be used to prevent pest incidence and reduce pest population buildup such as the use of resistant varieties, good sanitary practices and proper plant culture. Examples of prevention include choosing an appropriate location for planting, making sure the root system is able to grow adequately and selecting plants that are compatible with the site's environment. Appendix A lists specific techniques that can be employed to achieve pest prevention.

Monitoring

The basis of an effective IPM Program is the development and use of a regular monitoring or scouting program. Monitoring involves examining plants and surrounding areas for pests, examining tools such as sticky traps for insect pests and quantitatively or qualitatively measuring the pest population size or injury. This information can be used to determine if pest populations are increasing, decreasing, or staying the same and to determine when to use a control tactic. Weather and other environmental conditions may also play a factor in whether a pest outbreak may occur so it is important to monitor temperature and soil moisture as well.

It is important to use a systematic approach when monitoring, for example you should examine leaves of a similar age each time you check for pests, rather than looking at the older leaves on some plants and younger ones on others. Randomly looking at a plant and its leaves does not allow you to track changes in pest population or damage over time.

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It is important to establish and maintain a record-keeping system to evaluate and improve your IPM program. Records should include information such as date of examination, pests found, size and extent of the infestation, location of the infestation, control options utilized, effectiveness of the control options, labor and material costs. Appendix A lists specific techniques that can be employed to in the monitoring of pests.

Injury Levels and Action Thresholds

In order to have a way to determine when a control measure should be taken, injury levels and action thresholds must be set for each pest. An injury level is the level of unacceptable damage. For example, the injury level for a leaf-feeding beetle may be set at 30% of the leaves being damaged. Action thresholds are the set of conditions required to trigger a control action. An example of this would be finding an average of 5 or more beetles on 10 shrubs in a location. Action thresholds are set from previous experience or published recommendations and based on expected injury levels. Injury levels are often set by the public's comments. Appendix A lists specific techniques that can be employed to determine injury levels and action thresholds.

Pest Control Tactics

Integrated pest management programs use a variety of pest control tactics in a compatible manner that minimizes adverse effects to the environment. A combination of several control tactics is usually more effective in minimizing pest damage than any single control method. The type of control that an agency selects will likely vary on a case-by-case basis due to the varying site conditions.

The primary pest control tactics to choose from include:

- Cultural
- Mechanical/Physical
- Biological
- Pesticide

Appendix A lists specific pest control techniques that can be employed.

Cultural Controls

Cultural controls are modifications of normal plant care activities that reduce or prevent pests. In addition to those methods used in the pest preventions, other cultural control methods include adjusting the frequency and amount of irrigation, fertilization, and mowing height. For example, spider mite infestations are worse on water-stressed plants, over-fertilization may cause succulent growth which then encourages aphids, too low of a mowing height may thin turf and allow weeds to become established.

Mechanical/Physical Controls

Mechanical control tactics involve the use of manual labor and machinery to reduce or

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eliminate pest problems using methods such as handpicking, physical barriers, or machinery to reduce pest abundance indirectly. Examples include hand-pulling or hoeing and applying mulch to control weeds, using trap boards for snails and slugs, and use of traps for gophers.

The use of physical manipulations that indirectly control or prevent pests by altering temperature, light, and humidity can be effective in controlling pests. Although in outdoor situations these tactics are difficult to use for most pests, they can be effective in controlling birds and mammals if their habitat can be modified such that they do not choose to live or roost in the area. Examples include removing garbage in a timely manner and using netting or wire to prevent bird from roosting.

Biological Controls

Biological control practices use living organisms to reduce pest populations. These organisms are often also referred to as beneficials, natural enemies or biocontrols. They act to keep pest populations low enough to prevent significant economic damage. Biocontrols include pathogens, parasites, predators, competitive species, and antagonistic organisms. Beneficial organisms can occur naturally or can be purchased and released.

The most common organisms used for biological control in landscapes are predators, parasites, pathogens and herbivores.

- Predators are organisms that eat their prey (e.g. Ladybugs).
- Parasites spend part or all of their life cycle associated with their host. Common parasites lay their eggs in or on their host and then the eggs hatch, the larvae feed on the host, killing it (e.g. Tiny stingless wasps for aphids and whiteflies).
- Pathogens are microscopic organisms, such as bacteria, viruses, and fungi that cause diseases in pest insects, mites, nematodes, or weeds (e.g. Bacillus thuringiensis or BT).
- Herbivores are insects or animals that feed on plants. These are effective for weed control. Biocontrols for weeds eat seeds, leaves, or tunnel into plant stems (e.g. goats and some seed and stem borers).

In order to conserve naturally occurring beneficials, broad-spectrum pesticides should be avoided since the use of these types of pesticides may result in secondary pest outbreak due to the mortality of natural enemies that may be keeping other pests under control (Figure 2).

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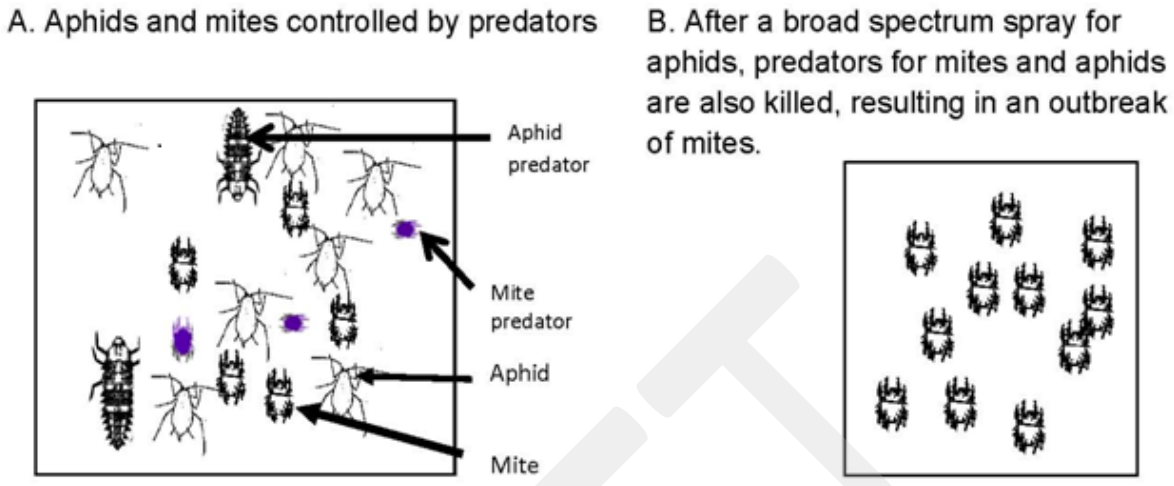


Figure 2 Example of Secondary Pest Outbreak Caused By Use of a Broad Spectrum Insecticide

Pesticide Controls

Any substance used for defoliating plants, regulating plant growth or preventing, destroying, repelling or mitigating any pest, is a pesticide. Insecticides, miticides, herbicides, fungicides, rodenticides and molluscides are all pesticides. Anything with an EPA or DPR registration number on the label is a non-exempt pesticide.

Pesticides should only be used when other methods fail to provide adequate control of pests and just before pest populations cause unacceptable damage. The overuse of pesticides can cause beneficial organisms to be killed and pest resistance to develop. When pesticides must be used, considerations should be made for how to use them most successfully. Avoid pesticides that are broad-spectrum and relatively persistent since these are the ones that can cause the most environmental damage and increase the likelihood of pesticide resistance. Always choose the most specific but least toxic to non-target organisms method.

In addition, considerations should be given to the proximity to water bodies, irrigation schedules, weather (rain or wind), etc. that are secondary factors that may result in the pesticide being moved off-site into the environment. Consideration should be made of the temporary loss of use of an area (application in a park may result in the area being sectioned off).

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Appendix A: Optional IPM Techniques to Integrate into IPM Program

The following practices are generally accepted to be effective IPM techniques. These procedures increase the long-term prevention and suppression of pest problems (insects, weeds, diseases, and vertebrates) with the minimum impact on human health, the environment, and non-target organisms. Emphasis is placed on improving cultural practices to prevent problems and utilize alternative control measures instead of broad spectrum pesticides. The following IPM techniques are divided into the following categories:

- General Pesticide Management Practices
- Pest and Symptom Identification
- Prevention
- Monitoring
- Injury Levels and Action Thresholds
- Pest Control Tactics

GENERAL PESTICIDE MANAGEMENT PRACTICES

- Maintain a complete inventory of all pesticides used and the use sites. This inventory should be updated annually.
- If pesticides are necessary, CAUTION-labeled pesticides should be considered before more toxic alternatives.
- Ensure that no banned or unregulated pesticides are stored or applied.
- Restricted use pesticides should only be used when no other alternatives are practical.
- Only small quantities of pesticides should be purchased eliminating the need for stockpiling.
- MSDSs should be regularly updated to reflect new pesticides or label changes to pesticides in storage.
- Pesticides should be used only according to label instructions.
- Weather conditions that could affect application should be considered. For example, wind conditions affect spray drift; rain may wash pesticide off of leaves.
- Pesticides should not be applied where there is a high chance of movement into water bodies; for example, they should not be applied near wetlands, streams, lakes, ponds or storm drains unless it is for an approved maintenance activity.
- In most cases, empty pesticide containers should be triple-rinsed before disposal. Particular information on the proper disposal of the pesticide and its container can be found on the label.

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- Pesticide equipment and containers should not be cleaned or rinsed in the vicinity of storm drains or other open water areas.
- Pesticides should be stored in covered areas with cement floors and in areas insulated from temperature extremes.
- Chemicals and equipment should be secured during transportation to prevent tipping or excess jarring.
- Pesticides should be transported completely isolated from people, food and clothing, for example, in the bed of the truck rather than in the passenger compartment.
- Pesticide equipment, storage containers and transportation vehicles should be inspected frequently.
- A plan for dealing with pesticide spills and accidents should be developed.
- Unless their safety is compromised, workers should immediately clean up any chemical spills according to label instructions and notify the appropriate supervisors and agencies.
- Pesticide applications on public property, which take place on school grounds, parks, or other public rights-of-way where public exposure is possible, should be posted with warning signs. The specific criteria for the signage can be found in FAC, section 12978. Pesticide applications by the Department of Transportation on public highway rights-of-way are exempt.

PEST AND SYMPTOM IDENTIFICATION

Insects, Mites, and Snails and Slugs

- Field personnel should be trained to recognize basic pests found in the landscape in the following groups: insects, mites, and mollusks.
- A licensed Pest Control Adviser can be on staff or hired to properly identify a pest and the symptoms caused by the pest.
- Field personnel can be trained to utilize disease life cycles to apply treatments when the organism can be controlled most effectively.
- Field personnel can be trained to distinguish between beneficial insects and actual pests found in the landscape (e.g. parasitizing wasps).
- Unknown samples can be submitted to the Orange County Agricultural Commissioner for identification by the county entomologist or plant pathologist.
- Abiotic or nonliving factors (wind, sunburn, air pollution, etc…) should be considered as possible causes of observed symptoms as well as biotic (living) factors.

Weeds

- Field personnel can be trained to identify common weeds in the landscape.
- Field personnel can be trained to utilize weed life cycles to properly control

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weeds such as controlling crabgrass utilizing a pre-emergent herbicide applied in mid-January.
- A licensed Pest Control Adviser can be on staff or contracted to properly identify the pest.

Diseases

- Field personnel can be trained to recognize common diseases or their signs/symptoms in the landscape.
- Field personnel can be trained to utilize disease life cycles to apply treatments when the organism can be controlled most effectively.
- Field personnel can be trained to recognize the difference between biotic and abiotic problems.
- Field personnel can be trained to understand how common diseases are spread throughout the landscape.
- Disease signs and symptoms can be sampled and submitted to the Orange County Agricultural Commissioner for identification by the county plant pathologist.
- A licensed Pest Control Adviser can be on staff or contracted to properly identify the pest.
- Photographs of disease signs and symptoms can be taken and compared to reference guides such as UC IPM's *Pests of Landscape Trees and Shrubs*.

Vertebrates

- Field personnel can be trained to recognize vertebrate pests and the damage they cause in the landscape.
- Field personnel can be trained to utilize vertebrate behavior to properly control the pest most effectively.
- Field personnel can be trained in vertebrate baiting and trapping.
- A licensed Pest Control Adviser can be on staff or contracted to properly identify vertebrate pest.

PREVENTION

Landscape Design Procedures

- Drainage, soil characteristics, water quality and availability should be considered during plant selection.
- Sun exposure, heat, and high temperature conditions should be considered during plant selection.
- Plant material should be selected based on adaptability to local climate conditions, such as those conditions common to a Mediterranean climate.
- Adequate space should be allowed for root growth, especially trees.

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- Nursery stock should be inspected and rejected if not healthy (injuries, diseased, circling roots/potbound, poor staking and/or pruning).
- Pest resistant species and cultivars should be selected.
- Plants with similar growth characteristics and irrigation requirements should be grouped together.
- Landscape design should match available irrigation technology to avoid excess water use and to minimize surface runoff.

Site Preparation and Planting Procedures

- Soil drainage properties can be assessed and compacted soils improved prior to planting.
- A soil analysis can be conducted to determine the chemical and physical properties of the existing soil and then appropriate amendments such as organic matter can be added.
- Irrigation should be installed as designed in order to avoid poor uniformity once plants are in place.
- Proper planting procedures should be followed for particular plant species to avoid planting too deeply or too shallow.
- Nursery tree stakes can be removed at planting and replaced with staking that allows trunk to flex; removing these stakes after 1 to 1.5 years.
- A soil probe or other soil moisture measurement device can be utilized to monitor soil moisture levels in existing root ball and surrounding soil during establishment period.

Water Management

- Plants should be examined weekly for symptoms of water stress and to assist in determining irrigation scheduling.
- Soil moisture can be monitored with a soil probe or soil moisture sensors to assist in scheduling irrigation.
- Evapotranspiration (ET) data or 'smart' clock technology can be utilized to schedule irrigation.
- Cyclic irrigation (short-multiple run times) can be employed to minimize surface runoff.
- Low precipitation sprinklers or low-volume systems can be utilized to reduce surface runoff.
- Systems should be inspected monthly to check for leaks, broken pipes, and clogged or broken sprinkler heads.
- Adjust sprinklers to avoid application of water directly to the trunk of trees (can promote disease) or on to concrete surfaces where it can enter storm drains.
- A hotline, email, or other dedicated method can be established for citizens to

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report leaks and broken sprinkler heads

Fertilizing Procedures

- To avoid nutrient losses below the root zone, fertilize only when plants are actively growing.
- Fertilizer should not be applied within 48 hours of a rain event to avoid losses below the root zone and in surface runoff.
- Soil analyses can be conducted in order to determine existing nutrient levels in the soil prior to fertilizing.
- Turf grass fertilizer maintenance schedules can be based on UC recommendations found online at UC Guide for Healthy Lawns: http://www.ipm.ucdavis.edu/TOOLS/TURF/MAINTAIN/fertilize.html
- Sports turf grass fertilizer maintenance guidelines can be based on UC recommendations found in *Establishing and Maintaining the Natural Turf Athletic Field (UCR ANR Publication Number: 21617)*.
- Overfertilization, especially of trees and shrubs, should be avoided to ensure plant growth is not excessively succulent making it more susceptible to pest infestations.
- Off-target fertilizer applications or spills should be cleaned up immediately by sweeping up and applying to landscape or turf or replacing in spreader or bag to ensure material does not enter storm drains.

Pruning Procedures

- Damaged or diseased wood should be regularly pruned from landscape plants.
- Trees should be pruned according to standards set forth by a professional tree care organization such as the International Society of Arboriculture.
- Plants too large for a space should be replaced instead of pruning them severely.
- Unnecessary pruning should be avoided as wounds are entry sites for decay and disease organisms.
- The age and species of the plant should be taken into account when determining the time of year to prune. For example, eucalyptus should be pruned in December and January when long-horned beetles are not active.
- Tree height reduction should be discouraged. When deemed necessary by a licensed arborist, the crown reduction method approved by a professional tree care organization should be utilized. Topping should not be done to reduce tree size.

MONITORING FOR PESTS AND PROBLEMS

Insect/Mollusk Monitoring Procedures

- Monthly visual inspections of plants for insects, mites, snail and slug damage,

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and recording results is an effective method for tracking changes and easy recall of data.

- Yellow sticky traps can be utilized to assess populations of insects.
- Insects can be dislodged from plants by shaking over a collection surface usually consisting of a clipboard with a white sheet of paper.
- If available for a particular insect, pheromone-baited traps can be utilized.
- Soil-dwelling turf insects can be brought to the surface for monitoring by flushing a specific area of soil (i.e. 2' x 2' grid) with plain water or a soapy water mixture.
- The amount of honeydew (aphids) and frass (caterpillars) present can be utilized as an indicator of population levels.

Weed Monitoring Procedures

- Landscapes can be inspected at least 4 times a year (early winter, early spring, summer and early fall) for weeds in order to determine if and when a weed problem exists.
- Site surveys can be utilized to record the location, date, and severity of weed problem for an effective method of tracking changes and easy recall of data.
    - The number of weeds encountered at periodic intervals (e.g. every 1 to 2 feet) can be counted and recorded along a straight line transecting a landscaped, area or within a selected area, for example 4 sq. ft. samples done in random places in a bed or turf area.

Disease Monitoring Procedures

- Landscapes should be regularly checked for conditions, such as overwatering and injuries, which promote disease.
- Landscapes should checked monthly for disease symptoms and signs. Disease prone plants should be checked more frequently.
- Landscape inspections should note date when disease signs and symptoms were first noticed and the current environmental conditions and soil moisture levels as an effective method of tracking changes and easy recall of data.

Vertebrate Monitoring Procedures

- Landscapes can be regularly inspected for vertebrate presence either by damage caused by animal, actual animal sightings, and/or droppings.
- Records can be kept of the absence or presence of actual vertebrates, the damage caused, and/or the presence or absence of droppings.
- Maps can be created and updated at least twice a year, recording areas of high vertebrate damage or signs (such as gopher mounds).

INJURY LEVELS AND ACTION THRESHOLDS

Insect/Mollusk Thresholds and Guidelines

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- Insect tolerance levels can be established based on the public's acceptance of damage to the landscape or a certain level of nuisance pests (i.e. ants), the actual plant species in the landscape, and long-term monitoring and knowledge of pests causing the damage.
- Thresholds can be based on levels where reasonable control of the pest can be achieved with minimum impact on the environment.
- Insect monitoring records can be utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of aphids on a rose garden at City Hall is low, while in a native shrub border it might be considerably higher.

Weed Thresholds and Guidelines

- Weed tolerance levels can be established based on public safety or the public's acceptance and the resources available to manage the landscape at that level.
- Weed monitoring records can be utilized to rank the percentage of the landscape area infested (none, light, moderate, heavy, or very heavy) with weeds.
- Public areas can be ranked according to high, medium, or low level of weed control and management conducted according to levels set for each rank (see Appendix B)

Disease Thresholds and Guidelines

- Disease tolerance levels can be established based on the public's acceptance and the resources available to manage the landscape at the level required.
- Disease monitoring records can be utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of powdery mildew on roses at City Hall is much lower than the threshold for its presence on Euonymus in a parking lot at a city sports park.

Vertebrate Thresholds and Guidelines

- Vertebrate tolerance levels can be established based on public safety, the public's acceptance and the resources available to manage the landscape at the level required.
- Vertebrate monitoring records can be utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of gopher mounds in a sport field is zero, while in a native shrub border it might be two before a trapping strategy is implemented.

PEST CONTROL TACTICS

Insect/Mollusk Management Methods

Cultural/Mechanical/Physical Control Methods

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RB AR10493

- Sticky barriers can be applied to trunks of trees and large shrubs to prevent ants and other wingless invertebrates from plant canopies.
- Small insect infestations can be removed by pruning infested plant parts.
- Copper bands can be installed around base of trees or planting areas where snail and slug infestations are prevalent.
- Plant canopies can be thinned to increase light penetration to expose certain soft-bodied insects (soft-scale) as well as snails and slugs to heat.
- Strong streams of water can be used to dislodge insects such as aphids and whiteflies, from leaves.
- The use of plants that snails and slugs use for shelter should be avoided.
- Avoid irrigating between 5pm and 5am when moisture remains on plant material for several hours.

Biological Control Methods

- Persistent broad-spectrum pesticides should be avoided, especially if biological control of an insect has been established by UC researchers. Examples include parasitoid wasps controlling Eugenia Psyllids, Giant Whitefly, and Ash Whitefly.
- Natural predators (beneficial insects) can be augmented with purchases of additional predators from commercially available resources.

Pesticide Control Methods

- The most selective, rather than broad-spectrum, pesticide should be used.
- If available for controlling a particular insect, biological and botanical pesticides should be selected.
- Insecticidal soaps can be utilized to control infestations of soft-bodied insects such as aphids, thrips, and immature scales.
- Horticultural oils (neem oil and narrow-range refined oils) can be utilized to control infestations of soft-bodied immature and adult insects such as aphids, scales, and whiteflies.
- Pesticides should only utilized when the potential for impacts to the environment, especially water quality, are minimized.
- Equipment should be calibrated prior to the application of the insecticide to avoid excess material being applied to the landscape environment.
- Applicators should be trained to not apply pesticides to hard surfaces and to not allow any pesticide to enter the storm drain system.
- Spot treatments should be utilized rather than broadcast methods.
- Insecticide/fertilizer combinations should only used if it is appropriate timing for BOTH the insecticide application and the fertilizer application.

Weed Management Methods

Cultural, Mechanical, and Physical Control Methods

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- Timers can be set to avoid overwatering as weeds establish in areas where soil moisture is excessive.
- Drainage can be managed to avoid wet areas.
- Weeds can be removed from a site prior to planting.
- Mower height can be adjusted to turf species and time of year.
- Mower should be washed after mowing a weedy site.
- Hand-pulling, mowing, trimmers/brushcutters, flaming, hoeing, and rototilling around landscape plants should be the main methods utilized to control annual weeds and young perennial weeds.
- Soil solarization can be utilized to control some annual and perennial weed species.
- Bare soil areas can be covered with a thick layer of mulch to suppress weeds and conserve soil moisture.
- Soil, mulch, and plant material should be weed-free before it is introduced into the landscape.

Pesticide Control Methods

- Spot treatments can be utilized rather than broadcast methods.
- Herbicide/fertilizer combinations should only used if it is appropriate timing for BOTH the herbicide application and the fertilizer application.
- Herbicides should be utilized according to established thresholds (see Appendix B).
- Organically acceptable herbicides (shown to be effective through science-based research) should be used where appropriate.
- Herbicides can be applied to the stage of weed growth most susceptible to the chemical.
- Equipment should be calibrated prior to the application of the herbicide to avoid excess material being applied to the landscape environment.

Disease Management Methods

Cultural, Mechanical, and Physical Control Methods

- Localized areas of diseased plants should be pruned out and disposed of.
- Pathogen-infested plant parts can be removed from the soil surface area to reduce certain pathogens (e.g. Camellia Petal Blight).
- Pruning tools can be sterilized (e.g. a diluted bleach solution) between plants to prevent the spread of pathogen to other plants.
- Proper irrigation and fertilization can be maintained to prevent plant stress, waterlogging, and subsequent susceptibility to disease.
- Soil solarization can be utilized to control soil pathogens in annual beds where it

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is most effective.

- Mulch can be kept at least 6" from base of plants to avoid excessive moisture around crown possibly resulting in crown rots and is no deeper than 4"
- Disease-prone plants can be replaced with non-susceptible species.

Pesticide Control Methods

- Preventative fungicides and bactericides should only used where diseases can be predicted from environmental conditions and applied prior to infection or the appearance of symptoms.
- Synthetic fungicides should be used sparingly in the landscape and only in high visibility areas in order to minimize development of resistance.
- Organic fungicides and bactericides should be utilized in combination with cultural, mechanical, and physical control methods in order to improve their effectiveness.
- Copper-based fungicides should only be utilized in situations where its entry into surface runoff and storm drains is virtually impossible and after consultation with PCA and IPM coordinator.
- Mycopesticides, commercially available beneficial microorganisms, should be used where appropriate.
- Fungicides classes can be rotated to avoid resistance.

Vertebrate Management Methods

Cultural and Physical Control Methods

- Groundcovers can be maintained such that they do not harbor rats.
    - Shrubs pruned at least 1 foot from the ground (rats).
    - Sources of drinking water removed (leaky faucets, puddles).
    - Trash cans have lids and are emptied daily (rats).
    - Screens or other barriers installed under structures that have a space between soil and floor (rabbits).
- Habitat modification, based on pest biology can be used to reduce shelter. Trapping can be used for gophers when safe and practical.
- Kill traps used for ground squirrels and rabbits, should be checked daily, and put in places not accessible by children or non-target animals.
- Gas cartridges can be used for ground squirrels according to UC recommendations.

Pesticide Control Methods

- Anti-coagulant baits can be used and applied according to label and UC recommendations.
- Bait should be applied in a manner that non-target animals do not have access to

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it.

- Restricted use pesticides should only be applied by or under the direct supervision of an individual with a qualified applicators certificate (QAC). To receive a QAC, a person must take a test administered by Department of Pesticide Regulation (DPR). To obtain test materials, test schedules, and an application, see http://www.cdpr.ca.gov/docs/license/liccert.htm.

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Appendix B

Ranking public areas for weeds (or other pest) management:

Areas ranked as **HIGH** may include areas that the public sees and expects to be well-maintained. Examples are entrances to public buildings such as city hall and libraries.

These areas are allowed to use pesticides based on established thresholds.

Areas ranked as **MEDIUM** may include areas the public sees but does not expect a high level of maintenance. Examples are landscaped areas away from the entrance, recreational and picnic areas. These areas can tolerate a higher lever of weeds.

*These areas are allowed to use pesticides but the threshold is much higher and pesticides are used infrequently and only after consultation with IPM coordinato*r.

Areas ranked as **LOW** may include areas the public rarely sees or does not expect a high level of maintenance. Examples are medians, landscaped areas in parking lots, wildlands. These areas can tolerate a higher lever of weeds.

These areas are not allowed to use pesticides except in extreme cases and only after consultation with IPM coordinator.

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Example Catch Basin Cleaning Log

Catch Basin Cleaning Log			
Date	Location	Number of Catch Basins Cleaned	Total Amount Removed
Notes:			

Example of Completed Catch Basin Cleaning Log

Catch Basin Cleaning Log			
Date	Location	Number of Catch Basins Cleaned	Total Amount Removed
7/1/13	Street #1	20	55 cu. ft.
	Intersection #1	10	
	Street #2	5	
Notes:			

Drainage Inlet/Catch Basin Information		
Location		
Street:	Cross Street:	Side (N,S,E,W)
Distance:	Direction (N,S,E,W):	Inlet #:
Map #:	Grid:	
Condition		
Length of Opening:	Height of Opening:	Stencil Legible (Y/N):
Bicycle Bars (Y/N):	Grate Size:	Inlet Protection Bar (Y/N):
Treatment Control BMP (Y/N):	Type of BMP:	
Repairs Required:		

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Illicit Connection Investigations Guidance

Field Screening Techniques

If evidence of an illicit discharge is detected, as described in Section 2, and the source does not appear to be evident or above ground, investigations will be conducted to determine if the discharge is being conveyed through an illicit connection. A good source of information includes *Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems* (EPA/600/R-92/238.1993, Pitt et al). General guidance follows below. These techniques can also be used if a Permittee elects to survey sections of their system for illicit connections.

Document Research

Maps of drainage facilities can be reviewed to locate upstream connections and drainage basins as an initial step to locate potential illicit connections. Other records, such as connection permits and discharge permits, can also be reviewed to determine if legal connections may be the source.

Physical Inspections

Catch basins, manholes and other facilities that can be safely investigated from the surface should be physically checked for evidence of connections. This may be a hard pipe connection, or could be a hose or other conveyance that directs a discharge into the storm drain facility. Identification of connections that exhibit evidence of suspected illicit discharges during routine site inspection (e.g., industrial, commercial or construction). Investigation is conducted to determine if the discharge is being conveyed through an illicit connection when evidence of illicit discharge is detected, and the source does not appear to be evident or above ground.

Facilities that are large enough for personnel to enter can also be physically inspected, however, entry into facilities requires strict adherence to health and safety procedures, including confined space entry procedures. In general, a space is “confined” if it is not intended for human occupancy, has limited openings for entry or exit, and has insufficient natural or mechanical ventilation. Information on safety procedures can be found in many documents, including the *Occupational Safety and Health Guidance Manual*, National Institute for Occupational Safety and Health; *OSHA Safety and Health Standards 29 CFR 1910 (General Industry)*, US Department of Labor, and *Title 8 of the California Code of Regulations, General Industry Safety Order*.

Dye Tests

Dye tests can reveal illicit connections in areas where storm drain flows are unexplained and the Permittee has access to suspect facilities. Typical dye tests consist of the addition of fluorescent dye to a floor drain or waste line from a domestic, commercial or industrial process, followed by monitoring for the dye in downstream storm drains. Permittees should conduct dye testing facility by facility (in each area where unexplained flow exists) until all facilities in the area are tested.

Smoke Tests

Smoke tests can reveal if illicit connections exist, and can reveal their source. Storm drains are sealed via sandbags or other sealing devices (plugs, etc.) and smoking incendiary devices are ignited upstream of the seal. Simultaneous inspections inside area facilities should reveal illicit connections even in the

absence of flow. As illicit discharges are intermittent, smoke tests offer real advantages over other types of illicit discharge source identification methods. However, as many legitimate connections to a storm drain may exist (roof drains, street drains, etc.) smoke may be observed extensively. This may cause some illicit connections to be missed, and create a problem with area businesses and residents as excessive smoke begins to enter private property.

T.V. Inspections

T.V. inspections can reveal if illicit connections exist, but cannot be used to view up the connection to determine the source. Robotized or otherwise mobile television cameras allow visual inspection of storm drains (pipes) too small or dangerous for personnel to enter. Although an excellent method of identifying and documenting illicit connections, T.V. inspections have high costs unless the equipment is already owned or can be borrowed from neighboring agencies.

Guidance Source

Los Angeles County Model Stormwater Quality Management Program, 2003.

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Illicit Discharge Investigation and Elimination Guidance

Introduction

Once illicit discharges/disposal are detected and identified, they must be eliminated. Sometimes the source of the spill or discharge/disposal is apparent. The incident can be removed through voluntary cleanup/termination or enforcement procedures, and steps can be taken to prevent its recurrence. These prevention methods can include education and outreach materials for residents and businesses, preventive maintenance practices for infrastructure, vehicles and equipment or additional enforcement.

When the source of the discharge is not apparent, further investigation will be necessary to eliminate it and prevent it from recurring. The following discusses methods that can be used to document the incident, determine the nature of the material, and investigate the source.

Advance Planning

An effective investigation program requires good advance planning. Sufficient staff should be trained to conduct investigations so that qualified staff are available whenever investigations are necessary. Staff should become familiar with illicit discharge investigation and sampling procedures. General guidance follows below to assist with overall planning, but should not be considered complete for proper sampling quality assurance purposes.

Equipment

Appropriate equipment for field investigations may include:

Table 1: Typical Equipment for Investigations

Equipment Type	Equipment
General	Inspection checklist
	Field data log book
	Camera
	Tape measure
	Storm drain system map
	Flashlight
Flow measurement	Ping pong ball or other light floatable
	Stopwatch
Laboratory	Graduated container
	Temperature/pH/conductivity (EC) probe
	Field test kits (e.g., Lamotte test kit)
	12 1-liter amber glass sample bottles
	12 1-liter HDPE sample bottles
	Cooler with ice for sample preservation
	Gloves
	Splash goggles/safety glasses
	Deionized water in wash bottle
First Aid	First aid kit

Data Collection

Before entering the field, the inspection crew should locate information such as the following on a storm drain/street map for areas that will be investigated:

- All known or suspected pollutant generating activities
- Locations of NPDES dischargers
- All locations where storm drains enter open channels
- Catch basins and storm drain manholes

Visual Observation

Visual observation of the storm drain system and/or of activities on the surface can provide information on the source of illicit discharges. It is the simplest method to begin with and the least costly. Evidence of illicit discharges may only consist of visual observations because most illicit discharges are intermittent and will probably not be flowing when inspected. A field inspection crew should investigate the surface drainage system in the vicinity of suspected illicit discharges. This may include accessible areas in the public right-of-way adjacent to residences and businesses, catch basins, open channels near known points of discharge, and upstream manholes.

Photos of visual observations should be taken to aid subsequent data analysis and follow up planning. The following types of visual observations should be recorded on an investigation checklist, such as the one attached:

- Location
- General site description
- Amount, appearance of discharge/disposal
- Stains
- Structural cracking and corrosion
- Vegetative growth
- Nearby facilities with poor outside housekeeping practices
- Pipes/hoses connected to/directed toward drainage system

If the source of the discharge is determined, appropriate methods should be used to eliminate it through voluntary cleanup/termination or enforcement procedures, and steps should be taken to prevent its recurrence.

Sampling and Testing

If flow is observed, and the source of the discharge is not apparent, the crew should collect a sample and measure flow. Several tests should be conducted to determine the nature of the material. This can be compared to records of local facilities and possible pollutant generating activities as an aid in determining the possible sources of the flow.

The sample should be measured for pH, temperature and conductivity (EC). If any of these parameters are abnormal, or strong odors or flow discoloration are detected, the sample should be analyzed. This can be done with a field test kit, which will detect the presence of copper, phenols, detergents, and chlorine. Findings should be recorded on the inspection checklist.

If visual observations are abnormal and/or the field tests detect high concentrations of any constituent, the crew should consider collecting samples for laboratory analysis. The laboratory can usually supply properly cleaned sample bottles and specify either amber glass or plastic (HDPE) bottles depending on the analyses required. If there is enough flow, the field crew should fill several of each type of bottle to obtain enough sample volume for a range of analyses. If there is a limited quantity or sampling is difficult, the field crew should collect as much sample as possible so that the laboratory can run a limited set of analyses. The samples should be placed in a cooler filled with ice and transported to the lab(s) on the same day. Arrangements should be made prior to the field inspection with an analytical laboratory capable of performing the required analyses.

The laboratory analyses run on each sample should be carefully considered. Given the potential high cost for laboratory work, it is prudent to limit the number of analytical parameters (or analytes) tested for each sample. Tests may be selected based on the findings of indicator analyses, visual observations, field tests, and information collected about the types of materials processed, stored and/or spilled within each drainage area.

Guidance Source

Los Angeles County Model Stormwater Quality Management Program, 2003.

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ILLICIT CONNECTION/ ILLICIT DISCHARGE INVESTIGATION REPORT

Response Time:
☐ 1-6 hrs. ☐ 13 hrs. ☐ 24 hrs. ☐ 48 hrs.

RESPONSE

Date:	Time:	Inspector:

INVESTIGATION

Location/ Address:

Reason for Investigation: ☐ Complaint ☐ Discharge/Spill Response ☐ Visual Monitoring
☐ Other: _____

Type of Material: ☐ Hazardous ☐ Wastewater ☐ Oil/Grease ☐ Soil/ Sediment ☐ Trash ☐ Sewage
☐ Fuel (Gas/Diesel) ☐ Chemicals ☐ Other _____

Estimated Quantity: ☐ Gallons ☐ Lbs.

Entered Storm Drain System: ☐ Yes ☐ No Storm Drain Location: _____	Entered Receiving Waters: ☐ Yes ☐ No Name of Receiving Water: _____

Observations

Field Testing: ☐ Yes ☐ No Details:	Sample Collected: ☐ Yes ☐ No Details:

Direct/ Constructed Connections Found: ☐ Yes ☐ No
Details:

RESPONSIBLE PARTY

Name:

Address:	Phone/ email:

Repeat Violation? ☐ Yes ☐ No

OUTREACH MATERIAL

Outreach Material Distributed: ☐ None ☐ General Information ☐ BMP Brochure ☐ Other _____

ENFORCEMENT

Enforcement: ☐ None ☐ Written Warning ☐ Notice of Violation ☐ Citation/Infraction ☐ Cease and Desist Order

Other Actions

FOLLOW-UP VISIT

Date:	Time:	Inspector:
Discharge Stopped? ☐ Yes ☐ No		Proper Clean-Up Action Taken: ☐ Yes ☐ No

Further Action Required: ☐ Yes ☐ No
Details:

DRAFT

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ILLICIT CONNECTION/ ILLICIT DISCHARGE REPORTING & RESPONSE

Received by:	
Date:	Time Received:

REPORTING PARTY	
Name:	Anonymous: ☐ Yes ☐ No
Address:	Phone/email:

INCIDENT	
Date:	Time:
Location/ Address:	
Land Use: ☐ Residential ☐ Commercial ☐ Industrial ☐ Public	
Type of Material: ☐ Hazardous ☐ Wastewater ☐ Oil/Grease ☐ Sediment ☐ Trash ☐ Other _____ ☐ Unknown	
Estimated Quantity: ☐ Gallons ☐ Lbs.	
Entered Storm Drain System/ Receiving Waters? ☐ Yes ☐ No	
Description / Details	
Agencies Contacted: ☐ Office of Emergency Services ☐ HazMat Team ☐ LA County ☐ Regional Board ☐ Other	
Source Investigation Conducted? ☐ Yes ☐ No	Source Identified? ☐ Yes ☐ No
Direct/ Constructed Connections Found? ☐ Yes ☐ No	

ALLEGED RESPONSIBLE PARTY	
Name:	
Address:	Phone/ email:
Vehicle License No:	

ACTION & CLOSURE	
Referred to:	Date:
Department:	Phone/ email:
Actions Taken/ Details	

Date Closed:

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Spill Prevention Coordination

Procedures

This attachment discusses spill prevention coordination procedures that identify:

- Divisions or sections responsible for responding to reports of spills
- General and specific spill response procedures including responsible division or section
- Spill response training activities
- Activities conducted to improve spill response procedures and equipment

Divisions or Sections Responsible for Responding to Reports of Spills

Identify the divisions or sections responsible for responding to reports of spills and note divisions or sections that respond to specific types of spills such as hazardous materials spills or sewage spills. Also indicate the specific field staff who respond to spills and the level of support they provide to lead emergency response agencies and source of spill investigations.

General and Specific Spill Response Procedures

Describe or reference general spill response procedures involved in responding to complaints and identifying spills through inspections. Include the spill response process from the spill identification stage through clean up and report preparation. Copies of the forms and reports prepared to document spills should also be included. Specific procedures for hazardous materials spills, floods, and sewage spills should be referenced. Contractor support for spill events, if applicable, should also be noted.

Spill Response Training Activities

Provide an overview of all spill response training that is conducted within the various divisions and sections of the agencies.

Activities to Improve Spill Response Procedures and Equipment

List all activities conducted within the implementing agency to improve spill response procedures and update equipment. Explain how improvements are identified, prioritized, and implemented. Include a schedule of how often spill response procedures and equipment are evaluate.

Spill Investigation, Containment and Cleanup

Investigation

Depending on the location of the spill and the type of material, the appropriate department/ agency should be notified. This may include:

- Storm drain maintenance, if the spill reaches the storm drain system
- Street and road maintenance, if the spill is in the public right-of-ways
- Sewer system maintenance, if the material is from the sewage system
- Industrial waste inspection, if the material is from industrial facilities
- Fire Departments/"first responders," if the material may be hazardous
- Contractors for hazardous materials, if the material is hazardous

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These departments/agencies should determine the nature of the material and the extent of the spill. If any agency determines there is a chance that the spill involves hazardous materials, then the local Administering Agency will be notified. An example of spill investigation procedures is depicted in Figure D-1. Reporting procedures for hazardous substances are discussed further in Section 5 of this Illicit Connection/Illicit Discharge Elimination model program.

Containment and Cleanup

Once the nature and extent of the spill is determined, the appropriate departments and field superintendents will be notified to contain and clean up the spill. The three types of cleanup scenarios are (1) hazardous, (2) wastewater, and (3) other non-hazardous materials.

Hazardous

Handling procedures regarding releases of hazardous or potentially hazardous substances into the environment are covered in a number of federal and state regulations, including: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); Superfund Amendments and Reauthorization Act (SARA); Resource Conservation and Recovery Act (RCRA); and multiple bills codified under Division 20 of the California Health and Safety Code. These procedures are well established and are practiced by local hazardous materials response teams - generally a local Fire Department.

Material determined to be hazardous will be contained by the appropriate hazardous material response team. The team will contact an approved contractor for cleanup. Details are contained in the local *Emergency Response Procedures* manual.

Wastewater

Field crews responding to a sewage spill or overflow should contain the spill to prevent entry of the sewage into the storm drain system or natural watercourse. This will involve a coordinated effort between the sewer, street, and storm drain maintenance crews.

To the maximum extent possible, sewage should be prevented from entering the storm drain system by covering or blocking storm drain inlets and catch basins or by containing or diverting the overflow away from open channels and other storm drain fixtures (using sandbags, inflatable dams, etc.).

In the event that raw sewage enters a storm drain catch basin, where possible the sewage should be vacuumed or pumped out of the catch basin. If a sewage overflow enters a storm drain channel, where possible the downstream channel area should be blocked, flushed with potable water and the captured water pumped to a nearby sewer manhole. Any time a sewage spill enters the storm drain system and has the potential to reach coastal waterways, the local agency and L.A. County Dept. of Health Services, Bureau of Environmental Protection must be notified (323) 881-4147.

Once the spill is contained, it should be removed and the area disinfected. Every effort should be made to ensure that the disinfectant is not discharged to the storm drain system, using methods such as those described above.

Other Non-hazardous Materials

Non-hazardous materials should generally be removed by appropriate crews with knowledge of or jurisdiction over the location of the spill, as indicated in Section D.1. Because the situations and materials will vary widely, procedures will vary as well.

RB-AR10508

All materials should be prevented from entering waterways to the maximum extent possible. Many materials in sufficient quantities can deplete the oxygen level in receiving waters, or smother benthic communities. Typical examples of these materials include landscape waste, milk, flour, and many other organic liquids and solids or fine powders. These materials should generally be removed by first collecting and/or sweeping up all solids and disposing them in a landfill or other approved location. Liquids should be diverted to an area away from waterways where they may be removed with a vacuum truck or can soak into the ground.

Guidance Source

Los Angeles County Model Stormwater Quality Management Program, 2003.

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Watershed Management Program Appendix 3

A-3-2 Example Vacant Lot Ordinance

For the TSS Reduction Strategy

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EXAMPLE VACANT LOT ORDINANCE

For the TSS Reduction Strategy (City of Whittier Municipal Code § 8.08.026)

8.08.026 VACANT LOTS

For the purpose of this section, a vacant lot shall mean any property which is either undeveloped or has an existing on-site building/structure that is either abandoned, vacant and/or is un-leased by the property owner for more than thirty days.

All vacant lots within the city (except those that do not immediately front onto a public street, are less than five feet wide in width or depth, are identified on the city's zoning map as "open space," are used as designated habitat conservation or for active agricultural production) shall be maintained in accordance with the following provisions of this section within thirty days of becoming vacant:

A. Unimproved Vacant Lot Types. Lots that are unimproved due to never having been developed or having become vacant subsequent to the removal of any pre-existing buildings, structures or impervious surfaces shall be subject to the approval of a vacant lot landscape and irrigation plan by the director of parks, recreation and community services and shall be improved and maintained at all times in accordance with the following provisions:

1. Lots That Are Less Than One-Half Acre. For unimproved vacant lots that are less than one-half acre in size (21,780 square feet), the entire lot shall be improved and maintained in the following manner:

    a) The property owner shall landscape the entire lot using drought tolerate or xeriscape material that requires little to no water after the first three years of growth. Durable, high quality, synthetic turf may also be used as an alternative. The landscape material selected shall be reviewed and approved to the satisfaction of the director of parks, recreation and community services prior to installation, per Section 13.42.120 of the Whittier Municipal Code. The ground cover shall be maintained in good condition at all times.

    b) The lot shall be improved with an operable automatic irrigation system for the ground cover which shall be installed and maintained in good condition by the property owner at all times.

    c) The lot shall be maintained free of litter, weeds, graffiti, debris, including the stockpiling of any material, at all times. Any on-site litter, weeds, debris or stockpiling of material shall be immediately removed by the property owner, upon discovery. The property owner or their designated representative shall be responsible for inspecting the property at reasonable intervals or take other steps to reasonably ensure that no litter, weeds, graffiti, debris or material stockpiling collects or is maintained on the lot.

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d) Any dead or dying vegetation as well as any broken, malfunctioning or non-functioning irrigation components on the lot shall be replaced by the property owner within seventy-two hours of their discovery or notification. The property owner shall be responsible for inspecting the property at reasonable intervals, or take other steps to reasonably ensure that there is no dead or dying vegetation nor any broken, malfunctioning or non-functioning irrigation components on the lot.

e) At the discretion of the director of parks, recreation and community services the standards contained in Section 8.08.026(A)(2) (Lots that are one-half acre or greater) may be applied to vacant lots that are one-half acre or less if deemed appropriate to mitigate any one or more of the following circumstances:

i. To adequately secure the property from illegal dumping or other such illicit activities.

ii. Because of public safety concerns or hazards associated with the property.

iii. A declared state or regional drought.

2. Lots That Are One-Half Acre or Greater. For unimproved vacant lots that are one-half acre (21,780 square feet) or greater in size, the entire lot shall be improved and maintained in the following manner:

a) The property owner shall provide a minimum five-foot wide landscape planter adjacent to all public rights-of-way (except those property lines located immediately adjacent to an alley) that abut their vacant lot.

b) All landscape planters shall be improved with an operable automatic irrigation system. The landscape material selected shall consist of drought tolerate or xeriscape material that requires little to no water after the first three years of growth. Durable, high quality, synthetic turf may also be used as an alternative. The landscape material selected shall be reviewed and approved to the satisfaction of the director of parks, recreation and community services prior to installation, per Section 13.42.120 of the Whittier Municipal Code. The ground cover shall be maintained in good condition at all times.

c) All on-site landscaping and irrigation shall be maintained in good condition at all times by the property owner of the lot. Any dead or dying landscaping shall be replaced by the property owner within seventy-two hours of their discovery or notification, including any broken, malfunctioning or non-functioning irrigation components. The property owner shall be responsible for inspecting the property at reasonable intervals or take other steps to reasonably ensure that all of the landscaping and irrigation on the lot is maintained in good condition and there are no broken, malfunctioning or non-functioning irrigation components on the lot.

d) A six-foot high, view obscuring, decorative perimeter barrier shall be erected around the entire vacant lot, with a minimum five-foot wide perimeter

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landscape planter in front of the fencing. In circumstances where the director of parks, recreation and community services finds that a higher perimeter barrier is warranted for adequate security of the site and/or because of unusual topographical circumstances associated with the vacant lot, the perimeter barrier may be constructed up to a maximum of eight feet high. All perimeter barriers shall include a gravel pathway leading to a security gate to provide accessibility to the interior of the lot for the police department or other emergency personnel. A key or security code for the gate shall be provided to the Whittier Police Department by the property owner upon installation and shall be kept up-to-date at all times.

e) All decorative, view obscuring, perimeter barriers shall consist of either painted wood, redwood, woodcrete, green vinyl chain-link fencing with a green windscreen securely attached (along the interior of the fence), or any other durable, aesthetically attractive, material deemed acceptable to the director of parks, recreation and community services. On corner or reversed corner lots, all fencing shall comply with Section 18.64.050 for visual safety.

f) All perimeter barriers shall be maintained in good condition at all times by the property owner. Any on-site graffiti shall be removed by the property owner within seventy-two hours of its discovery or notification. The property owner shall be responsible for inspecting the property at reasonable intervals.

B. Improved Vacant Lots. Vacant lots improved with existing on-site buildings or structures that are vacant, abandoned, or un-leased for thirty days or more (as determined by the director of parks) shall be maintained by the property owner as follows:

1. All existing on-site landscaping and irrigation shall be maintained in good condition at all times and in accordance with the provisions contained in Chapters 8.08, 8.22 and8.24 of this code, including any conditions of approval applied to the site as part of the approved vacant lot landscape and irrigation plan under Section 8.08.026(C).
2. Any dead or dying vegetation as well as any broken, malfunctioning or non-functioning irrigation components for the lot shall be replaced by the property owner within seventy-two hours of their discovery or notification. The property owner or their designated representative shall be responsible for inspecting the property at reasonable intervals, or take other steps to reasonably ensure that there is no dead or dying vegetation nor any broken, malfunctioning or non-functioning irrigation components on the lot.
3. The lot shall be maintained free of litter, weeds, and debris, including the stockpiling of any material, at all times. Any on-site litter, debris or stockpiling of material shall be immediately removed by the property owner, upon discovery or notification. The property owner or their designated representative shall be responsible for inspecting the property at reasonable intervals, or take other steps to reasonably ensure that no litter, weeds, graffiti, debris or material stockpiling collects or is maintained on the lot.

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4. All on-site structures shall be maintained in good condition at all times. Damage to any on-site buildings or structures shall be abated within ten days by the property owner upon discovery. An alternative abatement period shall be required, if deemed necessary by the building official, to protect the public health, safety and welfare.
5. The lot shall be adequately secured at all times to prevent illegal dumping, criminal activity, vandalism, graffiti, on-site loitering by the homeless and any/all other attractive nuisances to the satisfaction of the director of parks, recreation and community services and the chief of police.

C. Vacant Lot Landscape and Irrigation Plan. Prior to the issuance of a demolition permit on any lot in which the construction of a new building, structure, parking lot, or impervious surface will not commence within thirty days after demolition, the property owner shall submit a vacant lot landscape and irrigation plan for review and approval of the director of parks, recreation and community services (with the appropriate plan check fees). The director of parks, recreation and community services may impose any reasonable conditions of approval on the vacant lot landscape and irrigation plan to ensure that the lot will be adequately maintained during the time that it is vacant. Upon approval of the plan, the landscape and irrigation improvements to the lot, as specified in the plan, shall be completed to the satisfaction of the director of parks, recreation and community services within thirty days after demolition. A reasonable extension of time may be granted by the director of parks, recreation and community services in those situations when the director, in his or her sole discretion, determines that a good faith effort is being made by the property owner to comply with the provisions of this section.

1. Appeal of Decision.
    a) The decision of the director of parks, recreation and community services to approve, conditionally approve or deny any vacant lot landscape and irrigation plan may be appealed in writing to the city manager within fifteen calendar days. The decision of the city manager shall be final, unless appealed in writing to the city council within fifteen calendar days of the city manager's decision. All decisions of the city council shall be final.
    b) At the sole discretion of the city council, the provisions contained within this ordinance may be made modified, as deemed appropriate, if a finding is made that the legal property owner has demonstrated an extreme financial hardship such as, but not limited to, the filing of bankruptcy, property tax default, their exists over six months of outstanding arrears to the monthly mortgage payment on the property, or any other extreme/unique hardship the city council believes is contrary to the purpose and intent of this ordinance.

D. View Obscuring Barriers and Fencing on Vacant Lots. There shall be no on-site fencing or view obscuring perimeter barriers that screen any vacant lot in any manner that obstructs vehicular and/or pedestrian visibility of the public right-of-way, or interferes with the public's use of the public right-of-way, as determined by the director of public works. The directors of public works and parks, recreation and community services shall approve the location and design of all vacant lot fencing and perimeter barriers prior to the construction of any such fencing or barriers on a vacant lot.

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E. The director of parks, recreation and community services shall implement all applicable sections of Chapter 13.42 (Water Conservation in Landscaping), regardless of the size of the vacant lot, to ensure that the approved vacant lot landscape and irrigation plan conserves water to greatest extent possible, while preserving the health of the landscaping approved on the vacant lot.

F. Where a recorded easement on vacant lot exists, the director of parks, recreation and community services may require and/or permit the property owner to use an appropriate ground cover over the easement (i.e., gravel, turf block, paving or some other acceptable material) that would enable a vehicle to drive over the easement. Any impervious surface approved over an easement shall be subject to the prior written approval of the easement holder.

G. Implementation. All vacant lots, regardless of how they became vacant, that are existing at the time of the adoption of the ordinance shall be brought into immediate compliance with all applicable provisions of this section, unless currently landscaped and irrigated under a previously approved vacant lot and landscape and irrigation plan approved by the director of community development or director of parks, recreation and community services prior to the adoption of this current ordinance. A reasonable extension of time may be granted by the director of parks, recreation and community services in those situations when the director, at his or her sole discretion, determines that a good faith effort is being made by the property owner to comply with this section.

H. Noncompliance Declared Nuisance. Failure to comply with any of the applicable requirements in this section shall constitute a public nuisance, as designated in Section 8.08.030, and the city attorney or the district attorney may commence an action or proceeding for civil abatement, removal and enjoinment thereof, in the manner proscribed by law; and shall take other steps and apply to such courts as may have jurisdiction to grant such relief as well as abate or remove the nuisance, including abatement in accordance with the provisions of this chapter.

(Ord. 2906 § 1, 2008)

(Ord. No. 2928, § 1, 6-23-09; Ord. No. 2958, § 3, 10-12-10)

RB-AR10515

Watershed Management Program Appendix 3

A-3-3 Example Street Sweeping Municipal Code

For the TSS Reduction Strategy

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EXAMPLE MUNICIPAL CODE LANGUAGE FOR PRIVATE PARKING LOT SWEEPING

For the TSS Reduction Program (City of Signal Hill Municipal Code § 12.16.060)

12.16.060 ILLICIT DISCHARGES

A. Except as otherwise permitted herein, all non-storm water discharges to the municipal storm drain system are prohibited.

B. No person shall cause, facilitate or permit any illicit discharge to the municipal storm drain system.

C. No person shall cause, facilitate or permit a discharge into an MS4 that causes or contributes to an exceedence of any water quality standard.

D. No person shall cause, facilitate or permit any discharge into an MS4 that causes or threatens to cause a condition of pollution, contamination, or nuisance (as defined in California Water Code § 13050).

E. No person shall cause, facilitate or permit any discharge into an MS4 containing pollutants which have not been reduced to the Maximum Extent Practicable.

Q. All owners and operators of industrial and/or commercial motor vehicle parking lots containing more than twenty-five parking spaces shall conduct regular sweeping and other similar measures to minimize the discharge of pollutants and other debris in the municipal storm drain system.

V. Any person who violates the terms of this section shall immediately commence all appropriate response action to investigate, assess, remove and/or remediate any pollutants discharged as a result of such violation, and shall reimburse the City or other appropriate governmental agency, for all costs incurred in investigating, assessing, monitoring and/or removing, cleaning up, treating or remediating any pollutants resulting from such violation, including all reasonable attorneys' fees and environmental and related consulting fees incurred in connection therewith.

(Ord. 2013-11-1462 § 1; Ord. 2003-02-1316 § 1; Ord. 2002-07-1304 § 2; Ord. 96-12-1215 § 1)

RB-AR10517

Reasonable Assurance Analysis for Lower Los Angeles River, Los Cerritos Creek, and Lower San Gabriel River

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

Paradigm Environmental
4797 Seminole Dr
San Diego, CA 92115

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1. Introduction

The Municipal Separate Storm Sewer System Permit (Permits) for Los Angeles County[1] and the City of Long Beach[2] includes optional provisions for a Watershed Management Program (WMP) that allows permittees the flexibility to customize their stormwater programs to achieve compliance with applicable receiving water limitations (RWLs) and water quality based effluent limitations (WQBELs) through implementation of control measures. A key element of each WMP is the Reasonable Assurance Analysis (RAA), which is used to demonstrate "that the activities and control measures…will achieve applicable WQBELs and/or RWLs with compliance deadlines during the Permit term" (NPDES Permit Order No. R4-2012-0175, Section C.5.b.iv.[5], page 64; NPDES Permit Order No. R4-2014-0024, Section C.5.h.vii.[2]). This report presents the Reasonable Assurance Analysis (RAA) for the Lower Los Angeles River (LLAR), Los Cerritos Channel (LCC), and Lower San Gabriel River (LSGR) WMPs.

While the Permits prescribe the RAA as a quantitative demonstration that control measures (best management practices [BMPs]) will be effective, the RAA also promotes a modeling process to identify and prioritize potential control measures to be implemented by the WMP. In other words, the RAA not only demonstrates the cumulative effectiveness of BMPs to be implemented, it also supports their *selection*. Furthermore, the RAA incorporates the applicable compliance dates and milestones for attainment of the WQBELs and RWLs, and therefore supports BMP scheduling.

On March 25, 2014, the Los Angeles Regional Water Quality Control Board (Regional Board) issued "RAA Guidelines" (LARWQCB 2014) to provide information and guidance to assist permittees in development of the RAA. The approach herein is consistent with the RAA Guidelines.

This report is organized in nine sections, as follows:

- Section 1: Introduction
- Section 2: Applicable Interim and Final Requirements
- Section 3: Modeling System to be used for the RAA
- Section 4: Current/Baseline Pollutant Loading
- Section 5: Estimated Required Pollutant Reductions
- Section 6: Determination of BMP Capacity for RAA
- Section 7: Cumulative Volume Reduction Goals to Achieve Required Reductions
- Section 8: Pollutant Reduction Plan
- Section 9: References

[1] National Pollutant Discharge Elimination System Permit Order No. R4-2012-0175

[2] National Pollutant Discharge Elimination System Permit Order No. R4-2014-0024

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2. Applicable Interim and Final Requirements

The WMPs for LLAR, LCC, and LSGR follow the process in the Permits and identify the Water Quality Priorities (WQ Priorities) including the highest (Category 1) Water Quality Priorities which are subject to Total Maximum Daily Loads (TMDLs) and WQBELs. Practically all of these TMDLs include associated compliance schedules that are considered in this RAA. The TMDL and WMP milestones/compliance dates establish the pace at which BMPs must be implemented. Traditionally, the approach of TMDL implementation plans has been focused on *final* TMDL compliance, whereas the Permit compliance paths offered to WMPs increase emphasis on *milestones*. In line with the RAA Guidelines, for all final TMDL and TMDL/WMP milestones that occur in the next two Permit cycles, the combination of BMPs expected to result in attainment of the corresponding Permit limits are identified.

The TMDL milestones for the LLAR, LCC, and LSGR WMP areas are shown in Table 2-2 through Table 2-4. The Permits require each WMP to provide reasonable assurance for the TMDL milestones that occur in the current Permit term. If applicable TMDLs do not prescribe a milestone in the current Permits, a milestone must be established. The array of TMDLs creates a potentially complicated sequence based on multiple pollutants, and thus this RAA includes a limiting pollutant analysis. As described in Section 5, the identified limiting pollutant for wet weather is zinc for LLAR, LCC, and LSGR. As such, the wet weather milestones for the Los Angeles River, Los Cerritos Channel, and San Gabriel River Metals TMDLs establish the pace of stormwater BMP implementation. The wet weather milestones established for the current Permits include the following:

- **Lower Los Angeles River:** Achieve 31% of the required reduction by September 30, 2017. This milestone was created for the WMP, as the metals TMDL includes a 25% milestone in 2012 (prior to the current Permit term) and a 50% milestone in 2024 (beyond the current Permit term). Achievement of this milestone for zinc provides reasonable assurance of achieving a similar or greater reduction for other WQ Priorities.
- **Los Cerritos Channel:** Achieve 10% of the required reduction[3] by September 30, 2017. This milestone is directly from the metals TMDL. Achievement of this milestone for zinc provides reasonable assurance of achieving a similar or greater reduction for other WQ Priorities.
- **Lower San Gabriel River:** Achieve 10% of the required reduction by September 30, 2017. This milestone is directly from the metals TMDL. Achievement of this milestone for zinc provides reasonable assurance of achieving a similar or greater reduction for other WQ Priorities.

The pollutant reduction plan to achieve these milestones is described in Section 8, along with the plan to achieve the milestones for the next Permit term (achieve 35% of the required reduction in LCC and LSGR and achieve 50% of the required reduction in LLAR). A summary of the milestones within the current and next Permit terms and final milestone based on final TMDLs are summarized in Table 2-1. The required reductions that form the basis of the milestones are calculated in Section 5.

[3] The interim milestones are expressed in terms of the *required* reduction not total reduction (e.g., if the required reduction to attain final limits is 50%, then the 10% milestone equates to a 5% reduction). These reductions are calculated in Section 5.

Table 2-1. Summary of schedule for interim and final milestones

WMP Area	Milestone 1 (2017)	Milestone 2 (interim date of applicable metals TMDL)	Milestone 3 (final date of applicable metals TMDL)
LLAR	31%	50%	100%
LCC	10%	35%	100%
LSGR	10%	35%	100%

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Table 2-2. Schedule of TMDL milestones for the Lower LA River

TMDL	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone (Bolded numbers indicated milestone deadlines within the current Permit term) [1]									
				2012	**2013**	**2014**	**2015**	**2016**	2020	2024	2028	2032	2037
LAR Nutrients	Ammonia-N, Nitrate-N, Nitrite-N, Nitrate-N+Nitrite-N	Meet WQBELs	All	Pre 2012									
				Final									
LAR Trash	Trash	% Reduction	All	9/30	9/30	9/30	9/30	9/30					
				70%	80%	**90%**	**96.70%**	**100%**					
LAR Metals	Copper, Lead	% of MS4 area Meets WQBELs	Dry	1/11					1/11	1/11			
				50%					75%	100%			
	Copper, Lead, Zinc, Cadmium	% of MS4 area Meets WQBELs	Wet	1/11						1/11	1/11		
				25%						50%	100%		
LA River Bacteria	*E. coli*	Meet WQBELs	Wet and Dry[2]										3/23
													Final
Dominguez Channel and LA/LB Harbors Toxics	Sediment: DDTs, PCBs, Copper, Lead, Zinc, PAHs	Meet WQBELs	All	12/28								3/23	
				Interim								Final	
Long Beach City Beaches and LAR Estuary Bacteria	Total Coliform, Fecal Coliform, Enterococcus	Meet WLAs	All	USEPA TMDLs, which do not contain interim milestones or implementation schedule. The Permits allow MS4 Permittees to propose a schedule in a WMP.									

[1] The Permit term is assumed to be five years from the Los Angeles County Permit effective date or December 27, 2017.

[2] The schedule for attaining the dry weather Bacteria TMDL is not shown in Table 3-2, which is stepwise by reach/segment and depends on whether a Load Reduction Strategy is developed for implementation.

Table 2-3. Schedule of TMDL milestones for Los Cerritos Channel WMP

TMDL	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone (Bolded numbers indicated milestone deadlines within the current Permit term) [1]									
				2012	**2013**	**2014**	**2015**	**2016**	2017	2020	2023	2026	2032
Los Cerritos Channel Metals	Copper	% Load Reduction or % of MS4 area Meets WQBELs	Dry						9/30	9/30			
									30%	70%	100%		
	Copper, Lead, Zinc	% Load Reduction or % of MS4 area Meets WQBELs	Wet						9/30	9/30			
									10%	35%	70%	100%	
Dominguez Channel and LA/LB Harbors Toxics	Sediment: DDTs, PCBs, Copper, Lead, Zinc, PAHs	Meet WQBELs	All	12/28									3/23
				Interim									Final

[1] The Permit term is assumed to be five years from the Los Angeles County Permit effective date or December 27, 2017.

Table 2-4. Schedule of TMDL milestones for the Lower San Gabriel River WMP

TMDL	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone (Bolded numbers indicated milestone deadlines within the current Permit term) [1]									
				2012	**2013**	**2014**	**2015**	**2016**	2017	2020	2023	2026	2032
San Gabriel River Metals	Copper, Selenium	% Load Reduction or % of MS4 area Meets WQBELs	Dry						9/30	9/30			
									30%	70%	100%		
	Copper, Lead, Zinc	% Load Reduction or % of MS4 area Meets WQBELs	Wet						9/30	9/30			
									10%	35%	70%	100%	
Dominguez Channel and LA/LB Harbors Toxics	Sediment: DDTs, PCBs, Copper, Lead, Zinc, PAHs	Meet WQBELs	All	12/28									3/23
				Interim									Final

[1] The Permit term is assumed to be five years from the Los Angeles County Permit effective date or December 27, 2017.

3. Modeling System used for the RAA

The Watershed Management Modeling System (WMMS) was used to develop this RAA. WMMS is specified in the Permits as a potential tool to conduct the RAA. The Los Angeles County Flood Control District (LACFCD), through a joint effort with U.S. Environmental Protection Agency (USEPA), developed WMMS specifically to support informed decisions associated with managing stormwater. The ultimate goal of WMMS is to identify cost-effective water quality improvement projects through an integrated, watershed-based approach. The WMMS encompasses Los Angeles County's coastal watersheds of approximately 3,100 square miles, representing 2,566 subwatersheds (Figure 3-1). As described in the following subsections, WMMS is a modeling system that incorporates three tools: (1) the watershed model for prediction of long-term hydrology and pollutant loading, (2) a BMP model, and (3) a BMP optimization tool to support regional, cost-effective planning efforts. A version of WMMS is available for public download from LACFCD.

The version of WMMS to be used for the RAA in the LLAR, LLC, and LSGR WMPs is customized from the public download version, including the following modification/enhancements:

- Updates to meteorological records to represent the last 10 years (per the RAA Guidelines) and to allow for simulation of the design storm;
- Calibration adjustments to incorporate the most recent 10 years of water quality data collected at the nearby mass emission station;
- Application of a second-tier of BMP optimization using System for Urban Stormwater Treatment and Analysis INtegration (SUSTAIN), which replaces the Nonlinearity-Interval Mapping Scheme (NIMS) component of WMMS.
- Optimization of BMP effectiveness for removal of bacteria pollutants (rather than metals only); and
- Updates to Geographic Information System (GIS) layers, as available.

The subwatersheds in the LLAR, LLC, and LSGR WMP areas that are represented by WMMS are shown in Figure 3-2 through Figure 3-4, which include modifications to confine to jurisdictional boundaries included in these WMP areas. Also shown are the "RAA assessment points", which are used to calculate required load reductions (described in Section 5).

3.1. Watershed Model - LSPC

The watershed model included within WMMS is the Loading Simulation Program C++ (LSPC) (Shen et al. 2004; Tetra Tech and USEPA 2002; USEPA 2003). LSPC is a watershed modeling system for simulating watershed hydrology, erosion, and water quality processes, as well as in-stream transport processes. LSPC also integrates a geographic information system (GIS), comprehensive data storage and management capabilities, and a data analysis/post-processing system into a convenient PC-based Windows environment. The algorithms of LSPC are identical to a subset of those in the Hydrologic Simulation Program–FORTRAN (HSPF) model with selected additions, such as algorithms to dynamically address land use change over time. Another advantage of LSPC is that there is no inherent limit to the size and resolution of the model than can be developed, making it an attractive option for modeling the Los Angeles region watersheds. USEPA's Office of Research and Development (Athens, Georgia) first made LSPC available as a component of USEPA's National TMDL Toolbox (http://www.epa.gov/athens/wwqtsc/index.html). LSPC has been further enhanced with expanded capabilities since its original public release.

The WMMS development effort culminated in a comprehensive watershed model of the Los Angeles County Flood Control District that includes the unique hydrology and hydraulics of the system and characterization of water quality loading, fate, and transport for all the key TMDL constituents (LACDPW 2010a, 2010b). Since the original development of the WMMS LSPC model, Los Angeles County personnel have independently updated the model with meteorological data through April 2012.

To support the objectives of the WMPs, jurisdictional boundaries were also intersected with the WMMS LSPC model subwatersheds resulting in a finer resolution spatial unit for modeling. Model land use was then resampled using this subwatershed-jurisdiction intersect, properly distributing land use categories at the jurisdictional level for attributing sources, while maintaining hydrologic connectivity within the watershed model. This refinement introduced a new layer of resolution, facilitating the rollup of modeled results by jurisdiction to better support source attribution and implementation responsibilities among the participating entities.



Figure 3-1. WMMS model domain and represented land uses and slopes by subwatershed

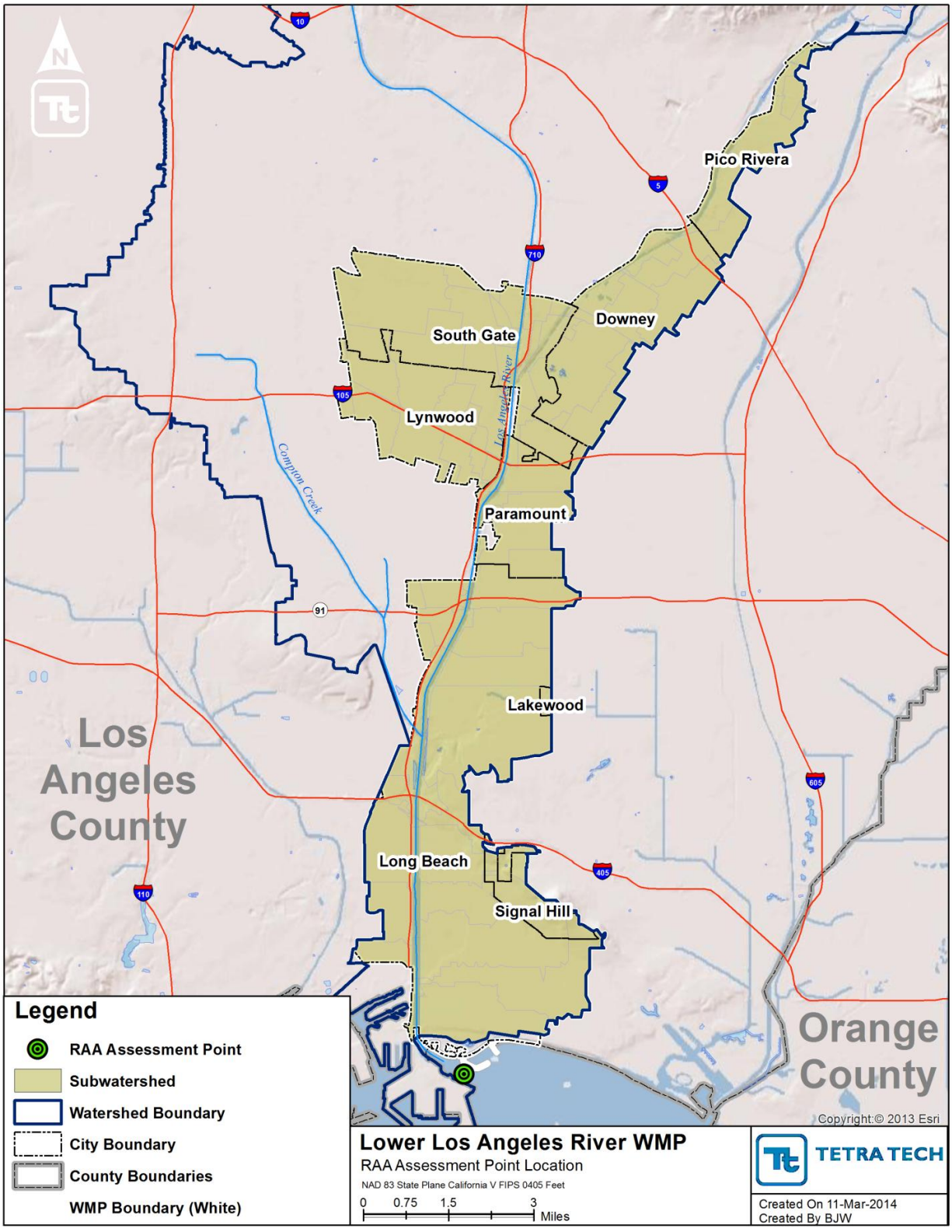


Figure 3-2. Lower LA River WMP Area subwatersheds represented by WMMS

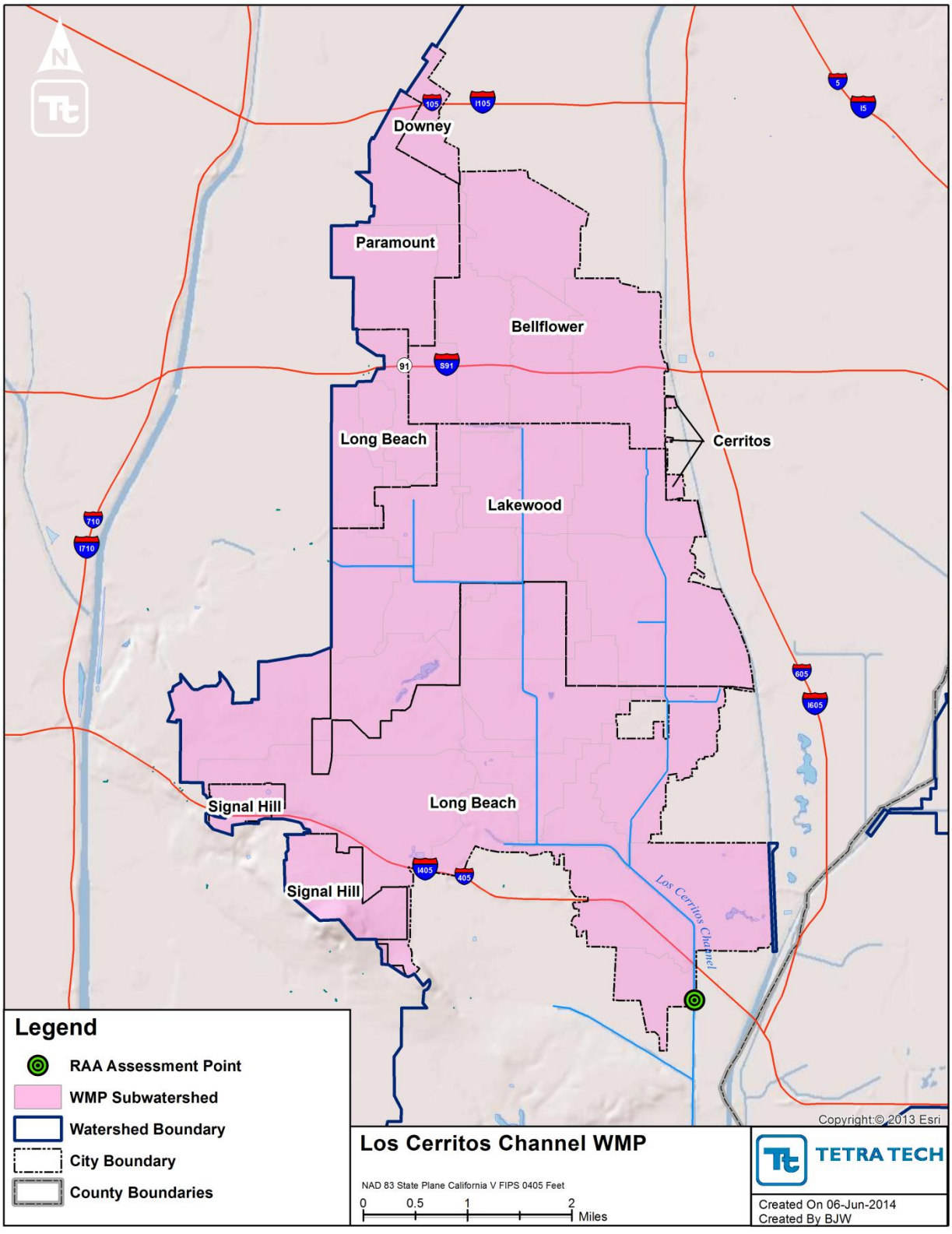


Figure 3-3. Los Cerritos WMP Area subwatersheds represented by WMMS

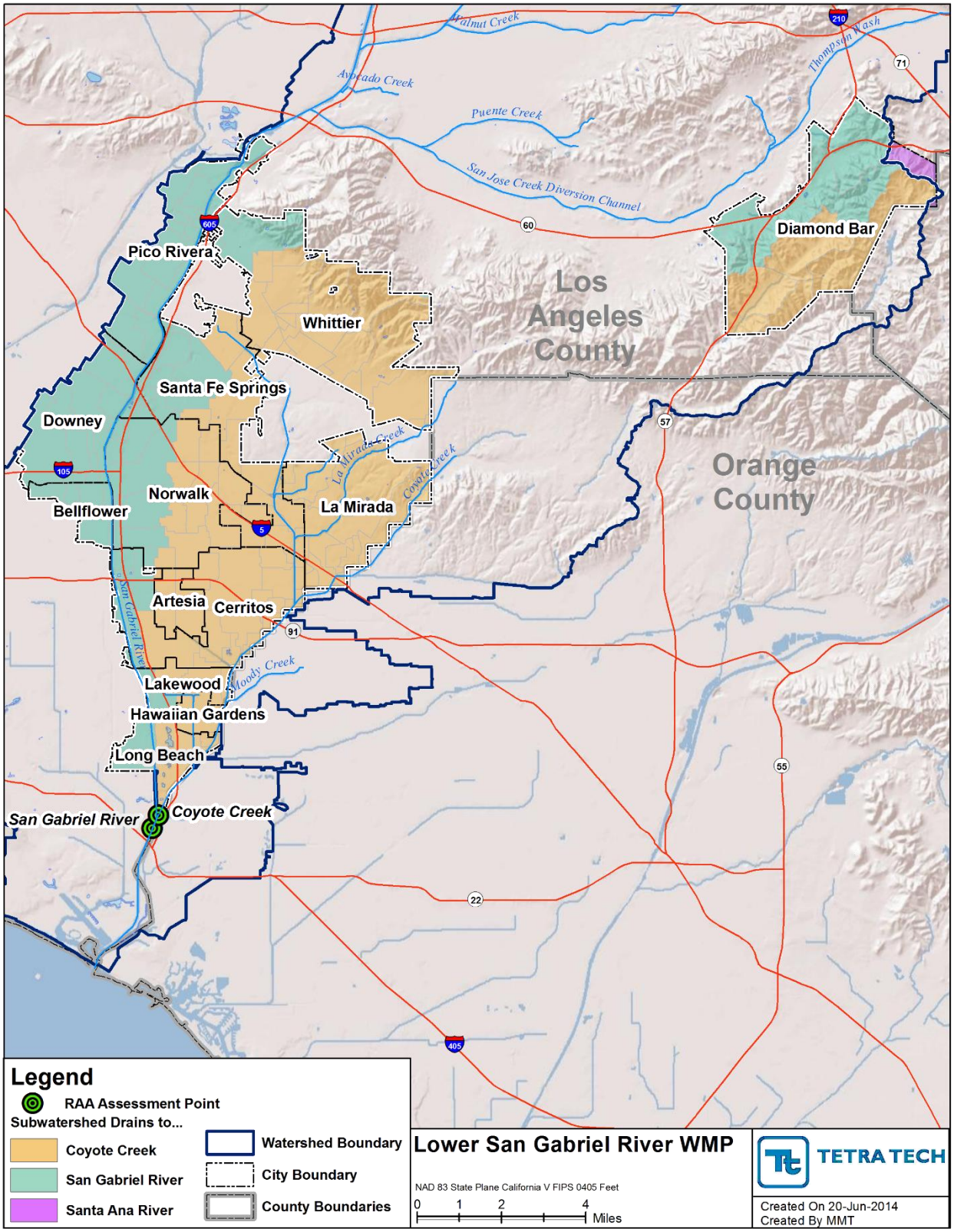


Figure 3-4. Lower San Gabriel River WMP Area subwatersheds represented by WMMS

3.2. Small-Scale BMP Model – SUSTAIN

The System for Urban Stormwater Treatment and Analysis INtegration (SUSTAIN) was developed by USEPA to support practitioners in developing cost-effective management plans for municipal storm water programs and evaluating and selecting BMPs to achieve water resource goals (USEPA, 2009). It was specifically developed as a decision-support system for selection and placement of BMPs at strategic locations in urban watersheds. It includes a process-based continuous simulation BMP module for representing flow and pollutant transport routing through various types of structural BMPs. Users are given the option to select from various algorithms for certain processes (e.g., flow routing, infiltration, etc.) depending on available data, consistency with coupled modeling assumptions, and the level of detail required. Figure 2-3 shows images from the SUSTAIN model user interface and documentation depicting some of the available BMP simulation options in a watershed context.

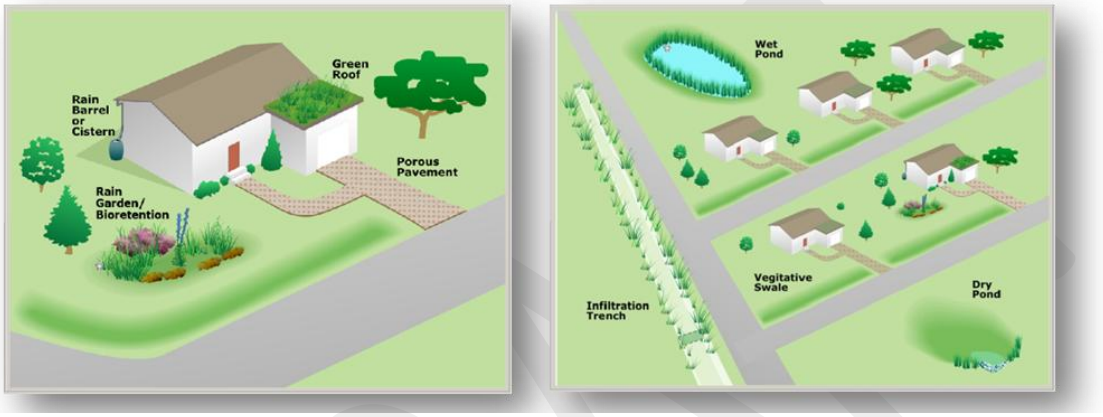


Figure 2-3. SUSTAIN model interface illustrating some available BMPs in watershed settings

SUSTAIN extends the capabilities and functionality of traditionally available models by providing integrated analysis of water quantity, quality, and *cost factors*. The SUSTAIN model in WMMS includes a cost database comprised of typical BMP component cost data from a number of published sources including BMPs constructed and maintained in Los Angeles County. SUSTAIN considers certain BMP properties as "decision variables," meaning that they are permitted to change within a given range during model simulation to support BMP selection and placement optimization. As BMP size changes, so do cost and performance. SUSTAIN runs iteratively to generate a cost-effectiveness curve comprised of optimized BMP combinations within the modeled study area (e.g., the model evaluates the optimal width and depth of certain BMPs to determine the most cost-effective configurations for planning purposes).

3.3. Large-Scale BMP Optimization Tool – NIMS/SUSTAIN

WMMS was specifically designed to dynamically evaluate effectiveness of BMPs implemented in subwatersheds for meeting downstream RWLs while maximizing cost-benefit. WMMS employs optimization based on an algorithm names Nonlinearity-Interval Mapping Scheme (NIMS) to navigate through the many potential scenarios of BMP strategies and identify the strategies that are the most cost effective (Zou et al. 2010). Given the relatively small spatial scale of the WMP area, NIMS was not applied for this study. Instead, a two-tiered approach was applied using the NSGA-II solution technique available in SUSTAIN. For Tier 1, treatment capacities were optimized for each contributing segment, which resulted in unique cost-effectiveness curves for each segment based on available opportunities therein. For Tier 2, the search space was composed of Tier 1 solutions, thereby streamlining the search process. The resulting Tier 2 curve represents the optimal large scale solution because it is comprised of optimized Tier 1 solutions. This approach is especially useful for prioritizing areas for management for scheduling implementation milestones as described in Section 8.

4. Current/Baseline Pollutant Loading

The LSPC model within WMMS was reconfigured and recalibrated specifically for the WMP areas to provide an estimate of current/existing pollutant loads from jurisdictions within the WMPs. Reconfiguration of model subwatersheds was performed to provide specific accounting of loadings from individual jurisdictions. Calibrations were performed to meet specifications of the RAA Guidelines (LARWQCB 2014).

4.1. Model Calibration to Existing Conditions

The LSPC watershed model was originally calibrated for hydrology using a regional approach relying on USGS observed daily streamflow datasets through Water Year (WY) 2006 (LACDPW 2010a). Water Quality was then calibrated using small-scale, land use level water quality monitoring data to develop representative event mean concentrations by land use (LACDPW 2010b). Model performance was also validated at the mass emissions monitoring stations in the context of a county-wide modeling effort. The calibration period for the original WMMS LSPC model began in 1996 and ended in 2006. For the RAA, an analysis was performed to evaluate performance of the LSPC model as it relates to the LLAR, LCC, and LSGR watersheds to understand and benchmark its applicability for use as a baseline condition. The evaluation of monitoring data was extended beyond the original WMMS-LSPC calibration to include the period from 10/1/2001 through 9/30/2011 incorporating both the average year (WY 2008) and 90th percentile (WY 2003) year.

Data available for the LACDPW water quality and hydrologic monitoring stations, S10 and F319 were used to reexamine simulated water quality and hydrology conditions in LA River. The two stations are co-located just south of the West Wardlow Road overpass and drain approximately 800 square miles, or nearly the entire LA River watershed. The monitoring stations were selected for comparison due to their location near the outlet of the LA River watershed, which encompasses the aggregate contributions of all upstream pollutant sources. The selected flow gage, F319, was also used to calibrate the WMMS LSPC model and, therefore, links the current and previous efforts. Water quality and hydrologic records for WYs 2003–2011 were compared to the simulated watershed model output to determine the necessary model parameter adjustments to establish an up-to-date model calibration. The locations of these two gages are presented in Figure 4-1. Statistical summaries and flow regime analysis of the water quality monitoring datasets from the Los Angeles River mass emission station S10 are presented in Attachment E.

Watershed model simulation of existing water quality conditions for the LCC watershed were evaluated for WYs 2003–2011 using data collected at the City of Long Beach Stearns Street monitoring location, just north of interstate 405. The water quality monitoring location is positioned at the WMP hydrologic outlet and captures the cumulative watershed loading effects impacting water quality conditions in this 27 square mile portion of the LCC watershed. No flow monitoring data are available in the watershed, thus simulated flow conditions could not be evaluated against observed data for LCC. The location of the water quality monitoring is presented in Figure 4-1 below and statistical summaries of the monitoring dataset are presented in Attachment E.

For the LSGR, hydrology was re-assessed at two monitoring locations using available data from WYs 2001-2011 The two monitoring locations selected include USGS 11087020 San Gabriel River at Whittier Narrows Dam CA and the LACDPW streamflow gage F354 located along Coyote Creek south of Spring Street (coincident with mass emission station S13). The USGS gage was selected for continuity with the development and calibration of the original WMMS LSPC modeling system. The primary monitoring location selected to calibrate water quality for LSGR was the LA County mass emission station S14. The San Gabriel River Monitoring Station is located below San Gabriel River Parkway in Pico Rivera. At this location the upstream tributary area is 450 square miles (LACDPW 2013). A second mass emission station, the Coyote Creek Monitoring Station (S13) located below Spring Street in the lower San Gabriel River watershed was also used to validate the water quality calibration. The locations of these two gages are presented below in Figure 4-1. Statistical summaries and flow regime analysis of the water quality monitoring datasets from the San Gabriel River and Coyote Creek mass emission stations S14 and S13 are presented in Attachment E.

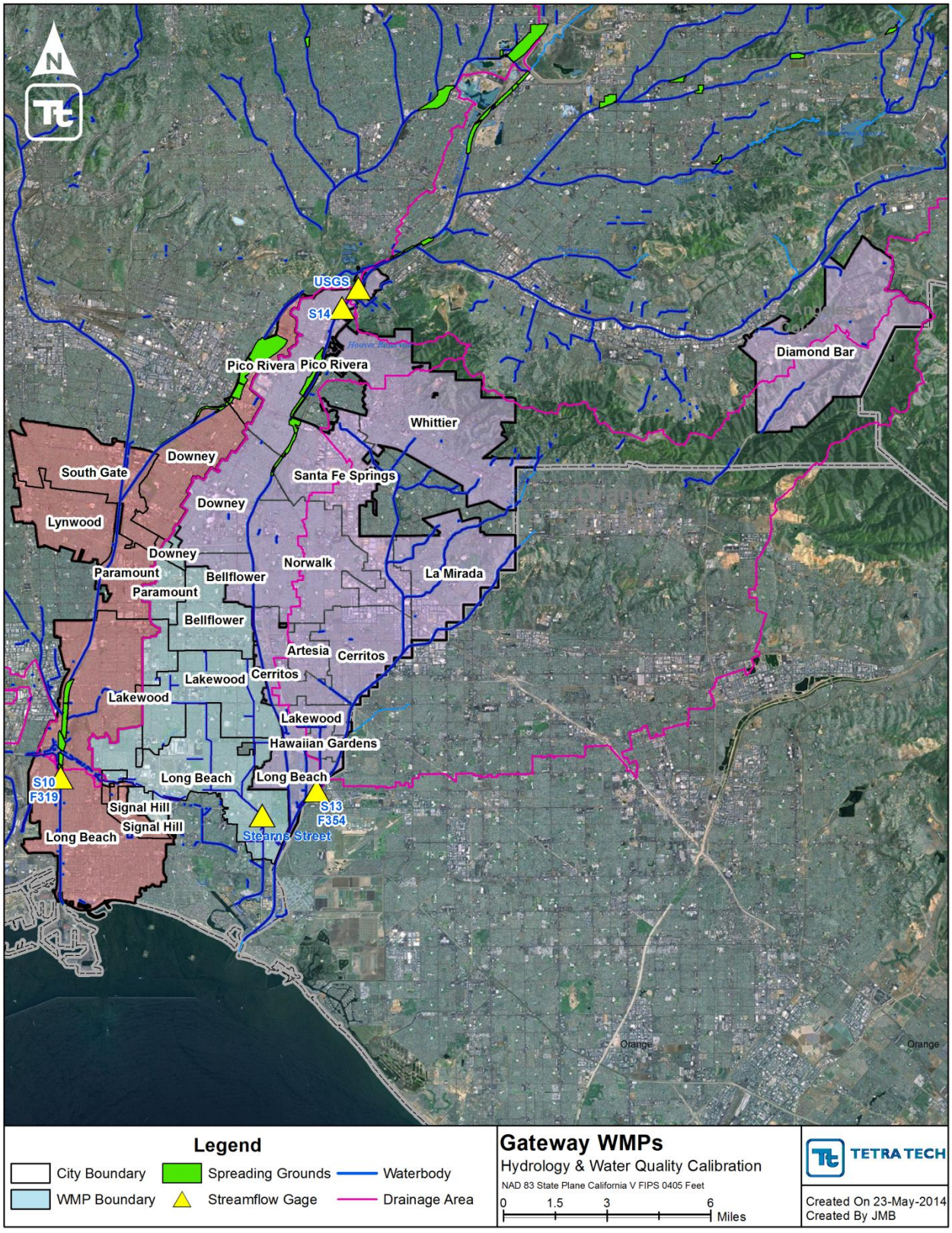


Figure 4-1. WMP groups hydrology and water quality calibration sites.

To demonstrate the ability to predict the effect of watershed processes and management actions, model calibration and validation are necessary and critical steps in any model application. Acceptable model calibration criteria for

benchmarking an RAA were developed by the Regional Board and are listed below in Table 4-1 (LARWQCB 2014). The objectives of establishing model assessment criteria are to ensure the calibrated model reflects all the model conditions and properly utilizes the available modeling parameters, thus yielding meaningful results. The lower bound of "Fair" level of agreement listed in Table 4-1 is considered a target tolerance for the model calibration process.

Table 4-1. Model assessment criteria from the RAA Guidelines

Constituent Group	Percent Difference Between Modeled and Observed		
	Very Good	Good	Fair
Hydrology / Flow	0 – 10	>10 – 15	>15 – 25
Sediment	0 – 20	>20 – 30	>30 – 40
Water Quality	0 – 15	>15 – 25	>25 – 35
Pesticides / Toxics	0 – 20	>20 – 30	>30 – 40

4.1.1. Hydrology Calibration

Table 4-2 and Table 4-3 present the hydrology calibration assessment for the Lower Los Angeles River and Lower San Gabriel River gages, respectively. Nash-Sutcliffle efficiency is a correlation coefficient commonly used in hydrological modeling to measure how well a model predicts temporal variation. A value of 1.0 means a perfect match between modeled and observed. A value of 0 means that the computed mean of observed data is as good a predictor as the model. A negative value means that the data-mean is a better predictor than the model. Because the Regional Board guidance only required annual average flow volume metric, evaluating Nash-Sutcliffe helped to demonstrate that the model also performed well at predicting *intra-annual* flow variablilty.

Table 4-2. Summary of model hydrology calibration performance for Lower Los Angeles River

Water Quality Parameter	Model Period	Hydrology Parameter	Modeled vs. Observed Volume (% Error)	Regional Board Guidance Assessment
In-stream flow at Los Angeles River below Wardlow Road (LA DPW F319)	10/1/2002 – 9/30/2011	Flow Volume	11.88	Good
		Nash-Sutcliffe	0.678	n/a

Table 4-3. Summary of model hydrology calibration performance for Lower San Gabriel River

Water Quality Parameter	Model Period	Hydrology Parameter	Modeled vs. Observed Volume (% Error)	Regional Board Guidance Assessment
In-stream flow at SAN GABRIEL R AB WHITTIER NARROWS DAM CA (USGS 1108702)	10/1/2001 – 9/30/2011	Flow Volume	-19.0	Fair
		Nash-Sutcliffe	0.74	n/a
Coyote Creek near Spring Street (LA DPW F354)	10/1/2003 – 9/30/2011	Flow Volume	4.9	Very Good
		Nash-Sutcliffe	0.61	n/a

4.1.2. Water Quality Calibration

Water quality calibration for the LLAR, LCC, and LSGR incorporated sampling from LA County mass emission stations at S10 (LA River), Strearns Street (LCC), and S13 and S14 along Coyote Creek and the San Gabriel River, respectively. The updated observed concentration data collected at these sites were used to refine the calibration and benchmark model performance. Daily observed loads were calculated by multiplying observed concentration and daily observed flow. Daily loads were estimated for LCC using simulated flows due to the lack of observed data. The percent error between this daily observed load and the daily modeled load was then calculated for each constituent. The results of this evaluation at the two gages are presented in Table 4-4 through Table 4-7.

Table 4-4. Summary of model performance by constituent at the Los Angeles River (S10) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	91	-6.8	Very Good
Total Copper	58	-3.4	Very Good
Total Zinc	58	-18.1	Good
Total Lead	52	-0.1	Very Good
Fecal Coliform	57	-5.1	Very Good
Total Nitrogen	58	-4.0	Very Good
Total Phosphorous	57	6.9	Very Good

Table 4-5. Summary of model performance by constituent at Los Cerritos Channel (Stearns St.) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	85	2.7	Very Good
Total Copper	57	-2.1	Very Good
Total Zinc	56	1.5	Very Good
Total Lead	57	2.2	Very Good
Fecal Coliform	55	1.0	Very Good
Total Nitrogen	56	17.5	Good
Total Phosphorous	56	-0.4	Very Good

Table 4-6. Summary of model performance by constituent at the San Gabriel River (S14) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	45	8.57	Very Good
Total Copper	42	-9	Very Good
Total Zinc	44	16.1	Very Good
Total Lead	44	-3.97	Very Good
Fecal Coliform	43	1.85	Very Good
Total Nitrogen	*Not evaluated at this location*		
Total Phosphorous	44	-2.27	Very Good

Table 4-7. Summary of model performance by constituent at the Coyote Creek (S13) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	42	1.28	Very Good
Total Copper	27	-28.9	Fair
Total Zinc	27	-32.44	Fair
Total Lead	25	-1.58	Very Good
Fecal Coliform	24	-34.48	Fair
Total Nitrogen	*Not evaluated at this location*		
Total Phosphorous			

Two fecal coliform samples were removed from the observed dataset at the San Gabriel River S14 mass emission station prior to performing the load calculation. These two samples appear to be outliers in the dataset with concentration values 10-100x greater than the remaining samples. These observations occurred on 10/17/2005 and 10/13/2009.

For pollutants not explicitly represented in the WMMS LSPC model, and for dry weather analysis, 90th percentile concentrations were calculated based on observed monitoring data at the LACDPW mass emission sites. The 90th percentile concentration was used for compliance with the Regional Board RAA guidelines (LARWQCB 2014). A summary of the 90th percentile concentrations for each constituent and waterbody are presented below in Table 4-8. For subsequent load reduction analyses, these concentrations were assumed for all wet or dry weather conditions they were assigned to represent existing conditions within their respective watersheds.

Table 4-8. 90th percentile concentrations assumed for non-modeled pollutants

Waterbody	Pollutant	Wet Weather	Dry Weather	90th Percentile Concentration	Units
Los Angeles River (S10)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Cadmium	●		4.8	ug/l
	Copper		●	25.68	ug/l
	Lead		●	3.43	ug/l
	E. coli		●	19,600	MPN/100 mL
Los Cerritos Channel (Stearns)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Copper		●	25.4	ug/l
	E. coli		●	14,200	MPN/100 mL
San Gabriel River (S14)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Copper		●	29.89	ug/l
	Selenium		●	4.77	ug/l
	E. coli		●	2,190	MPN/100 mL
Coyote Creek (S13)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Copper		●	28.54	ug/l
	E. coli		●	11,500	MPN/100 mL

[1] DDT, PCBs and PAHs were below MDL, so concentrations were assumed half MDL.

4.2. Current Best Management Practices/Minimum Control Measures

It is important to note the model calibration incorporates local stormwater BMPs implemented through late 2012 into the baseline condition. The only BMPs/control devices that were explicitly incorporated into the baseline model were the Dominguez Gap basins. All other BMPs, which individually were assumed to have a small effect on water quality at the watershed scale, are implicitly represented in the baseline condition. BMPs implemented in 2013 can be categorized as WMP implementation measures and their volume/load reductions are a component of the pollutant reduction plan for attaining interim and final milestones.

5. Estimated Required Pollutant Load Reductions

This section provides a description of the process for identifying critical conditions and calculating required load reductions to meet interim and final limitations.

5.1. Selected Average (Interim) and Critical (Final) Conditions

The RAA Guidelines specify that average conditions shall be used to establish load reductions for interim milestones and critical conditions shall be used to establish load reductions for final limits. In addition, the Permits provide two pathways for addressing WQ Priorities (see Figure 5-1):

- Volume-based: Retain the standard runoff volume from the 85th percentile, 24-hour storm
- Load-based: Achieve the necessary pollutant load reductions to attain Permit limits

Both types of numeric goals were evaluated as part of this RAA.

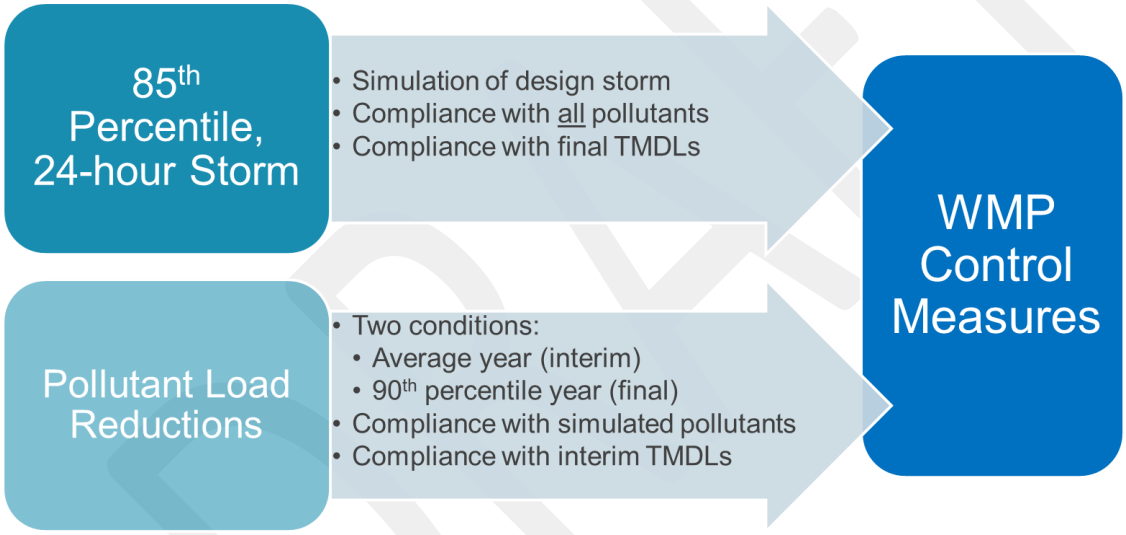


Figure 5-1. Two Types of Numeric Goals and WMP Compliance Paths according to the Permits

5.2. Representative Conditions for Wet Weather

Two approaches were considered and ultimately used in the RAA to represent wet weather critical conditions: the 90th percentile wet year and 85th percentile, 24-hour (design) storm, as described in the following subsections.

5.2.1. Average and 90th Percentile Wet Years

This RAA is based on continuous simulation, and a "representative" year-long time period was selected to represent average and critical conditions, which allows the modeling to capture the variability of rainfall and storm sizes/conditions. For LLAR, LCC, and LSGR, WY2008 was selected as the representative year for average conditions and WY2003 was selected as the representative year for the 90th percentile critical wet conditions.

To select these average and critical years for the RAA, the following steps were taken:

1. **Calculated key rainfall metrics for the last 25-years:** the average and critical years were identified by aggregating data from available rain gages across the entire Los Angeles River and San Gabriel River watersheds (LCC is in between, so the analysis for LLAR and LSGR also applies to LLC). For

comparison, other regional watersheds were also analyzed and presented. The two key metrics evaluated were: (1) total annual rainfall, and (2) average rainfall per wet day (with wet days defined as days with rainfall totals greater than 0.1 inches). The first is clearly an indicator of volume, while the second is an indicator of rainfall intensity. To evaluate long-term conditions, the analysis covered 25 water years (WY) from 1987 through 2011—the total rainfall for each precipitation gage was area-weighted and aggregated into annual totals by water year (i.e. previous October through current September).

2. **Selected years from the most recent 10-years that are most representative of average and 90th percentile**: per the RAA Guidelines, the most recent 10-year period represented in the available data were used to develop the RAA. Table 5-1 and Table 5-2 show average rainfall volumes and intensities (inches per wet day), respectively, for the most recent 10 years compared against the entire 25-years. Both the average and 90th percentile values were compared across the 10- and 25-year records. For the San Gabriel River, 2007-08 is a representative average year based on both the rainfall volume (Table 5-1) and intensity (Table 5-2) metrics. Because BMP performance is typically intensity-dependent, average rainfall per wet day (Table 5-2) was selected as a better metric for use in determining the 90th percentile than annual average rainfall (Table 5-1), which led to selection of 2002-03 as the critical year.

It should be noted that wet weather conditions were also reflective on the definition of dry/wet days. As described in Section 5, for analysis of non-bacteria pollutants (including the limiting pollutant zinc) days with greater than 90th percentile daily average flow were flagged as "wet," which aligns with the critical condition used for the LAR and LSGR metals TMDLs.

5.2.2. 85th Percentile, 24-hour Storm

The design storm is identified in the RAA Guidelines as an acceptable critical condition, and capture of design storm volumes by BMPs is a specified compliance metric in the Permits for TMDLs. The design storm was evaluated and used as a wet weather critical condition for the RAA. As described above, the design storm is a volume-based standard. Each subwatershed within each WMP area has a unique 85th percentile runoff volume, due to varying rainfall amounts and land characteristics (imperviousness, soils, slope, and the like). The rainfall depths associated with the 85th percentile, 24-hour storm are shown in Figure 5-2, based on rolling 24-hour intervals for the 25-year period between October 1, 1987 and September 30, 2011. Within the WMP area, the 85th percentile rainfall depth values range between 0.72 and 1.08 inches.

To determine the "standard volume" associated the design storm, initial conditions were set in LSPC to reflect representative conditions at the start of the simulation, along with regionally derived infiltration rates, and 85th percentile rainfall depths were used as rainfall boundary conditions. At each location the storm distribution presented in Figure 5-3 was used to temporally distribute the 24-hour rainfall volumes (LACDPW 2006). The model was then run to predict the associated runoff volumes for each subwatershed in the WMP area. Those runoff volumes represent the volumes that would need to be retained in order to attain the numeric goals associated with the 85th percentile, 24-hour storm.

Shown in Figure 5-4 are the rainfall depths and runoff depths (runoff volume divided by subwatershed area) associated with the design storm for each subwatershed in the WMP areas. About 50 percent of the subwatersheds in all three WMP areas experiences 0.4 inches or more of runoff under the 85th percentile, 24-hour storm, while about 10 percent of the area experiences about 0.55 inches or more of runoff. Figure 5-5 summarizes the total design storm volumes (in acre-feet) for each jurisdiction. The runoff depths for each subwatershed in the WMP area are graphically shown in Figure 5-6, Figure 5-7, and Figure 5-8.

Table 5-1. Average Rainfall Depths (Water Years 2002–2011 vs. 25-year Average and 90th Percentile)

Year	Average Rainfall Totals (in./year)				
	Ballona Creek	Dominguez Channel	Malibu Creek	San Gabriel River	Los Angeles River
2001-02	25.4	19.1	28.1	30.6	30.5
2002-03	17.1	13.9	20.8	23	20.4
2003-04	10.2	8.1	9.2	13.7	11.2
2004-05	39.3	28.4	42.6	49.6	46.7
2005-06	14.1	9.8	16.9	17.9	17.5
2006-07	4.3	3.1	6.8	6.4	5.8
2007-08	13.2	11.9	18.6	19.4	17.5
2008-09	9.6	8.5	12.3	14.6	12.5
2009-10	16.8	14.9	20.3	24.1	20.5
2010-11	21.2	18.5	25.3	28.5	25.7
Avg. (1987-2011)	15.9	12.5	18.4	20.7	19.2
90th %ile (1987-2011)	30.8	22.9	34.7	37.8	36.9

Red Box: WMP Watersheds. Blue highlighted cells are the two years in each basin with the smallest difference from the 25-year average. Orange cells have the smallest difference from the 90th percentile of the 25-year record.

Table 5-2. Average Rainfall Intensity (Water Years 2002–2011 vs. 25-year Average and 90th Percentile)

Year	Average Rainfall Per Wet Day (in./wet day)				
	Ballona Creek	Dominguez Channel	Malibu Creek	San Gabriel River	Los Angeles River
2001-02	0.36	0.32	0.41	0.42	0.36
2002-03	0.79	0.66	0.88	0.92	0.84
2003-04	0.61	0.48	0.61	0.66	0.58
2004-05	0.98	0.69	1.03	1.07	1.03
2005-06	0.53	0.41	0.61	0.64	0.61
2006-07	0.31	0.27	0.39	0.41	0.37
2007-08	0.56	0.52	0.68	0.76	0.71
2008-09	0.49	0.48	0.56	0.65	0.57
2009-10	0.64	0.6	0.71	0.82	0.72
2010-11	0.62	0.58	0.73	0.76	0.7
Avg. (1987-2011)	0.59	0.52	0.67	0.72	0.66
90th %ile (1987-2011)	0.78	0.66	0.91	0.97	0.89

Red Box: WMP Watersheds. Blue highlighted cells are the two years in each basin with the smallest difference from the 25-year average. Orange cells have the smallest difference from the 90th percentile of the 25-year record.

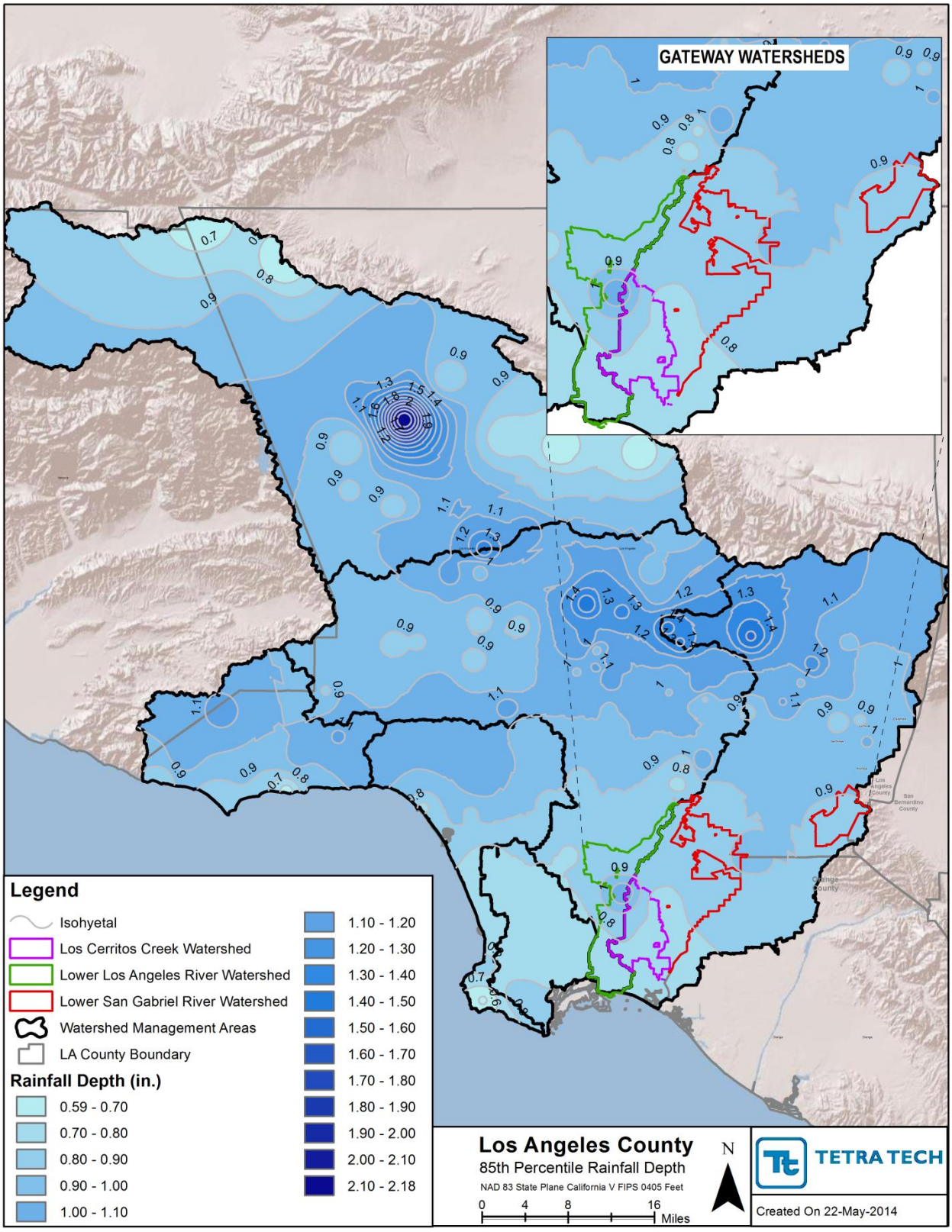


Figure 5-2. Rainfall depths associated with the 85th percentile, 24-hour storm.

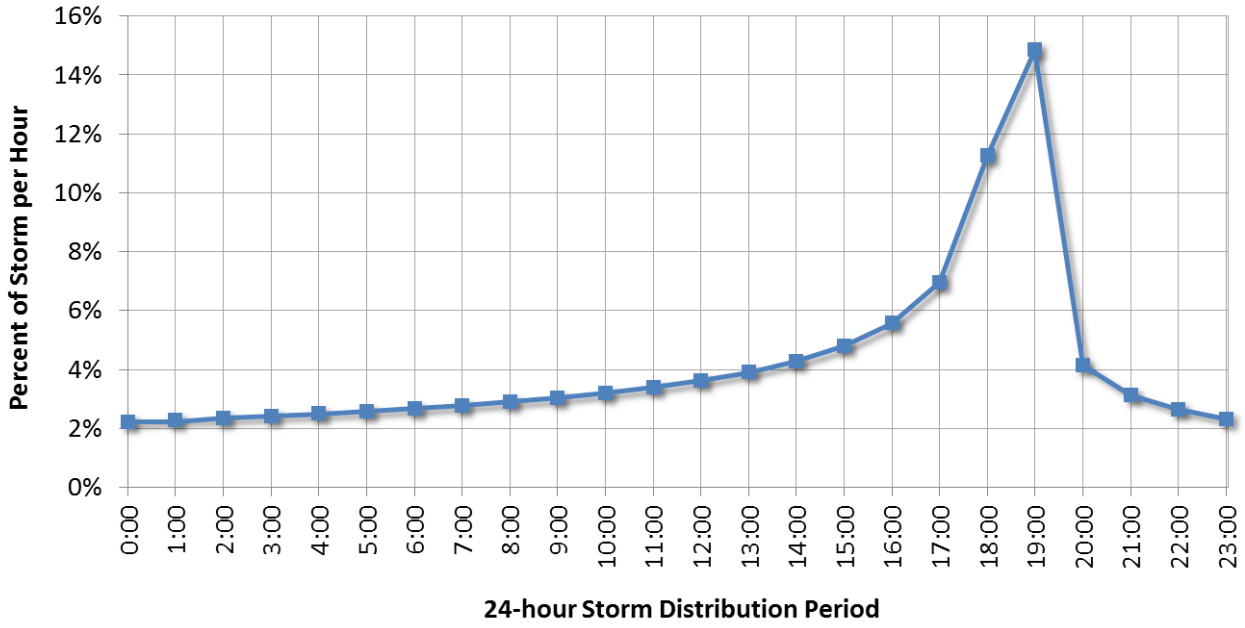


Figure 5-3. Temporal Distribution for 85th Percentile 24-hour Storm for LSPC Simulation.

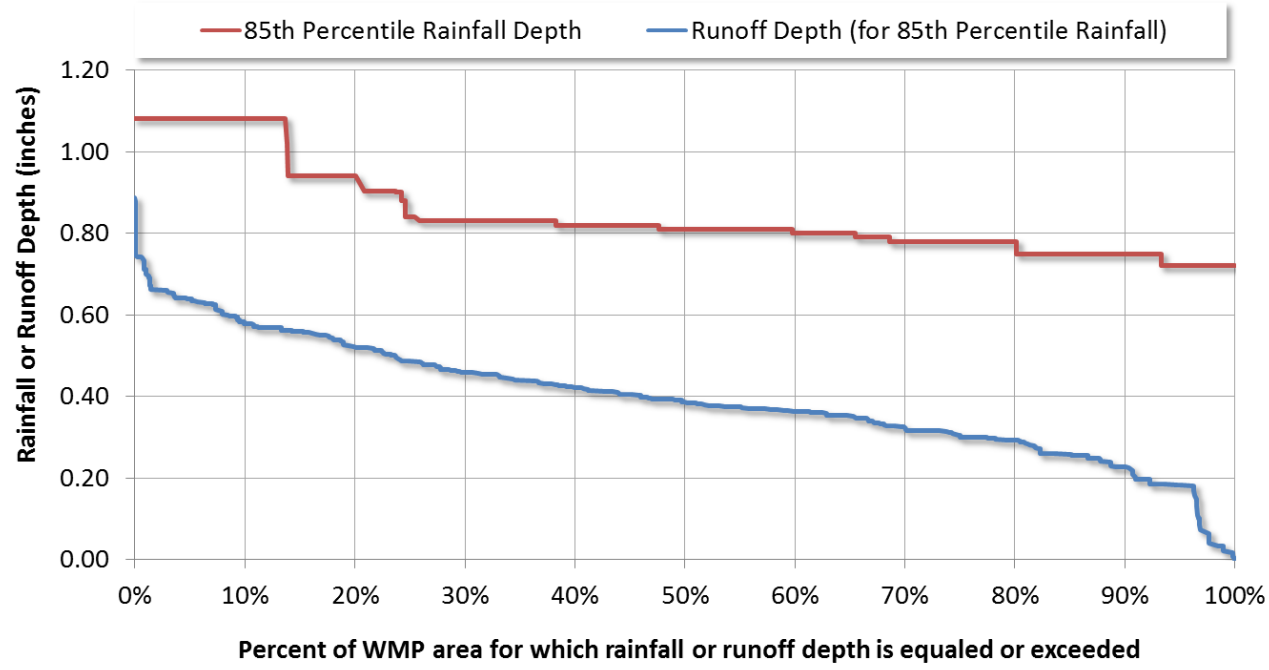


Figure 5-4. Rainfall and Runoff Depths Associated with 85th Percentile Rainfall in the WMP subwatersheds.

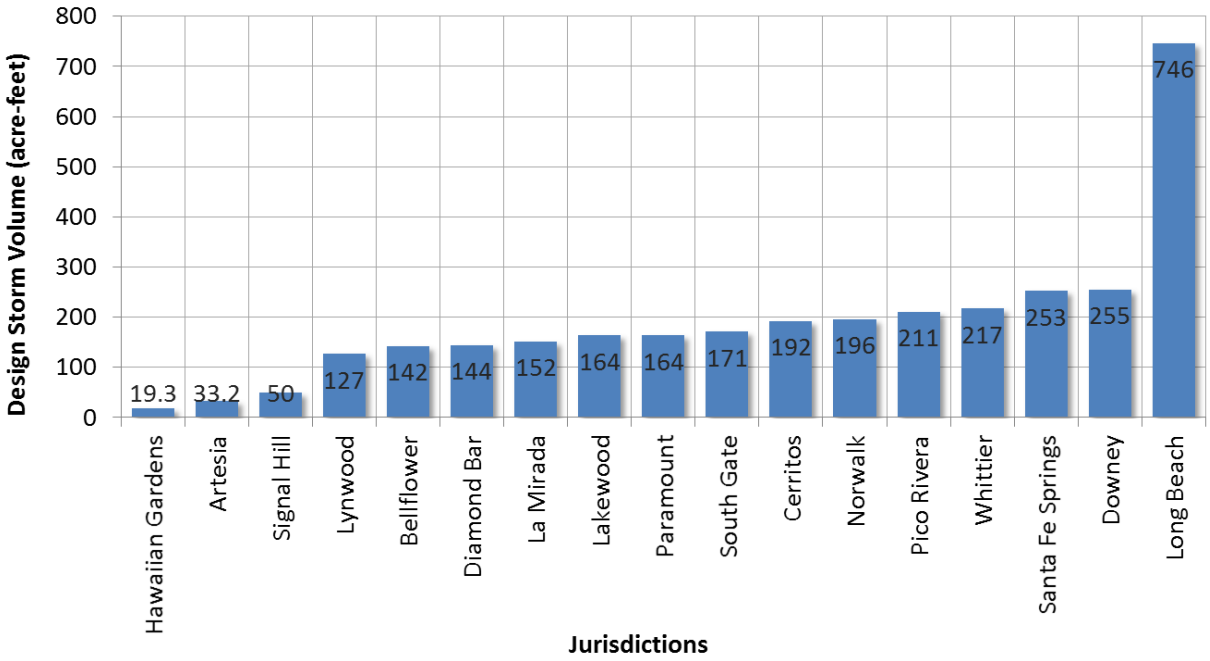


Figure 5-5. Runoff Volume Associated with the 85th Percentile, 24-hour Storm (by jurisdiction).

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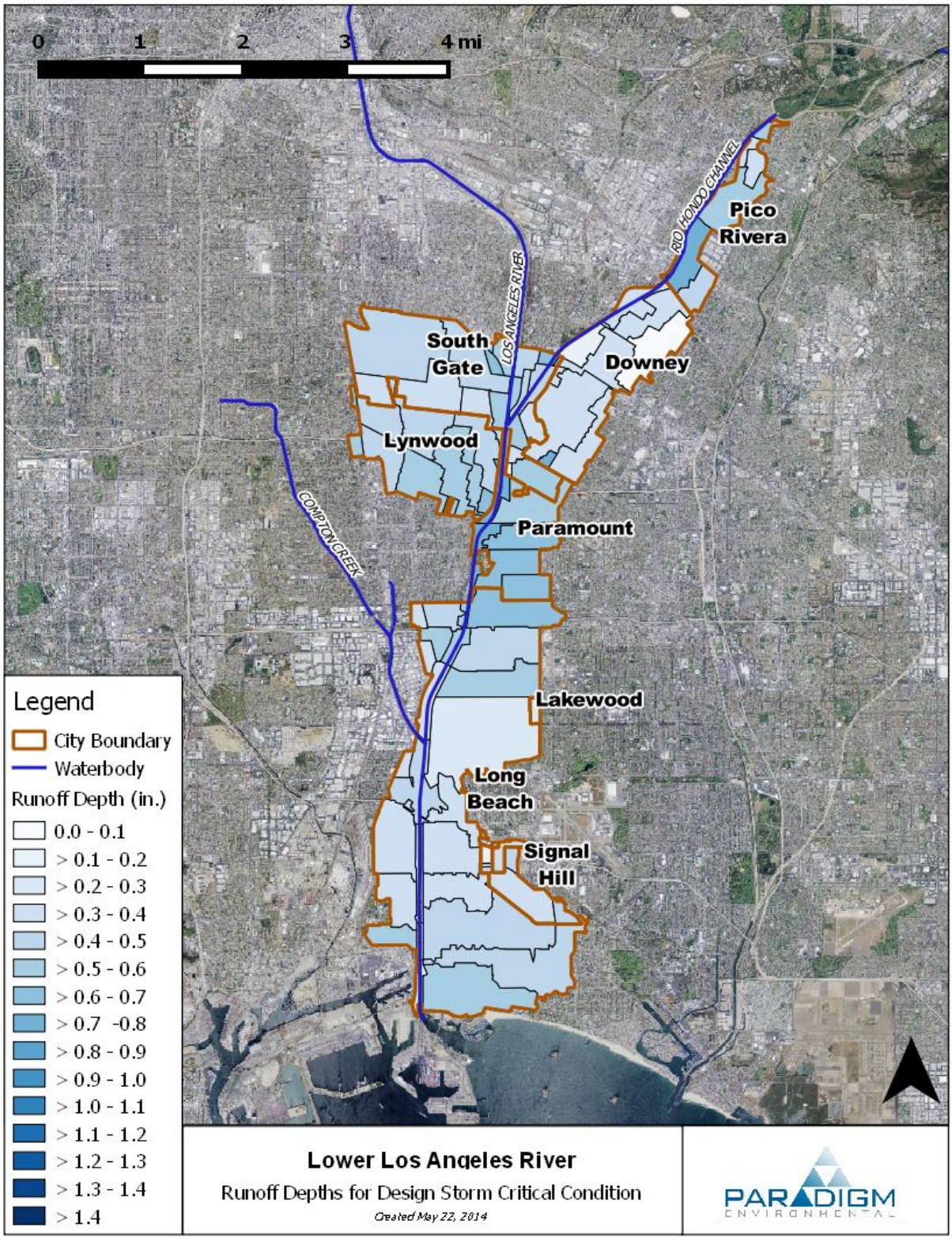


Figure 5-6. Runoff Associated with the 85th Percentile, 24-hour Storm for Lower Los Angeles River.

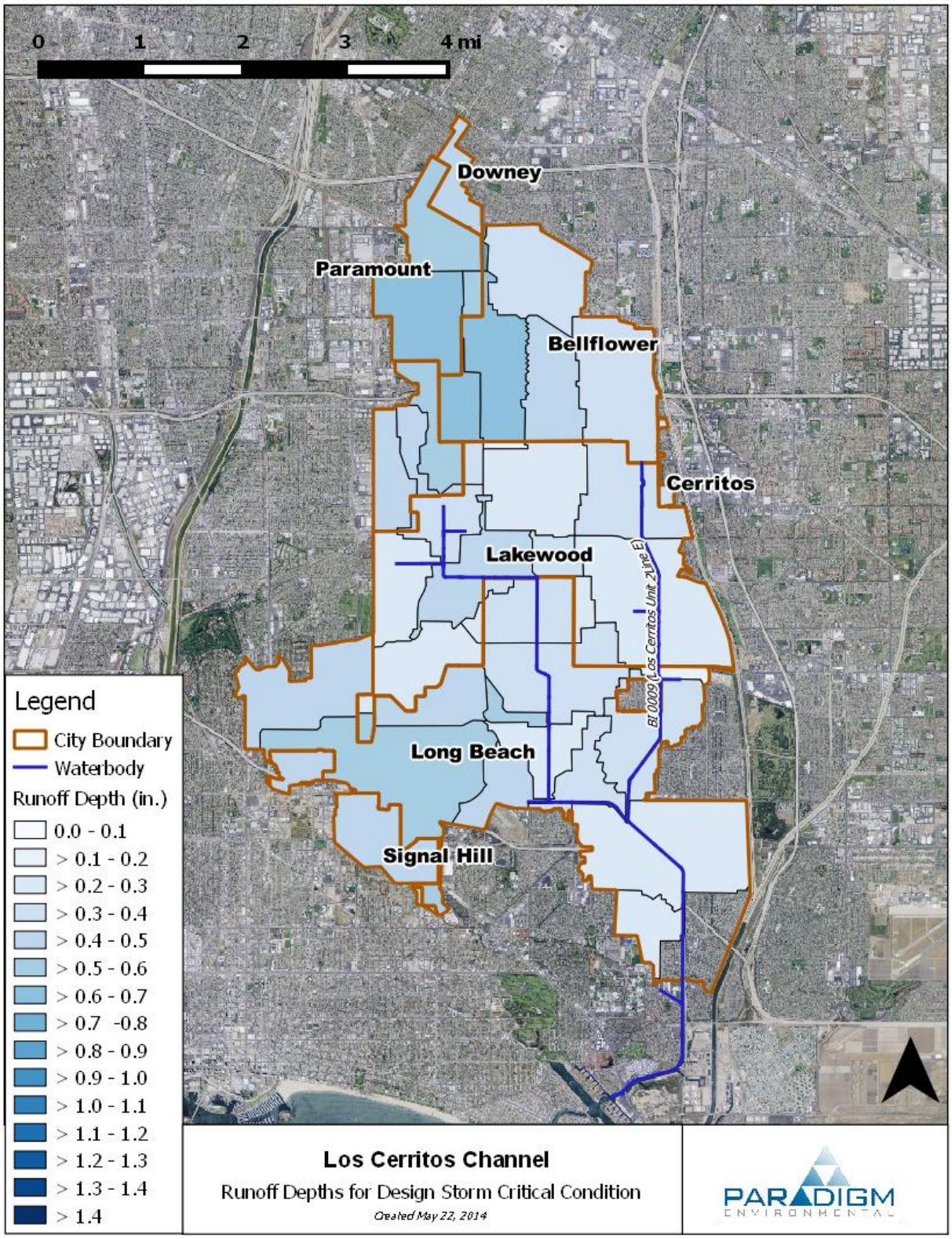


Figure 5-7. Runoff Associated with the 85th Percentile, 24-hour Storm for Los Cerritos Channel.

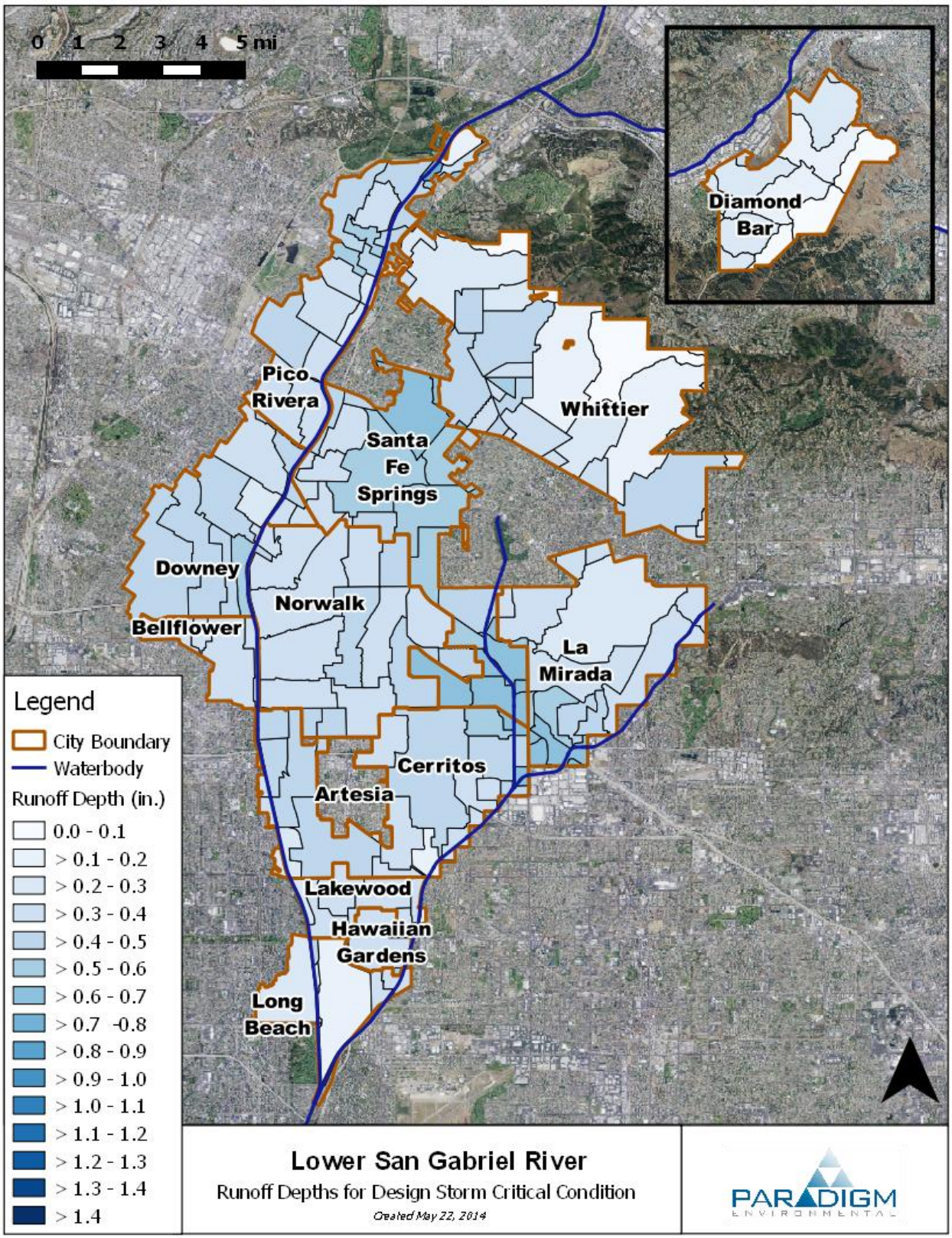


Figure 5-8. Runoff Associated with the 85th Percentile, 24-hour Storm for Lower San Gabriel River.

5.2.3. Representative Conditions for Dry Weather

Although clearly defined definitions exist for wet periods, definitions for dry periods are less clearly defined. Wet weather periods are either defined in terms of rainfall or instream flow. For bacteria, a wet day is one with a rainfall total greater than 0.1 inches plus the three subsequent days, while metals criteria define wet days as those with instream flow above the 90th percentile. One seemingly intuitive way of defining a dry period is simply to use the "non-wet" days represented as the inverse of wet days. However, summary of model results indicate some residual influence of wet weather among the "non-wet" days. This presents some challenges for estimating loads and evaluating dry weather compliance because BMP planning would be better served by choosing design conditions that are more influenced by natural background baseflow and/or anthropogenic activities such as point source discharges or dry weather runoff from irrigation (instead of post-rain event interflow).

The RAA Guidelines recommend using the most recent 10 years of data for modeling scenarios to ensure that the plans are based on a representative range of wet and dry conditions. Regional precipitation and instream flow patterns are highly variable; therefore, a representative dry period is one that consistently represents minimal influence to wet weather conditions. To identify a representative dry period, the analysis covered 25 WYs from 1987 through 2011. The following steps were taken:

1. The total rainfall for each precipitation gage in the study area was summarized and classified into wet and non-wet periods according to the bacteria criteria definition for wet weather (i.e. days with rainfall > 0.1 inches plus the three subsequent days).
2. Dry periods were evaluated on a monthly time scale. Table 5-3 shows the average number of consecutive 30-day dry periods, counted by month of the associated mid-interval date, for each of the rainfall gages within the three WMP areas over the 25 years of rainfall evaluated. The color-ramp indicates relative dryness, with red being driest. Table 5-3 indicates that on average, the months of June, July, and August are the driest months in the year, averaging 24-30 consecutive dry intervals. Note that because this table counts mid-interval dates by month, values approaching 30 actually indicate continuous dry intervals approaching 60 days (15 days on either side of the 30 day interval).
3. Select periods within the average and critical year were identified for dry weather simulations. The areal coverage or non-wet intervals in the two selected representative years (2008 and 2003) were compared against the 10-year period (2001-2011) and the long-term 25-year period (1998-2011). Figure 5-9, Figure 5-10, and Figure 5-11 show the selected representative dry period against summaries of non-wet weather conditions in the LLAR, LCC, and LSGR WMP areas, respectively. Within the two selected years, the 45-day period between 8/17 and 9/30 was found to be the most representative of dry weather conditions because (1) no rainfall occurred at any of the gages throughout all three WMP areas, (2) it was during a time of the year that was historically shown to experience the least amount of spatially-weighted rainfall in a year, and (3) it was late in the summer following an extended period of no rainfall for both 2003 and 2008.

The identified periods between 8/17 and 9/20 during the average and critical years were used for subsequent dry weather simulations for the dry weather component of the RAA.

Table 5-3. Consecutive 30-day Dry Periods per month by WMP and rainfall gage (10/1/1987 – 9/30/2011)

WMP	StaID	Average Number of Consecutive 30-Day Dry Intervals Per Month (10/1/1987 – 9/30/2011)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Los Cerritos Channel	D1254	2.2	1.9	6.2	11.9	22.3	25.2	28.9	28.9	21.4	12.7	7.8	4.4
	D1255	2.8	1.8	4.4	8.8	20.3	25.1	29.7	29.8	21.8	13.0	7.3	2.9
	D225	3.0	2.3	6.3	10.5	20.6	24.7	28.8	29.5	21.4	13.1	9.1	3.6
	D388	2.1	1.3	3.8	8.5	18.6	24.0	27.6	29.2	21.0	12.3	5.1	3.2
	D415	1.9	1.2	5.7	9.6	19.0	24.0	28.1	29.1	23.4	13.1	8.9	3.7
Lower Los Angeles River	D1113	4.2	2.5	8.3	9.8	19.5	24.4	28.1	27.8	23.6	13.7	8.8	4.5
	D1114	1.6	1.1	4.0	8.9	19.6	25.1	29.7	29.6	20.8	12.3	5.5	3.0
	D1256	2.1	1.4	4.8	10.4	20.5	24.6	28.8	29.8	23.5	14.2	6.2	3.1
	D291	3.3	1.1	5.0	8.8	19.4	24.4	28.7	28.4	21.9	11.6	4.6	3.5
	D388	2.1	1.3	3.8	8.5	18.6	24.0	27.6	29.2	21.0	12.3	5.1	3.2
	D415	1.9	1.2	5.7	9.6	19.0	24.0	28.1	29.1	23.4	13.1	8.9	3.7
Lower San Gabriel River	D106	4.2	0.6	6.0	10.9	19.7	24.6	28.6	29.0	23.9	14.0	8.2	4.0
	D1088	2.2	1.0	3.8	9.0	17.6	24.1	28.5	29.0	20.9	12.6	5.9	2.7
	D1095	2.4	0.5	4.4	10.0	19.2	24.6	28.6	29.1	21.2	14.2	7.1	4.2
	D1114	1.6	1.1	4.0	8.9	19.6	25.1	29.7	29.6	20.8	12.3	5.5	3.0
	D1254	2.2	1.9	6.2	11.9	22.3	25.2	28.9	28.9	21.4	12.7	7.8	4.4
	D1255	2.8	1.8	4.4	8.8	20.3	25.1	29.7	29.8	21.8	13.0	7.3	2.9
	D1256	2.1	1.4	4.8	10.4	20.5	24.6	28.8	29.8	23.5	14.2	6.2	3.1
	D1257	2.0	0.5	4.5	10.6	18.9	24.4	28.6	29.8	21.2	10.3	5.7	3.0
	D1271	1.8	1.6	3.9	9.4	18.1	24.4	28.6	29.7	21.6	11.7	7.3	3.4
	D156	3.0	1.5	5.2	10.1	19.2	24.6	28.5	29.3	21.0	13.4	7.2	5.0
	D17	1.7	1.2	5.2	9.1	17.5	22.4	28.6	29.0	22.6	11.3	5.2	3.7
	D225	3.0	2.3	6.3	10.5	20.6	24.7	28.8	29.5	21.4	13.1	9.1	3.6
	D269	1.8	0.5	4.2	8.1	18.0	24.2	28.6	29.1	22.2	13.0	6.7	3.2

Legend: Wet → Dry

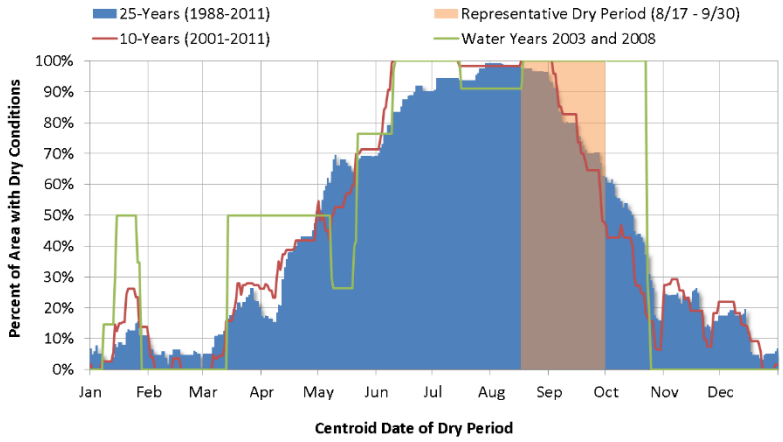


Figure 5-9. Spatiotemporal summary of non-wet weather conditions in the Lower Los Angeles River WMP area.

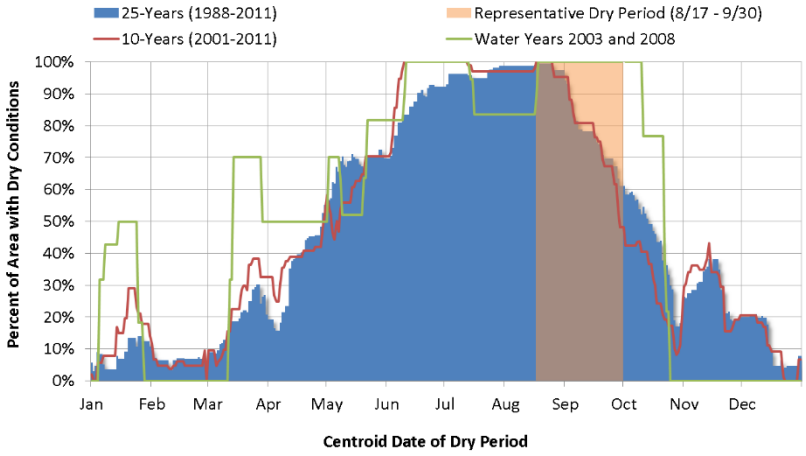


Figure 5-10. Analysis of summary of non-wet weather conditions in the Los Cerritos Channel WMP area.

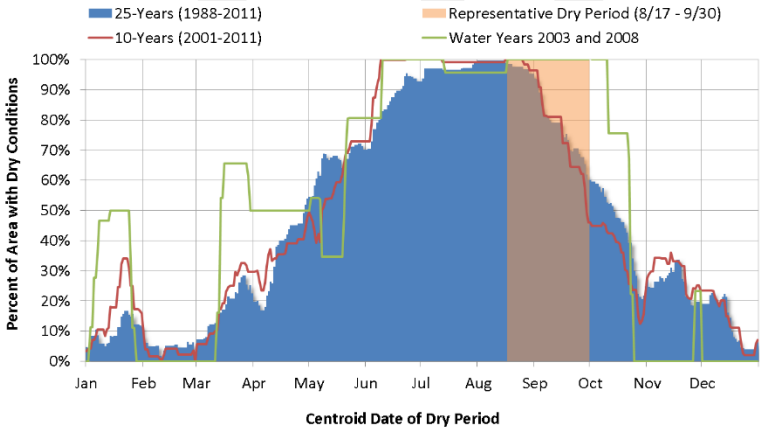


Figure 5-11. Spatiotemporal summary of non-wet weather conditions in the Lower San Gabriel River WMP area.

5.3. Calculated Required Pollutant Reductions to Achieve Final Limits

Using the average storm year (2007-08) and 90th percentile storm year (2002-03), required pollutant reductions were calculated for attainment of interim and final limitations, respectively, applicable to each WMP area. Per the RAA Guidelines, the percent reduction used to determine the control measures necessary to attain interim milestones shall be based on the average year, while the control measures for attainment of the final limits are based on the 90th percentile year.

Required load reductions were evaluated at RAA Assessment Points located at the bottom-most discharge from each WMP areas (shown in Figure 3-2 through Figure 3-4). The RAA Assessment Points represent locations where the collective discharge from each jurisdiction with each WMP area can be assessed to contribute to pollutant loads to the receiving waters. Pollutant loads outside of the WMP areas are not considered in this loading analysis at the RAA Assessment Points, although in reality other loads exist. However, transport of pollutant loads from individual jurisdictions within the WMP areas are considered, including the effect of LACFCD infrastructure and other hydraulic features that can impede flows and associated pollutant loads to the location of the RAA Assessment Points. The result is an accounting system that provides reasonable tracking and estimation of required load reductions throughout each individual WMP area so that meaningful goals can be set for BMP implementation planning.

Applicable targets for wet and dry conditions for Category 1 WQ Priorities (corresponding to the TMDLs within each watershed) are listed in Table 5-4 and Table 5-5, respectively. These targets were used to establish the daily "exceedance load" and daily "allowable load". The differences in these loads, as predicted by LSPC, were tracked across the average year and 90th percentile year and used to calculate the required pollutant reduction. While Category 1 WQ Priorities were emphasized, targets were also applied for Category 2 and Category 3 WQ Priorities. In particular, to provide a comprehensive WMP planning approach, copper, lead, zinc and *E. coli* were assessed for all RAA assessment points (even if a TMDL is not applicable).

For bacteria targets, it should be noted that Allowable Exceedance Days and high flow suspension (HFS) days were incorporated (if applicable) into the percent reduction calculation. The approach of the LA River Bacteria TMDL was used to align Exceedance Days and HFS days. The HFS applies to LLAR and LSGR but not LCC (and thus HFS days were not incorporated into the required reduction calculation for LCC). For LSGR and LCC, a bacteria TMDL has not been adopted but the RAA Guidelines state that targets and critical conditions from other TMDLs in the region should be utilized. If the Allowable Exceedance Days were removed from the percent reduction calculations for LSGR and LCC, the required reductions would increase.

Table 5-4. Applicable wet weather TMDL targets for Category 1 WQ Priorities

WMP Area	Waterbody	Pollutant	Target	Source
LLAR	LAR Reach 1 (freshwater)	Cd kg/d	$2.8x10^{-9}$ X daily storm volume (L) - 1.8	WQBEL
	LAR Reach 1 (freshwater)	Cu kg/d	$1.5x10^{-8}$ X daily storm volume (L) - 9.5	WQBEL
	LAR Reach 1 (freshwater)	Pb kg/d	$5.6x10^{-8}$ X daily storm volume (L) - 3.85	WQBEL
	LAR Reach 1 (freshwater)	Zn kg/d	$1.4x10^{-7}$ X daily storm volume (L) - 83	WQBEL
	All LLAR	DDT ug/kg TSS	1.58	Harbor Toxics TMDL
	All LLAR	PCBs ug/kg TSS	22.7	Harbor Toxics TMDL
	All LLAR	PAHs ug/kg TSS	4,022	Harbor Toxics TMDL
	LAR Reach 1 (freshwater)	*E-coli* MPN/100mL	235 (exceedances allowed during HFS days and 10 exceedance days)	WQBEL

WMP Area	Waterbody	Pollutant	Target	Source
LCC	All LCC	Cu g/d	$4.709X10^{-6}$ X daily storm volume (L)	WQBEL
	All LCC	Pb g/d	$26.852X10^{-6}$ X daily storm volume (L)	WQBEL
	All LCC	Zn g/d	$46.027X10^{-6}$ X daily storm volume (L)	WQBEL
	All LCC	DDT ug/kg TSS	1.58	Harbor Toxics TMDL
	All LCC	PCBs ug/kg TSS	22.7	Harbor Toxics TMDL
	All LCC	PAHs ug/kg TSS	4,022	Harbor Toxics TMDL
LSGR	SG Reach 2	Pb ug/L	81.34	WQBEL
	Coyote Cr.	Cu ug/L	24.71	WQBEL
	Coyote Cr.	Pb ug/L	96.99	WQBEL
	Coyote Cr.	Zn ug/L	144.57	WQBEL
	SG Reach 1 & Coyote Cr.	DDT ug/kg TSS	1.58	Harbor Toxics TMDL
	SG Reach 1 & Coyote Cr.	PCBs ug/kg TSS	22.7	Harbor Toxics TMDL
	SG Reach 1 & Coyote Cr.	PAHs ug/kg TSS	4,022	Harbor Toxics TMDL

Table 5-5. Applicable dry weather TMDL targets for Category 1 WQ Priorities

WMP Area	Waterbody	Pollutant	Target	Source
LLAR	LAR Reach 1 (freshwater)	Cu ug/L	23	WQBEL
	LAR Reach 1 (freshwater)	Pb ug/L	12	WQBEL
	LAR Reach 1 (freshwater)	*E-coli* MPN/100mL	126	WQBEL
LCC	All LCC	Cu g/d	67.2	WQBEL
	All LCC	*E-coli* MPN/100mL	126	WQBEL
LSGR	SG Reach 1	Cu ug/L	18	WQBEL
	SG Reach 1	*E-coli* MPN/100mL	126	WQBEL
	San Jose Cr. Reach 1&2	Se ug/L	5	WQBEL
	San Jose Cr. Reach 1&2	*E-coli* MPN/100mL	126	WQBEL
	Coyote Cr.	Cu kg/d	0.941	WQBEL
	Coyote Cr.	*E-coli* MPN/100mL	126	WQBEL

5.3.1. Wet-Weather Required Pollutant Reductions

The wet weather pollutant reduction targets for average and critical conditions are summarized in **Error! Reference source not found.** (all WMP areas) and shown graphically in Figure 5-12 through Figure 5-15 (individual WMP areas). These analyses were used to determine the limiting pollutant. The limiting pollutant is defined as the pollutant requiring the greatest load reduction, and BMPs implemented to achieve the limiting pollutant reductions are protective of other pollutant reductions (e.g., sediment or volume reductions). In **Error! Reference source not found.**, the red color gradient highlights limiting pollutants, with a deeper red generally indicating a more limiting pollutant. Zinc was identified as the limiting pollutant for each WMP area[4]. The determination of limiting pollutant considered implementation actions to control the pollutant – for example, State Bill 346 will result in significant reductions of copper loading from brake pads. Because total source control measures are not on the horizon for zinc, it becomes the limiting pollutant instead of copper. The evaluation of copper and organics as limiting pollutants and rationale for their exclusion is described below.

Although DDT and PCBs were estimated to have high load reduction requirements to meet WQBELs, they were not identified as limiting pollutants because the maximum detection limits (MDLs) used for the analysis heavily affected the calculated required reductions. Rather than use LSPC for reduction calculations, monitoring data were used directly and many reported concentrations for DDT, PCBs, and PAHs were below MDLs, so concentrations were assumed in the model to equal half the MDL. The MDL is above the target leading to non-detects requiring reductions. Of course, toxics will be addressed by control measures implemented for zinc. The Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL states that "implementation of other TMDLs in the watershed may contribute to the implementation of this TMDL," and implementation of the effective TMDLs in Los Angeles River and San Gabriel River are integrated within Phase I of the implementation of the toxics TMDL (LARWQCB and USEPA 2011). As a result, DDT, PCBs, and PAHs were not represented in Figure 5-12 through Figure 5-15.

Although copper was calculated to have a higher required reduction than zinc, the effect of Senate Bill 346 is expected to reduce those reductions without any implementation of structural control measures. The Brake Pad Partnership was formed in 1999 as a collaboration of cities, industry, and other entities to address the lack of information and research regarding the impact of brake debris material in the environment. After its formation, the Brake Pad Partnership commissioned several technical studies to better quantify the fate and transport of copper to San Francisco Bay including a detailed source assessment. Overall findings of the study estimated that of the anthropogenic sources of copper, approximately 35 percent are attributed to brake pad releases (BPP 2010). Even if the reduction was only half of this amount, the adjustment to the required copper reduction would still result in zinc being the limiting pollutant in LLAR, LCC, and LSGR.

After excluding organics and total copper for the reasons described previously, total zinc becomes the limiting pollutant in each of the WMP areas during the 90th percentile year. In other words, reductions of zinc during WMP implementation will drive reduction of other pollutants, particularly because the pollutant reduction plan emphasizes sediment control (other pollutants are typically transported with sediment) and retention/infiltration rather than pollutant treatment.

[4] In LSGR, a higher percent reduction for bacteria was calculated for the average year than the 90th percentile (see Figure 5-14). Although total annual rainfall in 2008 and 2003 were virtually identical over the entire SGR watershed (20.5 and 20.4 inches/year, respectively), 2003 had fewer wet days than 2008, resulting in relatively more intense events on average (about 18 percent higher). As a result, 2003 had more HFS days than 2008—exceedances during HFS days are not considered when computing the required load reduction, lowering the required reduction.

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Table 5-6. Wet-weather pollutant reduction targets by WMP area with analysis of limiting pollutants[5]

WMP	Year	Organics			Metals			Bacteria
		DDT	PCB	PAH	TCu [2]	TPb	TZn [3]	E-Coli
Lower Los Angeles River (LLAR)	2003	87.3%	72.0%	0.0%	84.1%	38.6%	67.4%	23.4%
	2008	90.0%	77.9%	0.0%	82.8%	32.9%	64.9%	45.1%
Los Cerritos Channel (LCC)	2003	86.6%	70.3%	0.0%	95.6%	76.7%	90.8%	40.4%
	2008	89.6%	77.1%	0.0%	87.1%	3.6%	75.6%	47.9%
Lower San Gabriel River (LSGR)	2003	79.5%	54.6%	0.0%	40.1%	0.0%	29.3%	22.9%
	2008	91.4%	80.7%	0.0%	18.0%	0.0%	25.0%[4]	53.0%
Coyote Creek (CC)	2003	75.9%	46.8%	0.0%	37.5%	0.0%	28.3%	19.1%
	2008	91.3%	76.8%	0.0%	22.7%	0.0%	30.4%[4]	59.2%

Color ramps highlight potentially limiting (Red) vs. pollutants determined to be non-limiting for this analysis (Blue)

1. Average year is 2008 and 90th percentile year is 2003
2. Red box: Organics managed through sediment and associated metals reduction. Organic load reductions above influenced by assigned concentrations at half the MDLs (monitoring data below MDLs), and therefore are suspect and not considered limiting. Cu is not limiting after brake-pad reductions
3. Blue Box: Zinc is limiting pollutant for the 90th percentile year
4. Bacteria reduction target is lower in 2003 than 2008 because more days were classified as high-flow suspension (HFS)

[5] For the Diamond Bar jurisdiction of the San Gabriel River WMP area, a portion flows to the Santa Ana River. Since this area is open space and therefore not associated with MS4 runoff, no reductions were determined necessary. Loadings for the 90th percentile year from this area are 1.16 kg/year of total Cu, 0.87 kg/year of total Pb, 5.21 kg/year of total Zn, and 4.91x10^{12} #/year of E-coli.

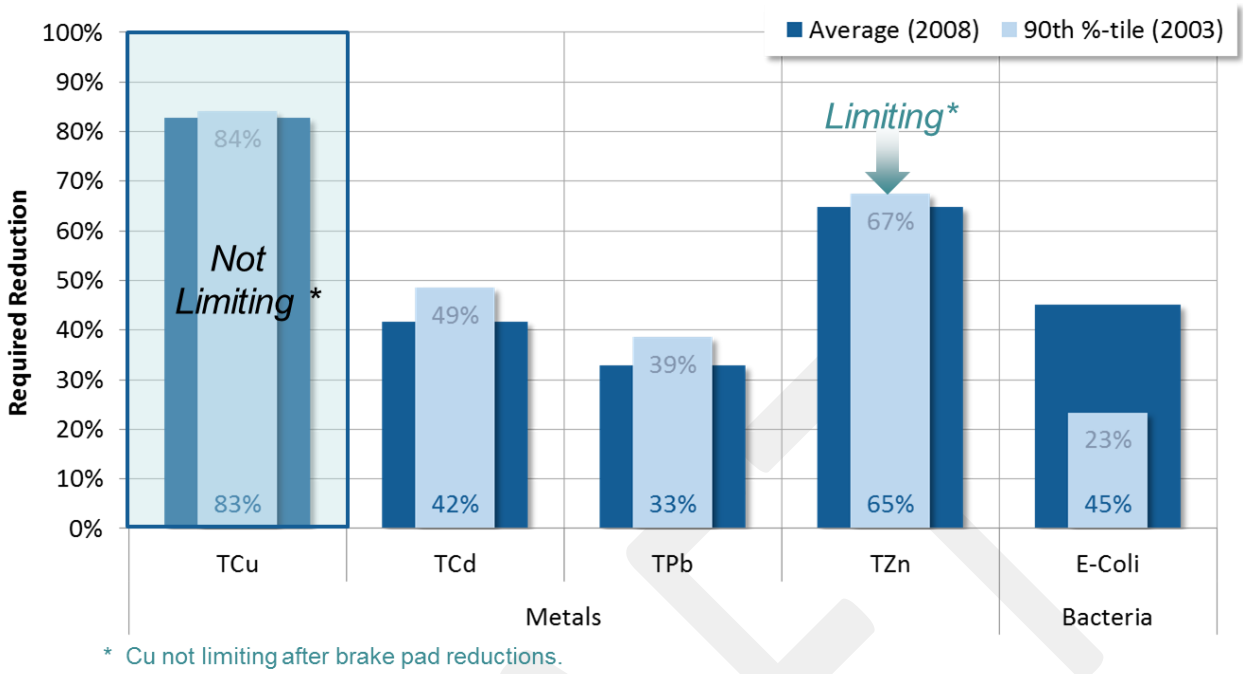


Figure 5-12. Wet-weather pollutant reduction targets and limiting pollutant for Lower Los Angeles River WMP.[6]

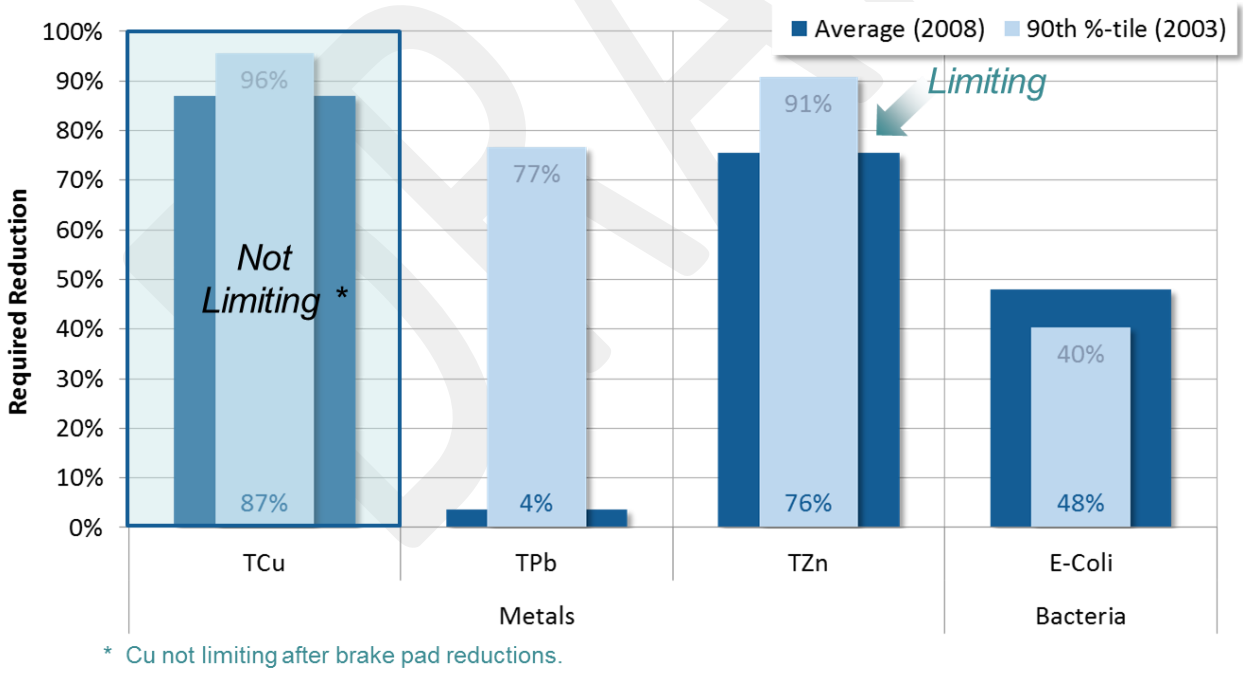


Figure 5-13. Wet-weather pollutant reduction targets and limiting pollutant for Los Cerritos Chanel WMP.

[6] Note that the Los Cerritos Channel TMDLs for Metals requires no reduction of Pb.

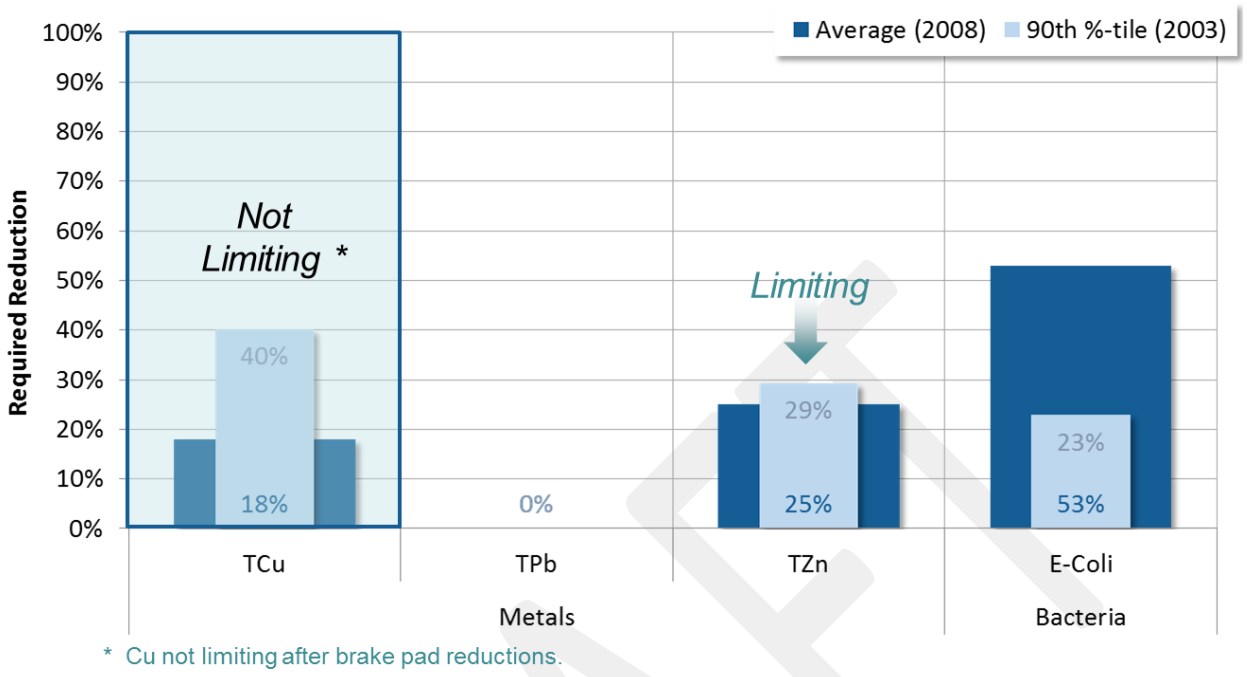


Figure 5-14. Wet-weather pollutant reduction targets and limiting pollutant for Lower San Gabriel River.

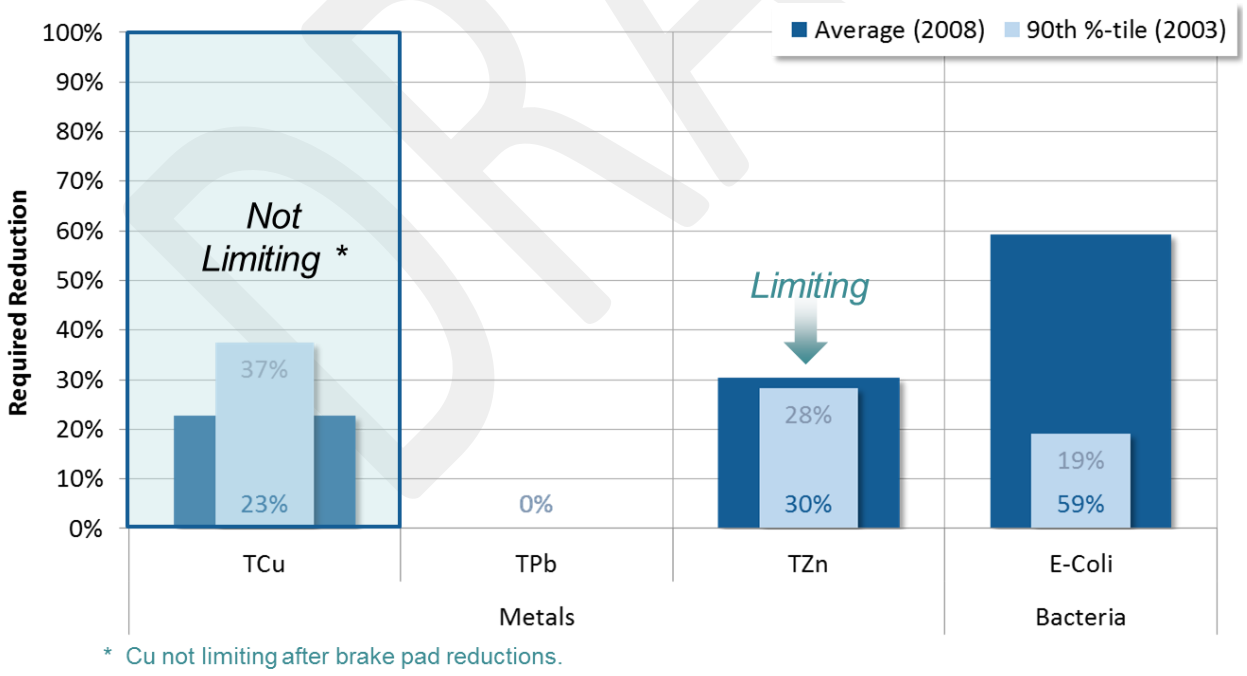


Figure 5-15. Wet-weather pollutant reduction targets and limiting pollutant for Coyote Creek.

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5.3.2. Dry-Weather Pollutant Reduction Targets

Using the representative dry-weather period of August 17 through September 30, as defined in Section 5.2.3, modeled instream flow was multiplied by the observed dry weather concentrations to get existing conditions loads, which are shown in Table 5-7. Likewise, target concentrations were also multiplied by modeled instream flow to get allowable load for each waterbody, which is shown in Table 5-8. Finally, Table 5-9 summarizes dry-weather reduction targets for each listed segment for both the average year and the 90th percentile year.

For dry weather, bacteria is the limiting pollutant (not zinc) because the required reductions are much higher than other pollutants. Reductions of bacteria during WMP implementation will drive reductions of other pollutants.

Table 5-7. Existing condition dry-weather loads by water body

Existing Condition		Dry Weather Flow (cfs)		Existing Load (kg/day or MPN/day)		
Waterbody	**Pollutant**	**2003**	**2008**	**2003**	**2008**	**Mean**
LAR Reach 1 (freshwater)	Cu ug/L	99.97	65.63	6.28	4.12	5.20
LAR Reach 1 (freshwater)	Pb ug/L	99.97	65.63	0.84	0.55	0.69
LAR Reach 1 (freshwater)	*E. coli* MPN/100ml	99.97	65.63	4.79E+13	3.15E+13	3.97E+13
LCC	Cu ug/L	4.65	2.20	0.29	0.14	0.21
LCC	*E. coli* MPN/100ml	4.65	2.20	1.62E+12	7.64E+11	1.19E+12
SG Reach 1	Cu ug/L	69.04	75.36	5.05	5.51	5.28
SG Reach 1	*E. coli* MPN/100ml	69.04	75.36	3.70E+12	4.04E+12	3.87E+12
San Jose Cr. Reach 1 & 2	Se ug/L	12.54	19.62	0.06	0.09	0.07
San Jose Cr. Reach 1 & 2	*E. coli* MPN/100ml	12.54	19.62	6.72E+11	1.05E+12	8.62E+11
Coyote Cr.	Cu ug/L	19.65	15.69	1.37	1.10	1.23
Coyote Cr.	*E. coli* MPN/100ml	19.65	15.69	5.53E+12	4.41E+12	4.97E+12

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Table 5-8. Allowable TMDL dry-weather loads by water body

Existing Condition		Dry Weather Flow (cfs)		Allowable Load (kg/day or MPN/day)		
Waterbody	**Pollutant**	**2003**	**2008**	**2003**	**2008**	**Mean**
LAR Reach 1 (freshwater)	Cu ug/L	99.97	65.63	5.63	3.69	4.66
LAR Reach 1 (freshwater)	Pb ug/L	99.97	65.63	2.94*	1.93*	2.43*
LAR Reach 1 (freshwater)	*E. coli* MPN/100ml	99.97	65.63	3.08E+11	2.02E+11	2.55E+11
LCC	Cu ug/L	4.65	2.20	0.07	0.07	0.07
LCC	*E. coli* MPN/100ml	4.65	2.20	1.43E+10	6.78E+09	1.06E+10
SG Reach 1	Cu ug/L	69.04	75.36	3.04	3.32	3.18
SG Reach 1	*E. coli* MPN/100ml	69.04	75.36	2.13E+11	2.32E+11	2.23E+11
San Jose Cr. Reach 1 & 2	Se ug/L	12.54	19.62	0.15*	0.24*	0.20*
San Jose Cr. Reach 1 & 2	*E. coli* MPN/100ml	12.54	19.62	3.87E+10	6.05E+10	4.96E+10
Coyote Cr.	Cu ug/L	19.65	15.69	0.94	0.94	0.94
Coyote Cr.	*E. coli* MPN/100ml	19.65	15.69	6.06E+10	4.48E+10	5.45E+10

*Existing dry-weather loads are currently below the allowable loads thus showing compliance for this pollutant.

Table 5-9. Required dry-weather percent reductions by water body

WMP	Waterbody	Pollutant	Required Dry-Weather Percent Reductions		
			2003	**2008**	**Mean**
LLAR	LAR Reach 1 (freshwater)	Cu	10%	10%	10%
	LAR Reach 1 (freshwater)	Pb	0%	0%	0%
	LAR Reach 1 (freshwater)	*E. coli*	99.36%	99.36%	99.36%
LCC	LCC	Cu	76.74%	50.85%	68.43%
	LCC	*E. coli*	99.11%	99.11%	99.11%
LSGR	Coyote Cr.	Cu	31.42%	14.11%	23.73%
	Coyote Cr.	*E. coli*	98.90%	98.90%	98.90%
	SG Reach 1	Cu	39.78%	39.78%	39.78%
	SG Reach 1	*E. coli*	94.25%	94.25%	94.25%
	San Jose Cr. Reach 1 & 2	Se	0%	0%	0%
	San Jose Cr. Reach 1 & 2	*E. coli*	94.25%	94.25%	94.25%

Color Ramp shows relative magnitude of reductions—darker means higher reductions

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6. Determination of Potential BMP Capacity for RAA

The process for determining the necessary cumulative BMP capacity depends on the type of numeric goal being addressed. As shown in Figure 6-1, the volume-based (design storm) approach, necessary BMP capacity was determined through a design storm analysis. For the load-based (pollutant reduction), the analysis leveraged the optimization routines in the customized WMMS. An initial step in the RAA was a comparison of the volume reductions required by the load-based and volume-based numeric goals, to support selection of the wet weather critical conditions.

For LLAR, LCC, and LSGR, the 90th percentile WY (2002-03) weather was selected as the critical condition for wet weather.

Details on the analyses performed to determine potential BMP treatment capacity are provided in Attachment A. The attachment describes the approach for incorporating nonstructural BMPs, accounting for the effect of LACFCD infrastructure, and separating the contribution from non-MS4 sources.

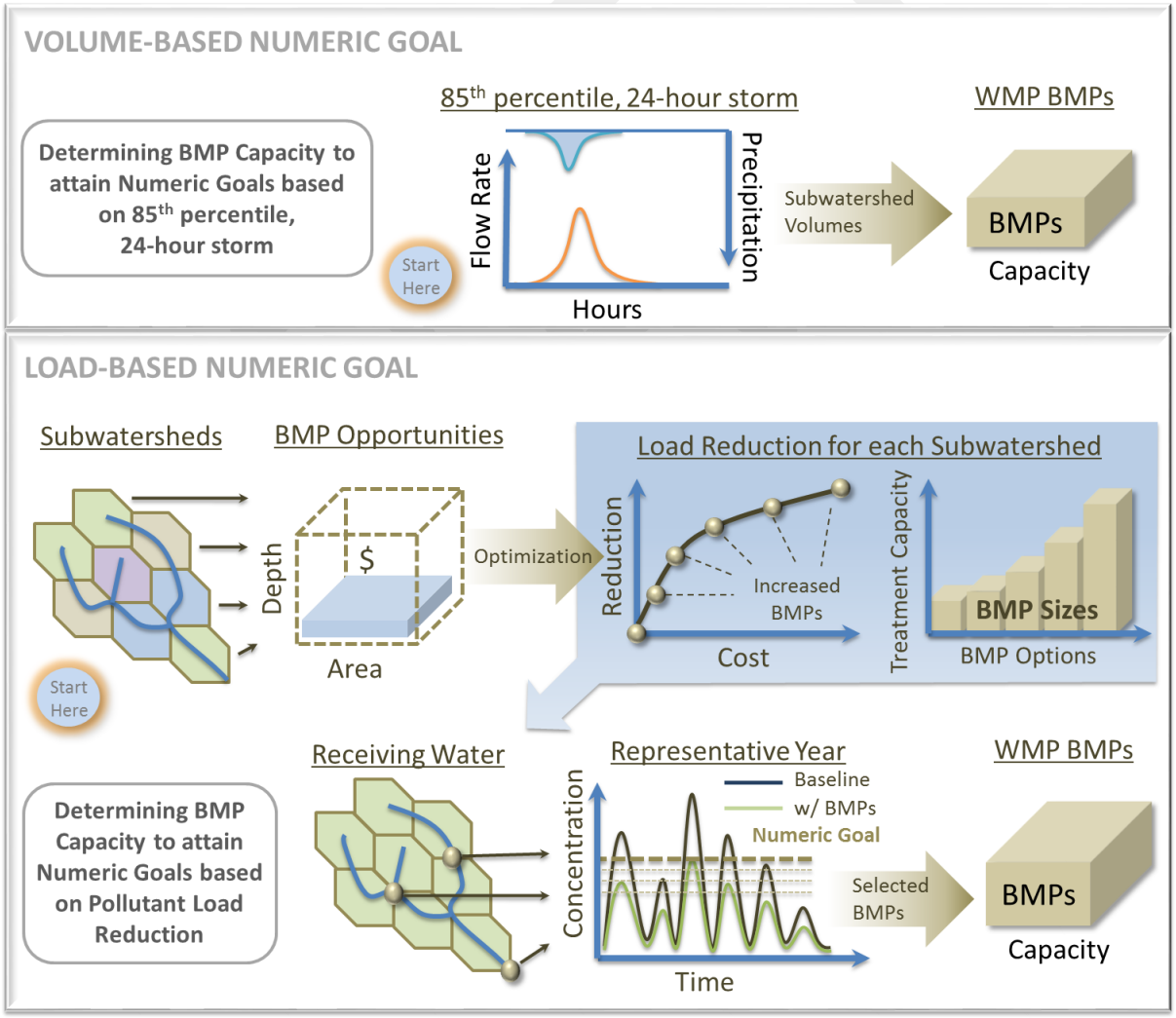


Figure 6-1. Illustration of Process for Determining Required BMP Capacities for the WMP using Volume-Based (top panel) and Load-Based (bottom panel) Numeric Goals.

7. Cumulative Volume Reduction Goals to Achieve Required Pollutant Reductions

The first output of the RAA is a series of "volume reduction goals" for each subwatershed and jurisdiction in the WMP area. WMMS was used to determine the stormwater retention volumes for each subwatershed that would achieve the required load reductions, as reported in this section. These calculated runoff reduction volumes for each subwatershed are a surrogate compliance metric for the responsible agencies. It should be noted that upon implementation, opportunities may arise where flow-through BMPs may provide similar ultimate pollutant load reduction, and may replace the need to implement volume-based reduction BMPs.

These volumes also form the basis for selection of BMPs to achieve those volume reductions, as described in Section 9 and Attachment A.

7.1. Volume Reductions for Structural BMPs

Structural BMPs were modeled using the assumptions outlined in Attachment A. BMP capacities were optimized across the entire study area to achieve the final milestone pollutant reduction requirements at each of the assessment points. Instead of summarizing optimization results in terms of BMP capacity, which is really specific to the network described in Attachment A, the results were summarized as required *annual* wet-weather retention volume (in acre-feet). This provides a volumetric basis that is (1) closely related to load reduction and (2) readily transferable as a control target for parallel BMP modeling at a finer resolution. Because the volumes were isolated to wet days, it is also not skewed by dry-weather runoff retention. The following subsections provide more details about the wet- and dry-weather analysis components.

7.1.1. Wet Weather

Using the structural BMP routing network in WMMS (described in Attachment A), the required *annual* wet-weather retention volume (in acre-feet) were calculated using the critical year time series. For milestones, the percent reduction was based on average year targets while final limits were based on critical year targets. The reported annual volumes are (1) based on required load reductions and (2) ready for BMP modeling at a finer resolution. A 10 percent load reduction was assumed to result from implementation of all nonstructural control measures outlined in the WMPs, setting the foundation of WMP implementation, and structural control measures provide additional load reduction.

Table 7-1 through Table 7-4 present incremental and cumulative retention volumes required to achieve each load reduction milestone by jurisdiction. The milestones are based on the metals TMDLs as described in Section 2. In order to calculate the incremental volume reductions for each milestone, optimization was performed for each jurisdiction to (1) emphasize BMP implementation in subwatersheds that volume reduction could most cost effectively reduce pollutants and (2) establish a cost-effective sequence of subwatersheds for each jurisdiction to achieve the milestones over time. In other words, WMMS was used to develop an implementation schedule that provides early gains in receiving water quality.

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Table 7-1. Annual volume reduction goals to achieve interim and final milestones for Lower Los Angeles River WMP by jurisdiction

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Downey	31%	143.8	143.8
	50%	221.7	365.5
	Final	360.5	726.0
Lakewood	31%	14.3	14.3
	50%	0.0	14.3
	Final	0.0	14.3
Long Beach	31%	540.7	540.7
	50%	1090.8	1,631.5
	Final	2270.1	3,901.7
Lynwood	31%	303.3	303.3
	50%	185.2	488.6
	Final	619.6	1,108.1
Paramount	31%	181.8	181.8
	50%	227.8	409.6
	Final	579.2	988.8
Pico Rivera	31%	365.3	365.3
	50%	0.0	365.3
	Final	12.0	377.3
Signal Hill	31%	32.8	32.8
	50%	106.6	139.4
	Final	58.4	197.9
South Gate	31%	229.3	229.3
	50%	343.2	572.6
	Final	940.0	1,512.6

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
2: Includes full implementation of planned non-structural practices

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RB-AR10564

Table 7-2. Annual volume reduction goals to achieve interim and final milestones for Los Cerritos Channel WMP by jurisdiction

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Bellflower	10%	NS	NS
	35%	336.1	336.1
	Final	801.3	1,137.4
Cerritos	10%	NS	NS
	35%	9.7	9.7
	Final	3.2	12.9
Downey	10%	NS	NS
	35%	77.0	77.0
	Final	35.8	112.8
Lakewood	10%	NS	NS
	35%	282.4	282.4
	Final	874.8	1,157.2
Long Beach	10%	NS	NS
	35%	560.9	560.9
	Final	2115.2	2,676.1
Paramount	10%	NS	NS
	35%	278.8	278.8
	Final	353.1	631.9
Signal Hill	10%	NS	NS
	35%	269.9	269.9
	Final	52.7	322.6

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
NS: Non-structural practices achieve 10% milestone

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Table 7-3. Annual volume reduction goals to achieve interim and final milestones for Lower San Gabriel River WMP

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Artesia	10%	NS	NS
	35%	1.1	1.1
	Final	0.0	1.1
Bellflower	10%	NS	NS
	35%	1.3	1.3
	Final	61.5	62.8
Cerritos	10%	NS	NS
	35%	6.6	6.6
	Final	52.8	59.4
Diamond Bar	10%	NS	NS
	35%	0.3	0.3
	Final	32.8	33.0
Downey	10%	NS	NS
	35%	4.3	4.3
	Final	259.6	263.9
Lakewood	10%	NS	NS
	35%	7.4	7.4
	Final	2.2	9.6
Long Beach	10%	NS	NS
	35%	26.9	26.9
	Final	2.3	29.2
Norwalk	10%	NS	NS
	35%	0.8	0.8
	Final	136.1	136.9
Pico Rivera	10%	NS	NS
	35%	0.2	0.2
	Final	74.8	75.1
Santa Fe Springs	10%	NS	NS
	35%	0.0	0.0
	Final	106.0	106.0
Whittier	10%	NS	NS
	35%	0.0	0.0
	Final	7.5	7.5

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
NS: Non-structural practices achieve 10% milestone

RB-AR10566

Table 7-4. Annual volume reduction goals to achieve interim and final milestones for the Coyote Creek portion of Lower San Gabriel River WMP by jurisdiction

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Artesia	10%	NS	NS
	35%	47.9	47.9
	Final	0.0	47.9
Cerritos	10%	NS	NS
	35%	0.1	0.1
	Final	194.2	194.3
Diamond Bar	10%	NS	NS
	35%	1.0	1.0
	Final	73.0	74.0
Hawaiian Gardens	10%	NS	NS
	35%	27.0	27.0
	Final	3.4	30.4
La Mirada	10%	NS	NS
	35%	0.8	0.8
	Final	174.9	175.7
Lakewood	10%	NS	NS
	35%	17.5	17.5
	Final	8.2	25.7
Long Beach	10%	NS	NS
	35%	37.5	37.5
	Final	0.0	37.5
Norwalk	10%	NS	NS
	35%	3.0	3.0
	Final	149.5	152.5
Santa Fe Springs	10%	NS	NS
	35%	0.4	0.4
	Final	260.3	260.7
Whittier	10%	NS	NS
	35%	2.1	2.1
	Final	252.6	254.7

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
NS: Non-structural practices achieve 10% milestone

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7.1.2. Dry Weather

Dry-weather reductions from non-structural BMPs were calculated using flow from representative dry period (Section 5.2) of 8/17/2003 through 9/30/2003 and 90th percentile concentrations calculated from observed data (Section 5.2.1). Similar to wet weather, a 10% load reduction is assumed to result from the cumulative effect of nonstructural BMPs. Also, the effects of a 25% reduction in irrigation of urban grass was explicitly simulated in the model to estimate the resulting associated reduction of dry weather flows at the RAA Assessment Points. Irrigation was modeled as artificial rainfall within the LSPC model as a function of the potential evapotranspiration of urban grass. Once irrigation was reduced 25%, this directly impacted a large portion of the nonstormwater discharges drivin primarily from over irrigation and impacts on dry weather flows were significant. The projected effect of non-structural and irrigation controls on dry weather flow and loads is presented in Table 7-5. Since *E. Coli* is the limiting dry weather pollutant with required reductions in excess of 90%, the remaining volume reduction not controlled by non-structural measures will be treated by the structural BMPs described in the previous section.

Table 7-5. Projected dry weather reductions from non-structural control measures

Watershed	Constituent	Quantity (Volume or Mass)			Percent Reduction Achieved	
		Baseline	NM	NS	NM	NS
Lower Los Angeles River	Flow (M Gal.)	198.3	178.5	86.6	10.0%	56.4%
	Copper (kg)	19.28	17.35	8.42	10.0%	56.4%
	Lead (kg)	2.58	2.32	1.12	10.0%	56.4%
	E. Coli (Billion MPN)	147,166	132,449	64,230	10.0%	56.4%
Los Cerritos Channel	Flow (M Gal.)	133.6	120.2	56.3	10.0%	57.8%
	Copper (kg)	12.84	11.56	5.42	10.0%	57.8%
	E. Coli (Billion MPN)	71,808	64,627	30,277	10.0%	57.8%
Lower San Gabriel River	Flow (M Gal.)	163.3	147.0	71.2	10.0%	56.4%
	Copper (kg)	18.48	16.63	8.06	10.0%	56.4%
	Selenium (kg)	2.95	2.65	1.29	10.0%	56.4%
	E. Coli (Billion MPN)	13,540	12,186	5,903	10.0%	56.4%
Coyote Creek	Flow (M Gal.)	213.4	192.0	88.4	10.0%	58.6%
	Copper (kg)	23.05	20.75	9.55	10.0%	58.6%
	E. Coli (Billion MPN)	92,887	83,599	38,491	10.0%	58.6%

NM: Non-modeled non-structural practices achieve 10% reduction

NS: Non-structural 25% irrigation reduction practices achieve an additional approximately 60% reduction

8. MS4 Volume Reduction Goals to Achieve Required Pollutant Reductions

Each jurisdiction in the Group's WMP area is subject to stormwater runoff from non-MS4 facilities. In particular, Caltrans roads and facilities regulated by nontraditional or general industrial permits contribute to the runoff volume for each subwatershed. It will be important for these entities to retain their runoff and/or eliminate their cause/contribution to receiving water exceedances. The runoff from these non-MS4 facilities was therefore estimated and subtracted from the cumulative volume reduction goal (Section 7) to establish the MS4 responsible targets as described in Attachment A.

8.1. Summary of MS4 Responsible Reduction Goals

Runoff volumes estimated for non-MS4 permitted areas and Caltrans were subtracted from the reduction target to generate the required MS4 treatment capacity shown in Table 8-1 through Table 8-4.

Table 8-1. Lower Los Angeles River Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Downey	726.0	654.7	71.2
Lakewood	14.3	14.3	-
Long Beach	3,901.7	3,039.6	862.1
Lynwood	1,108.1	667.9	440.2
Paramount	988.8	606.1	382.7
Pico Rivera	377.3	287.2	90.0
Signal Hill	197.9	188.9	9.0
South Gate	1,512.6	1,174.3	338.2
TOTAL	8,826.5	6,633.1	2,193.5

Table 8-2. Los Cerritos Channel Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Bellflower	1,137.4	990.4	147.0
Cerritos	12.9	12.9	0.0
Downey	112.8	93.0	19.8
Lakewood	1,157.2	1,152.1	5.1
Long Beach	2,676.1	1,629.8	1,046.2
Paramount	631.9	525.5	106.4
Signal Hill	322.6	284.3	38.3
TOTAL	6,050.9	4,688.0	1,364.8

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Table 8-3. San Gabriel River Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Artesia	1.1	1.1	0.0
Bellflower	62.8	57.4	5.4
Cerritos	59.4	4.1	55.3
Diamond Bar	33.0	1.1	32.0
Downey	263.9	87.3	176.7
Lakewood	9.6	2.2	7.4
Long Beach	29.2	29.2	0.0
Norwalk	136.9	4.8	132.1
Pico Rivera	75.1	60.4	14.7
Santa Fe Springs	106.0	30.3	75.8
Whittier	7.5	7.1	0.4
TOTAL	784.6	284.9	499.7

Table 8-4. Coyote Creek Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Artesia	47.9	15.9	32.0
Cerritos	194.3	56.7	137.6
Diamond Bar	74.0	36.7	37.4
Hawaiian Gardens	30.4	27.1	3.4
La Mirada	175.7	124.9	50.8
Lakewood	25.7	19.7	6.0
Long Beach	37.5	0.0	37.5
Norwalk	152.5	52.5	99.9
Santa Fe Springs	260.7	12.6	248.1
Whittier	254.7	200.1	54.6
TOTAL	1,253.4	546.1	707.3

9. Pollutant Reduction Plan

The BMPs used to achieve the MS4 volume reduction goals in Section 8 are not, per se, a component of the Permit compliance determination. Instead, over time each agency will report and demonstrate that the *cumulative* effect of projects implemented over time add up to the required reductions for interim milestones and final targets (reported as "MS4 Compliance Target"). However, the initial scenario of BMPs for WMP implementation (referred to as a Pollutant Reduction Plan in the RAA Guidelines) and their costs may be the most beneficial outcome of the WMP. A detailed WMP implementation scenario is presented in Attachment B, broken down by jurisdiction and subwatershed. The volume reductions are separated among right-of-way (ROW) BMPs and Low Impact Development (LID) on public parcels (in combination with nonstructural BMPs).

The Pollutant Reduction Plan is considered an "initial" scenario because over time, through adaptive management, the responsible agencies will likely "shift" among different types of BMPs (e.g., increase implementation of green streets and reduce implementation of regional BMPs) or substitute alterative BMPs altogether (e.g., implement dry wells instead of green streets). These shifts will be supported by analyses to show the substituted BMPs provide an equivalent volume reduction as the replaced BMPs.

9.1. Existing/Planned Regional Control Measures

Existing regional BMPs play an integral part in measuring the current reductions and need for future control measures. The annual volume or load removed from the existing and planned regional control measures were subtracted from the MS4 responsible runoff to determine the remaining treatment volume required. Detailed information for the existing and planned regional control measures is found in Attachment A.

The existing and planned regional control measure information was provided for the Lower Los Angeles River and Lower San Gabriel River. The jurisdictions that were impacted are listed with the associated annual reduction provided by these facilities in Table 9-1 and Table 9-2.

Table 9-1. Lower Los Angeles River Critical Year Existing/Planned Regional BMP Runoff Volume Reductions

Jurisdiction	COMPLIANCE TARGET		
	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Existing/Planned Regional BMP Reductions (acre-ft/year)	Remaining MS4 Responsible Critical Year Storm Volume (acre-ft/year)
Lakewood	14.3	6.4	7.9
Long Beach	3,039.6	633.4	2,406.2
Signal Hill	188.9	22.7	166.2

Table 9-2. Lower San Gabriel River Critical Year Existing/Planned Regional BMP Runoff Volume Reductions

Jurisdiction	COMPLIANCE TARGET		
	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Existing/Planned Regional BMP Reductions (acre-ft/year)	Remaining MS4 Responsible Critical Year Storm Volume (acre-ft/year)
Downey	87.3	24.0	63.3

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9.2. Future Control Measures for Attainment of Interim and Final Limits

The Pollutant Reduction Plans for wet and dry weather illustrate the sequencial BMP implementation strategy to attain all interim and final limits. Within each of the jurisdictions, the subwatershed subareas were individually prioritized and associated with milestones on the basis of cost-effectiveness for zinc removal. The optimization modeling results presented in Section 7 and Figure 9-1, Figure 9-2 and Figure 9-3 shown below identify the prioritization of subwatershed implementation based on the most effective combination of BMPs. The implementation schedule outlined in the Pollutant Reduction Plans for wet and dry weather are based upon this prioritization. The plans are presented in the following subsections.

9.2.1. Wet Weather

The interim and final targets are presented in total acre-feet per year that requires treatement through structural BMPs (less the non-MS4 and existing regional volumes as described in Sections 8 and 9.1). To properly capture the annual volume, BMPs are sized to the minimum volume needed to capture the target annual volume. Thus, the BMPs are presented as a volume (acre-feet) that has the ability to capture the required annual total to meet compliance.

An overall jurisdictional summary table is presented in Table 9-3 that outlines the required BMP volume to achieve compliance in the associated WMP group. The BMP volumes are the sum of existing distributed BMPs, potential green street BMPs, LID on public parcels, and remaining BMP volume that must be implemented as regional (or other) projects as necessary to meet the annual volume reduction target.

Table 9-4 through Table 9-7 outlines the jurisdiction-wide BMP volume targets necessary to meet the annual volume interim and final limits established in Section 8. Each distributed BMP was associated with a jurisdictional subwatershed and the associated implementation schedule, thus summing their impact across different interim goals. The remaining BMP volume after accounting for existing distributed BMPs is spread across right-of-way BMPs, LID on public parcels, and remaining BMP volume including potential regional projects. Priority was given to LID on public parcels, followed by right-of-way BMPs and finally other BMPs. Deatiled discussion on how the BMPs in the right-of-way and LID on public parcels were determined is found in Attachment A. Detailed tables are provided in Attachment B for each jurisdiction and associated subwatersheds. Detailed tables describing the existing distributed BMPs are found in Attachment D.

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Table 9-3. Jurisdictional Final Target BMP Volumes by WMP Group

	LLAR	LCC	LSGR - SGR	LSGR - CC	
Jurisdiction	**Total BMP Volume to Achieve Compliance (acre-ft)**	**Total BMP Volume to Achieve Compliance (acre-ft)**	**Total BMP Volume to Achieve Compliance (acre-ft)**	**Total BMP Volume to Achieve Compliance (acre-ft)**	**TOTAL**
Artesia	-	-	0.1	1.1	**1.2**
Bellflower	-	118.2	5.5	-	**123.7**
Cerritos	-	1.6	0.6	6.4	**8.6**
Diamond Bar	-	-	0.2	8.9	**9.1**
Downey	83.4	10.2	17.5	-	**111.2**
Hawaiian Gardens	-	-	-	2.2	**2.2**
La Mirada	-	-	-	15.2	**15.2**
Lakewood	1.2	169.5	0.4	1.9	**173.0**
Long Beach	319.1	208.7	2.7	0.0	**530.5**
Lynwood	95.5	-	-	-	**95.5**
Norwalk	-	-	0.3	4.7	**5.0**
Paramount	76.6	55.1	-	-	**131.7**
Pico Rivera	41.2	-	10.8	-	**52.0**
Santa Fe Springs	-	-	4.9	2.1	**7.0**
Signal Hill	22.3	28.6	-	-	**50.9**
South Gate	173.0	-	-	-	**173.0**
Whittier	-	-	1.4	39.1	**40.5**
TOTAL	**812.3**	**591.9**	**44.4**	**81.6**	**1,530.2**

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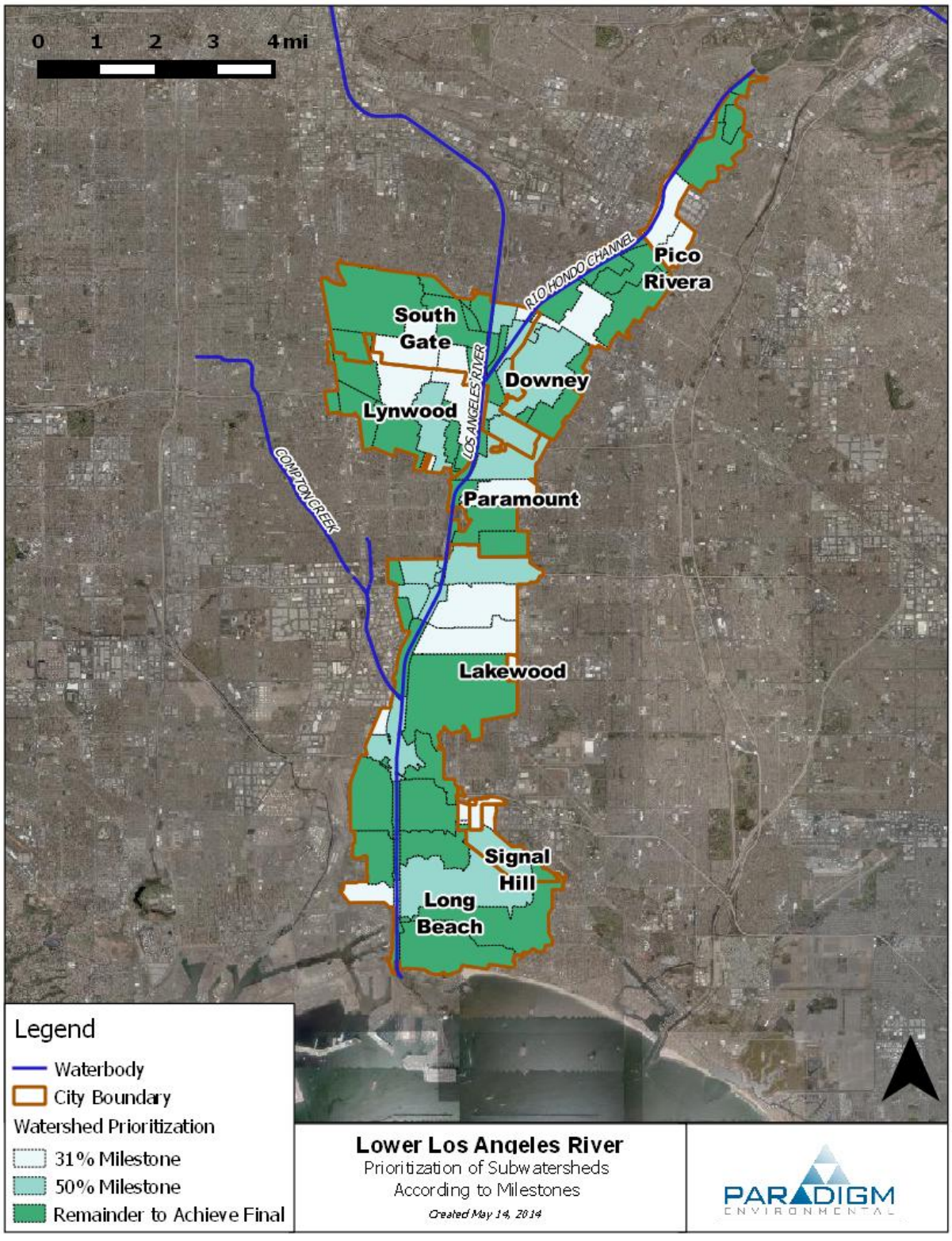


Figure 9-1. LLAR implementation areas associated with Interim and final milestones.

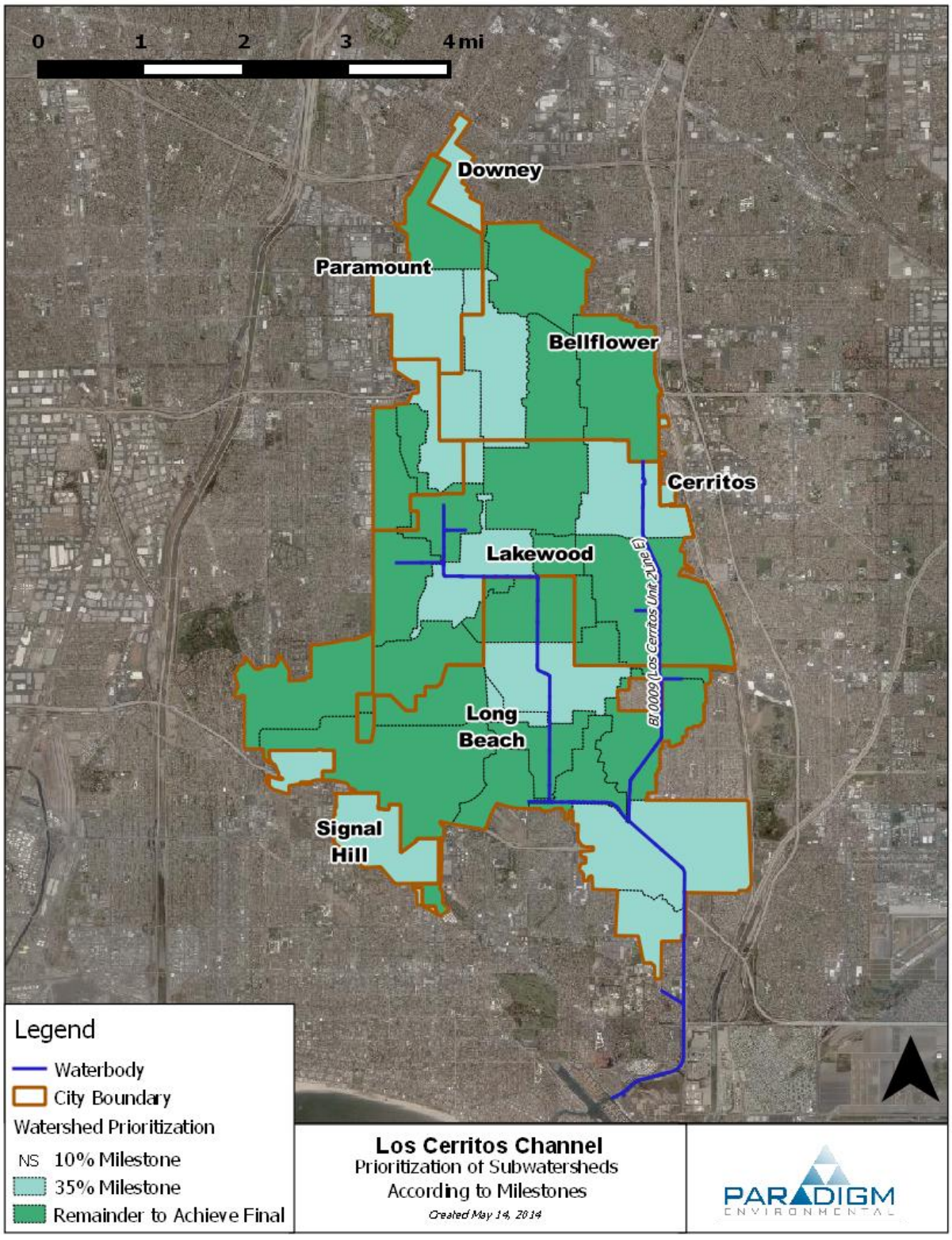


Figure 9-2. LCC implementation areas associated with Interim and final milestones.

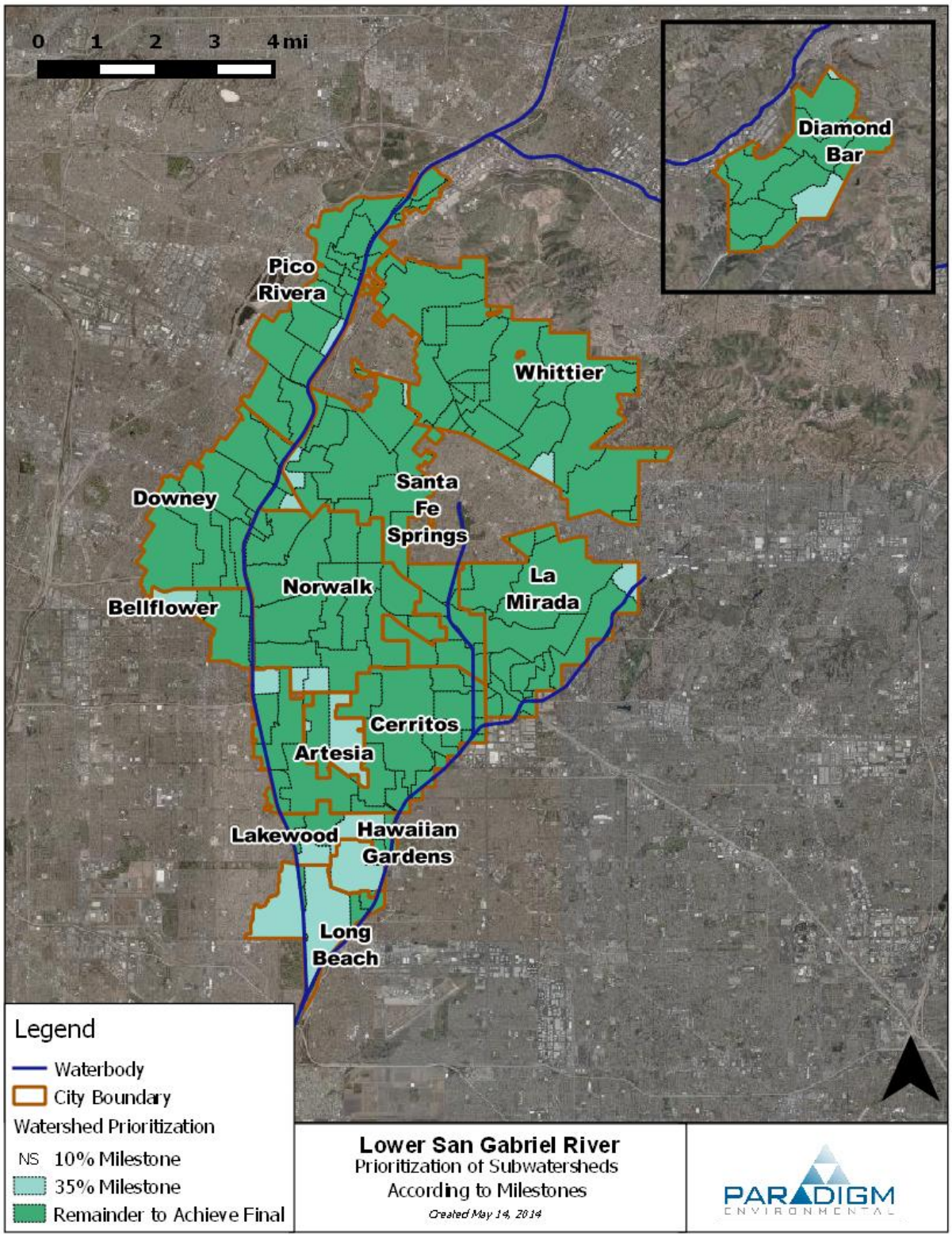


Figure 9-3. LSGR implementation areas associated with Interim and final milestones.

Table 9-4. Lower Los Angeles River Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Downey	31%	143.8	143.8	1.1	12.2	12.2	0.7	0.7	7.1	7.1
	50%	187.1	330.9	0.7	2.5	14.7	10.1	10.8	0.6	7.7
	Final	323.9	654.7	2.0	31.2	45.9	4.4	15.3	10.7	18.4
Lakewood	31%	7.9	7.9	NA	1.1	1.1	0.0	0.0	-	-
	50%	-	7.9		-	1.1	-	0.0	-	-
	Final	-	7.9		-	1.1	-	0.0	-	-
Long Beach	31%	6.5	6.5	NA	1.0	1.0	0.0	0.0	-	-
	50%	567.0	573.5		40.3	41.3	7.5	7.5	24.7	24.7
	Final	1,832.7	2,406.2		113.4	154.6	20.8	28.3	111.5	136.2
Lynwood	31%	235.9	235.9	NA	18.4	18.4	2.7	2.7	13.1	13.1
	50%	134.9	370.8		12.8	31.2	3.8	6.5	0.1	13.2
	Final	297.2	667.9		22.7	53.9	4.5	11.1	17.3	30.5
Paramount	31%	163.7	163.7	0.1	9.0	9.0	1.7	1.7	10.2	10.2
	50%	65.7	229.4		7.4	16.4	0.8	2.5	0.3	10.4
	Final	376.6	606.1		14.9	31.2	2.1	4.7	30.2	40.6
Pico Rivera	31%	275.3	275.2	NA	11.5	11.5	0.5	0.5	27.4	27.4
	50%	-	275.2		-	11.5	-	0.5	-	27.4
	Final	12.0	287.2		1.3	12.8	0.0	0.5	0.5	27.9
Signal Hill	31%	8.5	8.5	0.2	0.8	0.8	0.2	0.2	0.2	0.2
	50%	105.8	114.3		7.0	7.8	0.9	1.1	5.9	6.1
	Final	51.9	166.2		2.2	10.0	0.0	1.1	4.9	11.0
South Gate	31%	229.3	229.3	4.7	23.2	23.2	0.9	0.9	6.5	6.5
	50%	198.1	427.4		15.0	38.3	0.8	1.7	12.6	19.1
	Final	746.9	1,174.3		49.3	87.5	5.1	6.8	54.7	73.8

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Table 9-5. Los Cerritos Channel Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Bellflower	10%	NS	NS		-	-	-	-	-	-
	35%	244.4	244.4	NA	15.1	15.1	1.2	1.2	16.2	16.2
	Final	746.0	990.4		43.0	58.1	3.2	4.5	39.4	55.6
Cerritos	10%	NS	NS		-	-	-	-	-	-
	35%	9.7	9.7	NA	1.0	1.0	0.0	0.0	0.5	0.5
	Final	3.2	12.9		-	1.0	-	0.0	0.1	0.6
Downey	10%	NS	NS		-	-	-	-	-	-
	35%	57.2	57.2	0.1	5.3	5.3	0.0	0.0	2.7	2.7
	Final	35.8	93.0		-	5.3	-	0.0	2.1	4.8
Lakewood	10%	NS	NS		-	-	-	-	-	-
	35%	282.4	282.4	NA	31.5	31.5	4.7	4.7	6.9	6.9
	Final	869.7	1,152.1		90.0	121.5	7.0	11.8	29.3	36.2
Long Beach	10%	NS	NS		-	-	-	-	-	-
	35%	473.5	473.5	NA	33.8	33.8	12.3	12.3	16.4	16.4
	Final	1,156.3	1,629.8		87.9	121.7	9.5	21.8	48.9	65.3
Paramount	10%	NS	NS		-	-	-	-	-	-
	35%	267.0	267.0	NA	14.3	14.3	3.0	3.0	17.1	17.1
	Final	258.5	525.5		8.5	22.8	3.5	6.4	8.7	25.8
Signal Hill	10%	NS	NS		-	-	-	-	-	-
	35%	231.6	231.6	0.0	11.2	11.2	1.2	1.2	14.2	14.2
	Final	52.7	284.3		-	11.2	-	1.2	2.0	16.2

NS: Non-structural practices achieve 10% milestone

NA: No information/not enough information provided

*Runoff from non-MS4 sources and reductions fro existing regional BMPs are excluded from compliance target (see Attachment A)

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Table 9-6. San Gabriel River Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Artesia	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.1	1.1		-	-	0.1	0.1	-	-
	Final	-	1.1		-	-	-	0.1	-	-
Bellflower	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.3	1.3		0.2	0.2	0.0	0.0	-	-
	Final	56.1	57.4		1.5	1.8	3.7	3.7	0.0	0.0
Cerritos	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	4.1	4.1		0.6	0.6	0.0	0.0	-	-
Diamond Bar	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	1.1	1.1		0.2	0.2	-	-	-	-
Downey	10%	NS	NS		-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	63.3	63.3	7.1	10.0	10.0	0.4	0.4	-	-
Lakewood	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	2.2	2.2		0.2	0.2	0.0	0.0	0.1	0.1
Long Beach	10%	NS	NS	NA	-	-	-	-	-	-
	35%	26.9	26.9		1.1	1.1	1.3	1.3	-	-
	Final	2.3	29.2		0.3	1.4	-	1.3	0.0	0.0

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Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Norwalk	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.8	0.8		-	-	0.1	0.1	-	-
	Final	4.0	4.8		-	-	0.3	0.3	-	-
Pico Rivera	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.2	0.2		0.0	0.0	-	-	-	-
	Final	60.2	60.4		10.7	10.8	-	-	0.0	0.0
Santa Fe Springs	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	30.3	30.3		4.6	4.6	-	-	0.3	0.3
Whittier	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.0	0.0		-	-	-	-	0.0	0.0
	Final	7.1	7.1		1.4	1.4	-	-	-	0.0

NS: Non-structural practices achieve 10% milestone

NA: No information/not enough information provided

*Runoff from non-MS4 sources and reductions fro existing regional BMPs are excluded from compliance target (see Attachment A)

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Table 9-7. Coyote Creek Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Artesia	10%	NS	NS	NA	-	-	-	-	-	-
	35%	15.9	15.9		-	-	1.1	1.1	-	-
	Final	-	15.9		-	-	-	1.1	-	-
Cerritos	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.1	0.1		0.0	0.0	-	-	-	-
	Final	56.6	56.7		3.0	3.1	3.4	3.4	-	-
Diamond Bar	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.0	1.0		0.3	0.3	-	-	-	-
	Final	35.6	36.7		8.0	8.2	-	-	0.7	0.7
Hawaiian Gardens	10%	NS	NS	NA	-	-	-	-	-	-
	35%	23.6	23.6		0.3	0.3	1.5	1.5	-	-
	Final	3.4	27.1		0.2	0.6	0.1	1.6	0.0	0.0
La Mirada	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	124.9	124.9		9.6	9.6	5.6	5.6	-	-
Lakewood	10%	NS	NS	NA	-	-	-	-	-	-
	35%	17.5	17.5		0.9	0.9	0.7	0.7	-	-
	Final	2.3	19.7		-	0.9	0.3	0.9	-	-
Long Beach	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	0.0	0.0		-	-	0.0	0.0	-	-

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Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Norwalk	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.6	1.6	[redacted]	-	-	0.2	0.2	-	-
	Final	50.9	52.5	[redacted]	1.4	1.4	3.2	3.4	-	-
Santa Fe Springs	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-	[redacted]	-	-	-	-	-	-
	Final	12.6	12.6	[redacted]	1.0	1.0	-	-	1.1	1.1
Whittier	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-	[redacted]	-	-	-	-	-	-
	Final	200.1	200.1	[redacted]	39.0	39.0	-	-	0.0	0.0

NS: Non-structural practices achieve 10% milestone

NA: No information/not enough information provided

*Runoff from non-MS4 sources and reductions fro existing regional BMPs are excluded from compliance target (see Attachment A)

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9.2.2. Dry Weather

Dry weather reductions are attained through a combination of non-structural practices and structural BMPs as they are implemented as part of the wet weather attainment of limits. As wet-weather BMPs are implemented, they serve to remove the dry-weather flows thus meeting the compliance set forth to achieve dry-weather reductions. As a summary of the dry weather analysis, Table 9-8 through Table 9-11 outline the jurisdiction-wide attainment of interim and final milestones for dry weather. The reduction from implemented BMPs compares the actual dry-weather reduction versus the compliance target.

Table 9-8. Lower Los Angeles River Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Downey	31%	30.8%	65.9%
	50%	49.7%	76.9%
	Final	99.4%	99.4%
Lakewood	31%	30.8%	99.4%
	50%	49.7%	99.4%
	Final	99.4%	99.4%
Long Beach	31%	30.8%	62.1%
	50%	49.7%	74.3%
	Final	99.4%	99.4%
Lynwood	31%	30.8%	71.8%
	50%	49.7%	80.2%
	Final	99.4%	99.4%
Paramount	31%	30.8%	51.0%
	50%	49.7%	72.4%
	Final	99.4%	99.4%
Pico Rivera	31%	30.8%	71.8%
	50%	49.7%	71.8%
	Final	99.4%	99.4%
Signal Hill	31%	30.8%	69.3%
	50%	49.7%	94.9%
	Final	99.4%	99.4%
South Gate	31%	30.8%	62.8%
	50%	49.7%	75.9%
	Final	99.4%	99.4%

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Table 9-9. Los Cerritos Channel Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Bellflower	10%	9.9%	58.1%
	35%	34.7%	71.4%
	Final	99.1%	99.1%
Cerritos	10%	9.9%	56.4%
	35%	34.7%	99.1%
	Final	99.1%	99.1%
Downey	10%	9.9%	59.8%
	35%	34.7%	99.1%
	Final	99.1%	99.1%
Lakewood	10%	9.9%	55.6%
	35%	34.7%	69.6%
	Final	99.1%	99.1%
Long Beach	10%	9.9%	60.1%
	35%	34.7%	76.9%
	Fin al	99.1%	99.1%
Paramount	10%	9.9%	52.8%
	35%	34.7%	79.8%
	Final	99.1%	99.1%
Signal Hill	10%	9.9%	60.8%
	35%	34.7%	99.1%
	Final	99.1%	99.1%

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Table 9-10. San Gabriel River Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Artesia	10%	9.4%	57.6%
	35%	33.0%	94.3%
	Final	94.25%	94.25%
Bellflower	10%	9.4%	49.9%
	35%	33.0%	57.6%
	Final	94.25%	94.25%
Cerritos	10%	9.4%	43.7%
	35%	33.0%	48.1%
	Final	94.25%	94.25%
Diamond Bar	10%	9.4%	58.2%
	35%	33.0%	58.8%
	Final	94.25%	94.25%
Downey	10%	9.4%	57.4%
	35%	33.0%	58.1%
	Final	94.25%	94.25%
Lakewood	10%	9.4%	43.1%
	35%	33.0%	73.7%
	Final	94.25%	94.25%
Long Beach	10%	9.4%	46.6%
	35%	33.0%	91.6%
	Final	94.25%	94.25%
Norwalk	10%	9.4%	54.8%
	35%	33.0%	55.7%
	Final	94.25%	94.25%
Pico Rivera	10%	9.4%	51.8%
	35%	33.0%	51.9%
	Final	94.25%	94.25%
Santa Fe Springs	10%	9.4%	54.4%
	35%	33.0%	57.9%
	Final	94.25%	94.25%
Whittier	10%	9.4%	57.9%
	35%	33.0%	58.0%
	Final	94.25%	94.25%

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Table 9-11. Coyote Creek Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Artesia	10%	9.9%	60.9%
	35%	34.6%	85.1%
	Final	98.9%	98.9%
Cerritos	10%	9.9%	56.3%
	35%	34.6%	56.3%
	Final	98.9%	98.9%
Diamond Bar	10%	9.9%	61.3%
	35%	34.6%	65.9%
	Final	98.9%	98.9%
Hawaiian Gardens	10%	9.9%	59.7%
	35%	34.6%	96.9%
	Final	98.9%	98.9%
La Mirada	10%	9.9%	57.4%
	35%	34.6%	58.7%
	Final	98.9%	98.9%
Lakewood	10%	9.9%	60.7%
	35%	34.6%	76.5%
	Final	98.9%	98.9%
Long Beach	10%	9.9%	54.5%
	35%	34.6%	91.9%
	Final	98.9%	98.9%
Norwalk	10%	9.9%	59.2%
	35%	34.6%	60.8%
	Final	98.9%	98.9%
Santa Fe Springs	10%	9.9%	51.7%
	35%	34.6%	52.0%
	Final	98.9%	98.9%
Whittier	10%	9.9%	60.7%
	35%	34.6%	61.4%
	Final	98.9%	98.9%

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Attachment A: DETERMINATION OF BMP TREATMENT CAPACITY

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

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DRAFT

1. Determination of BMP Treatment Capacity

The process for determining the necessary cumulative BMP capacity depends on the type of numeric goal being addressed. As shown in Figure 1-1, the volume-based (design storm) approach, necessary BMP capacity was determined through a design storm analysis. For the load-based (pollutant reduction), the analysis leveraged the optimization routines in the customized WMMS. An initial step in the RAA was a comparison of the volume reductions required by the load-based and volume-based numeric goals, to support selection of the wet weather critical conditions.

This appendix describes key analyses conducted to determine the potential capacity of different BMPs including non-structural BMPs. In addition, it describes the approach for non-MS4 sources.

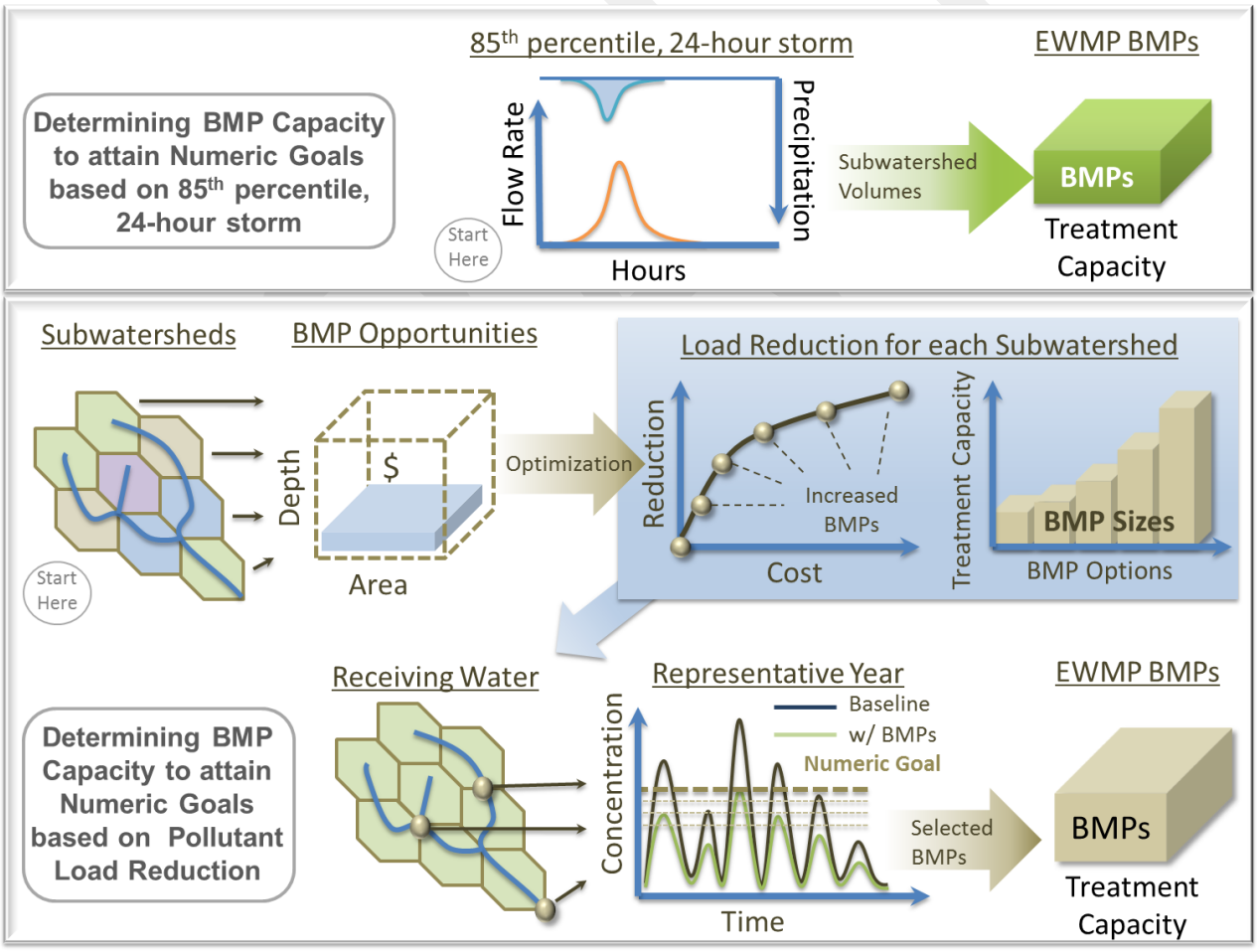


Figure 1-1. Illustration of Process for Determining Required BMP Capacities for the WMP using Volume-Based (top panel) and Load-Based (bottom panel) Numeric Goals.

1.1. Load Reduction Optimization Modeling Analysis

During development of WMMS, distributed BMPs were modeled at the subwatershed-scale using a generalized BMP treatment train. Depending on the land use type, different types of BMPs were applied. The three generalized BMP pathways were: (1) transportation, (2) residential, and (3) commercial/industrial/institutional. A conceptual schematic of the BMP network and pathways is presented in Figure 1-2 (LACDPW 2011).

For the RAA, subwatershed-scale SUSTAIN models were developed using the WMMS modeling assumptions. Each BMP from the treatment train described in Figure 1-2 was configured consistently with modeling performed during development of the WMMS system and followed the Regional Board RAA guidelines. A summary of key BMP parameters used for RAA modeling are presented in Table 1-1. Background infiltration rates were changed from those used during WMMS development (0.5 inches per hour) to site-specific infiltrations rates provided in the Los Angeles County Hydrology Manual and associated spatial datasets (LACDPW 2006). These rates also deviate somewhat from the values suggested in the RAA Guidelines (0.1 – 0.3 inches per hour); however, the data are locally-derived, published and reliable which provides adequate justification for their use.

First, SUSTAIN models were configured using the existing condition watershed model runoff timeseries and land use distributions as inputs, and benchmarked against the aggregated LSPC model results to establish baseline consistency. Second, using the SUSTAIN configuration with the respective BMP opportunities per pathway (as presented in Figure 1-2) in each subwatershed, optimization runs were formulated to maximize zinc reduction (i.e. the limiting target pollutant) while minimizing total estimated implementation cost. This resulted in a matrix of high-resolution cost-effectiveness curves for each subwatershed. Finally, a Tier-II optimization framework was configured to collectively optimize target load reductions at the downstream assessment point, with an added equitability constraint to ensure that each jurisdiction shared proportionally in the reduction effort. For the Tier-II optimization, instead of the decision variables being individual BMPs within a network like before, they were comprised of individual solutions taken off the cost-effectiveness curves at each subwatershed. The primary objective was to quantify the stormwater retention volume and load reductions provided by the collective actions occurring within each contributing jurisdiction tributary to the assessment point.

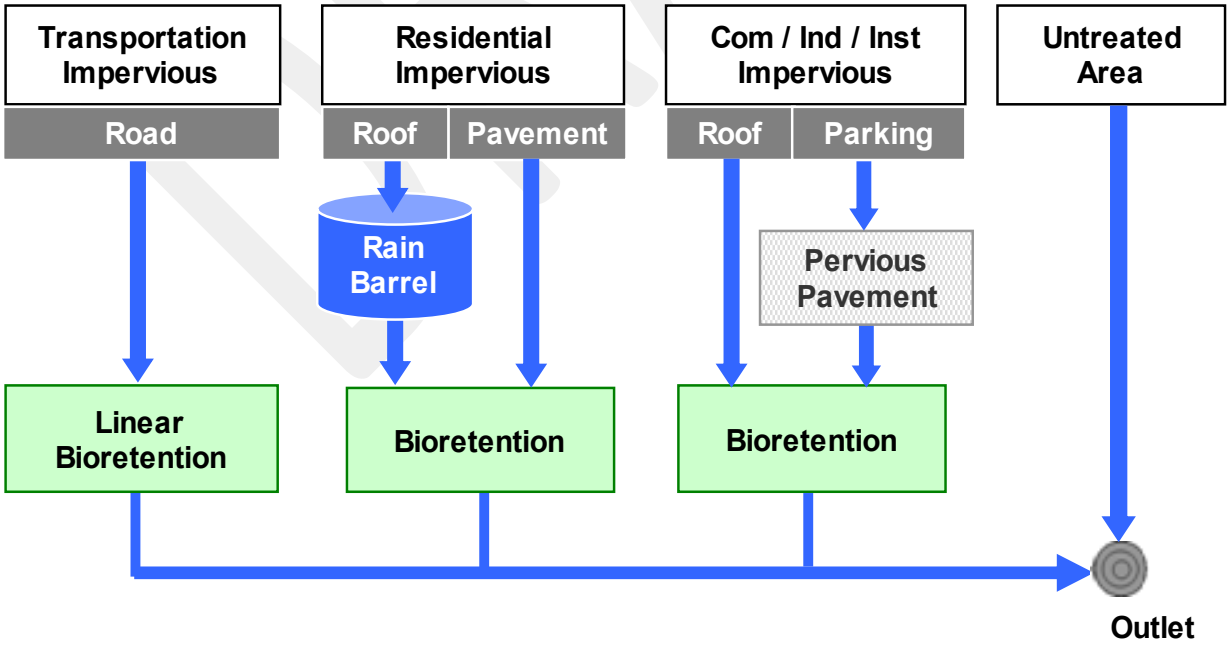


Figure 1-2. Conceptual schematic of the WMMS aggregate BMP treatment train (LACDPW 2011b).

Table 1-1. BMP parameters used in the load reduction modeling analysis

Constituent Group	Rain Barrel	Bioretention	Porous Pavement
Media Infiltration Rate (in/hr)	n/a	0.1 – 0.9	0.1 – 0.9
Substrate Layer Porosity (fraction)	n/a	0.4	0.4
Substrate Layer Field Capacity (fraction)	n/a	0.3	0.055
Substrate Layer Wilting Point (fraction)	n/a	0.1	0.05
Underdrain Gravel Porosity (fraction)	n/a	0.5	0.45
Vegetative Parameter, A (unitless)	n/a	0.6	1.0
Background Infiltration Rate (in/hr)	n/a	0.1 – 0.9	0.1 – 0.9
First Order Decay Rate (1/day)[1]	0.2 – 0.8	0.2 – 0.8	0.2 – 0.8
Underdrain Filtration Rate (%)[1]	n/a	0.5 – 0.9	0.5 – 0.9

1. Rates vary by pollutant and the type of BMP soil media

1.2. BMP Capacity Analysis for the Rights-of-Way

A key consideration for WMP implementation is the potential BMP capacity that could be provided by rights-of-way (ROW). In order to highlight the potential structural BMP implementation approaches to meet the volume targets, a BMP opportunity analysis was conducted. Two broad categories of BMPs – ROW BMPs and LID on public parcels – were used to describe the networks of BMPs needed to meet the target reductions.

This section describes how right-of-ways were evaluated for opportunities to locate BMPs and evaluate the key components that affect the ability of the ROW BMP networks to be effective: space available in the ROW, types of BMPs to site in the ROW, drainage areas that could potentially be treated by ROW BMPs, and estimated BMP infiltration rates.

Stormwater BMPs in the ROW are treatment systems arranged linearly within the street ROW and are designed to reduce runoff volumes and improve runoff water quality from the roadway and adjacent parcels. Implementing BMPs in the ROW provides an opportunity to meet water quality goals by locating BMPs in areas owned or controlled by a municipality to avoid the cost of land acquisition or establishing an easement. Implementing BMPs in the ROW allows for direct control of construction, maintenance, and monitoring activities by the responsible jurisdiction. Bioretention and permeable pavement are typically best suited for implementation in the ROW

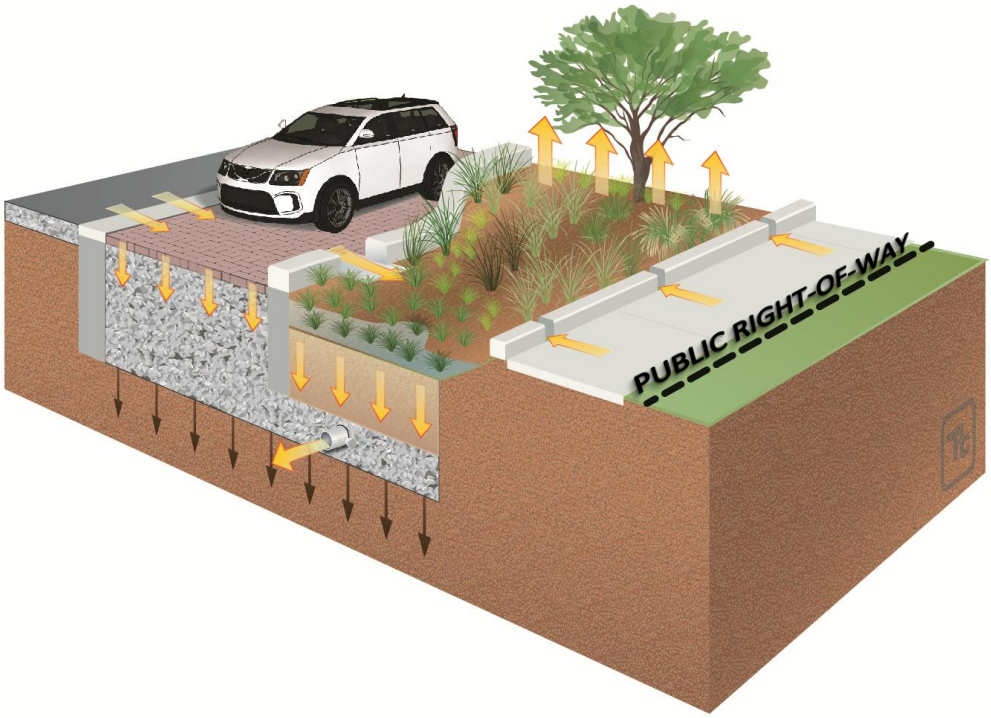


Figure 1-3. Conceptual schematic of ROW BMPs with an underdrain (Arrows indicate water pathways).

Not all roads are suited for ROW BMP retrofits; therefore, screening is required to eliminate roads where ROW BMP retrofits are impractical or infeasible due to physical constraints. While ROW BMP retrofits can be implemented in a variety of settings, the physical characteristics of the road itself such as the road type, local topography, and depth to groundwater can significantly influence the practicality of designing and constructing these features. A screening protocol was established to identify realistic opportunities for retrofits based on the best available GIS data. The opportunities identified during this process provide the foundation for the engineering analysis to determine the volume of stormwater that can be treated by ROW BMP retrofits in the subject watersheds. This section describes the data and the screening process used to identify the best available roads for ROW BMP retrofits.

1.2.1. Data Used

To evaluate BMP opportunities and available implementation areas, several key data sets were processed and formatted. Table 1-2 outlines the data set names, formats, descriptions, and sources.

Table 1-2. Summary of Data

Data Set	Format	Description	Source
Parcels	GIS Shapefile	Outlines property boundaries and sizes	Los Angeles County (LAC) Assessor
Roads	GIS Shapefile	Shows street centerline network & classification by Topologically Integrated Geographic Encoding and Reference (TIGER)	LAC GIS Portal
Land Use	GIS Shapefile	Subdivides the region into predefined land use categories with similar runoff properties. Each individual land use feature identifies the associated percent impervious coverage.	LAC WMMS Model
Subwatersheds	GIS Shapefile	Defines drainage areas to selected outlet points	LAC WMMS Model
Slopes	GIS Shapefile	Classifies regions by the slope category	LAC WMMS Model
Soils	GIS Shapefile	Outlines spatial extents of dominant soil types	LAC GIS Portal
Jurisdictions	GIS Shapefile	Establishes city and county boundaries	LAC GIS Portal
Drainage Network	GIS Shapefile	Identifies stormwater structure layout and conveyance methods	LAC GIS Portal
Groundwater Contours	GIS Shapefile	Illustrates groundwater depth as measured from the surface	LAC BOS
Soil Runoff Coefficient Curves	PDF File	Curves characterize effect of rainfall intensity on runoff coefficient per soil type	Hydrology Manual Appendix C (LADPW 2006)
Aerial Imagery	Layer File	Orthoimage of entire region	ESRI Maps & Data Imagery
Runoff Rates	Time Series	Hourly runoff for land uses for the continuous simulation model	LAC WMMS Model

1.2.2. ROW BMP Screening

High traffic volumes, speed limits, slopes, and groundwater tables, impact the feasibility of ROW BMP implementation. Road classification data contains information typically useful for determining if the street is subject to high traffic volumes and speeds, and Census TIGER road data provides the best available road classification information for the study area. Table 1-3 shows the Master Address File (MAF)/TIGER Feature Classification Codes (MTFCC) deemed appropriate for ROW BMP retrofit opportunities. Only roads with the MTFCCs listed in Table 1-3 can be considered for ROW BMP retrofits in this screening analysis. All other roads are screened out.

Table 1-3. ROW BMP MTFCC

MTFCC	Description
S1400	Local neighborhood road, rural road, city street
S1730	Alley
S1780	Parking lot road

In addition to the screening of road types, opportunities were further screened to remove segments that have steep slopes. BMP implementation on streets with grades greater than 10 percent present engineering challenges that substantially reduce the cost effectiveness of the retrofit opportunity. From the available slope information, roads were considered as retrofit opportunities if the slope was less than 10 percent.

The final screen applied to the roads is the depth to groundwater. Implementing ROW BMPs in areas where the groundwater table is high is not recommended due to the fact that the BMPs are rendered ineffective due to their storage capacity being seriously diminished with groundwater inflow. From the groundwater contours provided, roads were eliminated as opportunities if the depth to groundwater was less than 10 feet. Attachment C highlights the areas identified with groundwater depths of 10 feet or less. The highlighted areas provide a starting point for elimination, however it should be noted that further evaluation may be necessary based on local knowledge of areas with high groundwater tables or daylighting of perched groundwater layers as identified by the jurisdictions.

The results of the ROW BMP screening are presented in Attachment C. Attachment C shows the roads available for retrofit (highlighted in green) versus all of the roads within the study area. An overall watershed map and individual jurisdictional maps for each watershed show all the identified retrofit opportunities. The maps indicate that a majority of the roads within each jurisdiction pass through the screening as potential retrofits. It should be noted that due to the coarse nature of the road classification data, only freeways, highways, and major roads were eliminated in the classification screening process. In practice, retrofitting every street that passed through the screening will likely not be feasible and adaptive management strategies will be necessary in the future to further refine the road classification data layer to more accurately identify road types suitable for ROW BMP retrofits.

The screened opportunities were used as the basis to evaluate the potential runoff volume reduction provided by ROW BMP implementations. In the following section, an engineering assessment is presented that determines the ROW BMP contributing drainage areas and the overall volume reductions achieved through ROW BMP implementation.

1.2.3. ROW BMP Configuration

The three most important assumptions necessary to evaluate BMP volume reduction performance are (1) the physical BMP configuration assumptions, (2) the contributing drainage area characteristics, and (3) the in-situ soil infiltration rates. By understanding the area draining to the BMPs and the volume capacity and function of the BMPs, an assessment can be performed to evaluate the potential of ROW retrofit BMPs to capture the required runoff volume in each subwatershed. This section summarizes the information and processes used to establish BMP configuration assumptions to be used for the runoff analysis presented in the following section.

1.2.4. BMP Assumptions Based on Green Streets

ROW BMPs consists of multiple types and combinations of stormwater treatment options. A well-established and often utilized ROW BMP is green streets. Green streets provide multiple benefits for pollutant and volume reduction and have been implemented in locations throughout the nation. In the future and as updates are made to the WMP, other ROW BMPs may be incorporated to achieve the required volume reductions.

Green streets typically consist of bioretention areas between the curb and sidewalk (herein referred to as the parkway) and/or permeable pavement within the parking lane. Prior to evaluating green street BMP treatment capacity, it is imperative to establish a configuration that can be assumed for typical implementation watershed-wide. This establishes the parkway space needed for the BMPs (plan view) and also determines the hydraulic function and storage capacity of the subsurface systems.

Bioretention systems are surface and subsurface water filtration systems, which use vegetation and underlying soils to store, filter, and reduce runoff volume while removing pollutants. Figure 1-4 represents a typical bioretention system incorporated into a green street design. Bioretention systems consist of a ponding depth and engineered soil media depth to treat runoff. Table 1-4 outlines typical widths, depths, and soil parameters associated with green street bioretention cells. Green streets were assumed to have no underdrains because the

WMP emphasizes low impact development and stormwater volume reduction to achieve pollutant load reductions.

Driveways and utilities limit the road length that can be converted into a green street. From past experience and aerial imagery review in the local watersheds, it was determined that 30 percent of the road length could be considered as the maximum possibility for conversion into bioretention area. This factor was used to limit the total length of potential green street bioretention areas. The parameters outlined above and in the table below were assumed to be the typical green street BMP implementation configuration for the screening analysis and the BMP treatment capacity evaluation described in the next section.

Table 1-4. BMP Design and Modeling Parameters for Subsequent Analyses

Component	Design Parameter	Value
Ponding Area	Depth	0.8 feet
	Width	4.0 feet
Media Layer	Depth	3.0 feet
	Porosity	0.4
Overall Profile	Effective Depth[1]	2.0 feet

[1] Effective depth is the maximum equivalent depth of water stored within the bioretention area less the depth displaced by soil media (vertical summation of surface ponding depth and void storage depth)

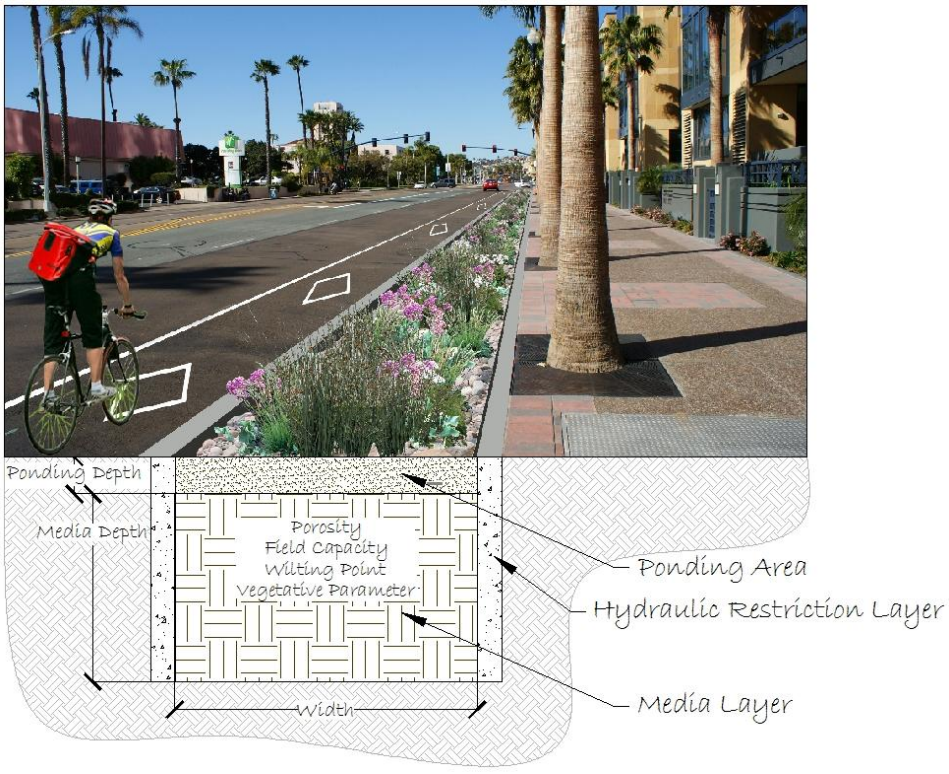


Figure 1-4. Typical bioretention section view (City of San Diego 2011).

Contributing Drainage Area Analysis

The purpose of this analysis was to realistically represent the area, type, and impervious coverage of land draining to potential green streets throughout the entire watershed. This is a critical step in WMP development because it predicts what volume of runoff can be assumed treated by green streets and what remaining (untreated) runoff must be routed to regional BMPs or addressed in other ways. The following engineering analyses were performed at a subwatershed-scale within the limits of available data and resources to estimate the maximum potential green street treatment capacity; given more detailed street-by-street drainage area data, the assumptions and results presented herein could be refined in future efforts to optimize green street treatment capacity. Figure 1-5 illustrates a simplified routing schematic used to represent the available runoff flow pathways to green street and regional BMPs throughout the watershed. The following subsections explain how each representative drainage area illustrated in Figure 1-5 was characterized.

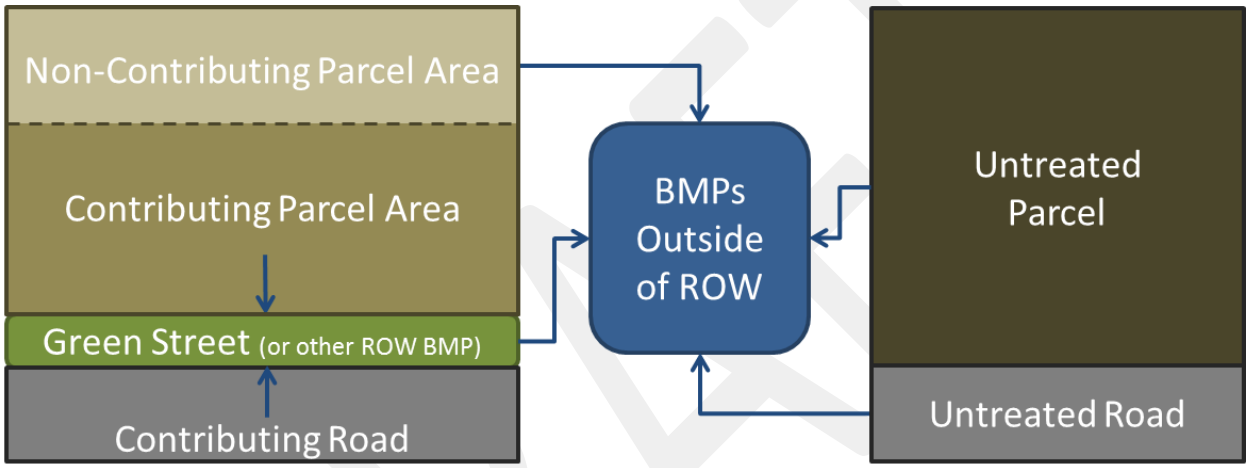


Figure 1-5. Green streets model schematic (arrows denote direction of runoff routing; figure not to scale).

Typical Parcel Size & Street Frontage Analysis

The nature of the green street analysis requires an understanding of typical parcel sizes and how much of the parcel drains to the ROW. Much of the runoff from parcels and the road drains to the ROW and is conveyed downstream through curb, gutter, and pipes. By identifying the typical parcel size, frontage length, and associated road area that drains to a candidate right-of-way area (Figure 1-6) the total area draining to potential green street retrofit opportunities was extrapolated throughout the watershed. For purposes of this study, only the high-density residential, multifamily residential, commercial, institutional, and industrial land uses were considered as contributing substantial runoff to the ROW (all other land uses contain minimal impervious area and thus contribute insubstantial runoff to the ROW).

The typical parcel size for each land use was determined by identifying all parcels for each land use. Once all the parcels were selected, the median parcel size for each land use was calculated and tabulated. This method evaluated thousands of parcels throughout the entire watershed and provided the most accurate depiction of the typical parcel size for each land use based on available data. Results are shown in Table 1-5.

Each parcel is adjacent to a portion of the ROW where the green street would be implemented. A subset of parcels approximate to the median parcel size for each land use was selected to determine the average frontage length. The portion of the selected parcels that was in contact with the ROW was measured using desktop analysis tools and averaged between all parcels of the same land use. Results are shown in Table 1-5.

Road area draining to green streets constitutes a substantial component of the total impervious drainage area. To establish road drainage areas, typical road widths were defined by sampling representative road segments located in each land use. Widths were measured from curb-to-curb using aerial orthoimagery and reported to the nearest even integer. The median sampled road width for each land use was calculated and compared with the City of Los Angeles Standard Street Dimensions (City of Los Angeles Bureau of Engineering 1999) for validation. To predict the resulting contributing road areas, the previously measured frontage length was multiplied by half the road width. Roads were assumed to be crowned; therefore, only half of the width would drain to one side of the road. Results are shown in Table 1-5.

As discussed in Section 1.2.4, only 30 percent of the frontage length could be converted into bioretention area. This factor was multiplied by the frontage length and used in limiting the total length of bioretention available within the model, as presented in Table 1-5.

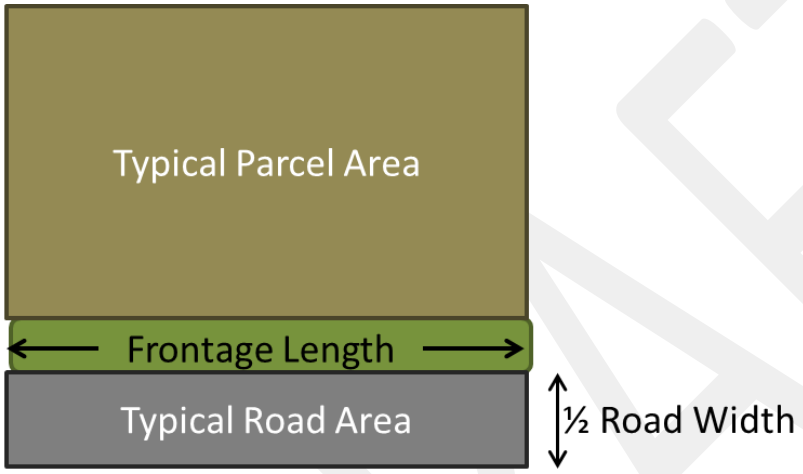


Figure 1-6. Typical parcel area, road width, road area, and frontage length schematic (figure not to scale)

Table 1-5. Typical parcel area, road area, and frontage length

Land Use	Typical Parcel Area (ft^2)	Frontage Length (ft)	Typical Road Width (ft)	Typical Road Area (ft^2)	BMP Length (ft)
High-density Residential	6,528	57	38	1,083	17
Multifamily Residential	13,526	60	30	900	18
Commercial	12,429	100	63	3,150	30
Institutional	38,215	143	37	2,646	43
Industrial	26,467	117	46	2,691	35
Other Land Use (Open Space, Vacant, etc.)	n/a[1]	100	40	2,000	30

[1] assumed not draining to ROW

Contributing Parcel Area Analysis

Many parcels will not always entirely drain to the ROW because portions can be retained on-site or flow onto an adjacent property. The actual volume of water that can be treated by a green street BMP was determined by identifying the typical proportion of the parcel that drains to the ROW (as shown in context of the model

schematic in Figure 1-7). This step also determines the area, and associated runoff, that is *not* expected to drain to green streets and is routed directly to downstream regional facilities or other practices (herein referred to as non-contributing parcel area).

The contributing areas to the green street BMPs were found using random sampling and identifying the surrounding parcel drainage patterns. Parcels were selected using a random number generator and drainage areas were determined on a desktop analysis using topography, aerial imagery, and drainage infrastructure features. The average contributing percentage was identified by evaluating multiple sites. Table 1-6 shows the percent contributing areas by land use that were determined from this analysis.

The impervious coverage of contributing parcel areas was also characterized during this step so that runoff could be simulated and routed to green streets in each land use. This was performed by tabulating the imperviousness data from the WMMS Model for each individual land use feature. The area-weighted mean impervious coverage was then calculated for each land use type. Results are tabulated for each land use in Table 1-6.

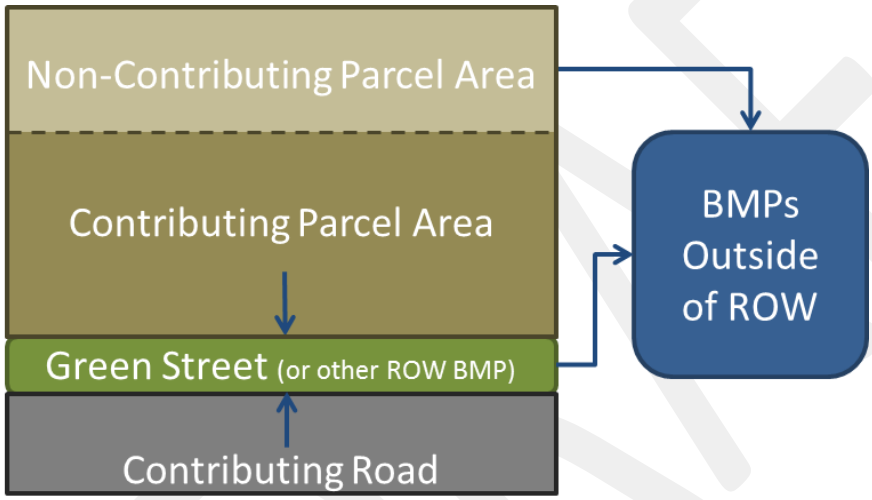


Figure 1-7. Parcel contributing area to ROW (impervious varies by land use; arrows denote direction of runoff routing; figure not to scale).

Table 1-6. Contributing area percentage by land use

Land Use	Contributing to ROW	Non-contributing to ROW	Percent Impervious
High-density Residential	80%	20%	36%
Multifamily Residential	80%	20%	60%
Commercial	80%	20%	90%
Institutional	80%	20%	72%
Industrial	35%	65%	66%
Other Land Use (Open Space, Vacant, etc.)	0%	100%	n/a

Untreated Roads Tabulation

Untreated roads consist of roadways with steep slopes, classifications not suited for green street implementation, or adjacent to open space or vacant parcels. Untreated road and associated adjacent parcel area that will ultimately drain to other BMPs was tabulated using available GIS data and screening results from Section 1.2.2 (conceptually illustrated in Figure 1-8).

Because green streets are implemented in the linear environment of the transportation corridor, it was assumed that the percentage of parcel area draining to green streets would be proportional to the percentage of suitable roads for green streets (as identified in Section 1.2.2) in each subwatershed. In other words, parcels associated with unsuitable roads were assumed to bypass green street treatment and routed directly to other facilities (these areas are defined herein as *untreated parcels*). The total treated and untreated parcel areas were reconciled with the total areas of each land use (per subwatershed) in the WMMS Model for validation and consistency.

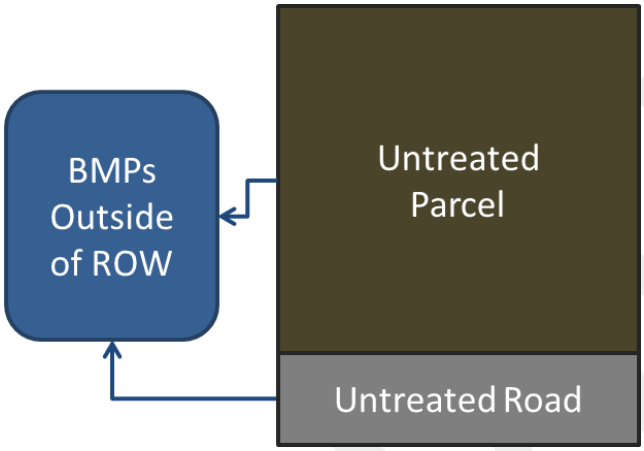


Figure 1-8. Schematic depicting untreated parcel and untreated road runoff routing (arrows denote direction of runoff routing; figure not to scale).

Summary of Contributing Drainage Areas

Results of the preceding analyses are presented in Figure 1-9. Areas that were assumed *un*treated by green streets include unsuitable roads and adjacent parcels, portions of suitable parcels that do not drain to the ROW, and predominantly pervious parcels (Open Space, Vacant, etc.), as discussed in preceding subsections; runoff from these untreated areas is assumed routed directly to regional facilities. Note that contributing areas are not necessarily proportional to contributing runoff due to variation in impervious coverage; runoff routing resulting from the preceding analyses is presented in the following section.

Given more detailed street-by-street engineering analyses, the potential area treated by green streets could be optimized, but the results below represent realistic estimates based on sound engineering judgment and currently available data and resources. Adaptive management strategies could target specific land uses that tend to bypass green street treatment (e.g. runoff, and associated treatment capacity, generated by industrial areas could be addressed through relevant industrial permits or onsite BMPs). Additional discussion on adaptive management strategies is provided in Section 8 of the main report.

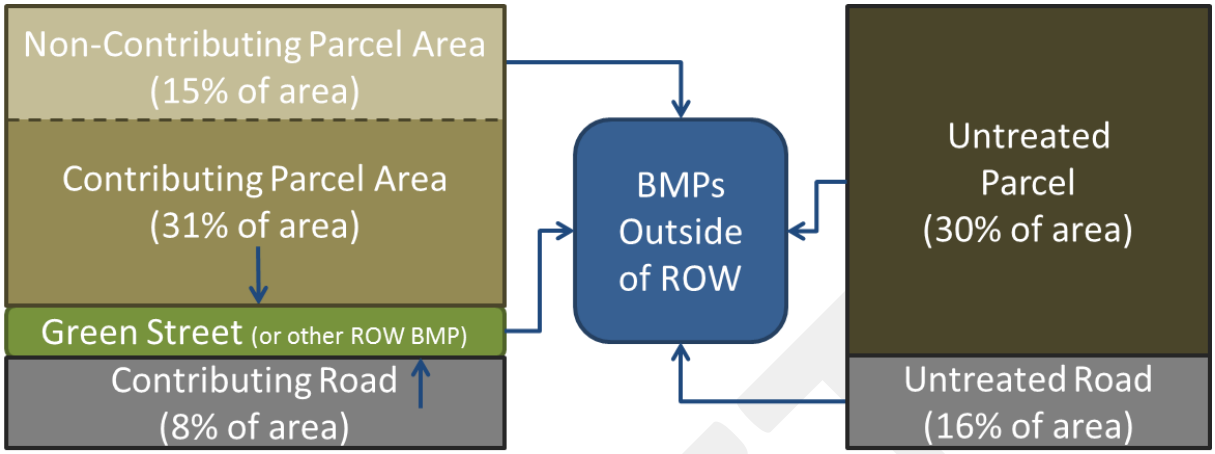


Figure 1-9. Schematic characterizing approximate distribution of routing to BMPs in the ROW for all WMP areas (arrows denote direction of runoff routing; figure not to scale).

BMP Infiltration Rates by Subwatershed

The purpose of performing the subwatershed infiltration rate analysis was to assign an average green street BMP infiltration rate to each subwatershed using soils data. Infiltration rates were assigned at the subwatershed level, which is the finest resolution at which the model performs hydrologic and water quality computations.

Soil data coverage provided through the LACDPW categorized soil unit areas into soil types. Runoff coefficient curves reported in the Hydrology Manual were developed by LACDPW for each soil type using double ring infiltrometer tests performed on areas of homogeneous runoff characteristics (LACDPW 2006). LADPW employed a sprinkling-type infiltrometer to perform the tests in each homogeneous area.

Runoff coefficient curves represent the response of the runoff coefficient (defined as the ratio of runoff to rainfall from a land area) to varying rainfall intensities. Each curve displays an inflection point representing the rainfall intensity at which substantial runoff initiates. According to LADPW (2006), each curve was assigned a minimum runoff coefficient of 0.1, "indicating that there is some runoff even at the smallest rainfall intensities." If it is assumed that substantial runoff initiates when the intensity of rainfall is greater than the soil's inherent infiltration rate, then the infiltration rate can be assumed equal to the rainfall intensity at the inflection point (less the assumed minimum runoff).

As demonstrated conceptually in Figure 1-10, the inflection point, and subsequently calculated infiltration rate, for each unique soil type in the WMP areas were identified using the runoff coefficient curves in Appendix C of the *Hydrology Manual* (LADPW 2006). Subwatershed areas were then intersected with the soil type coverage to calculate an area-weighted infiltration rate. Attachment C shows the distribution of the infiltration rates.

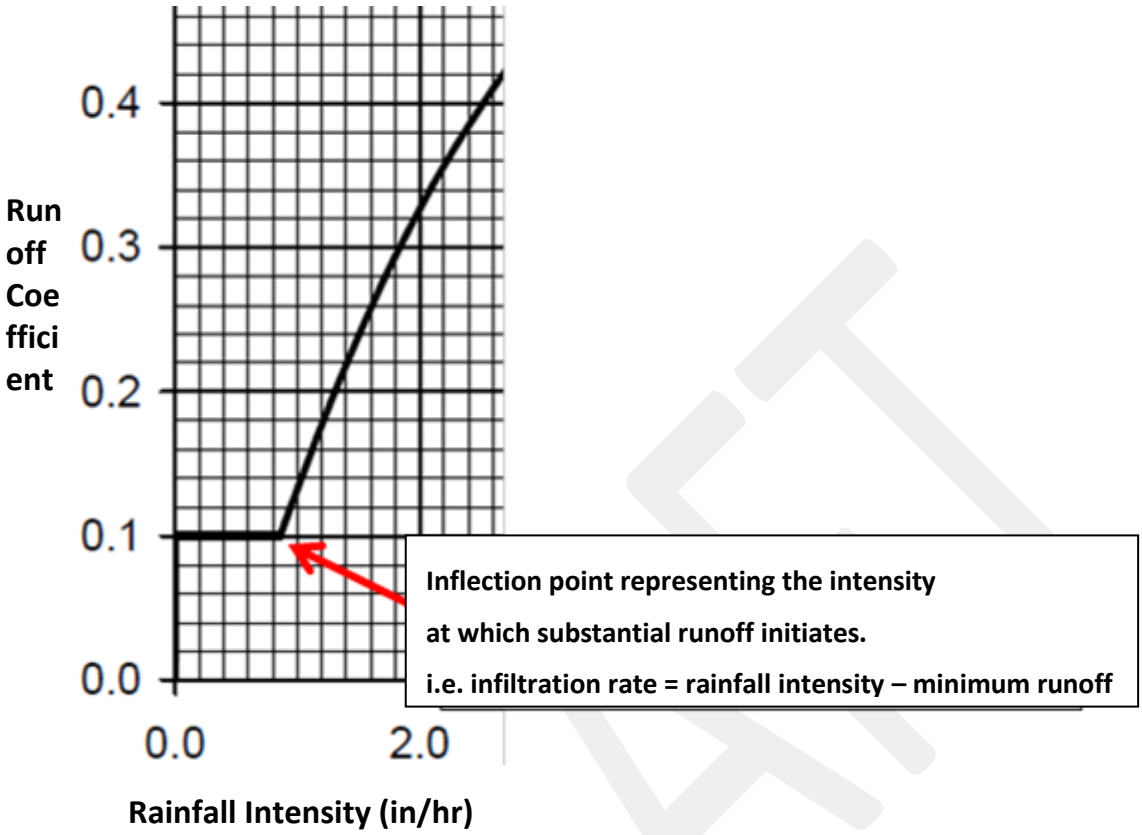


Figure 1-10. Example determination of runoff coefficient inflection point for an arbitrary soil type in Appendix C of LACDPW (2006).

1.3. LID on Public Parcels Assessment

Retrofitting public parcels with LID can be an efficient strategy for reducing stormwater runoff. This method allows municipalities the flexibility to prioritize and schedule stormwater projects to coincide with improvements that are already on the books (such as scheduled parking lot resurfacing, utility work, and public park improvements). Implementing LID on public parcels also allows municipalities the freedom to construct, inspect, and maintain BMPs without the need to purchase private property or to create stormwater easements.

The spatial extent of public parcels in each subwatershed was identified by selecting all parcels labeled as public by their assessors identification number (AIN). A total of 7,052 acres of public land was identified during this process (7% of the total WMP area). Each public parcel was assumed to implement BMPs that would treat the 85th percentile, 24-hour storm. The BMP volume was assumed to equal the 85th percentile, 24-hour storm depth times the impervious area.

LID retrofits are not feasible in all locations due to steep slopes, soil contamination hazards, and other constrains. The total runoff to be retained on public parcels was therefore discounted by 30% in order to provide a more realistic goal; this estimate was made in the lack of more detailed data, based on past LID screening exercises performed in Los Angeles County. The discount factor should be refined as actual public project sites are screened and prioritized.

1.4. Existing, Planned, and Potential BMPs

Existing and planned BMPs throughout the WMP areas were identified by the jurisdictions. These BMPs will provide capacity to reduce the annual storm runoff volume and demonstrate progress towards achieving the target runoff volume reduction.

1.4.1. Modeled Existing/Planned Subwatershed-Scale Regional BMPs

Regional BMPs that treat large portions of, or entire, subwatersheds (i.e. those with drainage areas larger than 50 acres) were modeled to quantify the impact to the upstream jurisdictions. The modeling approach and predicted performance for these specific sites is detailed in the following subsections. It is important to note that modeling was performed at a planning level coincident with the resolution of the subwatershed-scale WMMS model. Limited data were available to represent the sites, so conservative engineering assumptions were applied where appropriate. The calculated equivalent volume reductions from the BMPs can be refined during the adaptive management process once detailed design and monitoring data become available for the sites.

DeForest Wetlands Project

The DeForest Wetlands Project is located along the east bank of the Los Angeles River in the City of Long Beach and is comprised of approximately 34 acres of restored terrestrial and freshwater habitat and recreational amenities. The Project provides both groundwater recharge and surface water quality improvement. Site and modeling details are listed in Table 1-7.

Table 1-7. DeForest Wetlands Project details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	In Development		
Compliance Targets for Contributing Subwatersheds[1]	**248.7**	**ac-ft/yr**	Subwatershed 486066
	247.6	**ac-ft/yr**	Subwatershed 486068
Given Details			
Drainage Area	1490	ac	Delineated in GIS using WMMS subwatershed boundaries
Average Annual Infiltration Volume	15-35	ac-ft/yr	Per Section 3 of the WMP
Average Annual Treated Volume	800-1000	ac-ft/yr	Per Section 3 of the WMP; assumed volume is fully treated by wetland pollutant removal mechanisms prior to discharge; assumed treated volume is in addition to infiltration volume
Annual Runoff Volume Entering Wetland[1]	1589	ac-ft/yr	WMMS output
Annual Zinc Load Entering Wetland[1]	1808	lb Zn/yr	WMMS output
Wetland Zinc Effluent Concentration	20	µg/L	Upper limit of 95% confidence interval for wetland channels, per RAA Guidelines (LARWQCB 2014)
Modeling Results			
Estimated Annual Zinc Load Reduced by Infiltration[1]	17.1	lb Zn/yr	Assumed loading associated with minimum average infiltrated runoff; assumed load sequestered in sediments and/or sorbed to underlying soils
Estimated Annual Zinc Load Reduced by Wetland Functions[1]	535	lb Zn/yr	Reduction associated with treated volume; calculated by subtracting average effluent load associated with minimum treated volume from annual influent loading
Estimated Zinc Load Reduction	30.5%		

Relative to Annual Runoff[1]			
Estimated Zinc Load Reduction Relative to Compliance Target[1]	97.7%		
Estimated Equivalent Annual Volume Reduction[1]	**243.1**	**ac-ft/yr**	Subwatershed 486066
	242.0	**ac-ft/yr**	Subwatershed 486068

[1] Indicated annual volumes are referenced to the critical year

Dominguez Gap Wetlands Project

The Dominguez Gap Wetlands Project consists of two treatment wetlands situated on the east and west banks of the Los Angeles River that features habitat and recreational amenities. The East Basin is a 37-ac facility that is dewatered manually by a pump. The West Basin primarily functions as an infiltration basin and is approximately 15 acres. Table 1-8 and Table 1-10 characterize the site and modeling details of the East and West Basins, respectively.

Table 1-8. Dominguez Gap East Wetlands Project – East Basin details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	Complete		
Compliance Targets for Contributing Subwatersheds[1]	**346.9**	**ac-ft/yr**	Subwatershed 486014
	14.3	**ac-ft/yr**	Subwatershed 446014
Given Details			
Drainage Area	2075	ac	Delineated in GIS using WMMS subwatershed boundaries
Maximum Volume Treated per Storm Event	71	ac-ft	Per Section 3 of the WMP; assumed volume is fully treated by wetland pollutant removal mechanisms prior to discharge
Maximum Annual Volume Treated[1]	526	ac-ft/yr	Based on storm events recorded for critical year; assumed all storm event runoff volume treated up to 71 ac-ft
Annual Runoff Volume Entering Wetland[1]	913	ac-ft/yr	WMMS output
Annual Zinc Load Entering Wetland[1]	934	lb Zn/yr	WMMS output
Wetland Zinc Effluent Concentration	20	µg/L	Upper limit of 95% confidence interval for wetland channels, per RAA Guidelines (LARWQCB 2014)
Modeling Results			
Annual Zinc Load Reduced by Infiltration[1]	unknown	lb Zn/yr	Site soil information or monitored data required
Annual Zinc Load Reduced by Wetland Functions[1]	202	lb Zn/yr	Reduction associated with treated volume; calculated by subtracting average effluent load associated with minimum treated volume from annual influent loading
Zinc Load Reduction Relative to Annual Runoff[1]	22%		
Zinc Load Reduction Relative to Compliance Target[1]	55%		
Equivalent Annual Volume Reduction[1]	**191.7**	**ac-ft/yr**	Subwatershed 486014
	6.4	**ac-ft/yr**	Subwatershed 446014

[1] Indicated annual volumes are referenced to the critical year

Table 1-9. Dominguez Gap Wetlands Project – West Basin details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	Complete		
Compliance Targets for Contributing Subwatersheds[1]	**152.0**	**ac-ft/yr**	Subwatershed 486013 (41% contributes to West Basin)
	7.4	**ac-ft/yr**	Subwatershed 486015
Given Details			
Drainage Area	299	ac	Delineated in GIS using WMMS subwatershed boundaries
Annual Runoff Volume Infiltrated	All	ac-ft/yr	Per Section 3 of the WMP, no connection to Los Angeles River
Modeling Results			
Subwatershed 486013 Annual Runoff Volume Infiltrated[1]	47%		41% of subwatershed area contributes 47% of runoff volume to the basin
Subwatershed 446015Annual Runoff Volume Infiltrated	100%		100% of subwatershed area contributing
Equivalent Annual Volume Reduction[1]	**152.0**	**ac-ft/yr**	Subwatershed 486013 (compliance target is 43% annual reduction, so meets target)
	7.4	**ac-ft/yr**	Subwatershed 446015

[1] Indicated annual volumes are referenced to the critical year

Willow Springs Park

The Willow Springs Park project will convert a public parcel to a 47-acre park. The park will contain bioswales and a water feature integrated into a recreational spaces. Table 1-10 Characterizes the site and modeling details.

Table 1-10. Willow Springs Park details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	In Development		
Compliance Targets for Contributing Subwatersheds[1]	**26.5**	**ac-ft/yr**	Subwatershed 776012
	7.2	**ac-ft/yr**	Subwatershed 486012
Given Details			
Drainage Area	211	ac	Delineated in GIS using WMMS subwatershed boundaries
Total BMP Footprint	11	Ac	Per Section 3 of the WMP; natural channels/bioswales with very high infiltration rates
Underlying soil infiltration rates	0.9	In/hr	WMMS
Subwatershed area contributing	95%		
Modeling Results			
Maximum infiltration rate over footprint of BMP	0.83	ac-ft/hr	Assumed constant infiltration over entire footprint, applied to each time step of model runoff output draining to park – meets compliance target via infiltration
Equivalent Annual Volume Reduction[1]	**26.5**	**ac-ft/yr**	Subwatershed 776012
	7.2	**ac-ft/yr**	Subwatershed 446012

[1] Indicated annual volumes are referenced to the critical year

RB-AR10607

Discovery Park Infiltration Basin

An existing infiltration basin located at 12400 Columbia Way in the City of Downey treats runoff from approximately 51 acres (5% of the subwatershed in which the site is located). Field observations indicate that the facility has capacity to infiltration runoff at a rate of 2 in/hr (equivalent to approximately 4 ac-ft/day) in addition to detention storage. Table 1-11 reports the simplified modeling assumptions for this BMP – upon further evaluation of as-built conditions, the associated volume reduction can be refined during the adaptive management process.

Table 1-11. Discovery Park Infiltration Basin details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower San Gabriel River		
Location	City of Downey		
Status	Complete		
Compliance Targets for Treated Subwatersheds[1]	**80.6**	**ac-ft/yr**	Subwatershed 245115
Given Details			
Drainage Area	51	ac	
Observed Infiltration Rate	4	ac-ft/day	Per Gerald Green, personal communication, 2014, February 2
Percentage of Subwatershed Contributing to BMP	5%		
Approximate Runoff Volume Draining to BMP[1]	44	ac-ft/yr	WMMS
Modeling Results			
Equivalent Annual Volume Reduction[1]	**24**	**ac-ft/yr**	Assumed constant infiltration over entire footprint, applied to each time step of model runoff output draining to park

[1] Indicated annual volumes are referenced to the critical year

Parque Dos Rios

Parque Dos Rios is located at the confluence of the Los Angeles River and Rio Hondo River. An approximately 30-ac area between the freeway and the Los Angeles River will be converted to an infiltration basin to treat additional upstream area. Currently, the site is self-retaining open space and is characterized in the baseline model as such. No further runoff volume reductions were calculated for this site; as design details are finalized for the infiltration basin improvements, associated volume reductions can be applied towards upstream jurisdictional compliance targets.

1.4.2. Identified Parcel-Scale Regional and Distributed BMPs

The jurisdictions within the WMP areas compiled detailed lists of BMPs intended to treat areas smaller than 50 acres. As with the preceding regional BMPs, these strategies represent progress towards achieving the compliance target in each respective jurisdiction. The distributed BMPs are listed in Attachment D and can be applied towards meeting the compliance targets in each jurisdiction.

The WMP groups have identified additional potential regional BMPs and these are listed in Section 3 for LCC and Section 4 for LLAR and LSGR of the respective WMP.

1.5. Non-MS4 Facility Runoff

Each jurisdiction is the Group's WMP area is subject to stormwater runoff from non-MS4 facilities. In particular, Caltrans roads and facilities regulated by nontraditional or general industrial permits contribute to the runoff volume for each subwatershed. It will be important for these entities to retain their runoff and/or eliminate their cause/contribution to receiving water exceedances. The runoff from these non-MS4 facilities was therefore estimated and subtracted from the treatment target as described below.

1.5.1. Non-MS4 Permitted Areas

Non-MS4 permitted areas were identified based on the address list of permittees on the State Water Resources Control Board (SWRCB) website. Using the address information, corresponding parcel areas were selected using the LA County Assessor Parcel Viewer and the associated GIS Shapefile. The percentage of permitted land use area relative to the total land use area was calculated and the associated non-MS4 permitted area runoff as extracted from the WMMS runoff response output.

1.5.2. Caltrans

The design storm runoff generated by Caltrans facilities was estimated using WMMS land use data. Areas labeled as Transportation consist of freeways and other extensive transportation facilities that tend to fall under Caltrans jurisdiction (versus areas labeled as Secondary Roads, which are managed by local transportation departments); these areas were assumed to be Caltrans facilities. Runoff from Transportation land uses, less runoff from any overlapping non-MS4 permitted areas identified above, was extracted from the WMMS model output for each subwatershed.

1.6. Institutional BMPs and Minimum Control Measures

It is challenging to accurately quantify most institutional BMP and minimum control measure (MCM) benefits in terms of pollutant load reductions because they generally require extensive survey and monitoring information to quantify. In addition, nonstructural BMPs may target pollutants, land uses, or populations, resulting in different load reductions depending on the implementation technique. A number of MCMs are outlined in each WMP, representing an array of practices to most effectively address pollutants at their source or affect their transport. For the purposes of the RAA, a 10% reduction was assumed to represent the cumulative impact of these practices during both wet and dry conditions. Another explicitly modeled nonstructural BMP was a goal to reduce 25% of irrigation of urban vegetation, a goal that can result from a myriad of practices ranging from public education, enforcement, incentive programs, creative water rate structures, etc. The 25% reduction in irrigation was modeled directly in LSPC and is the primary driver for dry weather flow reductions. Pollutant load reductions from these nonstructural BMPs were subtracted from loads simulated in the baseline model to quantify progress towards meeting the watershed numeric goals. Results of both the 10% reduction for collective MCMs, in addition to irrigation reduction, are presented in Section 7 of the main RAA report for both wet and dry conditions.

Attachment B: Detailed Jurisdictional Compliance Tables

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Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

June 6, 2014

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B1. Lower Los Angeles River WMP Detailed Tables

B1.1. City of Downey

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6076	Final	17.0	-	-	1.2	-	1.2
6077	Final	123.0	0.3	11.8	1.2	6.4	19.6
6079	50%	176.4	0.7	1.7	10.1	-	12.5
6082	Final	0.3	-	-	0.0	0.0	0.0
6100	50%	10.7	0.0	0.8	0.0	0.6	1.4
6102	31%	143.8	1.1	12.2	0.7	7.1	21.1
6103	Final	-	0.7	-	-	-	0.7
6104	Final	37.1	0.3	3.2	0.0	0.9	4.5
6106	Final	76.4	0.4	9.1	1.6	-	11.1
6111	Final	69.5	0.3	7.1	0.5	3.3	11.2
6113	Final	0.6	-	0.0	-	0.1	0.1
Grand Total		654.7	3.8	45.9	15.3	18.4	83.4

B1.2. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6014	31%	7.9	-	1.1	0.0	-	1.2
Grand Total		7.9	-	1.1	0.0	-	1.2

B1.3. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6001	Final	-	-	-	-	-	-
6002	50%	378.7	-	23.8	5.2	19.3	48.3
6003	Final	429.9	-	22.4	1.4	32.8	56.5
6004	50%	2.4	-	0.1	-	0.3	0.3
6005	31%	6.6	-	1.0	0.0	-	1.0
6006	Final	35.9	-	0.3	0.1	4.1	4.5
6007	Final	67.0	-	6.4	0.1	4.0	10.6
6008	Final	144.0	-	13.9	2.0	3.5	19.4
6009	Final	159.5	-	11.5	0.7	9.2	21.4
6010	Final	100.8	-	8.2	0.9	4.8	13.9
6011	Final	184.8	-	14.4	0.9	9.6	24.9
6012	31%	-	-	-	-	-	-
6013	50%	-	-	-	-	-	-
6014	Final	155.2	-	15.0	7.9	-	22.9
6015	31%	-	-	-	-	-	-
6016	Final	-	-	-	-	-	-
6017	50%	1.1	-	-	-	0.1	0.1
6018	Final	45.8	-	4.3	-	2.6	6.9
6065	Final	36.7	-	0.4	0.0	4.6	5.0
6066	31%	-	-	-	-	-	-
6067	50%	25.3	-	2.6	0.3	0.5	3.3
6068	31%	-	-	-	-	-	-
6069	50%	42.6	-	0.6	0.0	3.5	4.1
6070	50%	22.2	-	2.7	0.4	-	3.1
6071	50%	94.4	-	10.5	1.6	1.0	13.1
6072	50%	0.3	-	0.0	-	0.0	0.0
7016	Final	473.3	-	16.5	6.9	36.3	59.7
Grand Total		2,406.2	-	154.6	28.3	136.2	319.1

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B1.4. City of Lynwood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6023	Final	26.3	-	1.0	0.7	1.6	3.3
6024	Final	10.6	-	0.4	-	1.1	1.4
6028	31%	11.2	-	0.8	-	0.9	1.7
6030	Final	45.2	-	4.0	2.4	-	6.4
6031	31%	133.0	-	9.9	2.0	7.5	19.4
6032	Final	60.5	-	6.0	0.4	3.4	9.8
6033	Final	113.3	-	7.4	0.2	10.7	18.2
6074	50%	134.9	-	12.8	3.8	0.1	16.8
6078	Final	-	-	-	-	-	-
6080	31%	91.7	-	7.7	0.7	4.7	13.2
6081	Final	41.3	-	4.0	0.8	0.5	5.3
6082	Final	-	-	-	-	-	-
Grand Total		667.9	-	53.9	11.1	30.5	95.5

B1.5. City of Paramount

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6069	31%	0.0	-	-	-	-	-
6071	Final	120.7	0.0	4.9	0.9	9.9	15.6
6072	Final	172.9	0.0	7.6	1.1	13.9	22.6
6073	Final	61.4	-	1.9	0.2	4.6	6.6
6075	31%	163.7	-	9.0	1.7	10.2	20.9
6076	50%	65.7	-	7.4	0.8	0.3	8.6
6078	Final	21.7	-	0.5	0.0	1.8	2.3
6080	Final	-	-	-	-	-	-
Grand Total		606.1	0.1	31.2	4.7	40.6	76.6

B1.6. City of Pico Rivera

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6106	31%	44.3	-	5.9	0.5	0.2	6.5
6111	Final	-	-	-	-	-	-
6112	31%	1.4	-	0.0	-	0.1	0.2
6113	31%	229.5	-	5.6	0.0	27.0	32.7
6114	Final	-	-	-	-	-	-
6115	Final	0.0	-	-	-	0.0	0.0
6116	Final	-	-	-	-	-	-
6117	Final	-	-	-	-	-	-
6126	Final	12.0	-	1.3	0.0	0.5	1.8
6129	Final	-	-	-	-	-	-
Grand Total		287.2	-	12.8	0.5	27.9	41.2

B1.7. City of Signal Hill

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6002	50%	105.8	-	7.0	0.9	5.9	13.9
6003	Final	43.7	-	1.9	0.0	4.2	6.0
6007	Final	-	-	-	-	-	-
6009	Final	8.2	0.1	0.3	-	0.7	1.1
6011	31%	6.0	0.1	0.8	-	0.2	1.1
6012	31%	2.5	-	0.0	0.2	-	0.2
Grand Total		166.2	0.2	10.0	1.1	11.0	22.3

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B1.8. City of South Gate

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6031	31%	148.6	-	16.9	0.8	5.3	22.9
6033	Final	61.9	-	4.5	0.3	4.8	9.5
6034	Final	416.7	-	30.0	3.8	25.3	59.0
6076	50%	92.5	-	7.5	0.7	5.1	13.2
6078	Final	-	-	-	-	-	-
6079	50%	54.4	-	4.9	0.1	3.4	8.4
6080	31%	48.7	-	5.8	-	2.5	8.3
6082	Final	82.8	0.0	4.3	0.1	9.4	13.8
6083	Final	11.5	-	0.7	-	0.9	1.6
6084	Final	137.8	4.7	8.3	0.8	5.9	19.8
6085	50%	-	-	-	-	-	-
6089	Final	18.3	-	0.8	0.2	1.8	2.7
6090	Final	3.4	-	0.6	-	-	0.6
6096	31%	0.6	-	0.0	0.0	0.0	0.1
6098	31%	0.1	-	-	0.0	-	0.0
6100	50%	51.2	-	2.6	0.0	4.2	6.8
6101	31%	25.0	-	0.5	0.1	2.6	3.3
6102	31%	6.3	-	-	-	0.8	0.8
6104	Final	7.4	-	0.0	0.0	0.9	1.0
6350	Final	-	-	-	-	-	-
6351	Final	7.1	-	0.0	0.0	1.1	1.1
Grand Total		1,174.3	4.7	87.5	6.8	73.8	173.0

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B2. Los Cerritos Channel WMP Detailed Tables

B2.1. City of Bellflower

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5507	Final	268.1	-	16.7	1.2	13.2	31.1
5517	Final	137.7	-	9.3	0.8	9.3	19.4
5518	Final	233.5	-	16.8	1.2	10.2	28.2
5519	35%	176.3	-	11.4	0.9	12.1	24.4
	Final	59.5	-	-	-	3.6	3.6
5523	35%	68.0	-	3.7	0.4	4.1	8.2
	Final	32.3	-	-	-	2.0	2.0
5524	Final	14.8	-	0.2	-	1.2	1.4
Grand Total		990.4	-	58.1	4.5	55.6	118.2

B2.2. City of Cerritos

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5506	Final	0.0	-	-	-	0.0	0.0
5507	35%	9.7	-	1.0	0.0	0.5	1.4
	Final	3.2	-	-	-	0.1	0.1
Grand Total		12.9	-	1.0	0.0	0.6	1.6

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B2.3. City of Downey

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5524	35%	57.2	0.1	5.3	0.0	2.7	8.1
	Final	35.8	-	-	-	2.1	2.1
Grand Total		93.0	0.1	5.3	0.0	4.8	10.2

B2.4. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5506	Final	226.5	-	31.4	2.1	5.1	38.5
5507	35%	131.0	-	15.4	2.6	1.5	19.5
	Final	45.2	-	-	-	3.6	3.6
5510	Final	19.9	-	0.4	-	1.5	1.9
5512	Final	138.8	-	7.7	0.2	7.0	14.9
5514	Final	35.3	-	3.7	1.3	0.4	5.4
5515	Final	26.6	-	3.9	0.2	0.5	4.6
5516	Final	31.9	-	4.0	0.4	0.8	5.3
5517	Final	134.4	-	18.6	1.4	2.8	22.9
5519	35%	3.1	-	0.2	-	0.2	0.4
	Final	6.4	-	-	-	0.1	0.1
5520	35%	130.9	-	14.0	2.1	4.4	20.6
	Final	33.5	-	-	-	3.3	3.3
5521	Final	95.2	-	11.6	0.6	2.2	14.3
5522	Final	71.9	-	8.7	0.8	1.6	11.1
5523	35%	17.4	-	1.9	-	0.7	2.6
	Final	4.0	-	-	-	0.3	0.3
Grand Total		1,152.1	-	121.5	11.8	36.2	169.5

B2.5. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5501	35%	0.1	-	0.0	0.0	0.0	0.0
	Final	0.1	-	-	-	0.0	0.0
5502	35%	0.1	-	0.0	0.0	0.0	0.0
	Final	0.2	-	-	-	0.0	0.0
5503	35%	57.7	-	4.2	2.3	2.0	8.5
	Final	20.1	-	-	-	1.7	1.7
5504	35%	196.6	-	10.2	3.3	8.7	22.2
	Final	104.4	-	-	-	5.5	5.5
5505	Final	130.5	-	15.9	1.6	3.2	20.7
5506	Final	8.6	-	0.1	0.2	0.4	0.7
5508	Final	65.6	-	7.7	0.9	1.7	10.3
5509	Final	25.6	-	-	2.2	-	2.2
5510	Final	152.2	-	9.8	0.9	6.1	16.8
5511	Final	48.5	-	6.7	0.2	1.3	8.1
5512	Final	329.5	-	22.2	1.7	16.8	40.7
5513	35%	23.9	-	1.5	0.1	2.1	3.7
	Final	6.6	-	-	-	0.4	0.4
5514	35%	106.0	-	10.9	5.9	-	16.7
	Final	46.8	-	3.7	-	2.8	6.5
5515	Final	91.0	-	10.8	1.7	2.3	14.9
5520	Final	7.4	-	0.8	-	0.3	1.2
5521	Final	49.2	-	6.0	0.1	1.8	7.9
5522	Final	48.6	-	4.2	0.0	3.1	7.3
5523	35%	89.3	-	7.0	0.8	3.5	11.3
	Final	21.4	-	-	-	1.6	1.6
Grand Total		1,629.8	-	121.7	21.8	65.3	208.7

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B2.6. City of Paramount

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5519	35%	24.0	-	1.9	0.2	1.4	3.5
	Final	11.4	-	-	-	0.6	0.6
5523	35%	243.0	-	12.4	2.8	15.7	30.9
	Final	89.6	-	-	-	4.1	4.1
5524	Final	157.5	-	8.5	3.5	4.0	16.0
Grand Total		525.5	-	22.8	6.4	25.9	55.1

B2.7. City of Signal Hill

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5510	35%	231.6	0.0	11.2	1.2	14.2	26.6
	Final	52.7	-	-	-	2.0	2.0
Grand Total		284.3	0.0	11.2	1.2	16.2	28.6

B3. Lower San Gabriel River (San Gabriel River) WMP Detailed Tables

B3.1. City of Artesia

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5109	35%	1.1	-	-	0.1	-	0.1
Grand Total		1.1	-	-	0.1	-	0.1

B3.2. City of Bellflower

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5110	Final	0.0	-	-	-	0.0	0.0
5112	Final	0.6	-	0.1	0.0	-	0.1
5113	Final	51.5	-	0.9	3.4	-	4.3
5114	Final	-	-	-	-	-	-
5115	35%	1.3	-	0.2	0.0	-	0.2
5116	Final	0.1	-	-	-	0.0	0.0
5118	Final	3.9	-	0.6	0.3	-	0.9
Grand Total		57.4	-	1.8	3.7	0.0	5.5

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B3.3. City of Cerritos

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5107	Final	-	-	-	-	-	-
5108	Final	-	-	-	-	-	-
5109	Final	-	-	-	-	-	-
5110	Final	2.9	-	0.4	0.0	-	0.4
5111	Final	-	-	-	-	-	-
5112	Final	1.2	-	0.2	0.0	-	0.2
5113	Final	-	-	-	-	-	-
5116	35%	-	-	-	-	-	-
Grand Total		4.1	-	0.6	0.0	-	0.6

B3.4. City of Diamond Bar

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5197	Final	0.0	-	0.0	-	-	0.0
5198	Final	-	-	-	-	-	-
5203	Final	-	-	-	-	-	-
5204	Final	-	-	-	-	-	-
5205	Final	1.0	-	0.2	-	-	0.2
5212	Final	-	-	-	-	-	-
5213	35%	-	-	-	-	-	-
Grand Total		1.1	-	0.2	-	-	0.2

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B3.5. City of Downey

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5113	Final	-	1.0	-	-	-	1.0
5114	Final	22.4	0.8	2.1	0.4	-	3.3
5115	Final	-	0.6	-	-	-	0.6
5118	Final	-	0.6	-	-	-	0.6
5119	Final	52.5	3.3	6.4	-	-	9.7
5122	35%	-	0.0	-	-	-	0.0
5124	Final	-	0.0	-	-	-	0.0
5125	Final	2.5	0.4	0.1	-	-	0.5
5126	Final	9.8	0.3	1.4	-	-	1.7
5127	Final	-	0.1	-	-	-	0.1
5128	Final	-	0.0	-	-	-	0.0
Grand Total		87.3	7.1	10.0	0.4	-	17.5

B3.6. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5105	Final	0.8	-	-	0.0	0.1	0.1
5106	35%	-	-	-	-	-	-
5107	Final	-	-	-	-	-	-
5108	Final	1.4	-	0.2	0.0	-	0.2
5110	Final	-	-	-	-	-	-
Grand Total		2.2	-	0.2	0.0	0.1	0.4

B3.7. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5102	Final	-	-	-	-	-	-
5103	35%	26.9	-	1.1	1.3	-	2.4
5104	Final	2.3	-	0.3	-	-	0.3
5105	Final	-	-	-	-	-	-
5106	Final	0.0	-	-	-	0.0	0.0
Grand Total		29.2	-	1.4	1.3	0.0	2.7

B3.8. City of Norwalk

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5109	35%	0.8	-	-	0.1	-	0.1
5116	Final	-	-	-	-	-	-
5117	Final	-	-	-	-	-	-
5118	Final	0.1	-	-	0.0	-	0.0
5120	Final	-	-	-	-	-	-
5121	Final	3.9	-	-	0.3	-	0.3
5122	Final	-	-	-	-	-	-
5124	Final	-	-	-	-	-	-
Grand Total		4.8	-	-	0.3	-	0.3

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B3.9. City of Pico Rivera

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5127	Final	0.0	-	-	-	0.0	0.0
5128	Final	6.4	-	1.2	-	-	1.2
5130	Final	6.1	-	1.1	-	-	1.1
5131	Final	11.7	-	2.0	-	-	2.0
5132	Final	0.0	-	-	-	0.0	0.0
5135	Final	4.3	-	0.8	-	-	0.8
5136	Final	7.2	-	1.3	-	-	1.3
5137	35%	0.2	-	0.0	-	-	0.0
5139	Final	7.8	-	1.4	-	-	1.4
5140	Final	-	-	-	-	-	-
5141	Final	4.9	-	0.8	-	-	0.8
5142	Final	-	-	-	-	-	-
5143	Final	8.9	-	1.6	-	-	1.6
5144	Final	-	-	-	-	-	-
5145	Final	1.7	-	0.3	-	-	0.3
5147	Final	-	-	-	-	-	-
5148	Final	0.2	-	0.0	-	-	0.0
5149	Final	0.0	-	-	-	-	-
5150	Final	-	-	-	-	-	-
5151	Final	-	-	-	-	-	-
5153	Final	1.0	-	0.2	-	-	0.2
5154	Final	-	-	-	-	-	-
Grand Total		60.4	-	10.8	-	0.0	10.8

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B3.10. City of Santa Fe Springs

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5120	Final	3.1	-	0.2	-	0.3	0.5
5122	Final	-	-	-	-	-	-
5123	Final	23.9	-	3.8	-	-	3.8
5127	35%	-	-	-	-	-	-
5129	Final	-	-	-	-	-	-
5130	Final	-	-	-	-	-	-
5132	Final	-	-	-	-	-	-
5133	Final	-	-	-	-	-	-
5134	Final	3.3	-	0.6	-	-	0.6
5135	Final	0.0	-	0.0	-	0.0	0.0
Grand Total		30.3	-	4.6	-	0.3	4.9

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B3.11. City of Whittier

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5138	Final	7.1	-	1.4	-	-	1.4
5142	Final	-	-	-	-	-	-
5146	Final	-	-	-	-	-	-
5147	Final	-	-	-	-	-	-
5148	Final	-	-	-	-	-	-
5153	35%	0.0	-	-	-	0.0	0.0
5173	Final	-	-	-	-	-	-
Grand Total		7.1	-	1.4	-	0.0	1.4

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B4. Lower San Gabriel River WMP (Coyote Creek) Detailed Tables

B4.1. City of Artesia

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5008	Final	-	-	-	-	-	-
5018	35%	15.9	-	-	1.1	-	1.1
Grand Total		15.9	-	-	1.1	-	1.1

B4.2. City of Cerritos

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5008	Final	7.7	-	-	0.9	-	0.9
5016	Final	-	-	-	-	-	-
5017	Final	4.3	-	-	0.5	-	0.5
5018	Final	14.9	-	-	1.1	-	1.1
5023	Final	-	-	-	-	-	-
5024	Final	-	-	-	-	-	-
5026	Final	5.8	-	1.0	0.0	-	1.0
5028	Final	-	-	-	-	-	-
5029	Final	4.9	-	0.3	0.2	-	0.6
5030	35%	0.1	-	0.0	-	-	0.0
5035	Final	-	-	-	-	-	-
5036	Final	1.2	-	0.2	0.0	-	0.2
5038	Final	-	-	-	-	-	-
5059	Final	15.1	-	1.6	0.5	-	2.0
5060	Final	-	-	-	-	-	-
5061	Final	2.6	-	-	0.2	-	0.2
Grand Total		56.7	-	3.1	3.4	-	6.4

B4.3. City of Diamond Bar

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5053	Final	-	-	-	-	-	-
5054	35%	1.0	-	0.3	-	-	0.3
5055	Final	8.4	-	1.2	-	0.7	1.9
5056	Final	-	-	-	-	-	-
5057	Final	-	-	-	-	-	-
5058	Final	27.2	-	6.7	-	-	6.7
Grand Total		36.7	-	8.2	-	0.7	8.9

B4.4. City of Hawaiian Gardens

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5004	Final	-	-	-	-	-	-
5007	35%	23.6	-	0.3	1.5	-	1.8
5009	Final	0.1	-	-	-	0.0	0.0
5013	Final	1.3	-	-	0.1	-	0.1
5014	Final	2.1	-	0.2	0.0	-	0.3
Grand Total		27.1	-	0.6	1.6	0.0	2.2

B4.5. City of La Mirada

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5037	Final	-	-	-	-	-	-
5038	Final	-	-	-	-	-	-
5039	Final	-	-	-	-	-	-
5040	Final	-	-	-	-	-	-
5041	Final	-	-	-	-	-	-
5042	Final	-	-	-	-	-	-
5043	Final	19.1	-	1.9	0.6	-	2.5
5044	Final	-	-	-	-	-	-
5045	35%	-	-	-	-	-	-
5059	Final	1.4	-	0.3	-	-	0.3
5060	Final	-	-	-	-	-	-
5062	Final	20.5	-	1.0	1.1	-	2.1
5063	Final	37.0	-	-	3.0	-	3.0
5064	Final	-	-	-	-	-	-
5067	Final	-	-	-	-	-	-
5069	Final	40.3	-	5.3	0.9	-	6.2
5070	Final	-	-	-	-	-	-
5073	Final	5.7	-	1.0	-	-	1.0
5074	Final	0.8	-	0.1	-	-	0.1
5080	Final	-	-	-	-	-	-
Grand Total		124.9	-	9.6	5.6	-	15.2

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B4.6. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5004	Final	-	-	-	-	-	-
5007	35%	17.5	-	0.9	0.7	-	1.6
5008	Final	2.3	-	-	0.3	-	0.3
5014	Final	-	-	-	-	-	-
5015	Final	-	-	-	-	-	-
5016	Final	-	-	-	-	-	-
5017	Final	-	-	-	-	-	-
Grand Total		19.7	-	0.9	0.9	-	1.9

B4.7. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5003	Final	-	-	-	-	-	-
5004	35%	-	-	-	-	-	-
5005	Final	-	-	-	-	-	-
5007	Final	-	-	-	-	-	-
5009	Final	-	-	-	-	-	-
5013	Final	0.0	-	-	0.0	-	0.0
Grand Total		0.0	-	-	0.0	-	0.0

B4.8. City of Norwalk

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5008	35%	1.6	-	-	0.2	-	0.2
5018	Final	2.0	-	-	0.2	-	0.2
5019	Final	24.3	-	-	1.8	-	1.8
5020	Final	-	-	-	-	-	-
5021	Final	16.9	-	-	1.3	-	1.3
5022	Final	7.7	-	1.4	-	-	1.4
5024	Final	-	-	-	-	-	-
5025	Final	-	-	-	-	-	-
5060	Final	-	-	-	-	-	-
5068	Final	-	-	-	-	-	-
5071	Final	-	-	-	-	-	-
5073	Final	-	-	-	-	-	-
Grand Total		52.5	-	1.4	3.4	-	4.7

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B4.9. City of Santa Fe Springs

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5019	Final	0.0	-	-	-	0.0	0.0
5020	Final	-	-	-	-	-	-
5022	Final	-	-	-	-	-	-
5024	Final	-	-	-	-	-	-
5025	Final	-	-	-	-	-	-
5060	Final	-	-	-	-	-	-
5061	Final	-	-	-	-	-	-
5062	Final	-	-	-	-	-	-
5067	Final	-	-	-	-	-	-
5068	Final	-	-	-	-	-	-
5069	Final	-	-	-	-	-	-
5071	Final	-	-	-	-	-	-
5072	Final	2.6	-	0.3	-	0.1	0.4
5073	Final	-	-	-	-	-	-
5084	Final	1.4	-	0.2	-	-	0.2
5089	Final	-	-	-	-	-	-
5092	Final	1.1	-	0.1	-	0.2	0.2
5093	Final	-	-	-	-	-	-
5094	Final	7.4	-	0.4	-	0.9	1.2
5095	35%	-	-	-	-	-	-
Grand Total		12.6	-	1.0	-	1.1	2.1

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B4.10. City of Whittier

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5045	Final	0.0	-	-	-	0.0	0.0
5064	Final	-	-	-	-	-	-
5065	Final	3.7	-	0.8	-	-	0.8
5070	Final	0.0	-	-	-	0.0	0.0
5079	Final	11.7	-	2.5	-	-	2.5
5080	Final	26.0	-	5.5	-	-	5.5
5081	35%	-	-	-	-	-	-
5082	Final	0.2	-	0.0	-	-	0.0
5083	Final	-	-	-	-	-	-
5086	Final	-	-	-	-	-	-
5087	Final	20.8	-	4.1	-	-	4.1
5088	Final	24.7	-	5.4	-	-	5.4
5089	Final	0.5	-	0.1	-	-	0.1
5090	Final	0.8	-	0.2	-	-	0.2
5091	Final	5.7	-	1.1	-	-	1.1
5092	Final	8.9	-	1.7	-	-	1.7
5093	Final	0.0	-	-	-	0.0	0.0
5094	Final	0.6	-	0.1	-	0.0	0.1
5095	Final	21.1	-	3.9	-	-	3.9
5096	Final	3.8	-	0.7	-	-	0.7
5097	Final	5.2	-	1.0	-	-	1.0
5098	Final	47.9	-	8.7	-	-	8.7
5099	Final	10.6	-	1.9	-	-	1.9
5100	Final	7.3	-	1.4	-	-	1.4
5101	Final	0.6	-	0.1	-	-	0.1
Grand Total		200.1	-	39.0	-	0.0	39.1

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Attachment C: Supporting Figures for Watershed Control Measures

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

June 6, 2014

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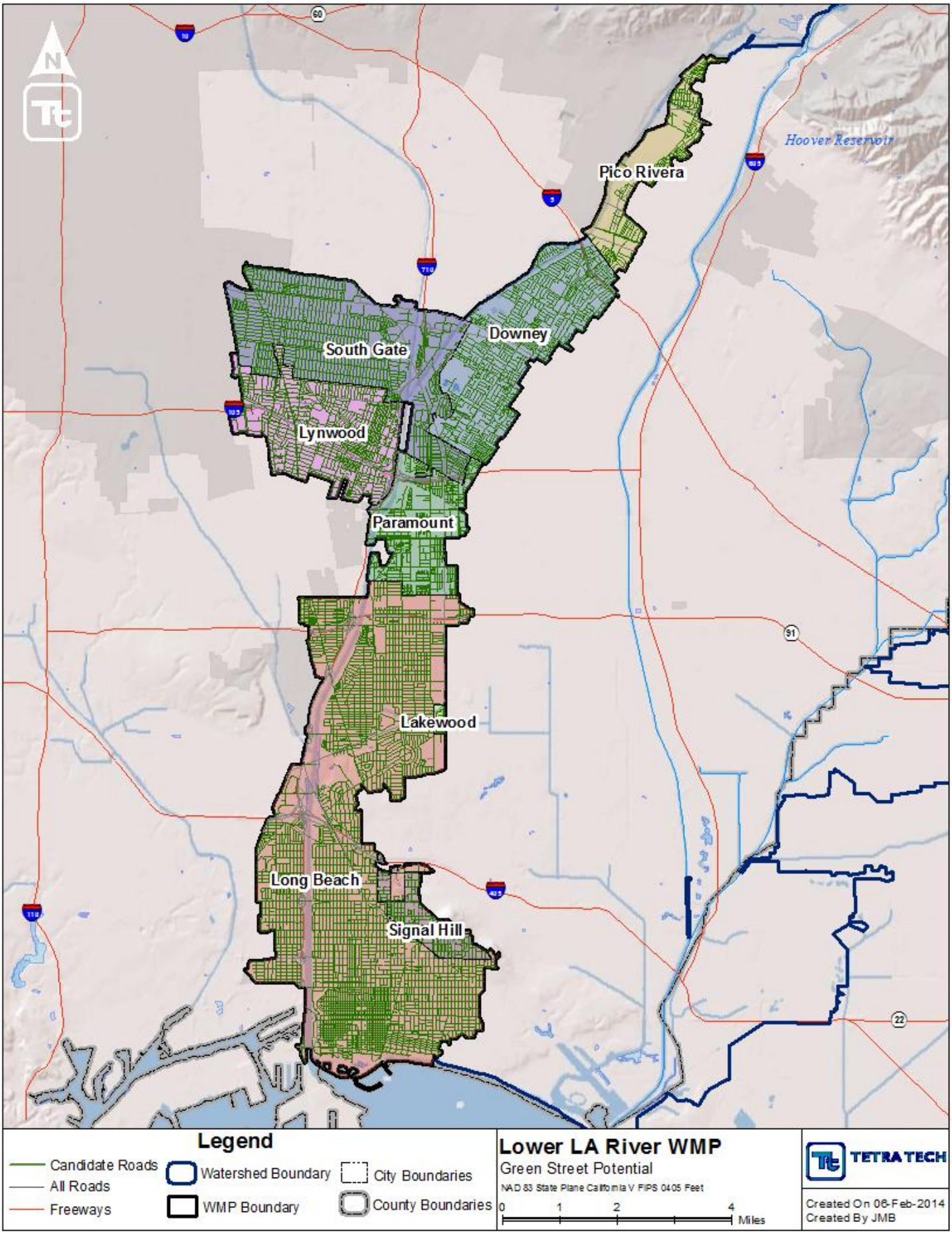


Figure 1. LLAR ROW BMP Potential Opportunities

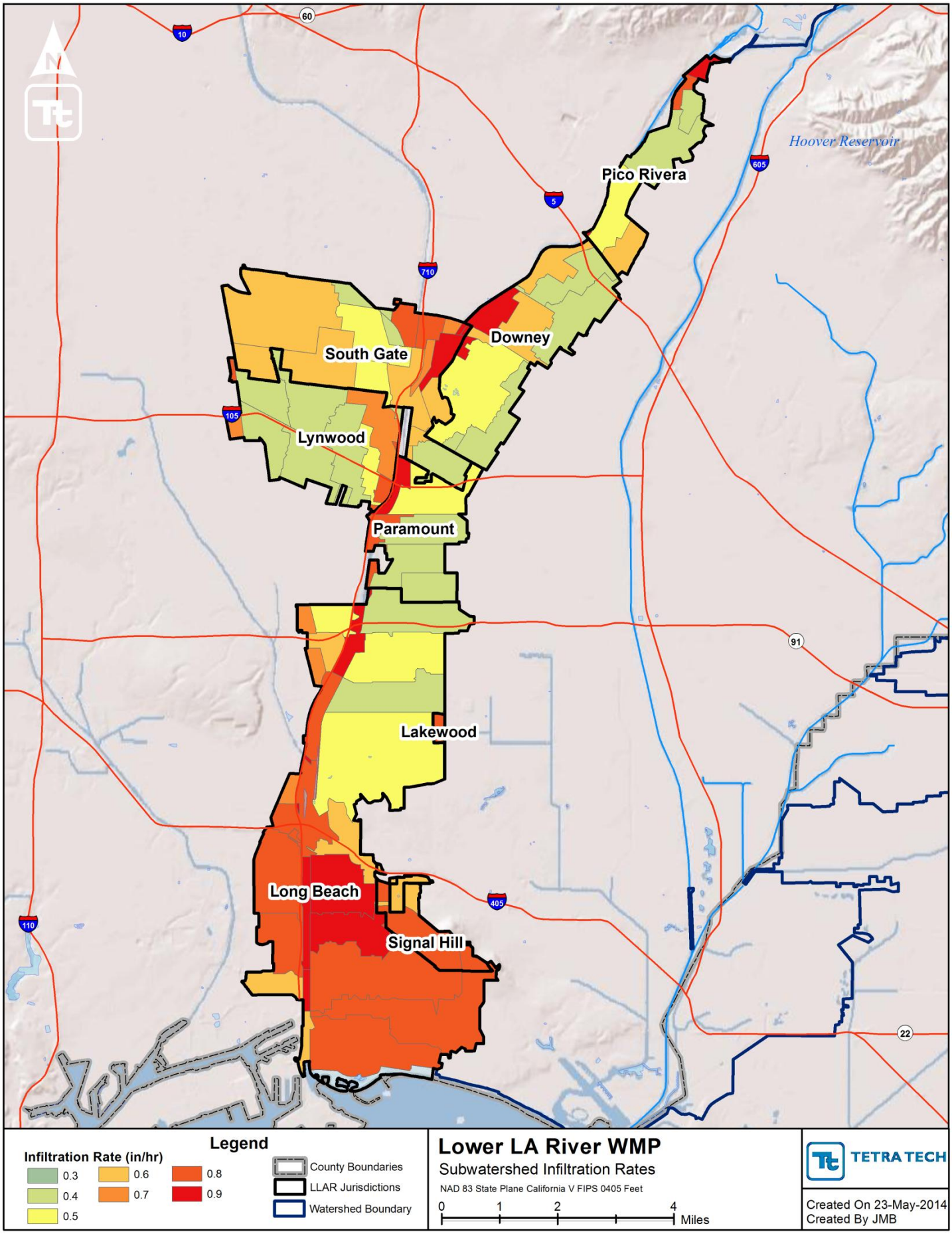


Figure 2. LLAR Subwatershed Infiltration Rates

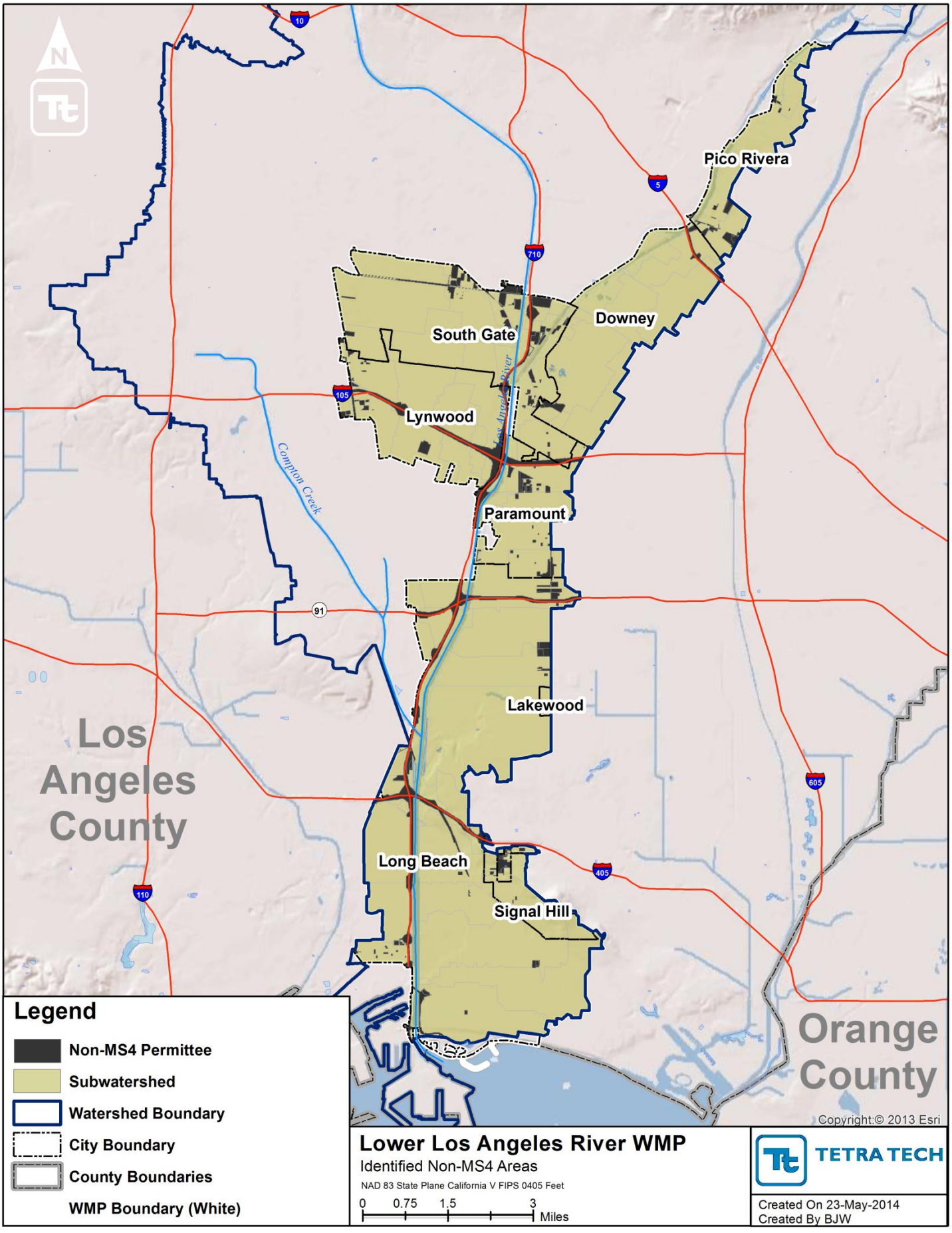


Figure 3. LLAR Non-MS4 Permittees

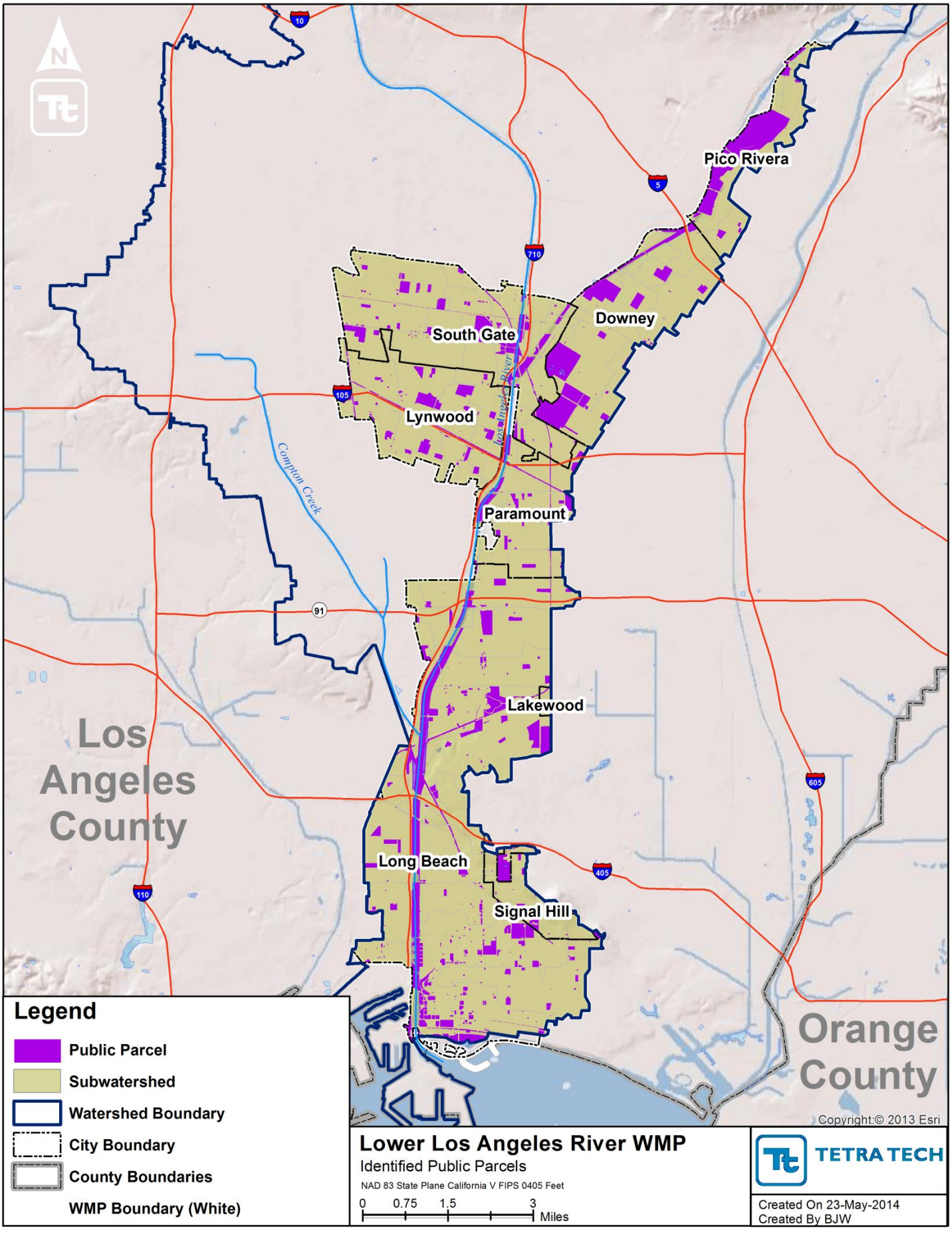


Figure 4. LLAR identified public parcels

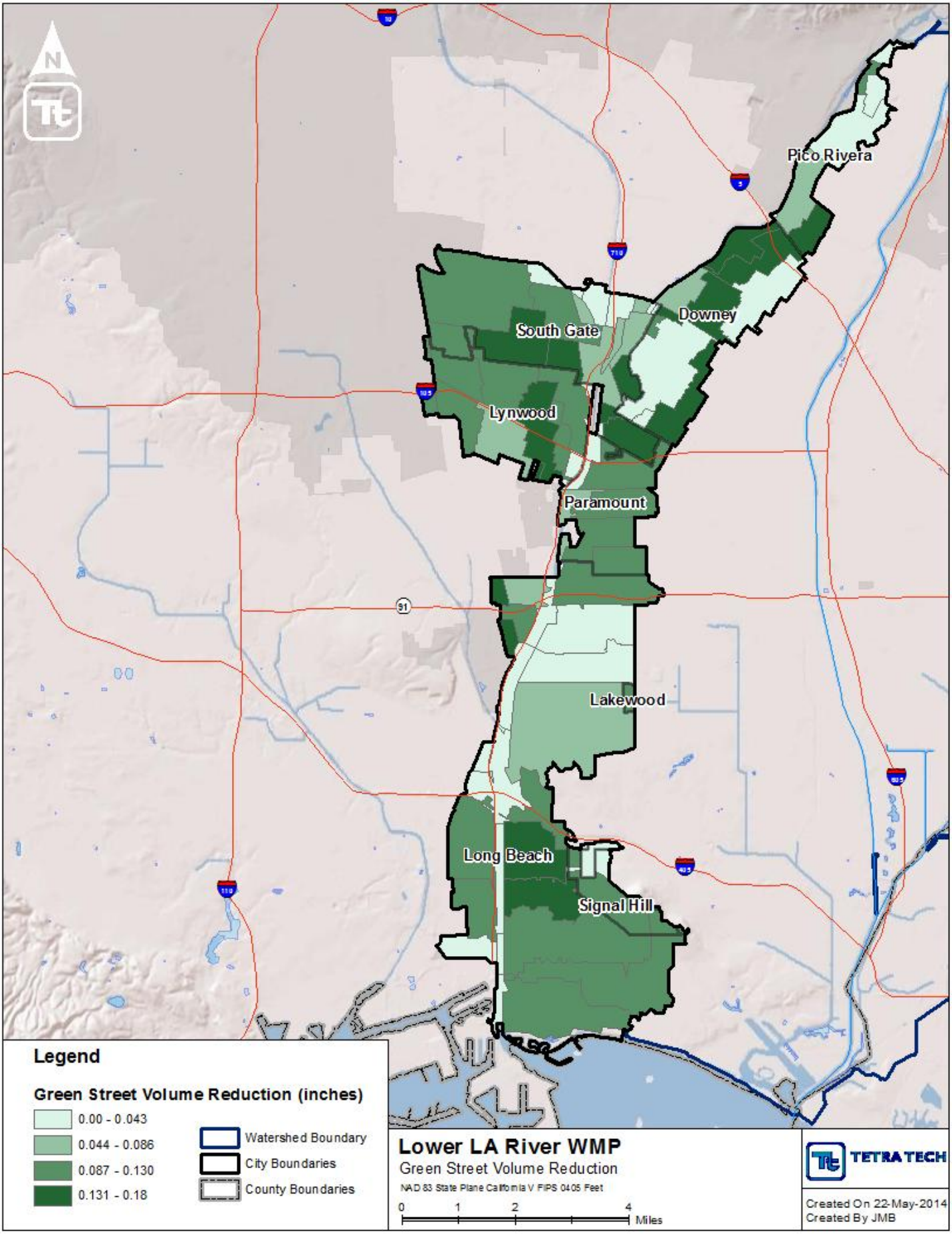


Figure 5. LLAR ROW BMP Volume Reduction

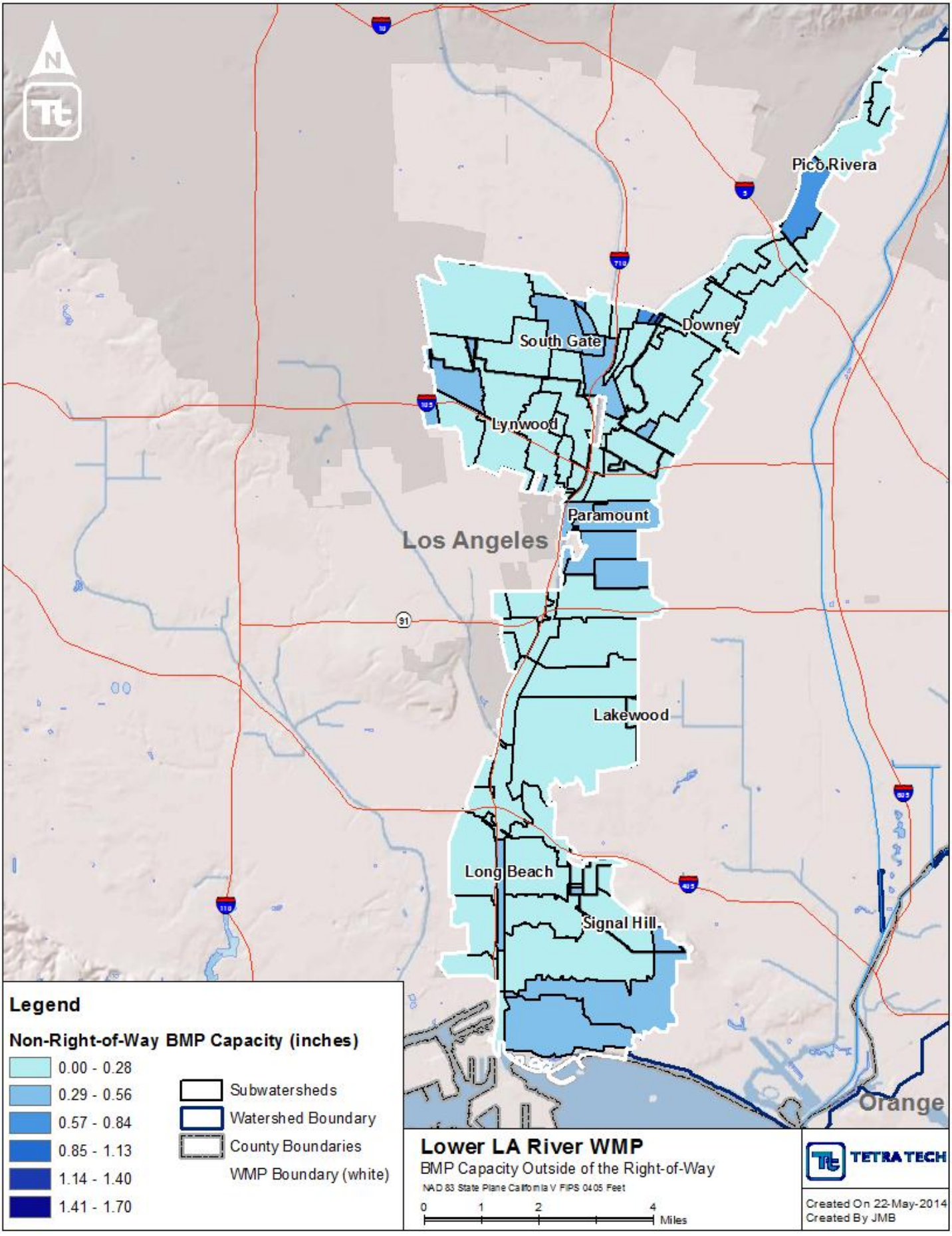


Figure 6. LLAR BMP capacity outside of the right-of-way

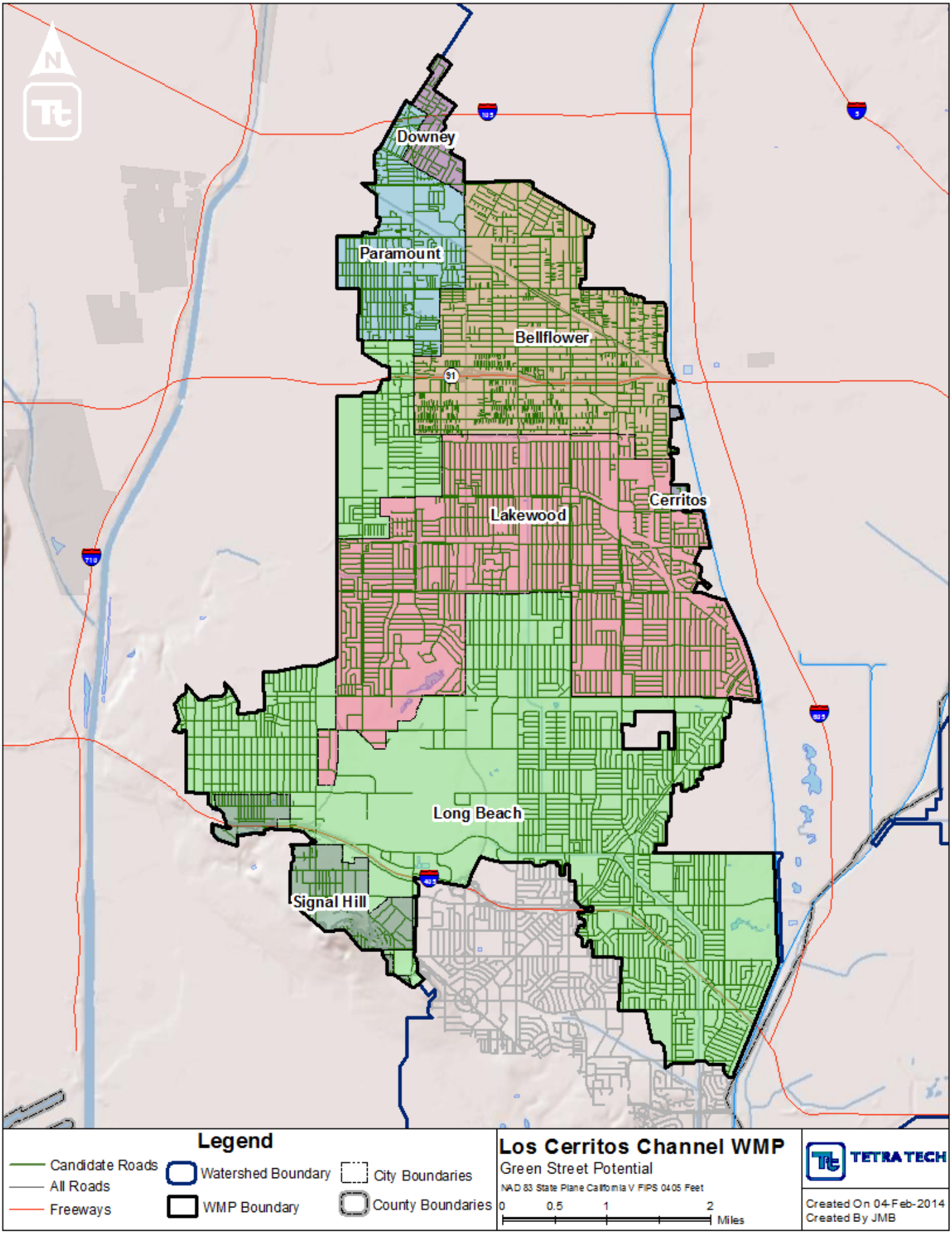


Figure 7. LCC ROW BMP Potential Opportunities

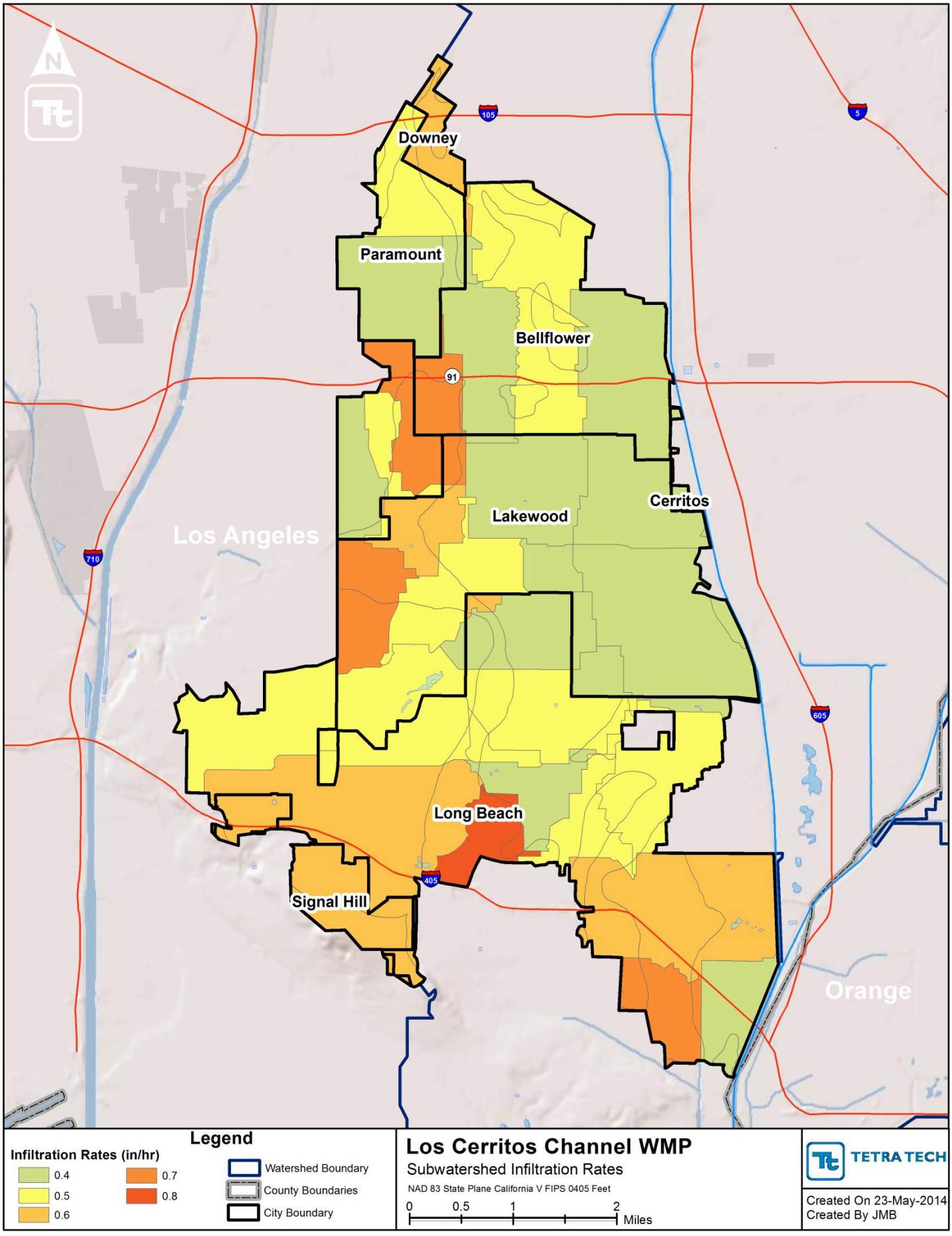


Figure 8. LCC Subwatershed Infiltration Rates

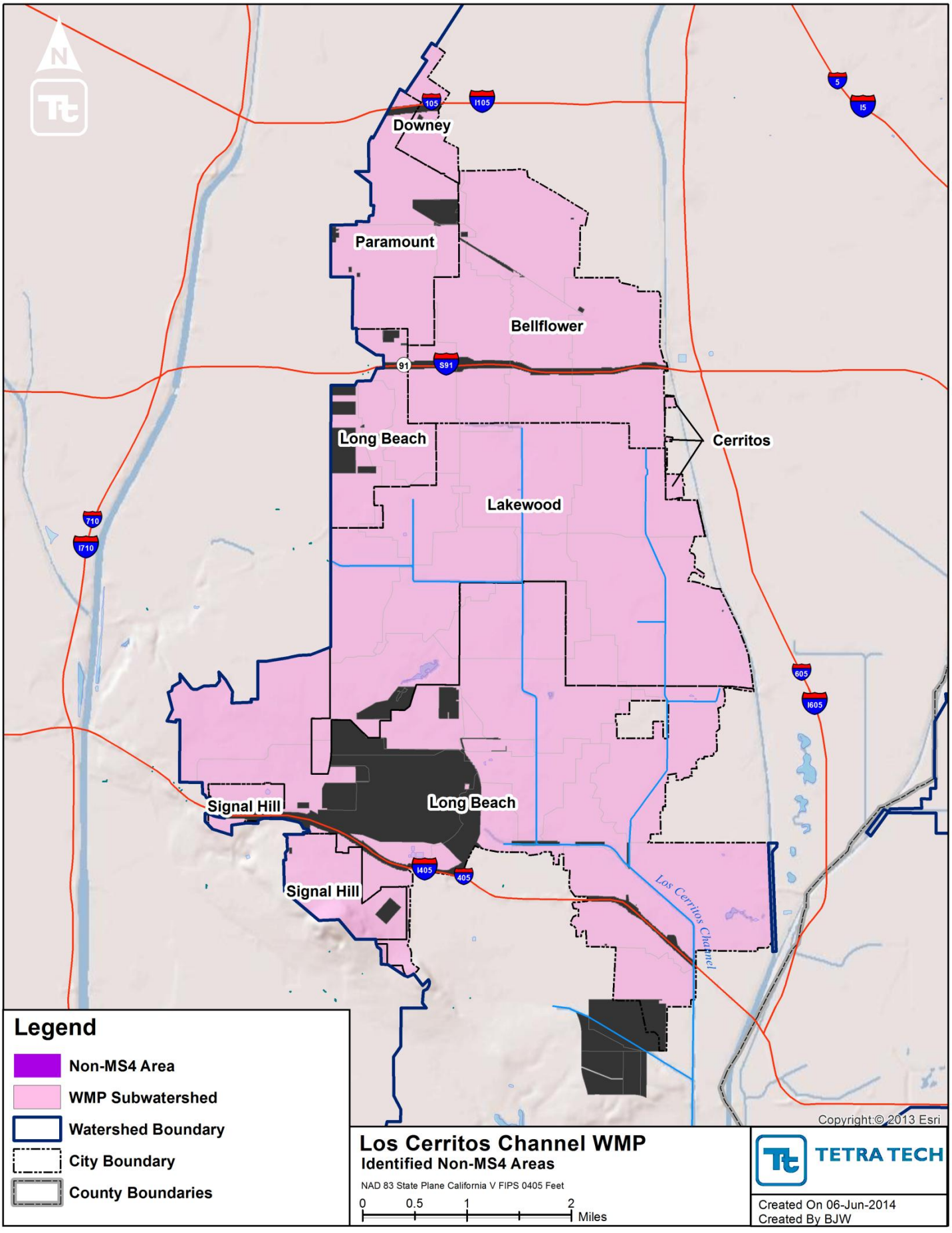


Figure 9. LCC Non-MS4 Permittees

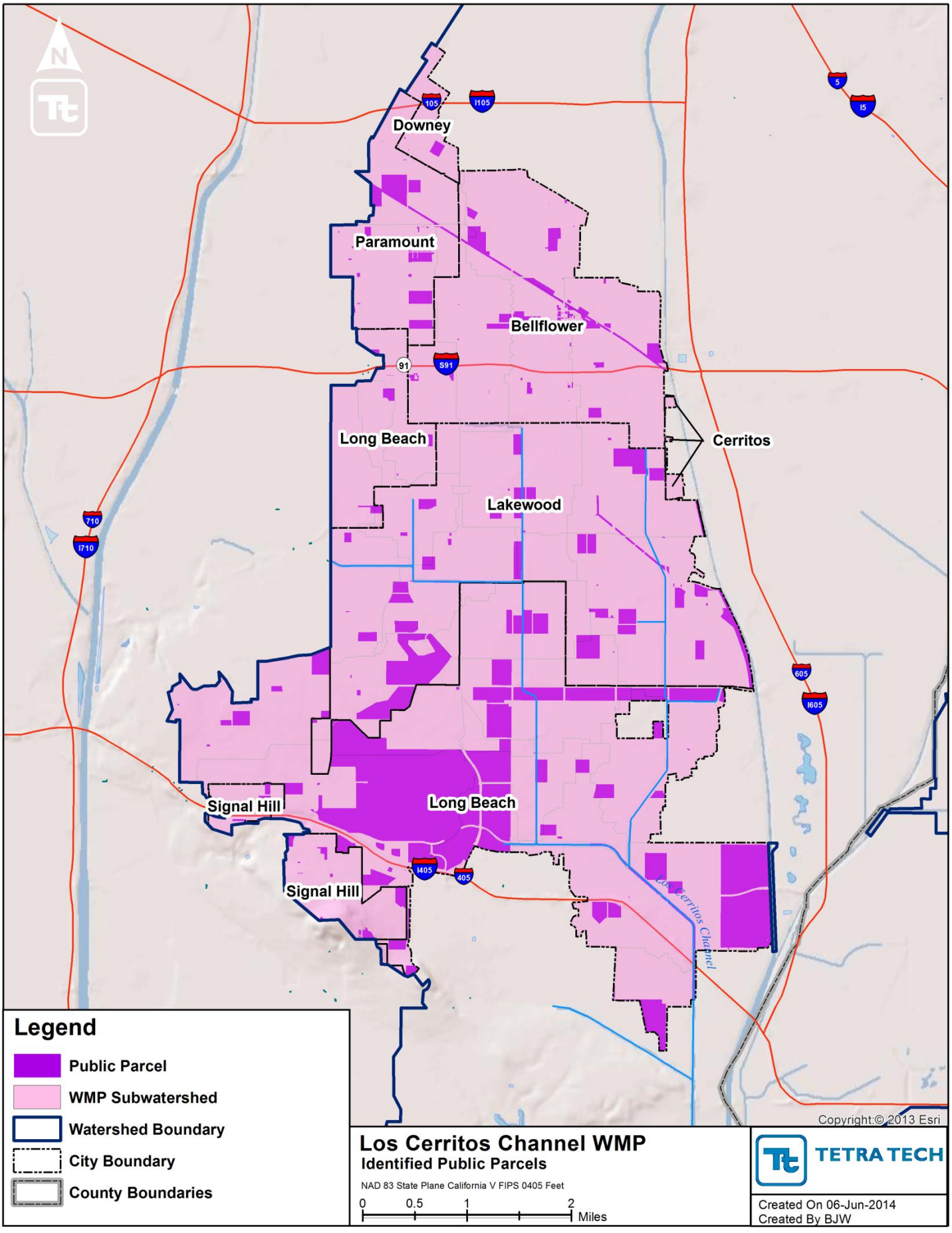


Figure 10. LCC identified public parcels

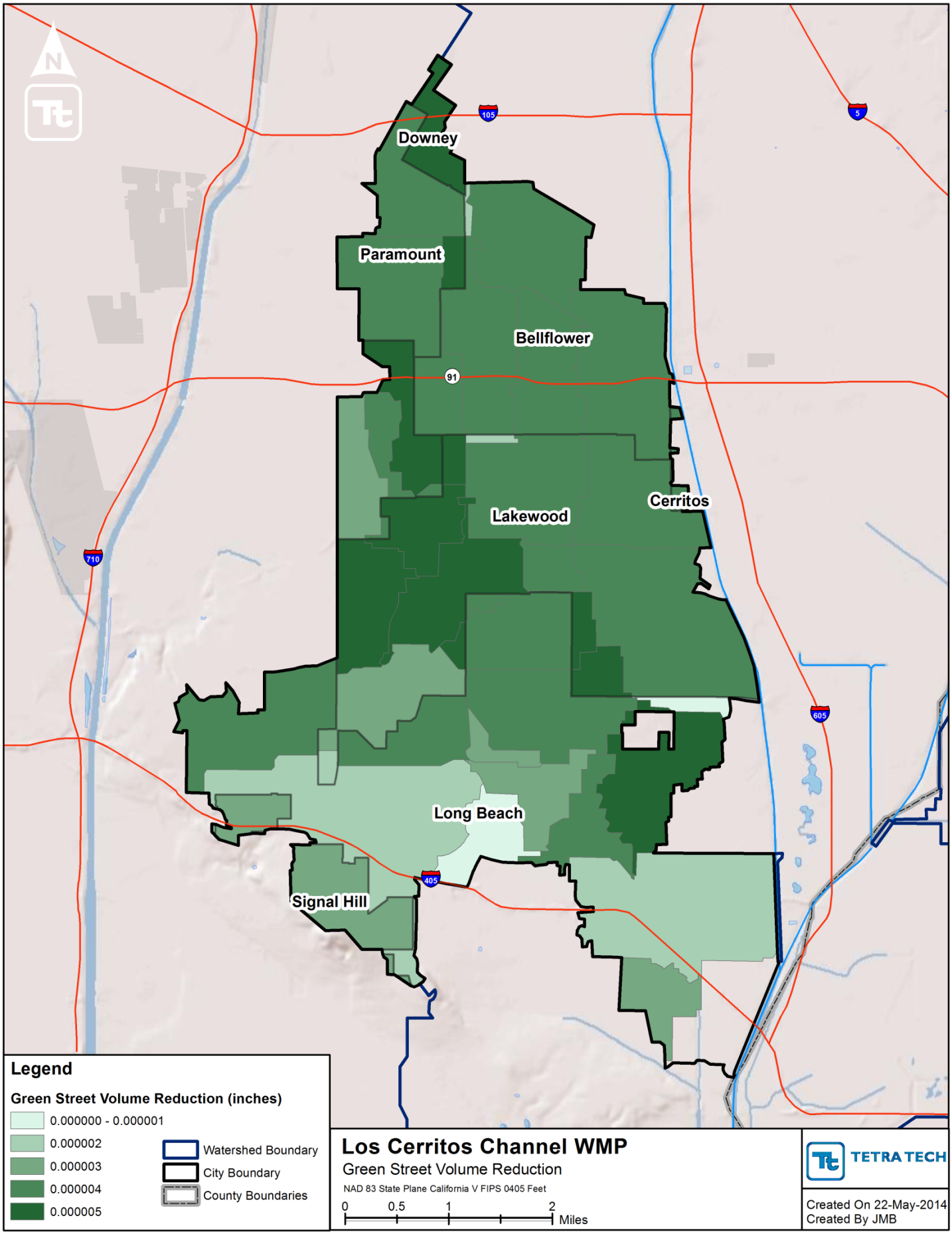


Figure 11. LCC ROW BMP Volume Reduction

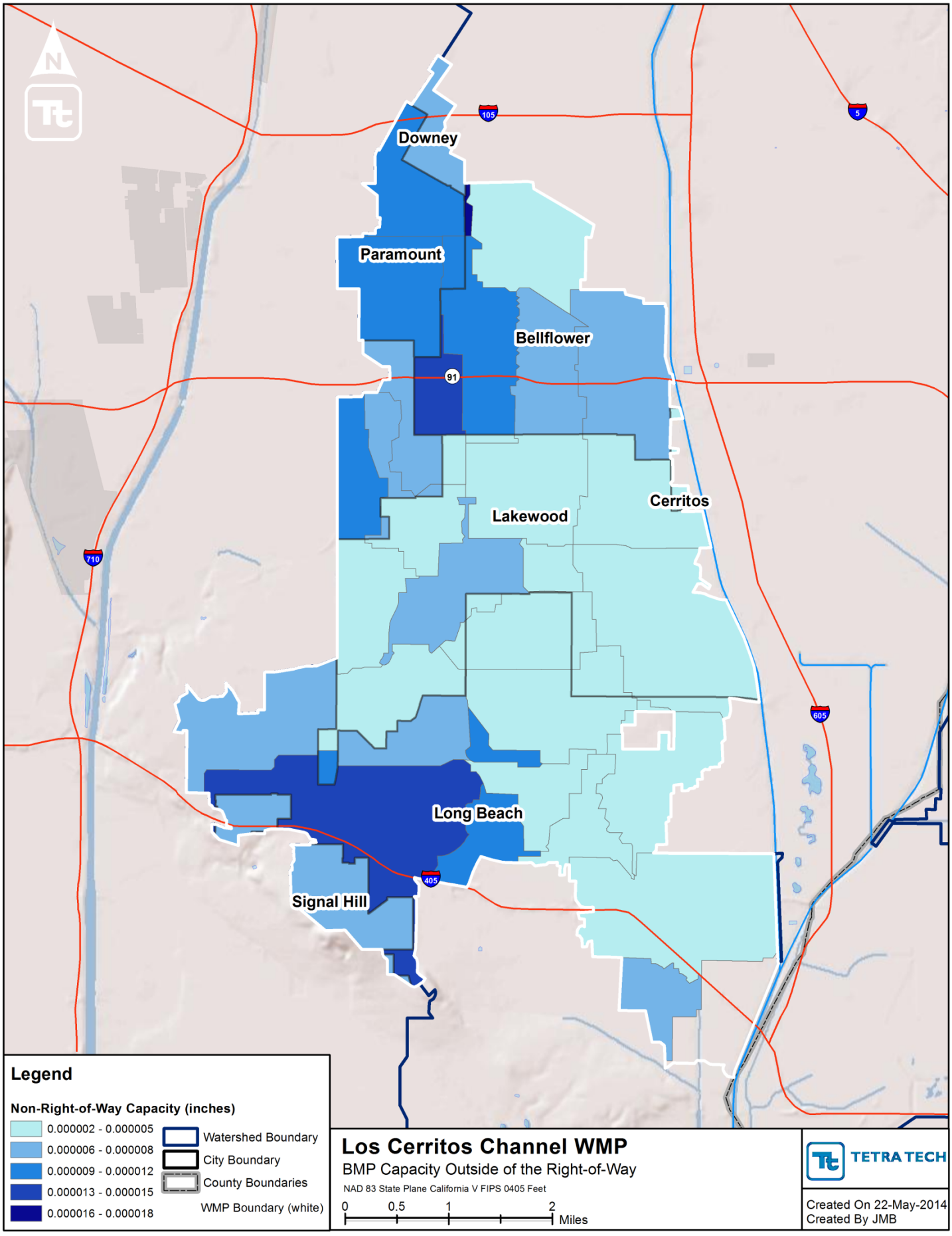


Figure 12. LCC BMP capacity outside of the right-of-way

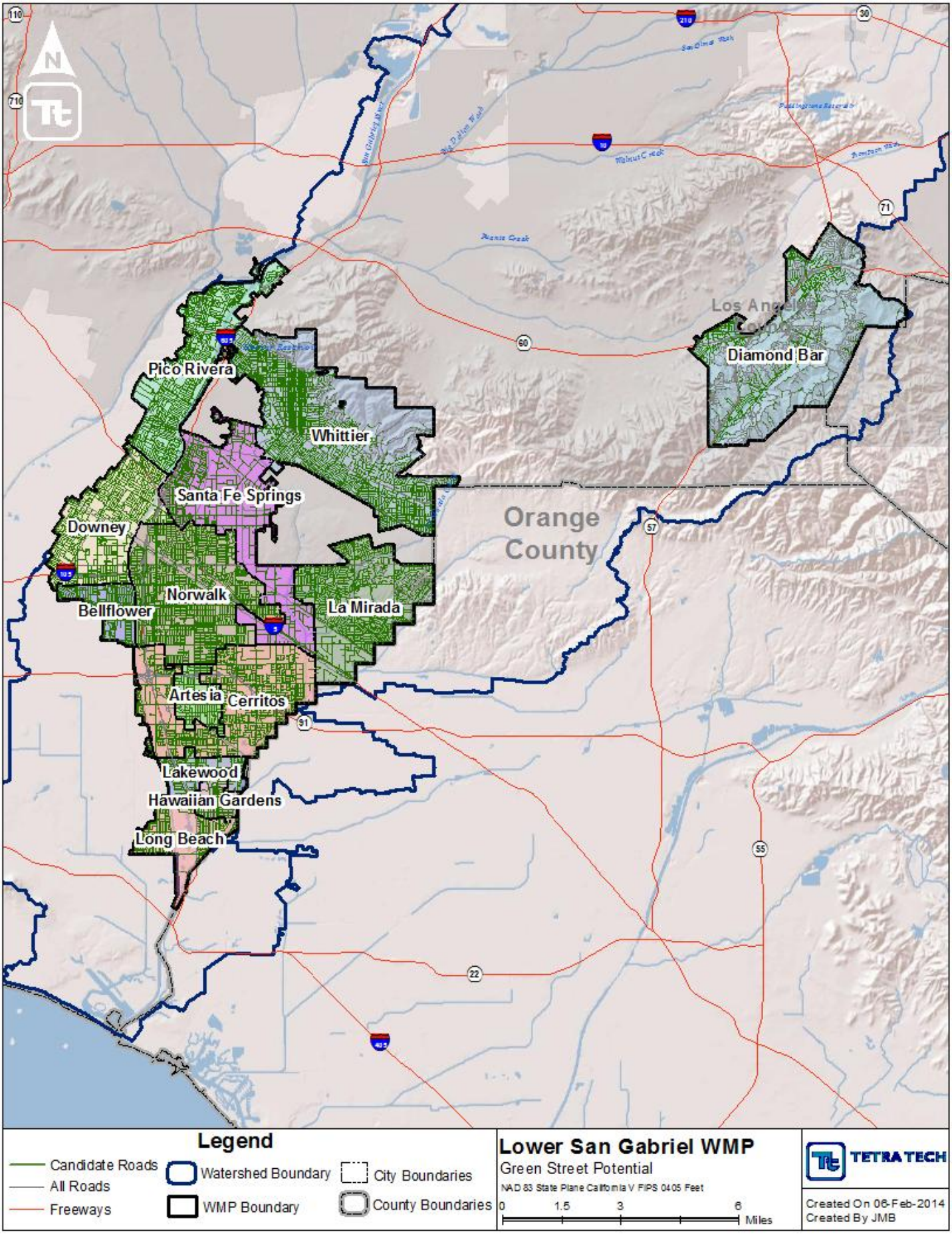


Figure 13. LSGR ROW BMP Potential Opportunities

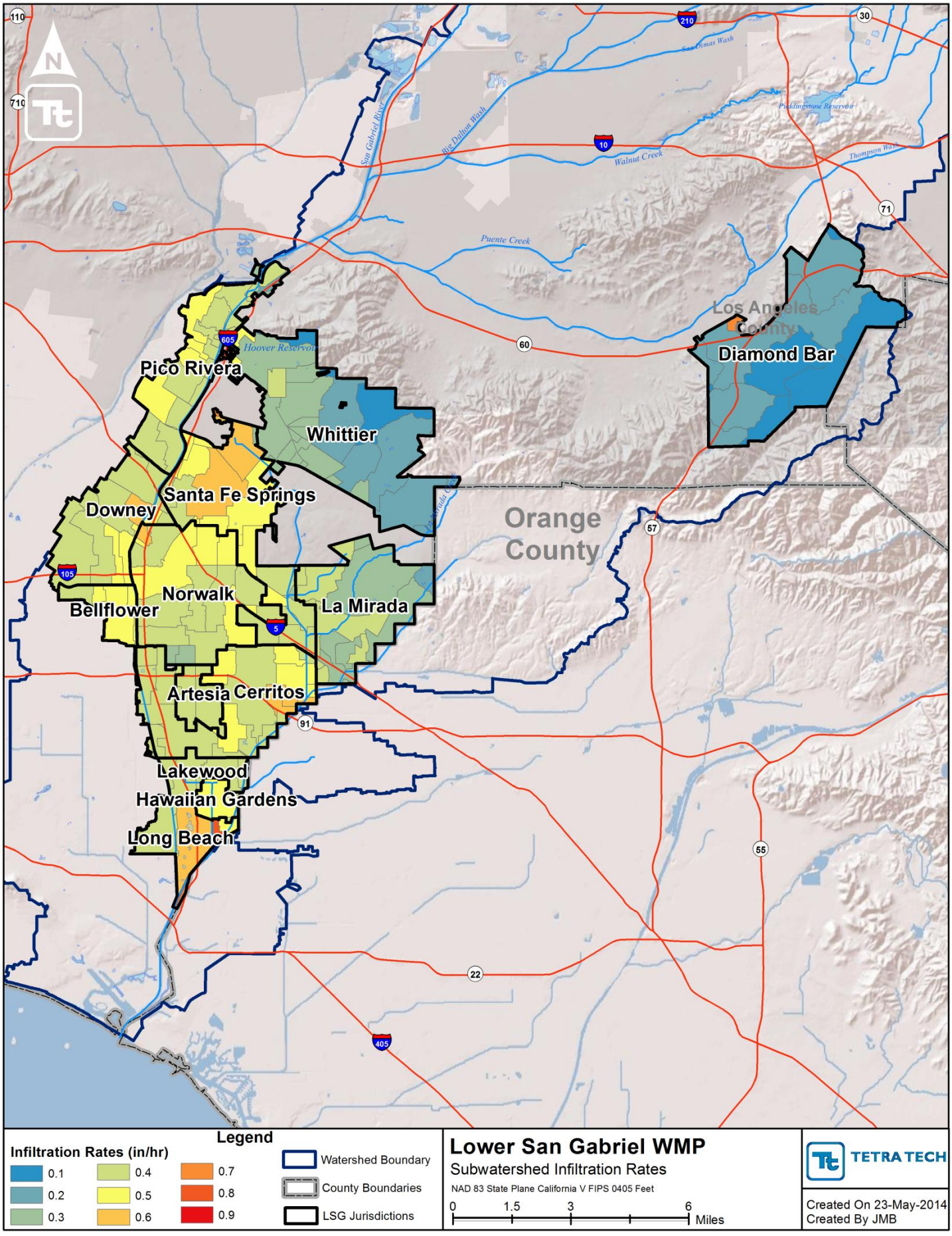


Figure 14. LSGR Subwatershed Infiltration Rates

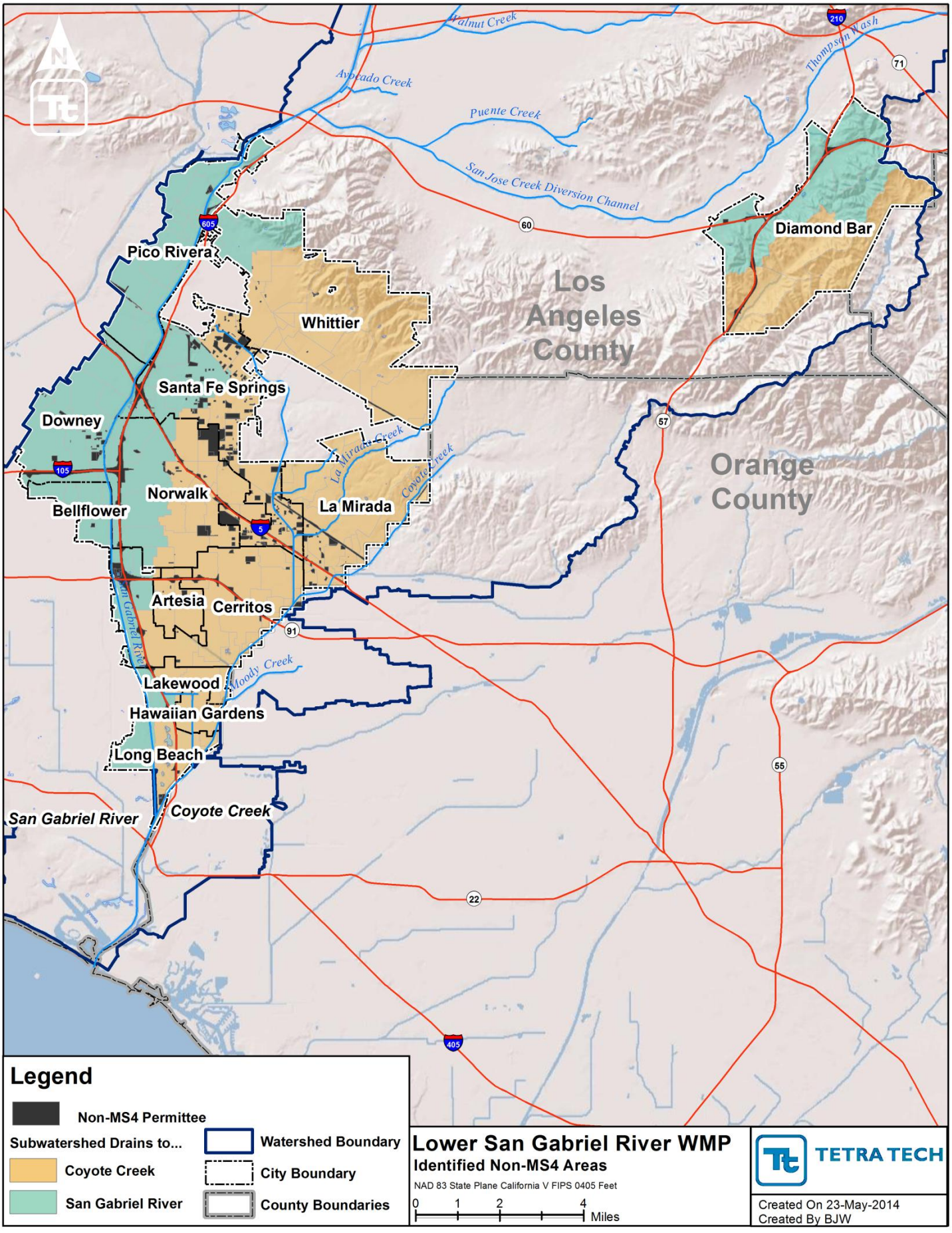


Figure 15. LSGR Non-MS4 Permittees

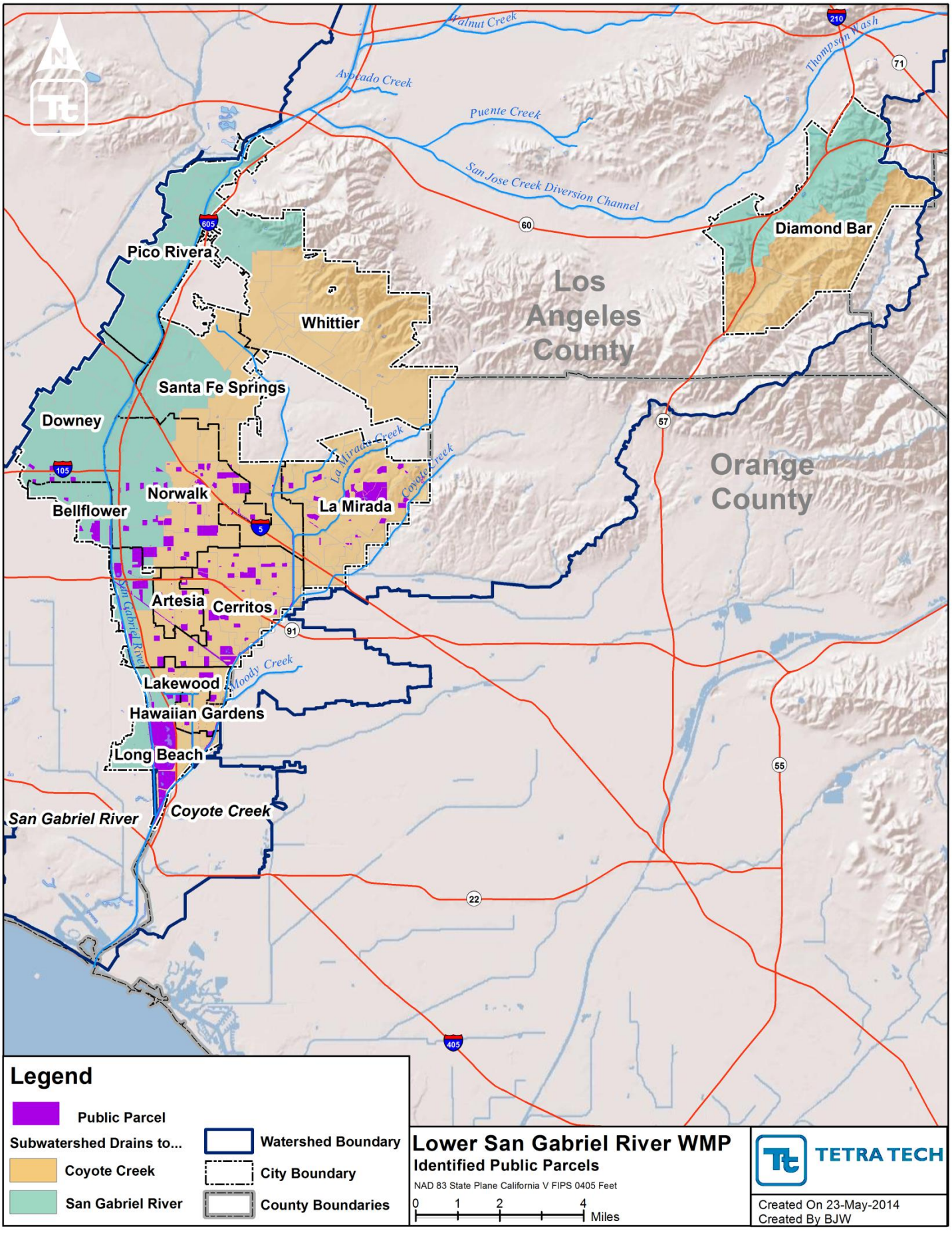


Figure 16. LSGR identified public parcels

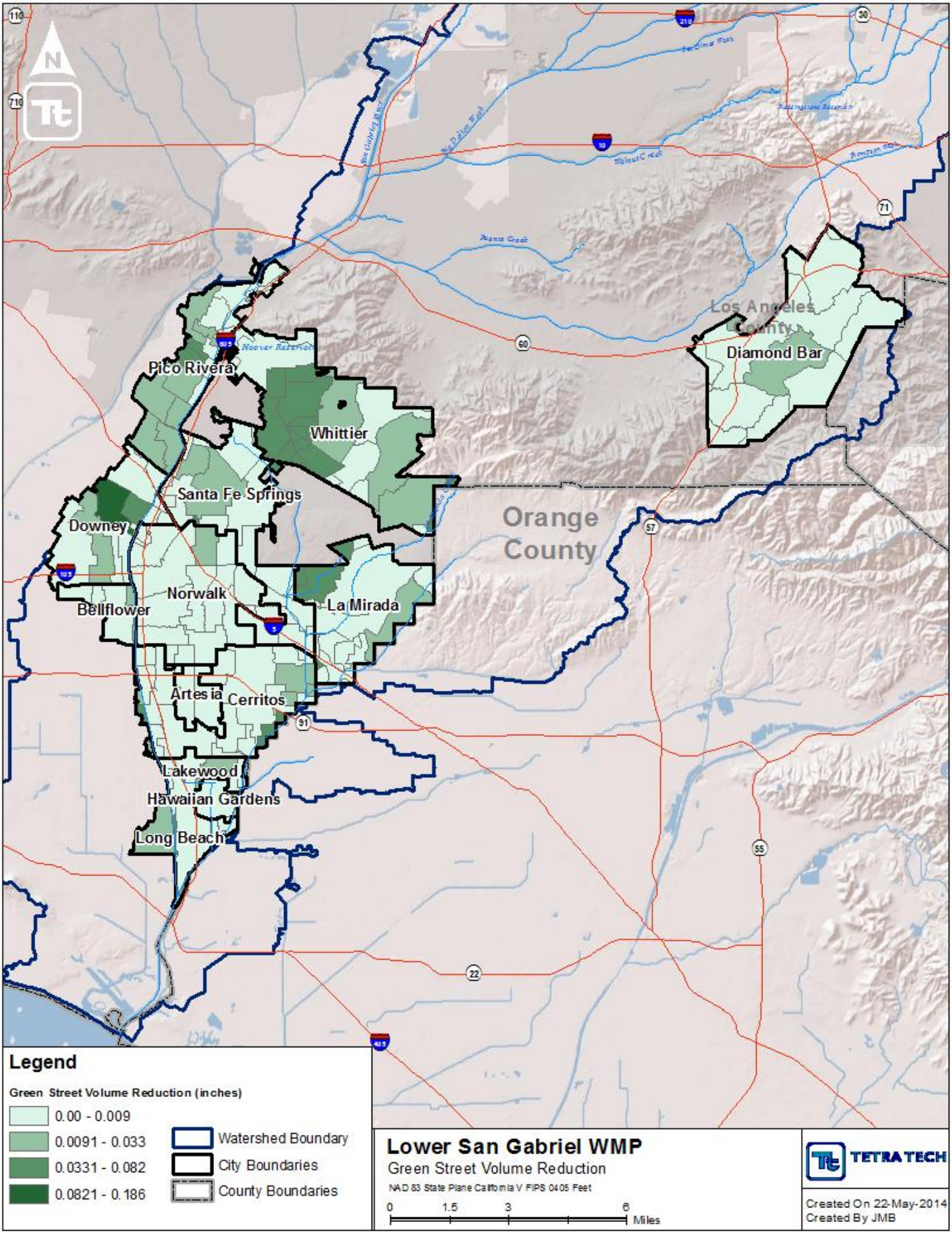


Figure 17. LSGR ROW BMP Volume Reduction

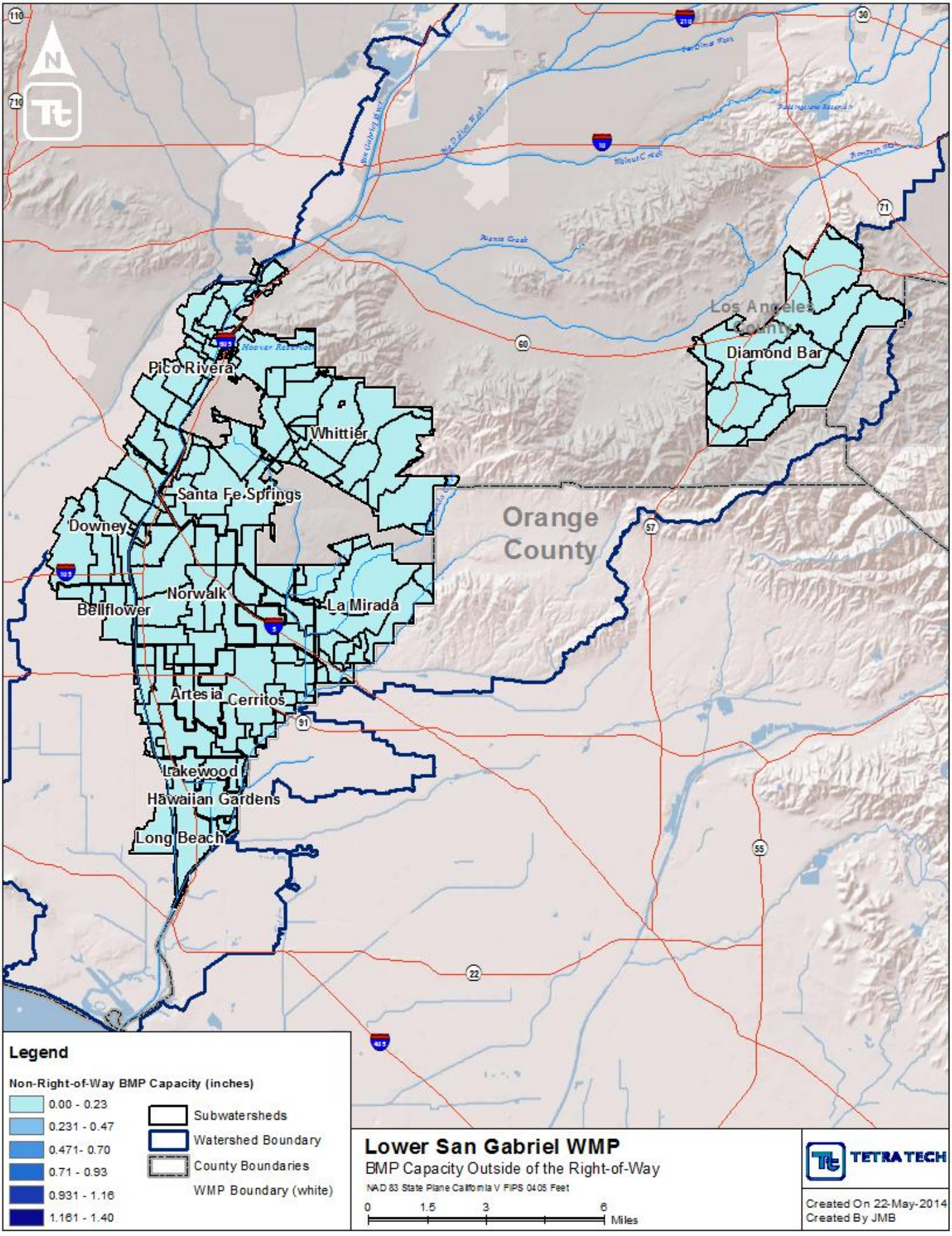


Figure 18. LSGR BMP capacity outside of the right-of-way

Attachment D: Existing and Planned BMPs

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

June 6, 2014

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D1. Existing and Planned BMPs

The following tables summarize existing and planned BMPs in each jurisdiction.

D1.1. City of Bellflower

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration	Existing	Riverview Park Infiltration Trenches	2012	10500 Somerset Blvd.	33.896662	-118.11016	105113	16	ac		
Bioretention / Biofiltration	Existing	Riverview Park Infiltration Trenches	2012	10500 Somerset Blvd.	33.896662	-118.11016	105113	16	ac		
Flow-Through Treatment BMP	Existing	Commercial Gas Station and mart	2008	14300 Bellflower Blvd	33.901581	-118.124915	105114	0.42	ac		
Flow-Through Treatment BMP	Existing	Commercial Storage	2005	10526 Rosecrans	33.902009	-118.108102	575118	19.5	ac		
Infiltration BMPs	Existing	St George Church	2012	15725 Cornuta	33.890539	-118.120735	105113	1.36	ac		
Infiltration BMPs	Existing	Autozone	2012	10239 Rosecrans	33.902265	-118.114834	105113	0.78	ac		

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D1.2. City of Downey

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow Through Treatment BMP	Existing	8314 SECOND ST	2/14/2014		33.9409	-118.13243	245114	1322	sf	0.153	cfs
Flow Through Treatment BMP	Existing	10030 LAKEWOOD	8/17/2007		33.9477	-118.11664	245125	24560	sf	0.17	cfs
Infiltration BMP	Existing	12327 WOODRUFF AV	2/14/2014		33.91989	-118.11706	245113	6894.4	sf	430.9	cf
Infiltration BMP	Existing	12145 WOODRUFF	7/8/2008		33.92338	-118.11805	245113	3200	sf	200	cf
Infiltration BMP	Existing	9500 WASHBURN	2/14/2014		33.92366	-118.1172	245113	342000	sf	9500	cf
Infiltration BMP	Existing	9236 HALL	4/17/2007		33.92972	-118.12155	245113	411840	sf	25740	cf
Infiltration BMP	Existing	9737 IMPERIAL	6/22/2010		33.91761	-118.11961	245114	5600	sf	350	cf
Infiltration BMP	Existing	12254 BELLFLOWER	9/13/2003		33.9214	-118.1239	245114	57600	sf	3600	cf
Infiltration BMP	Existing	11904 BELLFLOWER	2/14/2014		33.92607	-118.12515	245114	5400	sf	300	cf
Infiltration BMP	Existing	11610 LAKEWOOD	9/28/2007		33.93101	-118.12594	245114	91520	sf	5720	cf
Infiltration BMP	Existing	8329 DAVIS	6/15/2010		33.9366	-118.13379	245114	12608	sf	788	cf
Infiltration BMP	Existing	8522 FIRESTONE	2/16/2005		33.93678	-118.12978	245114	105456	sf	6591	cf
Infiltration BMP	Existing	8320 FIRESTONE BLVD	1/1/2010		33.9387	-118.13176	245114	90660	sf	525	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9060 IMPERIAL	4/15/2005		33.91646	-118.13532	245115	7056	sf	441	cf
Infiltration BMP	Existing	8141 DE PALMAQ	6/30/2003		33.93618	-118.1402	245115	443008	sf	27688	cf
Infiltration BMP	Existing	8317 DAVIS ST	2/14/2014		33.93683	-118.13441	245115	13920	sf	870	cf
Infiltration BMP	Existing	8333 IOWA	10/11/2001		33.93756	-118.13356	245115	9808	sf	613	cf
Infiltration BMP	Existing	8100 PHLOX	5/20/2004		33.93956	-118.13854	245115	14400	sf	900	cf
Infiltration BMP	Existing	11040 BROOKSHIRE	1/1/2014		33.93932	-118.12496	245119	1923616	sf	120226	cf
Infiltration BMP	Existing	11136 DOLLISON	6/22/2010		33.93448	-118.09613	245122	13824	sf	864	cf
Infiltration BMP	Existing	10239 PICO VISTA	4/7/2003		33.939	-118.10316	245126	2176	sf	136	cf
Infiltration BMP	Existing	10233 PICO VISTA	4/7/2003		33.93914	-118.10305	245126	2176	sf	136	cf
Infiltration BMP	Existing	10228 PICO VISTA	4/7/2003		33.93919	-118.10235	245126	5856	sf	366	cf
Infiltration BMP	Existing	10229 PICO VISTA	4/7/2003		33.93928	-118.10295	245126	2176	sf	136	cf
Infiltration BMP	Existing	10223 PICO VISTA	4/7/2003		33.93946	-118.10289	245126	2048	sf	128	cf
Infiltration BMP	Existing	10218 PICO VISTA	4/7/2003		33.93947	-118.10223	245126	5952	sf	372	cf
Infiltration BMP	Existing	10215 PICO VISTA	4/7/2003		33.93962	-118.10237	245126	2112	sf	132	cf
Infiltration BMP	Existing	10211 PICO VISTA	4/7/2003		33.93969	-118.10255	245126	2304	sf	144	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10219 PICO VISTA	4/7/2003		33.93975	-118.10273	245126	2304	sf	144	cf
Infiltration BMP	Existing	12800 PARAMOUNT	9/16/2008		33.92108	-118.15383	246077	3168	sf	198	cf
Infiltration BMP	Existing	7930 STEWARD & GRAY	11/18/2004		33.93539	-118.14527	246077	1600	sf	100	cf
Infiltration BMP	Existing	12229 JULIUS	1/1/2006		33.93343	-118.1561	246079	944	sf	59	cf
Infiltration BMP	Existing	7845 BENARES ST	6/14/2001		33.93839	-118.14549	246079	3568	sf	223	cf
Infiltration BMP	Existing	7841 BENARES ST	6/14/2001		33.93851	-118.14537	246079	1760	sf	110	cf
Infiltration BMP	Existing	7837 BENARES ST	6/14/2001		33.93863	-118.14528	246079	1760	sf	110	cf
Infiltration BMP	Existing	7848 BENARES ST	6/14/2001		33.93863	-118.14598	246079	10640	sf	665	cf
Infiltration BMP	Existing	7833 BENARES ST	6/14/2001		33.93875	-118.14518	246079	1760	sf	110	cf
Infiltration BMP	Existing	7844 BENARES ST	6/14/2001		33.93876	-118.14591	246079	2000	sf	125	cf
Infiltration BMP	Existing	7840 BENARES ST	6/14/2001		33.93886	-118.14578	246079	2000	sf	125	cf
Infiltration BMP	Existing	11706 RIVES	6/14/2001		33.93888	-118.14506	246079	1760	sf	110	cf
Infiltration BMP	Existing	7816 BENARES ST	6/14/2001		33.93896	-118.14553	246079	9600	sf	600	cf
Infiltration BMP	Existing	7812 BENARES ST	6/14/2001		33.93904	-118.14568	246079	1760	sf	110	cf
Infiltration BMP	Existing	11726 RIVES	6/14/2001		33.93904	-118.14614	246079	1920	sf	120	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7808 BENARES ST	6/14/2001		33.93911	-118.14583	246079	1760	sf	110	cf
Infiltration BMP	Existing	7808 BENARES ST	6/14/2001		33.93919	-118.14598	246079	1760	sf	110	cf
Infiltration BMP	Existing	7821 BENARES ST	6/14/2001		33.93921	-118.14506	246079	1872	sf	117	cf
Infiltration BMP	Existing	7804 BENARES ST	6/14/2001		33.93926	-118.14613	246079	9760	sf	610	cf
Infiltration BMP	Existing	7817 BENARES ST	6/14/2001		33.93931	-118.14525	246079	1760	sf	110	cf
Infiltration BMP	Existing	7813 BENARES ST	6/14/2001		33.93938	-118.14542	246079	1760	sf	110	cf
Infiltration BMP	Existing	7809 BENARES ST	6/14/2001		33.93945	-118.14557	246079	1760	sf	110	cf
Infiltration BMP	Existing	7805 BENARES ST	6/14/2001		33.93953	-118.14572	246079	1760	sf	110	cf
Infiltration BMP	Existing	7801 BENARES ST	6/14/2001		33.93961	-118.14587	246079	9600	sf	600	cf
Infiltration BMP	Existing	7140 FIRESTONE	10/3/2005		33.94707	-118.15469	246079	24048	sf	1503	cf
Infiltration BMP	Existing	8233 FIRESTONE	6/21/2010		33.94076	-118.13358	246102	91648	sf	5728	cf
Infiltration BMP	Existing	7814 FIRESTONE	2/14/2014		33.94418	-118.14232	246102	3000	sf	125	cf
Infiltration BMP	Existing	7676 FIRESTONE	2/26/2004		33.94527	-118.144	246102	213824	sf	13364	cf
Infiltration BMP	Existing	7201 FIRESTONE	4/19/2007		33.94821	-118.15273	246102	34352	sf	2147	cf
Infiltration BMP	Existing	7360 FLORENCE	6/21/2010		33.95872	-118.141	246102	14496	sf	906	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8129 FLORENCE	6/23/2010		33.95231	-118.12677	246103	8880	sf	555	cf
Infiltration BMP	Existing	8605 GALLATIN ROAD	2/14/2014		33.95768	-118.11432	246103	85792	sf	5362	cf
Infiltration BMP	Existing	9276 DOWNEY	1/4/2007		33.95901	-118.11926	246103	6400	sf	400	cf
Infiltration BMP	Existing	8801 LAKEWOOD	7/14/2006		33.96317	-118.11498	246106	18352	sf	1147	cf
Infiltration BMP	Existing	7880 TELEGRAPH	11/14/2004		33.97112	-118.12113	246111	123104	sf	7694	cf
Permeable Pavement	Existing	9449 IMPERIAL	6/22/2010		33.91809	-118.12656	245115	32160	sf	2010	cf
Permeable Pavement	Existing	9565 FIRESTONE	6/3/2008		33.93043	-118.11175	245119	18928	sf	1183	cf
Permeable Pavement	Existing	12628 PARAMOUNT	2/14/2014		33.92329	-118.15283	246077	15000	sf	284	cf
Permeable Pavement	Existing	11555 PARAMOUNT	2/14/2014		33.94116	-118.14067	246077	8125	sf	400	cf
Permeable Pavement	Existing	8043 SECOND ST	1/1/2009		33.94254	-118.13737	246102	105023	sf	6787	cf
Permeable Pavement	Existing	9250 LAKEWOOD	2/14/2014		33.95768	-118.1153	246103	24662	sf	939	cf
Regional Detention Facility	Existing	9341 IMPERIAL	5/6/2004		33.91918	-118.12898	245115	664624	sf	41539	cf
Regional Infiltration Facility	Existing	12074 LAKEWOOD	5/22/2005		33.9257	-118.13203	245115	960800	sf	60050	cf
Regional Infiltration Facility	Existing	12002 LAKEWOOD	5/22/2005		33.9261	-118.13169	245115	605264	sf	37829	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8764 FIRESTONE	8/14/2008	6523923.595890	6523923.595890	1798908.496460	245119	20064	sf	1254	cf
Infiltration BMP	Existing	9915 DOWNEY	9/27/2005	6523909.682530	6523909.682530	1805554.600030	246103	2265	sf	142	cf
Infiltration BMP	Existing	7602 RUNDELL	1/27/2006	6514863.657960	6514863.657960	1798182.489930	246079	2265	sf	142	cf
Infiltration BMP	Existing	10403 SAMOLINE	10/3/2005	6521224.982130	6521224.982130	1804890.047210	246102	2265	sf	142	cf
Infiltration BMP	Existing	12516 DOLAN	11/18/2005	6518146.741440	6518146.741440	1794105.551200	245115	1698	sf	106	cf
Infiltration BMP	Existing	7845 QUILL	3/28/2006	6515351.811960	6515351.811960	1796427.555720	246079	1698	sf	106	cf
Infiltration BMP	Existing	10435 BIRCHDALE	5/19/2005	6524444.362750	6524444.362750	1802478.415410	245119	1132	sf	71	cf
Infiltration BMP	Existing	8538 ALBIA	9/23/2005	6520089.101510	6520089.101510	1795567.094110	245115	566	sf	35	cf
Infiltration BMP	Existing	12159 CORNUTA	9/16/2005	6525392.928460	6525392.928460	1794233.560240	245114	566	sf	35	cf
Infiltration BMP	Existing	8064 DACOSTA	7/7/2005	6523365.354910	6523365.354910	1805913.806160	246103	566	sf	35	cf
Infiltration BMP	Existing	8551 DALEN	10/6/2005	6518205.327280	6518205.327280	1792517.271110	245115	566	sf	35	cf
Infiltration BMP	Existing	8318 DINSDALE	6/15/2006	6523907.628300	6523907.628300	1804895.972630	246103	566	sf	35	cf
Infiltration BMP	Existing	12641 DOLAN	9/2/2005	6517370.498610	6517370.498610	1793094.154440	245115	566	sf	35	cf
Infiltration BMP	Existing	12837 DOWNEY	6/13/2008	6516221.544620	6516221.544620	1792552.216840	246077	566	sf	35	cf
Infiltration BMP	Existing	12608 DUNROBIN	1/1/2007	6525044.715110	6525044.715110	1792041.222140	245114	566	sf	35	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7715 GAINFORD	5/9/2006	6521302.031220	6521302.031220	1807578.393730	246106	566	sf	35	cf
Infiltration BMP	Existing	12337 HORLEY	6/20/2007	6514828.837130	6514828.837130	1797233.894880	246079	566	sf	35	cf
Infiltration BMP	Existing	12619 IBBETSON	4/7/2008	6525826.717640	6525826.717640	1791950.694670	245114	566	sf	35	cf
Infiltration BMP	Existing	12142 MARBEL	5/5/2008	6521265.537710	6521265.537710	1794924.230550	245115	566	sf	35	cf
Infiltration BMP	Existing	12228 NORLAIN	6/24/2005	6513924.473210	6513924.473210	1798288.206130	246079	566	sf	35	cf
Infiltration BMP	Existing	11733 PATTON	12/9/2005	6521629.388810	6521629.388810	1797656.681610	245114	566	sf	35	cf
Infiltration BMP	Existing	11712 PRUESS	3/29/2006	6518005.349510	6518005.349510	1799785.098800	246077	566	sf	35	cf
Infiltration BMP	Existing	8605 SAMOLINE	10/23/2006	6525562.919850	6525562.919850	1810382.622670	246106	566	sf	35	cf
Infiltration BMP	Existing	7814 SPRINGER	7/20/2005	6515325.745000	6515325.745000	1796943.250000	246079	566	sf	35	cf
Infiltration BMP	Existing	7406 THIRD	9/23/2005	6517102.209740	6517102.209740	1803992.224080	246102	566	sf	35	cf
Infiltration BMP	Existing	8836 TWEEDY	8/21/2006	6524333.205540	6524333.205540	1809897.996880	246106	566	sf	35	cf
Infiltration BMP	Existing	9702 TWEEDY	8/30/2005	6522704.033740	6522704.033740	1807211.824630	246103	566	sf	35	cf
Infiltration BMP	Existing	11414 PARAMOUNT	11/17/2006	6519592.558830	6519592.558830	1800943.348310	245115	37135	sf	2321	cf
Infiltration BMP	Existing	8077 FLORENCE AV	1/1/2009	6523000.000000	6523000.000000	1805200.000000	246103	31872	sf	1992	cf
Infiltration BMP	Existing	8351 FLORENCE	11/29/2005	6524092.726100	6524092.726100	1804613.455750	246103	8252	sf	516	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11003 LAKEWOOD	1/1/2006	6524400.000000	6524400.000000	1799800.000000	245119	8252	sf	516	cf
Infiltration BMP	Existing	9288 LUBEC	6/21/2010	6528705.843900	6528705.843900	1803218.787040	245125	8252	sf	516	cf
Infiltration BMP	Existing	13240 BARLIN	6/24/2005	6517118.017720	6517118.017720	1789361.126310	245524	6189	sf	387	cf
Infiltration BMP	Existing	9802 BROOKSHIRE	4/24/2007	6525737.765210	6525737.765210	1805415.750650	246103	6189	sf	387	cf
Infiltration BMP	Existing	9026 SUVA	10/5/2006	6527186.692380	6527186.692380	1804858.393970	245125	6189	sf	387	cf
Infiltration BMP	Existing	7325 IRWINGROVE	4/27/2005	6518419.969630	6518419.969630	1807291.337240	246102	5158	sf	322	cf
Infiltration BMP	Existing	10064 PANGBORN	8/16/2005	6529846.676910	6529846.676910	1801177.429270	245125	5158	sf	322	cf
Infiltration BMP	Existing	8102 THIRD	3/4/2009	6520617.238210	6520617.238210	1801805.039980	246103	7616	sf	476	cf
Infiltration BMP	Existing	12200 BELLFLOWER	11/4/2008	6524061.916580	6524061.916580	1794195.827920	245114	4126	sf	258	cf
Infiltration BMP	Existing	9818 BIRCHDALE	12/28/2005	6526194.448530	6526194.448530	1804634.814020	245125	4126	sf	258	cf
Infiltration BMP	Existing	10419 BROOKSHIRE	7/30/2007	6523842.460000	6523842.460000	1803179.994160	245119	4126	sf	258	cf
Infiltration BMP	Existing	10432 BROOKSHIRE	2/14/2007	6523911.001360	6523911.001360	1803018.354450	245119	4126	sf	258	cf
Infiltration BMP	Existing	10329 CASANES	1/1/2006	6528565.218740	6528565.218740	1800358.453120	245126	4126	sf	258	cf
Infiltration BMP	Existing	13221 CORRIGAN	3/9/2006	6523120.117490	6523120.117490	1789965.324450	245114	4126	sf	258	cf
Infiltration BMP	Existing	8816 ELSTON	12/28/2005	6526840.850650	6526840.850650	1808666.263650	246103	4126	sf	258	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9278 GAINFORD	6/15/2005	6528421.969980	6528421.969980	1803000.469050	245125	4126	sf	258	cf
Infiltration BMP	Existing	7340 IRWINGROVE	12/6/2005	6518415.507880	6518415.507880	1806990.616650	246102	4126	sf	258	cf
Infiltration BMP	Existing	9055 IRWINGROVE	10/17/2006	6526414.238800	6526414.238800	1802422.724820	245119	4126	sf	258	cf
Infiltration BMP	Existing	9005 KRISTIN	1/1/2006	6524171.005660	6524171.005660	1809376.398810	246106	4126	sf	258	cf
Infiltration BMP	Existing	9015 KRISTIN	1/1/2006	6524137.396040	6524137.396040	1809320.713720	246106	4126	sf	258	cf
Infiltration BMP	Existing	10014 LA REINA	11/3/2005	6523603.973220	6523603.973220	1805275.605180	246103	4126	sf	258	cf
Infiltration BMP	Existing	8334 LEXINGTON	3/20/2006	6523900.000000	6523900.000000	1804200.000000	246103	4126	sf	258	cf
Infiltration BMP	Existing	7114 LUXOR	7/27/2005	6513446.571340	6513446.571340	1802395.175860	246100	4126	sf	258	cf
Infiltration BMP	Existing	10348 PANGBORN	10/12/2006	6529020.867850	6529020.867850	1800144.106260	245126	4126	sf	258	cf
Infiltration BMP	Existing	7268 PELLET	12/8/2005	6516203.991240	6516203.991240	1804244.566160	246104	4126	sf	258	cf
Infiltration BMP	Existing	9821 RIVES	9/12/2005	6521261.613640	6521261.613640	1807221.725140	246106	4126	sf	258	cf
Infiltration BMP	Existing	10427 STAMPS	2/27/2006	6523141.588150	6523141.588150	1803526.008280	246103	4126	sf	258	cf
Infiltration BMP	Existing	8325 TEXAS	8/30/2007	6520789.744350	6520789.744350	1799109.948610	245114	4126	sf	258	cf
Infiltration BMP	Existing	9211 ARRINGTON	6/21/2010	6527822.609270	6527822.609270	1805896.813180	245125	3095	sf	193	cf
Infiltration BMP	Existing	10372 BIRCHDALE	1/17/2006	6524786.108330	6524786.108330	1802711.833690	245119	2660	sf	166	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9509 BROCK	10/6/2005	6524084.133490	6524084.133490	1807438.122200	246103	3095	sf	193	cf
Infiltration BMP	Existing	9600 CORD	5/12/2008	6529842.639410	6529842.639410	1803668.379590	245125	3095	sf	193	cf
Infiltration BMP	Existing	10943 CORD	3/13/2007	6526539.555830	6526539.555830	1798046.595190	245119	3095	sf	193	cf
Infiltration BMP	Existing	12569 DOLAN	9/27/2006	6517675.526540	6517675.526540	1793796.546690	245115	3095	sf	193	cf
Infiltration BMP	Existing	9252A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9252B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9258A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9258B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9258C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9622 HALEDON	3/16/2006	6528283.868130	6528283.868130	1804260.791520	245125	3095	sf	193	cf
Infiltration BMP	Existing	11442 JULIUS	7/26/2007	6517126.240320	6517126.240320	1802109.297720	246079	3095	sf	193	cf
Infiltration BMP	Existing	10026 MATTOCK	1/1/2006	6530326.462180	6530326.462180	1801330.602850	245125	3095	sf	193	cf
Infiltration BMP	Existing	9303 PARAMOUNT	3/14/2006	6523934.101920	6523934.101920	1808355.150660	246106	3095	sf	193	cf
Infiltration BMP	Existing	8739 PARKCLIFF	1/23/2006	6516653.896010	6516653.896010	1788072.265990	245524	2063	sf	129	cf
Infiltration BMP	Existing	9303 PARROT	1/4/2007	6524270.384450	6524270.384450	1808221.036420	246106	3095	sf	193	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7313 PELLET	6/22/2010	6516478.702600	6516478.702600	1804386.841100	246104	3095	sf	193	cf
Infiltration BMP	Existing	10473 PICO VISTA	1/21/2009	6529579.260180	6529579.260180	1798825.132300	245126	3095	sf	193	cf
Infiltration BMP	Existing	7840 THIRD	8/29/2007	6519254.945150	6519254.945150	1802616.251380	246102	3095	sf	193	cf
Infiltration BMP	Existing	8347 VISTA DEL ROSA	7/26/2007	6527061.884710	6527061.884710	1808864.927170	246106	3095	sf	193	cf
Infiltration BMP	Existing	11632 ADENMOOR	6/15/2005	6524141.212380	6524141.212380	1797138.142940	245114	2063	sf	129	cf
Infiltration BMP	Existing	7124 ADWEN	12/20/2007	6513937.816490	6513937.816490	1803059.644840	246100	2063	sf	129	cf
Infiltration BMP	Existing	7258 ADWEN	1/3/2008	6515068.905460	6515068.905460	1802384.347520	246079	2063	sf	129	cf
Infiltration BMP	Existing	7646 ADWEN	10/6/2005	6517037.957040	6517037.957040	1801170.785850	246079	2063	sf	129	cf
Infiltration BMP	Existing	7702 ADWEN	5/11/2006	6517121.727310	6517121.727310	1801116.179360	246079	2063	sf	129	cf
Infiltration BMP	Existing	13032 AIRPOINT	5/14/2007	6517972.459000	6517972.459000	1790335.341940	245115	2063	sf	129	cf
Infiltration BMP	Existing	8455 ALAMEDA	8/7/2008	6519558.018350	6519558.018350	1795721.453060	245115	2063	sf	129	cf
Infiltration BMP	Existing	8632 ALAMEDA	11/2/2006	6520500.318510	6520500.318510	1795019.322380	245115	2063	sf	129	cf
Infiltration BMP	Existing	7945 ALBIA	10/11/2005	6516993.544600	6516993.544600	1797608.073070	246079	2063	sf	129	cf
Infiltration BMP	Existing	8704 ALBIA	5/28/2008	6520928.243910	6520928.243910	1795073.644330	245115	2063	sf	129	cf
Infiltration BMP	Existing	7845 ARNETT	6/18/2010	6518353.322440	6518353.322440	1801165.354440	246079	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9217 ARRINGTON	3/27/2006	6527795.727670	6527795.727670	1805838.303240	245125	2063	sf	129	cf
Infiltration BMP	Existing	7870 BAYSINGER	2/8/2008	6521311.922790	6521311.922790	1805484.679070	246102	2063	sf	129	cf
Infiltration BMP	Existing	9964 BELCHER	5/16/2007	6525622.979960	6525622.979960	1789815.793090	245113	2063	sf	129	cf
Infiltration BMP	Existing	12556 BELLDER	8/17/2007	6518567.857140	6518567.857140	1793310.793680	245115	2063	sf	129	cf
Infiltration BMP	Existing	11614 BELLFLOWER	11/7/2008	6523771.271210	6523771.271210	1797348.312220	245114	2063	sf	129	cf
Infiltration BMP	Existing	11802 BELLMAN	3/9/2007	6521898.080850	6521898.080850	1797268.375540	245114	2063	sf	129	cf
Infiltration BMP	Existing	7502 BENARES	1/30/2009	6515952.395710	6515952.395710	1801162.932420	246079	2063	sf	129	cf
Infiltration BMP	Existing	7824 BORSON	5/24/2007	6514090.231790	6514090.231790	1794571.039330	246077	2063	sf	129	cf
Infiltration BMP	Existing	7442 BROOKMILL	2/6/2006	6515991.568850	6515991.568850	1801492.813950	246079	2063	sf	129	cf
Infiltration BMP	Existing	9202 BUELL	7/21/2008	6526325.599230	6526325.599230	1799668.061170	245119	2063	sf	129	cf
Infiltration BMP	Existing	9340 BUELL	8/9/2006	6527287.659290	6527287.659290	1799162.594770	245126	2063	sf	129	cf
Infiltration BMP	Existing	8707 BYERS	3/15/2006	6521183.641890	6521183.641890	1796053.567730	245115	2063	sf	129	cf
Infiltration BMP	Existing	10446 CASANES	10/26/2006	6528470.793910	6528470.793910	1799828.787480	245126	2063	sf	129	cf
Infiltration BMP	Existing	10932 CASANES	11/17/2005	6527225.467210	6527225.467210	1797760.272650	245119	2063	sf	129	cf
Infiltration BMP	Existing	13341 CASTANA	10/28/2005	6517576.502130	6517576.502130	1788949.477410	245524	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7408 CECILIA	10/27/2005	6517829.130300	6517829.130300	1804625.827460	246102	2063	sf	129	cf
Infiltration BMP	Existing	7604 CECILIA	5/14/2007	6518455.494160	6518455.494160	1804215.794590	246102	2063	sf	129	cf
Infiltration BMP	Existing	9116 CHANEY	12/19/2005	6529189.877980	6529189.877980	1805493.817150	245125	2063	sf	129	cf
Infiltration BMP	Existing	8210 CHEYENNE	3/18/2008	6515440.785260	6515440.785260	1792057.306890	246077	2063	sf	129	cf
Infiltration BMP	Existing	9663 CLANCEY	8/17/2005	6527712.819630	6527712.819630	1804149.908320	245125	2063	sf	129	cf
Infiltration BMP	Existing	10708 CLANCEY	12/9/2005	6525546.299290	6525546.299290	1800088.746900	245119	2063	sf	129	cf
Infiltration BMP	Existing	8336 CLETA	5/8/2006	6520552.025180	6520552.025180	1798452.238760	245114	2063	sf	129	cf
Infiltration BMP	Existing	8557 CLETA	7/24/2006	6521804.225790	6521804.225790	1798033.515210	245114	2063	sf	129	cf
Infiltration BMP	Existing	8532 COLE	11/7/2005	6521000.000000	6521000.000000	1796400.000000	245115	2063	sf	129	cf
Infiltration BMP	Existing	9003 CORD	6/23/2010	6530731.156250	6530731.156250	1805583.409840	245127	2063	sf	129	cf
Infiltration BMP	Existing	9203 CORD	11/14/2008	6530209.591170	6530209.591170	1804419.169900	245125	2063	sf	129	cf
Infiltration BMP	Existing	13029 CORNUTA	5/17/2007	6525511.407030	6525511.407030	1790564.440990	245113	2063	sf	129	cf
Infiltration BMP	Existing	13102 CORNUTA	8/2/2007	6525701.503660	6525701.503660	1790504.914950	245113	2063	sf	129	cf
Infiltration BMP	Existing	13130 CORNUTA	6/25/2007	6525701.486250	6525701.486250	1790230.251310	245113	2063	sf	129	cf
Infiltration BMP	Existing	9245 DALEWOOD	9/23/2005	6532196.615620	6532196.615620	1804345.945760	245127	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	13440 DEMPSTER	10/26/2006	6516234.168650	6516234.168650	1789111.153470	245524	2063	sf	129	cf
Infiltration BMP	Existing	13448 DEMPSTER	5/10/2007	6516184.596670	6516184.596670	1789023.378330	245524	2063	sf	129	cf
Infiltration BMP	Existing	8125 DINSDALE	12/20/2005	6523223.693140	6523223.693140	1805447.514320	246103	2063	sf	129	cf
Infiltration BMP	Existing	10343 DOLAN	3/7/2007	6523688.489440	6523688.489440	1803733.392340	246103	2063	sf	129	cf
Infiltration BMP	Existing	10616 DOLAN	12/8/2005	6523091.688370	6523091.688370	1802186.196180	246103	2063	sf	129	cf
Infiltration BMP	Existing	8451 DONOVAN	10/20/2006	6518824.326830	6518824.326830	1794831.678890	245115	2063	sf	129	cf
Infiltration BMP	Existing	11915 DOWNEY	9/26/2007	6519404.158310	6519404.158310	1797577.606330	245115	2063	sf	129	cf
Infiltration BMP	Existing	12269 DOWNEY	3/16/2006	6518129.427940	6518129.427940	1795616.200900	246077	2063	sf	129	cf
Infiltration BMP	Existing	12631 DUNROBIN	1/14/2009	6524865.692630	6524865.692630	1791809.740080	245114	2063	sf	129	cf
Infiltration BMP	Existing	12644 DUNROBIN	12/27/2006	6525045.107610	6525045.107610	1791670.201830	245114	2063	sf	129	cf
Infiltration BMP	Existing	13212 DUNROBIN	3/6/2008	6525046.199690	6525046.199690	1790094.955960	245114	2063	sf	129	cf
Infiltration BMP	Existing	9018 EGLISE	6/18/2010	6530595.364130	6530595.364130	1805560.296250	245127	2063	sf	129	cf
Infiltration BMP	Existing	9252C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9252D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9252E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9254A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9258D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9258E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	8902 ELSTON	6/22/2010	6526760.905110	6526760.905110	1808606.155990	246103	2063	sf	129	cf
Infiltration BMP	Existing	8420 EUCALYPTUS	11/1/2007	6518268.185230	6518268.185230	1794519.531140	245115	2063	sf	129	cf
Infiltration BMP	Existing	8543 FARM	7/14/2008	6524366.648200	6524366.648200	1802748.102990	245119	2063	sf	129	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7963 FIFTH	4/13/2007	6520492.297340	6520492.297340	1803181.748460	246103	2063	sf	129	cf
Infiltration BMP	Existing	7606 FINEVALE	7/23/2007	6522317.087820	6522317.087820	1809781.757910	246111	2063	sf	129	cf
Infiltration BMP	Existing	8740 FIRESTONE	2/5/2008	6523707.154590	6523707.154590	1799037.579000	245119	2063	sf	129	cf
Infiltration BMP	Existing	8663 FONTANA	8/11/2005	6522041.808010	6522041.808010	1796935.622550	245114	2063	sf	129	cf
Infiltration BMP	Existing	7435 FOSTORIA	8/30/2005	6517713.795360	6517713.795360	1804555.032870	246102	2063	sf	129	cf
Infiltration BMP	Existing	7611 FOSTORIA	7/5/2007	6518456.715640	6518456.715640	1804071.041810	246102	2063	sf	129	cf
Infiltration BMP	Existing	8029 FOURTH	6/15/2006	6520786.200710	6520786.200710	1802533.409070	246103	2063	sf	129	cf
Infiltration BMP	Existing	8524 GAINFORD	6/27/2008	6525485.453790	6525485.453790	1804820.431910	245125	2063	sf	129	cf
Infiltration BMP	Existing	9332 GAINFORD	7/20/2006	6528750.550820	6528750.550820	1802746.272930	245125	2063	sf	129	cf
Infiltration BMP	Existing	9330 GALLATIN	8/2/2007	6529116.628720	6529116.628720	1804180.197000	245125	2063	sf	129	cf
Infiltration BMP	Existing	12271 GLYNN	10/18/2005	6518435.603700	6518435.603700	1795389.616520	245115	2063	sf	129	cf
Infiltration BMP	Existing	9123 HALEDON	1/23/2006	6528738.408770	6528738.408770	1805747.051990	245125	2063	sf	129	cf
Infiltration BMP	Existing	7915 HARPER	2/7/2006	6520609.146350	6520609.146350	1804298.454990	246102	2063	sf	129	cf
Infiltration BMP	Existing	9108 HASTY	8/23/2006	6531133.870830	6531133.870830	1805211.202040	245127	2063	sf	129	cf
Infiltration BMP	Existing	10840 HASTY	1/16/2008	6527245.272860	6527245.272860	1798387.513250	245119	2063	sf	129	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7468 HONDO	12/31/2008	6513888.485770	6513888.485770	1797503.008930	246079	2063	sf	129	cf
Infiltration BMP	Existing	7838 HONDO	2/26/2008	6515366.533450	6515366.533450	1796561.911100	246079	2063	sf	129	cf
Infiltration BMP	Existing	7926 HONDO	7/25/2006	6515828.269550	6515828.269550	1796282.236280	246079	2063	sf	129	cf
Infiltration BMP	Existing	12023 HORTON	10/5/2005	6515547.066470	6515547.066470	1799512.855270	246079	1032	sf	64	cf
Infiltration BMP	Existing	10234 JULIUS	11/5/2009	6519723.348540	6519723.348540	1806551.787860	246102	2063	sf	129	cf
Infiltration BMP	Existing	11828 JULIUS	1/3/2008	6515976.382140	6515976.382140	1800524.752810	246079	2063	sf	129	cf
Infiltration BMP	Existing	9256 KLINEDALE	12/4/2007	6531745.367500	6531745.367500	1804500.031620	245127	2063	sf	129	cf
Infiltration BMP	Existing	9452 KLINEDALE	4/24/2008	6531257.497660	6531257.497660	1803653.019950	245127	2063	sf	129	cf
Infiltration BMP	Existing	9031 LEMORAN	1/30/2009	6529792.995960	6529792.995960	1806045.812140	245125	2063	sf	129	cf
Infiltration BMP	Existing	9910 LESTERFORD	8/3/2005	6531140.582200	6531140.582200	1801442.142180	245125	2063	sf	129	cf
Infiltration BMP	Existing	8533 LOWMAN	1/3/2008	6525796.079270	6525796.079270	1810845.309540	246106	2063	sf	129	cf
Infiltration BMP	Existing	8349 LUBEC	12/27/2006	6524776.248350	6524776.248350	1805794.753990	246103	2063	sf	129	cf
Infiltration BMP	Existing	7630 LUXOR	6/27/2005	6516552.896900	6516552.896900	1800452.817120	246079	2063	sf	129	cf
Infiltration BMP	Existing	12342 MARBEL	3/23/2006	6520586.635090	6520586.635090	1793799.804370	245115	2063	sf	129	cf
Infiltration BMP	Existing	9045 MARGARET ST	1/1/2006	6524143.176440	6524143.176440	1798109.987740	245114	2063	sf	129	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10410 MATTOCK	10/2/2007	6529164.649420	6529164.649420	1799820.803610	245126	2063	sf	129	cf
Infiltration BMP	Existing	10615 MATTOCK	2/22/2006	6528479.681880	6528479.681880	1798952.207590	245126	2063	sf	129	cf
Infiltration BMP	Existing	9136 MELDAR	3/1/2007	6526738.891530	6526738.891530	1807241.651780	246103	2063	sf	129	cf
Infiltration BMP	Existing	7437 MULLER	10/3/2005	6518230.115820	6518230.115820	1805283.479580	246102	1032	sf	64	cf
Infiltration BMP	Existing	7452 MULLER	10/3/2005	6518271.461030	6518271.461030	1805049.518080	246102	2063	sf	129	cf
Infiltration BMP	Existing	10715 NEW	8/9/2007	6521988.945450	6521988.945450	1802370.638520	246103	2063	sf	129	cf
Infiltration BMP	Existing	10715 NEW	7/14/2008	6521988.945450	6521988.945450	1802370.638520	246103	2063	sf	129	cf
Infiltration BMP	Existing	10261 NEWVILLE	10/30/2007	6529641.666020	6529641.666020	1800383.942770	245126	2063	sf	129	cf
Infiltration BMP	Existing	10311 NEWVILLE	1/29/2009	6529538.574620	6529538.574620	1800214.882210	245126	2063	sf	129	cf
Infiltration BMP	Existing	10420 NEWVILLE	4/11/2008	6529346.061190	6529346.061190	1799529.176420	245126	2063	sf	129	cf
Infiltration BMP	Existing	10524 NEWVILLE	6/11/2007	6529062.272820	6529062.272820	1798916.257500	245126	2063	sf	129	cf
Infiltration BMP	Existing	9842 NORLAIN	3/9/2007	6519878.070320	6519878.070320	1807987.575840	246111	2063	sf	129	cf
Infiltration BMP	Existing	10403 PANGBORN	9/16/2005	6528806.561730	6528806.561730	1800136.574080	245126	2063	sf	129	cf
Infiltration BMP	Existing	10421 PANGBORN	6/5/2006	6528710.057740	6528710.057740	1799977.600600	245126	2063	sf	129	cf
Infiltration BMP	Existing	10903 PANGBORN	5/12/2008	6527497.056040	6527497.056040	1797964.159830	245119	2063	sf	129	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9508 PARAMOUNT	7/23/2007	6523724.334180	6523724.334180	1807653.518330	246106	2063	sf	129	cf
Infiltration BMP	Existing	9709 PARROT	6/20/2008	6523336.123150	6523336.123150	1806770.831150	246103	2063	sf	129	cf
Infiltration BMP	Existing	7107 PELLET	10/26/2005	6515228.221140	6515228.221140	1805197.090730	246104	2063	sf	129	cf
Infiltration BMP	Existing	10316 PICO VISTA	6/22/2010	6530326.941520	6530326.941520	1799752.739480	245126	2063	sf	129	cf
Infiltration BMP	Existing	10459 PICO VISTA	8/20/2008	6529643.308750	6529643.308750	1798930.291180	245126	2063	sf	129	cf
Infiltration BMP	Existing	11809 POMERING	1/25/2008	6515588.727520	6515588.727520	1800891.851040	246079	2063	sf	129	cf
Infiltration BMP	Existing	11821 POMERING	11/20/2008	6515535.205010	6515535.205010	1800794.072400	246079	2063	sf	129	cf
Infiltration BMP	Existing	9050 PRISCILLA	2/21/2007	6519218.937330	6519218.937330	1790014.532510	245115	2063	sf	129	cf
Infiltration BMP	Existing	8230 PURITAN	7/12/2007	6515756.650110	6515756.650110	1792196.388750	246077	2063	sf	129	cf
Infiltration BMP	Existing	8107 RAVILLER	6/22/2010	6524405.759790	6524405.759790	1808219.110840	246106	2063	sf	129	cf
Infiltration BMP	Existing	9940 RICHEON	12/26/2007	6520640.158150	6520640.158150	1807053.597690	246106	2063	sf	129	cf
Infiltration BMP	Existing	12015 RICHEON	6/21/2010	6515852.443580	6515852.443580	1799404.256870	246079	2063	sf	129	cf
Infiltration BMP	Existing	7336 RIO HONDO PL	12/26/2007	6516915.991390	6516915.991390	1804928.334260	246104	2063	sf	129	cf
Infiltration BMP	Existing	8418 RIVES	9/30/2005	6525367.917230	6525367.917230	1811575.863460	246106	1032	sf	64	cf
Infiltration BMP	Existing	11638 RIVES	11/2/2006	6517541.202300	6517541.202300	1800577.741160	246079	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11706 RIVES	10/16/2006	6517702.333530	6517702.333530	1800238.435400	246079	2063	sf	129	cf
Infiltration BMP	Existing	12436 ROSE	11/6/2006	6520776.455000	6520776.455000	1793075.765000	245115	2063	sf	129	cf
Infiltration BMP	Existing	12033 SAMOLINE	2/22/2008	6517025.771360	6517025.771360	1798249.691900	246079	2063	sf	129	cf
Infiltration BMP	Existing	12051 SAMOLINE	9/3/2008	6516919.542440	6516919.542440	1798077.846870	246079	2063	sf	129	cf
Infiltration BMP	Existing	12302 SAMOLINE	6/22/2010	6516399.204110	6516399.204110	1796321.463670	246077	2063	sf	129	cf
Infiltration BMP	Existing	7921 SECOND	2/15/2006	6519427.915180	6519427.915180	1802349.970040	246102	2063	sf	129	cf
Infiltration BMP	Existing	9700 SHELLEYFIELD	7/17/2008	6527622.312900	6527622.312900	1804250.399390	245125	2063	sf	129	cf
Infiltration BMP	Existing	10553 SHELLEYFIELD	6/11/2008	6525493.222190	6525493.222190	1800845.190450	245119	2063	sf	129	cf
Infiltration BMP	Existing	8732 SMALLWOOD	2/16/2006	6524307.398160	6524307.398160	1810444.440300	246106	2063	sf	129	cf
Infiltration BMP	Existing	8816 SMALLWOOD	10/11/2005	6524123.348010	6524123.348010	1810138.117570	246106	2063	sf	129	cf
Infiltration BMP	Existing	9127 SONGFEST	12/1/2005	6531508.595900	6531508.595900	1805094.820630	245127	2063	sf	129	cf
Infiltration BMP	Existing	9143 STEWART & GRAY	11/30/2005	6523803.019500	6523803.019500	1796254.085000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9211 STEWART & GRAY	11/27/2006	6524190.537790	6524190.537790	1796254.765000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9112 STOAKES	8/23/2006	6526782.391540	6526782.391540	1807626.036510	246103	2063	sf	129	cf
Infiltration BMP	Existing	9533 SUVA	6/27/2006	6530409.847860	6530409.847860	1802701.771860	245125	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9729 TRISTAN	10/18/2005	6526617.474570	6526617.474570	1804798.283870	245125	2063	sf	129	cf
Infiltration BMP	Existing	9216 TWEEDY	12/9/2005	6523630.155980	6523630.155980	1808715.397490	246106	2063	sf	129	cf
Infiltration BMP	Existing	13602 VERDURA	6/28/2007	6516296.473820	6516296.473820	1788728.235150	245524	2063	sf	129	cf
Infiltration BMP	Existing	10305 VULTEE	10/9/2006	6525949.622700	6525949.622700	1802510.250780	245119	2063	sf	129	cf
Infiltration BMP	Existing	10017 WILEY BURKE	6/22/2010	6520091.056520	6520091.056520	1807145.868160	246106	2063	sf	129	cf
Infiltration BMP	Existing	8538 ADOREE	9/26/2007	6517768.216360	6517768.216360	1792006.503470	245115	1032	sf	64	cf
Infiltration BMP	Existing	9407 ADOREE	1/1/2006	6522413.313750	6522413.313750	1791106.017430	245115	1032	sf	64	cf
Infiltration BMP	Existing	7134 ADWEN	1/1/2005	6514021.670500	6514021.670500	1803005.164870	246100	1032	sf	64	cf
Infiltration BMP	Existing	7343 ADWEN	9/4/2007	6515521.914470	6515521.914470	1802266.858280	246079	1032	sf	64	cf
Infiltration BMP	Existing	7743 ADWEN	12/5/2006	6517543.195590	6517543.195590	1801041.561520	246079	1032	sf	64	cf
Infiltration BMP	Existing	7802 ADWEN	10/18/2005	6517699.212930	6517699.212930	1800872.280990	246079	1032	sf	64	cf
Infiltration BMP	Existing	7828 ADWEN	8/4/2005	6517918.117250	6517918.117250	1800738.511970	246079	1032	sf	64	cf
Infiltration BMP	Existing	7852 ADWEN	1/9/2009	6518131.432520	6518131.432520	1800607.974520	246079	1032	sf	64	cf
Infiltration BMP	Existing	7855 ADWEN	11/23/2005	6518235.708380	6518235.708380	1800774.963010	246079	1032	sf	64	cf
Infiltration BMP	Existing	12823 AIRPOINT	6/29/2007	6518348.749200	6518348.749200	1791281.430170	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8441 ALAMEDA	10/31/2005	6519442.769190	6519442.769190	1795780.926380	245115	1032	sf	64	cf
Infiltration BMP	Existing	8549 ALAMEDA	6/23/2010	6520129.148230	6520129.148230	1795426.542360	245115	1032	sf	64	cf
Infiltration BMP	Existing	8448 ALBIA	1/1/2007	6519556.734390	6519556.734390	1795840.452920	245115	1032	sf	64	cf
Infiltration BMP	Existing	8528 ALBIA	2/27/2007	6520000.245000	6520000.245000	1795612.955000	245115	1032	sf	64	cf
Infiltration BMP	Existing	9718 ALIWIN	8/2/2005	6532030.038780	6532030.038780	1804115.104340	245127	1032	sf	64	cf
Infiltration BMP	Existing	7936 ALLENGROVE	1/22/2007	6524421.678930	6524421.678930	1809567.173140	246106	1032	sf	64	cf
Infiltration BMP	Existing	8116 ALLENGROVE	12/5/2005	6525137.825210	6525137.825210	1808747.451430	246106	1032	sf	64	cf
Infiltration BMP	Existing	9166 ANGELL	9/2/2008	6520625.089300	6520625.089300	1790394.866750	245115	1032	sf	64	cf
Infiltration BMP	Existing	9351 APPLEBY	1/3/2008	6529580.566170	6529580.566170	1804445.997380	245125	1032	sf	64	cf
Infiltration BMP	Existing	9520 ARDINE	10/6/2005	6527613.323800	6527613.323800	1797533.903060	245119	1032	sf	64	cf
Infiltration BMP	Existing	7814 ARNETT	6/22/2010	6517981.553910	6517981.553910	1801095.347060	246079	1032	sf	64	cf
Infiltration BMP	Existing	7815 ARNETT	6/22/2010	6518066.490340	6518066.490340	1801237.713920	246079	1032	sf	64	cf
Infiltration BMP	Existing	7832 ARNETT	1/11/2007	6518132.684800	6518132.684800	1801021.243050	246079	1032	sf	64	cf
Infiltration BMP	Existing	8241 ARNETT	11/29/2006	6520442.071210	6520442.071210	1799867.842140	245115	1032	sf	64	cf
Infiltration BMP	Existing	7743 BAIRNSDALE	5/16/2006	6523474.546480	6523474.546480	1810551.323320	246106	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12904 BARLIN	1/15/2009	6518150.890370	6518150.890370	1791163.941140	245115	1032	sf	64	cf
Infiltration BMP	Existing	13247 BARLIN	5/5/2005	6516868.829160	6516868.829160	1789428.146200	245524	1032	sf	64	cf
Infiltration BMP	Existing	7871 BAYSINGER	1/10/2007	6521422.493960	6521422.493960	1805635.813480	246102	1032	sf	64	cf
Infiltration BMP	Existing	8607 BAYSINGER	1/1/2005	6525304.240800	6525304.240800	1803291.716200	245119	1032	sf	64	cf
Infiltration BMP	Existing	9131 BAYSINGER	9/10/2008	6526918.982970	6526918.982970	1802474.767100	245119	1032	sf	64	cf
Infiltration BMP	Existing	9411 BAYSINGER	9/24/2007	6528736.042510	6528736.042510	1801262.782730	245126	1032	sf	64	cf
Infiltration BMP	Existing	9320 BELCHER	4/10/2007	6520600.361450	6520600.361450	1789754.109890	245115	1032	sf	64	cf
Infiltration BMP	Existing	9969 BELCHER	7/29/2009	6525669.288070	6525669.288070	1789992.480470	245113	1032	sf	64	cf
Infiltration BMP	Existing	10375 BELDER	6/22/2010	6522812.240000	6522812.240000	1803043.757460	246103	1032	sf	64	cf
Infiltration BMP	Existing	7441 BENARES	10/25/2005	6515921.019300	6515921.019300	1801396.174500	246079	1032	sf	64	cf
Infiltration BMP	Existing	7503 BENARES	1/16/2008	6516046.045620	6516046.045620	1801313.189720	246079	1032	sf	64	cf
Infiltration BMP	Existing	11014 BENFIELD	12/19/2005	6531918.630750	6531918.630750	1797937.959120	245122	1032	sf	64	cf
Infiltration BMP	Existing	8555 BIGBY	8/22/2005	6524606.668030	6524606.668030	1802914.545010	245119	1032	sf	64	cf
Infiltration BMP	Existing	9308 BIGBY	12/18/2008	6527591.908660	6527591.908660	1800839.109380	245126	1032	sf	64	cf
Infiltration BMP	Existing	9345 BIGBY	5/16/2006	6527999.312020	6527999.312020	1800803.102000	245126	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9389 BIGBY	9/20/2007	6528361.925530	6528361.925530	1800582.426270	245126	1032	sf	64	cf
Infiltration BMP	Existing	8246 BIRCHCREST	11/28/2005	6526713.325530	6526713.325530	1809350.628180	246106	1032	sf	64	cf
Infiltration BMP	Existing	10434 BIRCHDALE	12/2/2008	6524586.579650	6524586.579650	1802390.820140	245119	1032	sf	64	cf
Infiltration BMP	Existing	8812 BIRCHLEAF	5/3/2007	6527457.897210	6527457.897210	1808468.377860	246103	1032	sf	64	cf
Infiltration BMP	Existing	8912 BIRCHLEAF	10/9/2007	6527209.329660	6527209.329660	1808281.543500	246103	1032	sf	64	cf
Infiltration BMP	Existing	13330 BIXLER	3/21/2007	6516259.886220	6516259.886220	1789972.109000	245524	1032	sf	64	cf
Infiltration BMP	Existing	13411 BIXLER	9/30/2008	6515914.285010	6515914.285010	1789635.314360	245524	1032	sf	64	cf
Infiltration BMP	Existing	13425 BIXLER	8/17/2005	6515841.147610	6515841.147610	1789505.869380	245524	1032	sf	64	cf
Infiltration BMP	Existing	13454 BIXLER	5/10/2007	6515808.905200	6515808.905200	1789174.120800	245524	1032	sf	64	cf
Infiltration BMP	Existing	8220 BLANDWOOD	6/22/2010	6526086.691350	6526086.691350	1808873.058080	246103	1032	sf	64	cf
Infiltration BMP	Existing	12809 BLODGETT	1/1/2006	6518629.647540	6518629.647540	1791208.759970	245115	1032	sf	64	cf
Infiltration BMP	Existing	13026 BLODGETT	1/1/2005	6518225.401930	6518225.401930	1790248.943990	245115	1032	sf	64	cf
Infiltration BMP	Existing	13045 BLODGETT	10/6/2005	6517990.284020	6517990.284020	1790176.483690	245115	1032	sf	64	cf
Infiltration BMP	Existing	13114 BLODGETT	10/6/2005	6517888.613290	6517888.613290	1789931.616790	245115	1032	sf	64	cf
Infiltration BMP	Existing	7931 BORSON	9/6/2006	6514752.824370	6514752.824370	1794266.718830	246077	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8202 BORSON	6/5/2006	6516202.097710	6516202.097710	1793267.543860	246077	1032	sf	64	cf
Infiltration BMP	Existing	8428 BORSON	11/21/2008	6517449.915190	6517449.915190	1792528.167220	245115	1032	sf	64	cf
Infiltration BMP	Existing	8515 BORSON	3/14/2005	6517771.929480	6517771.929480	1792500.505870	245115	1032	sf	64	cf
Infiltration BMP	Existing	8345 BOYNE	6/18/2010	6519344.143470	6519344.143470	1796446.421390	245115	1032	sf	64	cf
Infiltration BMP	Existing	8402 BOYNE	1/1/2005	6519302.113240	6519302.113240	1796279.573520	245115	1032	sf	64	cf
Infiltration BMP	Existing	8525 BOYNE	7/20/2006	6520189.715440	6520189.715440	1796009.699660	245115	1032	sf	64	cf
Infiltration BMP	Existing	8528 BOYNE	2/22/2007	6520138.661540	6520138.661540	1795848.718800	245115	1032	sf	64	cf
Infiltration BMP	Existing	8613 BOYSON	1/1/2006	6520167.899980	6520167.899980	1794794.451220	245115	1032	sf	64	cf
Infiltration BMP	Existing	8647 BOYSON	7/29/2008	6520447.155570	6520447.155570	1794619.557270	245115	1032	sf	64	cf
Infiltration BMP	Existing	10216 BRANSCOMB	2/21/2007	6526794.108720	6526794.108720	1790310.156040	245113	1032	sf	64	cf
Infiltration BMP	Existing	10291 BRANSCOMB	7/25/2006	6527529.378260	6527529.378260	1790458.207730	245118	1032	sf	64	cf
Infiltration BMP	Existing	9624 BROCK	4/22/2005	6523849.153810	6523849.153810	1806723.688440	246103	1032	sf	64	cf
Infiltration BMP	Existing	12351 BROCK	9/3/2008	6516676.858850	6516676.858850	1795612.256100	246077	1032	sf	64	cf
Infiltration BMP	Existing	12608 BROCK	2/11/2005	6516008.590090	6516008.590090	1794308.259250	246077	1032	sf	64	cf
Infiltration BMP	Existing	8269 BROOKGREEN	1/1/2006	6526709.836510	6526709.836510	1808858.860970	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7847 BROOKMILL	6/21/2010	6518005.266020	6518005.266020	1800484.266850	246079	1032	sf	64	cf
Infiltration BMP	Existing	8025 BROOKPARK	1/1/2005	6525207.617130	6525207.617130	1809814.105880	246106	1032	sf	64	cf
Infiltration BMP	Existing	9707 BROOKSHIRE	3/14/2005	6525762.512240	6525762.512240	1805795.982660	246103	1032	sf	64	cf
Infiltration BMP	Existing	10429 BROOKSHIRE	1/19/2005	6523911.001360	6523911.001360	1803018.354450	245119	1032	sf	64	cf
Infiltration BMP	Existing	12404 BROOKSHIRE	6/25/2007	6518808.785660	6518808.785660	1794169.944640	245115	1032	sf	64	cf
Infiltration BMP	Existing	7622 BRUNACHE	10/31/2007	6515665.309920	6515665.309920	1799097.073030	246079	1032	sf	64	cf
Infiltration BMP	Existing	8216 BRUNACHE	11/6/2007	6518414.904440	6518414.904440	1797242.748270	245115	1032	sf	64	cf
Infiltration BMP	Existing	9033 BUCKLES	6/21/2010	6523179.898540	6523179.898540	1796909.863810	245114	1032	sf	64	cf
Infiltration BMP	Existing	7540 BUELL	1/1/2004	6518499.698980	6518499.698980	1804545.470300	246102	1032	sf	64	cf
Infiltration BMP	Existing	9330 BUELL	2/15/2006	6527195.126160	6527195.126160	1799219.087810	245126	1032	sf	64	cf
Infiltration BMP	Existing	9351 BUELL	6/21/2010	6527484.251630	6527484.251630	1799288.621620	245126	1032	sf	64	cf
Infiltration BMP	Existing	9634 BUELL	3/16/2006	6528774.281270	6528774.281270	1798139.573770	245126	1032	sf	64	cf
Infiltration BMP	Existing	9067 BUHMAN	11/20/2007	6530056.595350	6530056.595350	1805336.923900	245125	1032	sf	64	cf
Infiltration BMP	Existing	9208 BUHMAN	6/16/2008	6529799.831660	6529799.831660	1804544.819190	245125	1032	sf	64	cf
Infiltration BMP	Existing	10237 CASANES	3/23/2006	6528975.248660	6528975.248660	1801017.460740	245126	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10321 CASANES	1/1/2007	6528597.524650	6528597.524650	1800411.412530	245126	1032	sf	64	cf
Infiltration BMP	Existing	10403 CASANES	12/21/2005	6528532.829940	6528532.829940	1800305.536240	245126	1032	sf	64	cf
Infiltration BMP	Existing	10408 CASANES	1/1/2005	6528665.671960	6528665.671960	1800149.799930	245126	1032	sf	64	cf
Infiltration BMP	Existing	10812 CASANES	3/14/2005	6527610.698650	6527610.698650	1798391.295520	245119	1032	sf	64	cf
Infiltration BMP	Existing	10835 CASANES	4/1/2008	6527345.484730	6527345.484730	1798305.683780	245119	1032	sf	64	cf
Infiltration BMP	Existing	10944 CASANES	1/1/2006	6527151.352860	6527151.352860	1797710.972890	245119	1032	sf	64	cf
Infiltration BMP	Existing	8457 CAVEL	9/24/2007	6519984.576530	6519984.576530	1796420.555450	245115	1032	sf	64	cf
Infiltration BMP	Existing	9502 CECILIA	10/11/2007	6527927.079440	6527927.079440	1798327.652080	245126	1032	sf	64	cf
Infiltration BMP	Existing	9531 CECILIA	8/23/2006	6528208.236430	6528208.236430	1798317.933420	245126	1032	sf	64	cf
Infiltration BMP	Existing	9435 CEDARTREE	6/22/2010	6530636.457520	6530636.457520	1805866.234670	245127	1032	sf	64	cf
Infiltration BMP	Existing	9010 CHANEY	11/30/2005	6529789.693370	6529789.693370	1806340.793150	245125	1032	sf	64	cf
Infiltration BMP	Existing	9011 CHANEY	1/31/2006	6529640.900410	6529640.900410	1806424.653160	245125	1032	sf	64	cf
Infiltration BMP	Existing	9134 CHANEY	1/1/2005	6529119.825860	6529119.825860	1805332.958450	245125	1032	sf	64	cf
Infiltration BMP	Existing	10252 CHANEY	1/1/2006	6527373.631100	6527373.631100	1801932.130180	245119	1032	sf	64	cf
Infiltration BMP	Existing	10530 CHANEY	6/3/2008	6526461.472620	6526461.472620	1800532.795270	245119	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8355 CHARLOMA	9/16/2005	6524931.861530	6524931.861530	1806017.636180	246103	1032	sf	64	cf
Infiltration BMP	Existing	9037 CHARLOMA	9/25/2007	6527230.271760	6527230.271760	1804669.291940	245125	1032	sf	64	cf
Infiltration BMP	Existing	8565 CHEROKEE	2/14/2008	6524386.530150	6524386.530150	1802386.701010	245119	1032	sf	64	cf
Infiltration BMP	Existing	8030 CHEYENNE	1/1/2005	6514573.751210	6514573.751210	1792580.925090	246077	1032	sf	64	cf
Infiltration BMP	Existing	8117 CHEYENNE	4/10/2006	6515045.470000	6515045.470000	1792480.065000	246077	1032	sf	64	cf
Infiltration BMP	Existing	8418 CHEYENNE	1/1/2006	6516589.334020	6516589.334020	1791278.419980	245524	1032	sf	64	cf
Infiltration BMP	Existing	9303 CLANCEY	4/3/2006	6528228.489510	6528228.489510	1805319.961840	245125	1032	sf	64	cf
Infiltration BMP	Existing	10518 CLANCEY	3/9/2007	6526045.670270	6526045.670270	1800904.969960	245119	1032	sf	64	cf
Infiltration BMP	Existing	8316 CLETA	4/3/2007	6520383.826830	6520383.826830	1798544.940710	245114	1032	sf	64	cf
Infiltration BMP	Existing	8529 CLETA	1/1/2004	6521562.602410	6521562.602410	1798134.090240	245114	1032	sf	64	cf
Infiltration BMP	Existing	13113 COLDBROOK	6/13/2007	6524340.025750	6524340.025750	1790440.866070	245114	3095	sf	193	cf
Infiltration BMP	Existing	13227 COLDBROOK	2/22/2008	6524428.823880	6524428.823880	1789883.562480	245114	1032	sf	64	cf
Infiltration BMP	Existing	8554 COMOLETTE	6/21/2010	6517765.395020	6517765.395020	1791693.915800	245115	1032	sf	64	cf
Infiltration BMP	Existing	8417 CONKLIN	1/1/2006	6516931.143420	6516931.143420	1791819.671020	245524	1032	sf	64	cf
Infiltration BMP	Existing	7219 COOLGROVE	4/25/2006	6521787.460350	6521787.460350	1811479.001950	246111	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7605 COOLGROVE	6/22/2010	6522636.872680	6522636.872680	1810413.845850	246111	1032	sf	64	cf
Infiltration BMP	Existing	10210 CORD	2/12/2009	6528662.670970	6528662.670970	1801499.064930	245126	1032	sf	64	cf
Infiltration BMP	Existing	7706 COREY	6/22/2010	6515304.522120	6515304.522120	1798247.325380	246079	1032	sf	64	cf
Infiltration BMP	Existing	11708 CORRIGAN	5/30/2006	6523410.919990	6523410.919990	1796690.721900	245114	1032	sf	64	cf
Infiltration BMP	Existing	13227 CORRIGAN	4/11/2006	6523118.258510	6523118.258510	1789898.574120	245114	1032	sf	64	cf
Infiltration BMP	Existing	10809 CROSSDALE	1/30/2006	6532012.269030	6532012.269030	1798722.436870	245122	1032	sf	64	cf
Infiltration BMP	Existing	7803 DACOSTA	1/1/2006	6521705.534400	6521705.534400	1807011.928190	246106	1032	sf	64	cf
Infiltration BMP	Existing	7808 DACOSTA	3/29/2007	6521675.640660	6521675.640660	1806840.332210	246106	1032	sf	64	cf
Infiltration BMP	Existing	7826 DACOSTA	3/23/2007	6521825.889640	6521825.889640	1806744.301550	246106	1032	sf	64	cf
Infiltration BMP	Existing	8064 DACOSTA	1/6/2009	6523365.354910	6523365.354910	1805913.806160	246103	1032	sf	64	cf
Infiltration BMP	Existing	9242 DALEWOOD	5/17/2007	6532339.520890	6532339.520890	1804239.830010	245127	1032	sf	64	cf
Infiltration BMP	Existing	7044 DE PALMA	1/30/2006	6513058.006240	6513058.006240	1802286.102090	246100	1032	sf	64	cf
Infiltration BMP	Existing	7956 DE PALMA	7/28/2005	6517915.235930	6517915.235930	1799223.139650	246077	1032	sf	64	cf
Infiltration BMP	Existing	8232 DE PALMA	12/10/2008	6519342.730110	6519342.730110	1798392.424410	245115	1032	sf	64	cf
Infiltration BMP	Existing	13134 DEMING	2/6/2007	6518053.947000	6518053.947000	1789691.993030	245115	1032	sf	64	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	13240 DEMING	8/12/2005	6518068.820530	6518068.820530	1789032.682680	245115	1032	sf	64	cf
Infiltration BMP	Existing	13415 DEMPSTER	1/1/2007	6516194.546390	6516194.546390	1789419.790430	245524	1032	sf	64	cf
Infiltration BMP	Existing	13434 DEMPSTER	1/12/2006	6516258.965410	6516258.965410	1789155.039770	245524	1032	sf	64	cf
Infiltration BMP	Existing	13452 DEMPSTER	9/20/2005	6516159.819690	6516159.819690	1788979.483200	245524	1032	sf	64	cf
Infiltration BMP	Existing	7324 DINSDALE	6/21/2010	6518936.024560	6518936.024560	1807958.155410	246106	1032	sf	64	cf
Infiltration BMP	Existing	8352 DINSDALE	12/19/2005	6524191.795240	6524191.795240	1804722.231880	246103	1032	sf	64	cf
Infiltration BMP	Existing	9325 DINSDALE	7/3/2007	6528635.640220	6528635.640220	1802187.000380	245125	1032	sf	64	cf
Infiltration BMP	Existing	9812 DOLAN	1/10/2007	6524918.033470	6524918.033470	1805427.859430	246103	1032	sf	64	cf
Infiltration BMP	Existing	10410 DOLAN	9/19/2007	6523686.660150	6523686.660150	1803351.652190	245119	1032	sf	64	cf
Infiltration BMP	Existing	12522 DOLAN	12/9/2005	6518109.498100	6518109.498100	1794046.260040	245115	1032	sf	64	cf
Infiltration BMP	Existing	12634 DOLAN	4/11/2006	6517527.198260	6517527.198260	1793053.966010	245115	1032	sf	64	cf
Infiltration BMP	Existing	12712 DOLAN	4/27/2005	6517393.756980	6517393.756980	1792842.640770	245115	1032	sf	64	cf
Infiltration BMP	Existing	8740 DONOVAN	11/2/2006	6520467.711390	6520467.711390	1793463.175520	245115	1032	sf	64	cf
Infiltration BMP	Existing	6408 DOS RIOS	3/7/2007	6523246.583700	6523246.583700	1811462.058000	246111	1032	sf	64	cf
Infiltration BMP	Existing	6420 DOS RIOS	7/14/2008	6523082.430580	6523082.430580	1811381.024700	246111	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	6449 DOS RIOS	8/23/2005	6522675.424950	6522675.424950	1811505.638050	246111	1032	sf	64	cf
Infiltration BMP	Existing	6481 DOS RIOS	8/8/2007	6522296.417970	6522296.417970	1811546.494500	246111	1032	sf	64	cf
Infiltration BMP	Existing	9532 DOWNEY	9/21/2007	6524828.225510	6524828.225510	1806555.186060	246103	1032	sf	64	cf
Infiltration BMP	Existing	12115 DOWNEY	8/12/2005	6518801.058860	6518801.058860	1796628.276370	245115	1032	sf	64	cf
Infiltration BMP	Existing	12116 DOWNEY	7/24/2008	6518985.048760	6518985.048760	1796501.621880	245115	1032	sf	64	cf
Infiltration BMP	Existing	12545 DOWNEY	7/7/2005	6517126.997680	6517126.997680	1794204.833310	246077	1032	sf	64	cf
Infiltration BMP	Existing	13620 DOWNEY	10/24/2007	6515777.167020	6515777.167020	1788934.803130	245524	1032	sf	64	cf
Infiltration BMP	Existing	9756 DOWNEY SANFORD BRIDGE	11/6/2008	6530232.905320	6530232.905320	1802732.275270	245125	1032	sf	64	cf
Infiltration BMP	Existing	12109 DUNROBIN	5/27/2008	6524849.554990	6524849.554990	1794742.565720	245114	1032	sf	64	cf
Infiltration BMP	Existing	12602 DUNROBIN	4/21/2008	6525045.021790	6525045.021790	1792096.938130	245114	1032	sf	64	cf
Infiltration BMP	Existing	13118 DUNROBIN	8/1/2008	6525045.611060	6525045.611060	1790357.500340	245114	1032	sf	64	cf
Infiltration BMP	Existing	13447 EARNSHAW	3/4/2005	6516486.580000	6516486.580000	1788881.960000	245524	1032	sf	64	cf
Infiltration BMP	Existing	12246 EASTBROOK	7/3/2007	6525290.855020	6525290.855020	1793729.113600	245114	1032	sf	64	cf
Infiltration BMP	Existing	13102 EASTBROOK	5/30/2006	6525376.065000	6525376.065000	1790509.718450	245114	1032	sf	64	cf
Infiltration BMP	Existing	13207 EASTBROOK	1/1/2006	6525181.215010	6525181.215010	1790147.343800	245114	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9010 EGLISE	6/22/2010	6530616.481070	6530616.481070	1805612.930940	245127	1032	sf	64	cf
Infiltration BMP	Existing	9124 EGLISE	1/1/2006	6530099.347460	6530099.347460	1804464.036140	245125	1032	sf	64	cf
Infiltration BMP	Existing	10228 EGLISE	6/16/2008	6528317.527320	6528317.527320	1801552.496190	245126	1032	sf	64	cf
Infiltration BMP	Existing	8432 EUCALYPTUS	6/21/2010	6518375.883890	6518375.883890	1794450.252220	245115	1032	sf	64	cf
Infiltration BMP	Existing	8451 EUCALYPTUS	11/5/2008	6518648.903650	6518648.903650	1794509.449160	245115	1032	sf	64	cf
Infiltration BMP	Existing	8449 EVEREST	9/20/2006	6518402.636450	6518402.636450	1794253.840980	245115	1032	sf	64	cf
Infiltration BMP	Existing	9036 FARM	1/1/2005	6525791.032450	6525791.032450	1801568.335890	245119	1032	sf	64	cf
Infiltration BMP	Existing	9068 FARM	1/1/2005	6526062.157630	6526062.157630	1801402.977290	245119	1032	sf	64	cf
Infiltration BMP	Existing	8334 FIFTH	6/24/2005	6522409.331110	6522409.331110	1801742.536430	245114	1032	sf	64	cf
Infiltration BMP	Existing	8540 FIFTH	1/1/2005	6523591.182480	6523591.182480	1801021.450470	245114	1032	sf	64	cf
Infiltration BMP	Existing	7238 FLORENCE	11/14/2005	6518231.298960	6518231.298960	1807648.949310	246104	1032	sf	64	cf
Infiltration BMP	Existing	8324 FONTANA	1/1/2006	6519936.868340	6519936.868340	1797701.691440	245115	1032	sf	64	cf
Infiltration BMP	Existing	7322 FOSTER BRIDGE	6/18/2010	6520302.817760	6520302.817760	1810322.849060	246111	1032	sf	64	cf
Infiltration BMP	Existing	7441 FOSTORIA	10/25/2005	6517764.674110	6517764.674110	1804520.953030	246102	1032	sf	64	cf
Infiltration BMP	Existing	7520 FOSTORIA	1/20/2006	6517974.460950	6517974.460950	1804167.759820	246102	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7639 FOSTORIA	7/27/2007	6518691.469740	6518691.469740	1803918.676960	246102	1032	sf	64	cf
Infiltration BMP	Existing	7915 FOURTH	5/29/2007	6519890.537430	6519890.537430	1803170.158590	246102	1032	sf	64	cf
Infiltration BMP	Existing	7922 FOURTH	1/1/2005	6519878.319950	6519878.319950	1802959.531390	246102	1032	sf	64	cf
Infiltration BMP	Existing	7411 FOURTH PL	9/10/2007	6517375.746060	6517375.746060	1804408.156270	246102	1032	sf	64	cf
Infiltration BMP	Existing	7519 FOURTH PL	6/23/2005	6517868.488420	6517868.488420	1804088.501010	246102	1032	sf	64	cf
Infiltration BMP	Existing	7329 GAINFORD	9/20/2007	6519599.973200	6519599.973200	1808409.397520	246111	1032	sf	64	cf
Infiltration BMP	Existing	7725 GAINFORD	6/21/2010	6521357.607460	6521357.607460	1807543.814610	246106	1032	sf	64	cf
Infiltration BMP	Existing	7735 GAINFORD	12/15/2006	6521461.236080	6521461.236080	1807480.220630	246106	1032	sf	64	cf
Infiltration BMP	Existing	7771 GAINFORD	12/3/2007	6521758.954890	6521758.954890	1807297.289390	246106	1032	sf	64	cf
Infiltration BMP	Existing	8353 GAINFORD	1/4/2007	6524689.963810	6524689.963810	1805534.024270	246103	1032	sf	64	cf
Infiltration BMP	Existing	8553 GAINFORD	4/7/2008	6525875.670020	6525875.670020	1804802.065800	245125	1032	sf	64	cf
Infiltration BMP	Existing	9114 GAINFORD	6/23/2010	6527375.967240	6527375.967240	1803418.253090	245125	1032	sf	64	cf
Infiltration BMP	Existing	8319 GALLATIN	6/23/2010	6525634.222480	6525634.222480	1807445.394810	246103	1032	sf	64	cf
Infiltration BMP	Existing	9069 GALLATIN	3/1/2005	6527846.830170	6527846.830170	1805432.059660	245125	1032	sf	64	cf
Infiltration BMP	Existing	9243 GALLATIN	6/19/2006	6528915.102070	6528915.102070	1804595.777040	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8408 GALT	6/18/2010	6520848.594160	6520848.594160	1798562.646220	245114	1032	sf	64	cf
Infiltration BMP	Existing	8435 GALT	12/27/2005	6521154.530230	6521154.530230	1798569.782020	245114	1032	sf	64	cf
Infiltration BMP	Existing	9119 GARNISH	6/22/2010	6529517.516530	6529517.516530	1805110.082900	245125	1032	sf	64	cf
Infiltration BMP	Existing	9136 GARNISH	2/5/2007	6529607.954040	6529607.954040	1804869.027300	245125	1032	sf	64	cf
Infiltration BMP	Existing	9024 GAYMONT	8/28/2007	6523451.624790	6523451.624790	1809501.434890	246111	1032	sf	64	cf
Infiltration BMP	Existing	12636 GLYNN	10/25/2005	6517337.921050	6517337.921050	1793251.757000	245524	1032	sf	64	cf
Infiltration BMP	Existing	12751 GLYNN	1/1/2005	6516780.406550	6516780.406550	1792749.927780	245524	1032	sf	64	cf
Infiltration BMP	Existing	12755 GLYNN	6/18/2010	6516753.778610	6516753.778610	1792707.557200	245524	1032	sf	64	cf
Infiltration BMP	Existing	12912 GLYNN	1/1/2005	6516567.905690	6516567.905690	1791996.175300	245524	1032	sf	64	cf
Infiltration BMP	Existing	8731 GUATEMALA	10/30/2008	6523507.693960	6523507.693960	1811098.218950	246106	1032	sf	64	cf
Infiltration BMP	Existing	9203 GUATEMALA	3/23/2006	6521893.308510	6521893.308510	1810154.570390	246111	1032	sf	64	cf
Infiltration BMP	Existing	9959 GUATEMALA	6/23/2010	6518699.649950	6518699.649950	1808234.818150	246111	1032	sf	64	cf
Infiltration BMP	Existing	13537 GUNDERSON	3/3/2008	6517350.406160	6517350.406160	1787757.556610	245524	1032	sf	64	cf
Infiltration BMP	Existing	13547 GUNDERSON	6/19/2006	6517298.502270	6517298.502270	1787667.099660	245524	1032	sf	64	cf
Infiltration BMP	Existing	11538 GURLEY	5/3/2005	6520211.328840	6520211.328840	1799382.602480	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11935 GURLEY	6/18/2010	6519051.777570	6519051.777570	1797582.114550	245115	1032	sf	64	cf
Infiltration BMP	Existing	12019 GURLEY	6/18/2010	6518869.145640	6518869.145640	1797295.091770	245115	1032	sf	64	cf
Infiltration BMP	Existing	12052 GURLEY	1/10/2006	6518841.793230	6518841.793230	1796925.916150	245115	1032	sf	64	cf
Infiltration BMP	Existing	12117 GURLEY	1/1/2007	6518497.250390	6518497.250390	1796711.283370	245115	1032	sf	64	cf
Infiltration BMP	Existing	9117 HALEDON	7/31/2006	6528761.573350	6528761.573350	1805801.190120	245125	1032	sf	64	cf
Infiltration BMP	Existing	10341 HALEDON	5/1/2006	6526657.457480	6526657.457480	1801653.926760	245119	1032	sf	64	cf
Infiltration BMP	Existing	10349 HALEDON	2/8/2005	6526618.690140	6526618.690140	1801591.635520	245119	1032	sf	64	cf
Infiltration BMP	Existing	10425 HALEDON	4/14/2005	6526424.760130	6526424.760130	1801280.406410	245119	1032	sf	64	cf
Infiltration BMP	Existing	10439 HALEDON	9/30/2005	6526346.747570	6526346.747570	1801155.573630	245119	1032	sf	64	cf
Infiltration BMP	Existing	10525 HALEDON	1/28/2005	6526113.410380	6526113.410380	1800804.505840	245119	1032	sf	64	cf
Infiltration BMP	Existing	10550 HALEDON	12/19/2005	6526112.578950	6526112.578950	1800485.376650	245119	1032	sf	64	cf
Infiltration BMP	Existing	9049 HALL ROAD	4/30/2008	6523684.587500	6523684.587500	1797586.831540	245114	1032	sf	64	cf
Infiltration BMP	Existing	7215 HANNON	12/19/2008	6521498.261440	6521498.261440	1811442.204100	246111	1032	sf	64	cf
Infiltration BMP	Existing	13005 HANWELL	2/11/2009	6519590.457150	6519590.457150	1789492.134120	245115	1032	sf	64	cf
Infiltration BMP	Existing	9022 HASTY	10/13/2005	6531232.650260	6531232.650260	1805433.916070	245127	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9205 HASTY	6/22/2010	6530848.690890	6530848.690890	1804978.371330	245127	1032	sf	64	cf
Infiltration BMP	Existing	9206 HASTY	1/1/2005	6531000.691980	6531000.691980	1804885.411940	245127	1032	sf	64	cf
Infiltration BMP	Existing	9241 HASTY	1/1/2006	6530719.487200	6530719.487200	1804649.180550	245127	1032	sf	64	cf
Infiltration BMP	Existing	7736 HONDO	2/8/2005	6514830.078530	6514830.078530	1796886.774430	246079	1032	sf	64	cf
Infiltration BMP	Existing	7753 HONDO	1/24/2007	6515005.269000	6515005.269000	1796951.957630	246079	1032	sf	64	cf
Infiltration BMP	Existing	7803 HONDO	10/11/2005	6515156.509020	6515156.509020	1796903.351830	246079	1032	sf	64	cf
Infiltration BMP	Existing	7808 HONDO	6/22/2010	6515109.805390	6515109.805390	1796717.393590	246079	1032	sf	64	cf
Infiltration BMP	Existing	7814 HONDO	7/25/2008	6515161.093050	6515161.093050	1796686.379320	246079	1032	sf	64	cf
Infiltration BMP	Existing	7920 HONDO	8/21/2006	6515777.018460	6515777.018460	1796313.217950	246079	1032	sf	64	cf
Infiltration BMP	Existing	7932 HONDO	1/1/2006	6515879.568480	6515879.568480	1796251.099580	246079	1032	sf	64	cf
Infiltration BMP	Existing	9008 HORLEY	7/19/2007	6523080.991430	6523080.991430	1809910.740800	246111	1032	sf	64	cf
Infiltration BMP	Existing	9838 HORLEY	7/3/2008	6521155.061500	6521155.061500	1807271.870840	246106	1032	sf	64	cf
Infiltration BMP	Existing	12307 HORLEY	1/1/2005	6514989.782150	6514989.782150	1797487.116040	246079	1032	sf	64	cf
Infiltration BMP	Existing	11427 HORTON	11/23/2005	6517266.456490	6517266.456490	1802136.009270	246079	1032	sf	64	cf
Infiltration BMP	Existing	11553 HORTON	4/21/2005	6516872.120940	6516872.120940	1801498.085040	246079	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11708 HORTON	10/25/2005	6516455.941870	6516455.941870	1800783.417100	246079	1032	sf	64	cf
Infiltration BMP	Existing	12646 IBBETSON	5/6/2005	6526008.756240	6526008.756240	1791650.535870	245114	1032	sf	64	cf
Infiltration BMP	Existing	8217 IMPERIAL	1/5/2009	6516889.628840	6516889.628840	1794092.786860	246077	1032	sf	64	cf
Infiltration BMP	Existing	7320 IRWINGROVE	1/1/2006	6518255.802480	6518255.802480	1807084.876440	246102	1032	sf	64	cf
Infiltration BMP	Existing	7710 IRWINGROVE	12/11/2007	6520151.425540	6520151.425540	1805902.138310	246102	1032	sf	64	cf
Infiltration BMP	Existing	12208 IZETTA	1/1/2006	6524718.745010	6524718.745010	1794118.344290	245114	1032	sf	64	cf
Infiltration BMP	Existing	12252 IZETTA	7/10/2008	6524718.900100	6524718.900100	1793666.382200	245114	1032	sf	64	cf
Infiltration BMP	Existing	12631 IZETTA	8/28/2007	6524602.625920	6524602.625920	1791809.267080	245114	1032	sf	64	cf
Infiltration BMP	Existing	10228 JULIUS	5/20/2008	6519748.327880	6519748.327880	1806603.074440	246102	1032	sf	64	cf
Infiltration BMP	Existing	10234 JULIUS	6/22/2010	6519723.348540	6519723.348540	1806551.787860	246102	1032	sf	64	cf
Infiltration BMP	Existing	11848 JULIUS	6/23/2010	6515875.825190	6515875.825190	1800351.825190	246079	1032	sf	64	cf
Infiltration BMP	Existing	11859 JULIUS	8/23/2005	6515676.490910	6515676.490910	1800355.137490	246079	1032	sf	64	cf
Infiltration BMP	Existing	11865 JULIUS	11/13/2006	6515650.173870	6515650.173870	1800309.916770	246079	1032	sf	64	cf
Infiltration BMP	Existing	12129 JULIUS	9/29/2005	6514728.334670	6514728.334670	1798846.683770	246079	1032	sf	64	cf
Infiltration BMP	Existing	9263 KLINEDALE	6/21/2010	6531573.525950	6531573.525950	1804517.918460	245127	1032	sf	64	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9205 LA REINA	11/27/2006	6525690.537020	6525690.537020	1808255.600740	246103	1032	sf	64	cf
Infiltration BMP	Existing	9251 LA REINA	8/10/2007	6525325.121400	6525325.121400	1807968.316200	246103	1032	sf	64	cf
Infiltration BMP	Existing	9260 LA REINA	6/14/2007	6525343.506110	6525343.506110	1807785.350080	246103	1032	sf	64	cf
Infiltration BMP	Existing	9633 LA REINA	9/24/2007	6524180.010720	6524180.010720	1806496.849820	246103	1032	sf	64	cf
Infiltration BMP	Existing	10026 LA REINA	1/1/2005	6523542.730590	6523542.730590	1805175.247470	246103	1032	sf	64	cf
Infiltration BMP	Existing	10219 LA REINA	5/25/2006	6522978.941790	6522978.941790	1804778.433210	246103	1032	sf	64	cf
Infiltration BMP	Existing	8346 LA VILLA	8/29/2005	6522426.709000	6522426.709000	1801414.465390	245114	1032	sf	64	cf
Infiltration BMP	Existing	9524 LA VILLA	9/27/2005	6527942.492070	6527942.492070	1797972.664540	245119	1032	sf	64	cf
Infiltration BMP	Existing	14305 LAKEWOOD	1/1/2006	6518183.322800	6518183.322800	1787270.059950	245524	1032	sf	64	cf
Infiltration BMP	Existing	8218 LANKIN	3/28/2006	6516908.705740	6516908.705740	1794755.893760	246077	1032	sf	64	cf
Infiltration BMP	Existing	13407 LAURELDALE	10/25/2005	6516128.982330	6516128.982330	1789557.891060	245524	1032	sf	64	cf
Infiltration BMP	Existing	11034 LE FLOSS	3/21/2008	6531318.633350	6531318.633350	1797718.334360	245124	1032	sf	64	cf
Infiltration BMP	Existing	9013 LEMORAN	3/16/2006	6529860.990680	6529860.990680	1806212.694780	245125	1032	sf	64	cf
Infiltration BMP	Existing	10036 LESTERFORD	1/11/2006	6530911.516090	6530911.516090	1801094.347740	245125	1032	sf	64	cf
Infiltration BMP	Existing	8355 LEXINGTON	6/15/2005	6523932.891700	6523932.891700	1804236.927600	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7432 LUBEC	7/8/2005	6519806.105180	6519806.105180	1808430.037290	246111	1032	sf	64	cf
Infiltration BMP	Existing	9318 LUBEC	1/1/2006	6528946.832250	6528946.832250	1803071.454980	245125	1032	sf	64	cf
Infiltration BMP	Existing	7341 LUXOR	9/30/2005	6515165.173860	6515165.173860	1801559.243950	246079	1032	sf	64	cf
Infiltration BMP	Existing	7743 LUXOR	8/18/2006	6517197.964320	6517197.964320	1800308.569440	246079	1032	sf	64	cf
Infiltration BMP	Existing	7809 LUXOR	1/1/2006	6517239.593210	6517239.593210	1799986.863830	246079	1032	sf	64	cf
Infiltration BMP	Existing	7982 LUXOR	7/3/2007	6518306.219270	6518306.219270	1799333.376300	246077	1032	sf	64	cf
Infiltration BMP	Existing	8509 LUXOR	12/31/2008	6521183.510000	6521183.510000	1797885.775000	245114	1032	sf	64	cf
Infiltration BMP	Existing	11505 MAC GOVERN	5/1/2006	6519990.708800	6519990.708800	1799977.759420	245115	1032	sf	64	cf
Infiltration BMP	Existing	11527 MAC GOVERN	11/19/2007	6519889.562820	6519889.562820	1799806.361750	245115	1032	sf	64	cf
Infiltration BMP	Existing	8518 MANATEE	4/27/2005	6521541.591450	6521541.591450	1798287.495050	245114	1032	sf	64	cf
Infiltration BMP	Existing	12306 MARBEL	12/29/2005	6520780.434840	6520780.434840	1794110.003960	245115	1032	sf	64	cf
Infiltration BMP	Existing	12322 MARBEL	8/24/2005	6520697.258530	6520697.258530	1793976.926170	245115	1032	sf	64	cf
Infiltration BMP	Existing	10423 MATTOCK	11/21/2008	6528946.576280	6528946.576280	1799798.739650	245126	1032	sf	64	cf
Infiltration BMP	Existing	10527 MATTOCK	1/11/2007	6528618.163260	6528618.163260	1799183.483330	245126	1032	sf	64	cf
Infiltration BMP	Existing	8602 MEADOW	2/28/2008	6519007.155950	6519007.155950	1793158.643900	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8606 MEADOW	10/26/2006	6519050.372960	6519050.372960	1793129.529230	245115	1032	sf	64	cf
Infiltration BMP	Existing	8739 MEADOW	12/17/2007	6520051.313480	6520051.313480	1792689.390880	245115	1032	sf	64	cf
Infiltration BMP	Existing	9106 MELDAR	4/23/2007	6526980.004600	6526980.004600	1807421.893550	246103	1032	sf	64	cf
Infiltration BMP	Existing	7819 MELVA	1/1/2005	6515811.952890	6515811.952890	1797638.263460	246079	1032	sf	64	cf
Infiltration BMP	Existing	8609 MELVA	4/6/2007	6520260.479750	6520260.479750	1795043.474460	245115	1032	sf	64	cf
Infiltration BMP	Existing	9558 METRO	4/3/2008	6531485.802060	6531485.802060	1804114.777900	245127	1032	sf	64	cf
Infiltration BMP	Existing	11711 MITLA	7/13/2005	6513453.724060	6513453.724060	1802912.278240	246100	1032	sf	64	cf
Infiltration BMP	Existing	11819 MORNING	6/21/2010	6517496.555960	6517496.555960	1799723.226450	246077	1032	sf	64	cf
Infiltration BMP	Existing	12070 MORNING	9/13/2006	6516788.931410	6516788.931410	1797957.975300	246079	1032	sf	64	cf
Infiltration BMP	Existing	8637 MORY	1/1/2005	6520217.929830	6520217.929830	1794453.857040	245115	1032	sf	64	cf
Infiltration BMP	Existing	10903 MYRTLE	10/25/2005	6520809.999180	6520809.999180	1802308.735020	246103	1032	sf	64	cf
Infiltration BMP	Existing	8208 NADA	6/29/2005	6518679.653960	6518679.653960	1797804.552950	245115	1032	sf	64	cf
Infiltration BMP	Existing	8249 NADA	2/12/2008	6519111.183860	6519111.183860	1797730.010570	245115	1032	sf	64	cf
Infiltration BMP	Existing	9458 NANCE	6/20/2005	6526752.832360	6526752.832360	1796717.105850	245119	1032	sf	64	cf
Infiltration BMP	Existing	10609 NEDRA	6/3/2005	6522752.614640	6522752.614640	1802538.434710	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10850 NEWVILLE	7/3/2007	6528159.933410	6528159.933410	1797635.549950	245119	1032	sf	64	cf
Infiltration BMP	Existing	7510 NOREN	5/23/2006	6520838.348300	6520838.348300	1809064.222230	246111	1032	sf	64	cf
Infiltration BMP	Existing	11720 NORLAIN	9/22/2006	6515696.110230	6515696.110230	1801264.632180	246079	1032	sf	64	cf
Infiltration BMP	Existing	12336 NORLAIN	8/1/2007	6513658.838460	6513658.838460	1797875.767390	246079	1032	sf	64	cf
Infiltration BMP	Existing	11628 OLD RIVER SCHOOL	1/1/2006	6515797.838400	6515797.838400	1801876.521840	246079	1032	sf	64	cf
Infiltration BMP	Existing	8521 ORANGE	3/9/2007	6519427.831130	6519427.831130	1794911.101980	245115	1032	sf	64	cf
Infiltration BMP	Existing	9255 ORIZABA	2/15/2006	6525108.451310	6525108.451310	1808168.208600	246103	1032	sf	64	cf
Infiltration BMP	Existing	9719 ORIZABA	8/8/2007	6523780.810110	6523780.810110	1806377.528150	246103	1032	sf	64	cf
Infiltration BMP	Existing	12615 ORIZABA	1/27/2006	6516062.877730	6516062.877730	1794206.618320	246077	1032	sf	64	cf
Infiltration BMP	Existing	8511 OTTO	4/12/2005	6525130.700850	6525130.700850	1804530.864040	245125	1032	sf	64	cf
Infiltration BMP	Existing	9933 PANGBORN	6/29/2006	6530067.434760	6530067.434760	1801915.181390	245125	1032	sf	64	cf
Infiltration BMP	Existing	10202 PANGBORN	1/1/2006	6529571.236640	6529571.236640	1801045.668670	245125	1032	sf	64	cf
Infiltration BMP	Existing	11009 PANGBORN	1/31/2007	6527339.080190	6527339.080190	1797691.116980	245119	1032	sf	64	cf
Infiltration BMP	Existing	9530 PARAMOUNT	7/14/2005	6523601.663290	6523601.663290	1807461.311510	246103	1032	sf	64	cf
Infiltration BMP	Existing	9624 PARAMOUNT	5/9/2005	6523328.526550	6523328.526550	1807031.980170	246103	1032	sf	64	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8603 PARROT	3/14/2006	6526080.240790	6526080.240790	1809719.746830	246106	1032	sf	64	cf
Infiltration BMP	Existing	9625 PARROT	1/1/2005	6523451.735380	6523451.735380	1806960.011690	246103	1032	sf	64	cf
Infiltration BMP	Existing	9708 PARROT	6/29/2006	6523491.321500	6523491.321500	1806678.668660	246103	1032	sf	64	cf
Infiltration BMP	Existing	12045 PARROT	6/22/2010	6517861.439330	6517861.439330	1797868.798060	246077	1032	sf	64	cf
Infiltration BMP	Existing	12751 PARROT	12/14/2006	6515222.728500	6515222.728500	1793830.999240	246077	1032	sf	64	cf
Infiltration BMP	Existing	7130 PELLET	1/27/2005	6515276.387650	6515276.387650	1804845.311440	246104	1032	sf	64	cf
Infiltration BMP	Existing	7323 PELLET	1/1/2005	6516571.171210	6516571.171210	1804327.110650	246104	1032	sf	64	cf
Infiltration BMP	Existing	7354 PELLET	1/1/2006	6516665.448760	6516665.448760	1803945.359790	246102	1032	sf	64	cf
Infiltration BMP	Existing	7861 PHLOX	9/17/2007	6518688.116640	6518688.116640	1801430.417420	246079	1032	sf	64	cf
Infiltration BMP	Existing	10620 PICO VISTA	3/7/2007	6529428.403390	6529428.403390	1798283.402620	245126	1032	sf	64	cf
Infiltration BMP	Existing	10635 PICO VISTA	8/28/2007	6529197.816790	6529197.816790	1798270.093070	245126	1032	sf	64	cf
Infiltration BMP	Existing	7530 PIVOT	11/23/2005	6516899.016370	6516899.016370	1802660.318910	246079	1032	sf	64	cf
Infiltration BMP	Existing	7709 PIVOT	10/11/2005	6517859.569570	6517859.569570	1802212.124870	246079	1032	sf	64	cf
Infiltration BMP	Existing	7753 PIVOT	6/14/2005	6518241.212950	6518241.212950	1801966.921690	246079	1032	sf	64	cf
Infiltration BMP	Existing	11974 POMERING	6/18/2010	6515116.938670	6515116.938670	1799645.797070	246079	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8732 PRICHARD ST	1/12/2009	6516786.371080	6516786.371080	1788406.289900	245524	1032	sf	64	cf
Infiltration BMP	Existing	8734 PRICHARD ST	1/12/2009	6516831.574810	6516831.574810	1788380.860770	245524	1032	sf	64	cf
Infiltration BMP	Existing	8738 PRICHARD ST	1/12/2009	6516876.454020	6516876.454020	1788355.597890	245524	1032	sf	64	cf
Infiltration BMP	Existing	8740 PRICHARD ST	1/12/2009	6516921.333860	6516921.333860	1788330.343610	245524	1032	sf	64	cf
Infiltration BMP	Existing	8240 PRISCILLA	9/13/2007	6515555.844810	6515555.844810	1791697.292180	246077	1032	sf	64	cf
Infiltration BMP	Existing	9044 PRISCILLA	8/18/2005	6519169.042140	6519169.042140	1790017.667840	245115	1032	sf	64	cf
Infiltration BMP	Existing	9060 PRISCILLA	6/21/2010	6519318.719160	6519318.719160	1790008.270400	245115	1032	sf	64	cf
Infiltration BMP	Existing	11448 PRUESS	1/1/2006	6518742.114860	6518742.114860	1801046.878700	246077	1032	sf	64	cf
Infiltration BMP	Existing	11609 PRUESS	11/16/2006	6518299.675980	6518299.675980	1800455.121300	246077	1032	sf	64	cf
Infiltration BMP	Existing	11619 PRUESS	6/10/2005	6518270.484730	6518270.484730	1800355.677990	246077	1032	sf	64	cf
Infiltration BMP	Existing	11708 PRUESS	1/18/2005	6518033.994760	6518033.994760	1799832.073440	246077	1032	sf	64	cf
Infiltration BMP	Existing	8121 PURITAN	6/5/2006	6515245.448070	6515245.448070	1792698.037730	246077	1032	sf	64	cf
Infiltration BMP	Existing	7707 QUILL	6/1/2007	6514508.683200	6514508.683200	1796937.770200	246079	1032	sf	64	cf
Infiltration BMP	Existing	8108 QUOIT	6/5/2008	6516594.034560	6516594.034560	1795288.918170	246077	1032	sf	64	cf
Infiltration BMP	Existing	9109 RAVILLER	2/6/2007	6527953.464140	6527953.464140	1804924.402110	245125	1032	sf	64	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9367 RAVILLER	1/1/2006	6529435.914270	6529435.914270	1803746.913820	245125	1032	sf	64	cf
Infiltration BMP	Existing	9728 RICHEON	6/18/2010	6521201.804800	6521201.804800	1807962.626360	246106	1032	sf	64	cf
Infiltration BMP	Existing	12217 RICHEON	1/1/2005	6514937.033870	6514937.033870	1797986.477150	246079	1032	sf	64	cf
Infiltration BMP	Existing	12336 RICHEON	1/10/2007	6514721.816510	6514721.816510	1797298.695230	246079	1032	sf	64	cf
Infiltration BMP	Existing	12342 RICHEON	1/1/2005	6514694.932100	6514694.932100	1797256.523880	246079	1032	sf	64	cf
Infiltration BMP	Existing	12352 RICHEON	10/30/2008	6514641.834370	6514641.834370	1797172.034360	246079	1032	sf	64	cf
Infiltration BMP	Existing	11010 RIO HONDO	2/6/2006	6514511.989690	6514511.989690	1805412.886430	246104	1032	sf	64	cf
Infiltration BMP	Existing	8515 RIVES	2/6/2006	6524958.575190	6524958.575190	1811619.081610	246111	1032	sf	64	cf
Infiltration BMP	Existing	8546 RIVES	6/14/2010	6524726.063490	6524726.063490	1811337.492550	246106	1032	sf	64	cf
Infiltration BMP	Existing	11828 RIVES	1/1/2006	6517020.372820	6517020.372820	1799741.223590	246079	1032	sf	64	cf
Infiltration BMP	Existing	12056 RIVES	10/7/2005	6516252.097820	6516252.097820	1798479.870770	246079	1032	sf	64	cf
Infiltration BMP	Existing	12213 RIVES	6/7/2007	6515544.034920	6515544.034920	1797794.303030	246079	1032	sf	64	cf
Infiltration BMP	Existing	12301 RIVES	1/27/2006	6515274.134590	6515274.134590	1797373.251430	246079	1032	sf	64	cf
Infiltration BMP	Existing	12542 ROSE	6/18/2010	6520775.320830	6520775.320830	1792425.734550	245115	1032	sf	64	cf
Infiltration BMP	Existing	7444 RUNDELL	9/28/2006	6514195.392880	6514195.392880	1798477.819400	246079	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7458 RUNDELL	1/1/2006	6514328.036950	6514328.036950	1798395.544300	246079	1032	sf	64	cf
Infiltration BMP	Existing	8734 RUPP	5/24/2007	6518769.625610	6518769.625610	1791861.464390	245115	1032	sf	64	cf
Infiltration BMP	Existing	9206 SAMOLINE	9/20/2006	6524105.922670	6524105.922670	1808777.784250	246106	1032	sf	64	cf
Infiltration BMP	Existing	9363 SAMOLINE	2/12/2009	6523342.697990	6523342.697990	1808041.206940	246106	1032	sf	64	cf
Infiltration BMP	Existing	9630 SAMOLINE	1/1/2006	6523000.405210	6523000.405210	1807164.143360	246103	1032	sf	64	cf
Infiltration BMP	Existing	12041 SAMOLINE	6/23/2010	6516971.702030	6516971.702030	1798170.274910	246079	1032	sf	64	cf
Infiltration BMP	Existing	10629 SHELLEYFIELD	6/21/2010	6525284.582980	6525284.582980	1800508.363190	245119	1032	sf	64	cf
Infiltration BMP	Existing	9118 SHERIDELL	6/22/2010	6528683.896100	6528683.896100	1805941.227670	245125	1032	sf	64	cf
Infiltration BMP	Existing	10042 SIDEVIEW	6/21/2010	6529464.806690	6529464.806690	1801729.923910	245125	1032	sf	64	cf
Infiltration BMP	Existing	8349 SIXTH	6/21/2010	6522706.066860	6522706.066860	1802231.249170	245114	1032	sf	64	cf
Infiltration BMP	Existing	8363 SIXTH	6/18/2010	6522832.335670	6522832.335670	1802150.209500	245114	1032	sf	64	cf
Infiltration BMP	Existing	8532 SIXTH	6/23/2010	6523697.106090	6523697.106090	1801388.440460	245119	1032	sf	64	cf
Infiltration BMP	Existing	8514 SMALLWOOD	8/24/2006	6525167.581560	6525167.581560	1811228.866910	246106	1032	sf	64	cf
Infiltration BMP	Existing	12007 SMALLWOOD	1/1/2005	6516682.861570	6516682.861570	1798786.226940	246079	1032	sf	64	cf
Infiltration BMP	Existing	12936 SMALLWOOD	7/31/2006	6513688.714060	6513688.714060	1793540.982580	246077	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9235 SONGFEST	6/14/2006	6531351.855720	6531351.855720	1804709.858310	245127	1032	sf	64	cf
Infiltration BMP	Existing	7939 SPRINGER	10/6/2006	6516193.792450	6516193.792450	1796630.732180	246079	1032	sf	64	cf
Infiltration BMP	Existing	9306 STAMPS	6/21/2010	6525546.826990	6525546.826990	1807197.501010	246103	1032	sf	64	cf
Infiltration BMP	Existing	10446 STAMPS	1/1/2005	6523214.650320	6523214.650320	1803242.228000	246103	1032	sf	64	cf
Infiltration BMP	Existing	10536 STAMPS	6/1/2006	6522871.528480	6522871.528480	1802783.838380	246103	1032	sf	64	cf
Infiltration BMP	Existing	13219 STANBRIDGE	9/17/2007	6522806.618420	6522806.618420	1790045.381220	245114	1032	sf	64	cf
Infiltration BMP	Existing	8723 STEWART & GRAY	2/11/2009	6522100.372490	6522100.372490	1796545.507760	245114	1032	sf	64	cf
Infiltration BMP	Existing	9028 STOAKES	8/17/2007	6527221.634250	6527221.634250	1807951.198320	246103	1032	sf	64	cf
Infiltration BMP	Existing	7809 SUVA	1/13/2009	6522703.875430	6522703.875430	1808490.998990	246106	1032	sf	64	cf
Infiltration BMP	Existing	7827 SUVA	1/1/2006	6522849.829890	6522849.829890	1808368.560310	246106	1032	sf	64	cf
Infiltration BMP	Existing	8564 SUVA	1/1/2006	6526403.328390	6526403.328390	1805373.281490	245125	1032	sf	64	cf
Infiltration BMP	Existing	9943 TECUM	4/11/2008	6519363.349470	6519363.349470	1808047.658450	246111	1032	sf	64	cf
Infiltration BMP	Existing	9636 TELEGRAPH	5/8/2006	6531995.042290	6531995.042290	1804929.677680	245128	1032	sf	64	cf
Infiltration BMP	Existing	7968 THIRD	6/21/2005	6519929.169700	6519929.169700	1802199.016820	246102	1032	sf	64	cf
Infiltration BMP	Existing	9819 TRISTAN	10/7/2005	6526302.584780	6526302.584780	1804524.383680	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9253 TRUE	1/1/2005	6531891.994890	6531891.994890	1804462.821310	245127	1032	sf	64	cf
Infiltration BMP	Existing	8843 TWEEDY	9/12/2006	6524140.679400	6524140.679400	1809940.135780	246106	1032	sf	64	cf
Infiltration BMP	Existing	9012 TWEEDY	1/1/2005	6523977.735950	6523977.735950	1809300.273240	246106	1032	sf	64	cf
Infiltration BMP	Existing	9029 TWEEDY	1/1/2006	6523763.012330	6523763.012330	1809288.681880	246106	1032	sf	64	cf
Infiltration BMP	Existing	9612 TWEEDY	6/22/2010	6522847.016620	6522847.016620	1807449.028980	246106	1032	sf	64	cf
Infiltration BMP	Existing	9636 TWEEDY	10/11/2005	6522732.626430	6522732.626430	1807259.266340	246103	1032	sf	64	cf
Infiltration BMP	Existing	9714 TWEEDY	7/24/2006	6522647.237500	6522647.237500	1807116.822930	246103	1032	sf	64	cf
Infiltration BMP	Existing	9718 TWEEDY	9/22/2008	6522619.325230	6522619.325230	1807068.990310	246103	1032	sf	64	cf
Infiltration BMP	Existing	9730 TWEEDY	6/18/2010	6522565.360970	6522565.360970	1806976.155270	246103	1032	sf	64	cf
Infiltration BMP	Existing	13409 VERDURA	1/1/2006	6516484.588360	6516484.588360	1789346.159960	245524	1032	sf	64	cf
Infiltration BMP	Existing	8607 VIA AMORITA	1/19/2006	6524994.226680	6524994.226680	1803003.226520	245119	1032	sf	64	cf
Infiltration BMP	Existing	9356 VIA AMORITA	4/27/2005	6528170.664540	6528170.664540	1800850.979140	245126	1032	sf	64	cf
Infiltration BMP	Existing	7402 VIA RIO NIDO	2/10/2005	6518371.376580	6518371.376580	1806186.704160	246102	1032	sf	64	cf
Infiltration BMP	Existing	8303 VISTA DEL RIO	5/1/2007	6526003.249760	6526003.249760	1808077.011440	246103	1032	sf	64	cf
Infiltration BMP	Existing	8303 VISTA DEL ROSA	4/26/2007	6526763.242710	6526763.242710	1809159.607970	246106	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8351 VISTA DEL ROSA	12/19/2005	6527091.635630	6527091.635630	1808824.632820	246106	2063	sf	129	cf
Infiltration BMP	Existing	10265 VULTEE	4/24/2006	6525980.530560	6525980.530560	1802568.772980	245119	1032	sf	64	cf
Infiltration BMP	Existing	10339 VULTEE	6/18/2010	6525804.209560	6525804.209560	1802209.879860	245119	1032	sf	64	cf
Infiltration BMP	Existing	12709 VULTEE	3/9/2007	6519587.948000	6519587.948000	1791264.714830	245115	1032	sf	64	cf
Infiltration BMP	Existing	12725 WHITEWOOD	7/26/2005	6520341.668580	6520341.668580	1791179.460770	245115	1032	sf	64	cf
Infiltration BMP	Existing	9702 WILEY BURKE	6/21/2010	6521126.099980	6521126.099980	1808337.656530	246106	1032	sf	64	cf
Infiltration BMP	Existing	9750 WILEY BURKE	12/11/2006	6520822.729060	6520822.729060	1807995.132410	246106	1032	sf	64	cf
Infiltration BMP	Existing	9925 WILEY BURKE	1/10/2007	6520271.299840	6520271.299840	1807447.007570	246106	1032	sf	64	cf
Infiltration BMP	Existing	10540 WILEY BURKE	6/21/2007	6519089.326110	6519089.326110	1805048.306870	246102	1032	sf	64	cf
Infiltration BMP	Existing	10643 WOODRUFF	1/1/2006	6526887.322420	6526887.322420	1799535.375650	245119	1032	sf	64	cf
Infiltration BMP	Existing	7515 YANKEY	10/24/2006	6515115.108440	6515115.108440	1798924.389740	246079	1032	sf	64	cf
Infiltration BMP	Existing	10047 CASANES	1/1/2006	6529512.635540	6529512.635540	1801587.658100	245125	1032	sf	64	cf
Infiltration BMP	Existing	9220 CORD	1/1/2004	6530296.778820	6530296.778820	1804178.901350	245125	1032	sf	64	cf
Infiltration BMP	Existing	10040 MATTOCK	1/1/2006	6530247.042350	6530247.042350	1801200.601240	245125	1032	sf	64	cf
Infiltration BMP	Existing	10018 PANGBORN	1/1/2006	6530084.251260	6530084.251260	1801567.525640	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12053 PATTON	10/19/2004	6520642.037410	6520642.037410	1796050.004800	245115	1032	sf	64	cf
Infiltration BMP	Existing	12048 SAMOLINE	3/20/2007	6517021.712450	6517021.712450	1798014.455830	246079	2063	sf	129	cf
Infiltration BMP	Existing	7879 FLORENCE	2/14/2014	6521700.000000	6521700.000000	1806100.000000	246103	16504	sf	1032	cf
Infiltration BMP	Existing	9020 FIRESTONE	9/12/2008	6524113.023390	6524113.023390	1798572.164290	245119	70288	sf	4393	cf
Infiltration BMP	Existing	7910 FIRESTONE	6/28/2005	6519165.968790	6519165.968790	1801736.513180	246102	55686	sf	3480	cf
Infiltration BMP	Existing	7252 FIRESTONE	5/19/2004	6515489.000650	6515489.000650	1803082.633110	246079	36224	sf	2264	cf
Infiltration BMP	Existing	12256 PARAMOUNT	3/13/2006	6516813.225030	6516813.225030	1796497.685630	246077	34112	sf	2132	cf
Infiltration BMP	Existing	9462 FIRESTONE BL	2/14/2014	6526885.862260	6526885.862260	1797100.585140	245119	35437	sf	2215	cf
Infiltration BMP	Existing	8250 FIRESTONE BLVD	2/14/2014	6521000.000000	6521000.000000	1800300.000000	245115	59085	sf	3693	cf
Infiltration BMP	Existing	8018 TELEGRAPH	8/20/2004	6526800.000000	6526800.000000	1809400.000000	246106	35437	sf	2215	cf
Infiltration BMP	Existing	7447 FIRESTONE BLVD	7/9/2009	6516971.590923	6516971.590923	1803474.089243	246102	43124	sf	2192	cf
Infiltration BMP	Existing	9126 FLORENCE	4/25/2008	6526980.883730	6526980.883730	1802613.015890	245119	29248	sf	1828	cf
Infiltration BMP	Existing	11111 OLD RIVER SCHOOL	6/15/2004	6515500.000000	6515500.000000	1803800.000000	246102	27843	sf	1740	cf
Infiltration BMP	Existing	9634 WASHBURN	5/25/2004	6526574.558590	6526574.558590	1794738.334020	245118	35712	sf	2232	cf
Infiltration BMP	Existing	9475 FIRESTONE	9/20/2004	6527102.470060	6527102.470060	1797292.175990	245119	25078	sf	1567	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9125 IMPERIAL	9/17/2007	6520700.000000	6520700.000000	1792100.000000	245115	53104	sf	3319	cf
Infiltration BMP	Existing	11231 RIVES	4/25/2006	6518392.506170	6518392.506170	1802335.247680	246102	20250	sf	1266	cf
Infiltration BMP	Existing	7936 QUILL	8/23/2006	6515830.400000	6515830.400000	1795880.196930	246079	18984	sf	1187	cf
Infiltration BMP	Existing	8337 FONTANA	8/11/2005	6520206.194620	6520206.194620	1797870.434810	245114	36672	sf	2292	cf
Infiltration BMP	Existing	10225 LESTERFORD	6/22/2010	6530244.844140	6530244.844140	1800567.187010	245126	17718	sf	1107	cf
Infiltration BMP	Existing	7915 FLORENCE	8/11/2009	6522019.025220	6522019.025220	1805973.779210	246103	20192	sf	1262	cf
Infiltration BMP	Existing	11229 PARAMOUNT	3/16/2004	6519482.925030	6519482.925030	1801457.806750	246102	16453	sf	1028	cf
Infiltration BMP	Existing	8103 COLE	5/1/2007	6518213.448370	6518213.448370	1798049.118910	246077	0	sf	0	cf
Infiltration BMP	Existing	8722 BOYNE	7/1/2008	6521213.643060	6521213.643060	1795216.473800	245115	11390	sf	712	cf
Infiltration BMP	Existing	10612 LESTERFORD	6/14/2006	6529218.389270	6529218.389270	1798513.115960	245126	11390	sf	712	cf
Infiltration BMP	Existing	8444 LEXINGTON	4/24/2006	6524361.433930	6524361.433930	1803767.599820	246103	11390	sf	712	cf
Infiltration BMP	Existing	13221 BARLIN	10/10/2006	6516992.431610	6516992.431610	1789646.610200	245524	10125	sf	633	cf
Infiltration BMP	Existing	9611 GARNISH	6/7/2007	6529217.309540	6529217.309540	1803965.758960	245125	10125	sf	633	cf
Infiltration BMP	Existing	7118 PELLET	12/3/2008	6515184.074160	6515184.074160	1804905.113850	246104	10125	sf	633	cf
Infiltration BMP	Existing	9325 RIVES AM	2/14/2014	6522517.375370	6522517.375370	1808878.723180	246111	10125	sf	633	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9371 SUVA	3/13/2007	6529247.009310	6529247.009310	1803484.685240	245125	10125	sf	633	cf
Infiltration BMP	Existing	8556 FLORENCE	1/1/2006	6525137.675720	6525137.675720	1803770.147850	245125	8859	sf	554	cf
Infiltration BMP	Existing	9755 IMPERIAL	3/29/2006	6525700.000000	6525700.000000	1792200.000000	245114	8859	sf	554	cf
Infiltration BMP	Existing	10000 IMPERIAL	3/29/2006	6527246.839530	6527246.839530	1791706.604350	245118	8859	sf	554	cf
Infiltration BMP	Existing	10030 LESTERFORD	6/21/2010	6530953.991420	6530953.991420	1801165.004470	245125	8859	sf	554	cf
Infiltration BMP	Existing	7235 LUXOR	12/12/2005	6514593.326010	6514593.326010	1801941.887350	246079	8859	sf	554	cf
Infiltration BMP	Existing	8115 STEWART & GRAY	3/25/2009	6518648.406750	6518648.406750	1798495.150040	246077	11760	sf	735	cf
Infiltration BMP	Existing	9804 BROOKSHIRE	5/2/2007	6525737.765210	6525737.765210	1805415.750650	246103	7594	sf	475	cf
Infiltration BMP	Existing	7830 DANVERS	12/18/2008	6523967.248740	6523967.248740	1810379.348050	246106	7594	sf	475	cf
Infiltration BMP	Existing	8357 FLORENCE	11/29/2005	6524137.162990	6524137.162990	1804589.285090	246103	7594	sf	475	cf
Infiltration BMP	Existing	8562 FLORENCE	1/1/2006	6525210.620820	6525210.620820	1803736.004200	245125	7594	sf	475	cf
Infiltration BMP	Existing	10735 LAKEWOOD	1/19/2007	6524698.379320	6524698.379320	1800460.893140	245119	8640	sf	540	cf
Infiltration BMP	Existing	9732 ORIZABA	6/5/2008	6523842.356050	6523842.356050	1806158.297200	246103	7594	sf	475	cf
Infiltration BMP	Existing	12066 SAMOLINE	6/18/2010	6517119.562750	6517119.562750	1797806.070750	246079	7594	sf	475	cf
Infiltration BMP	Existing	7711 SECOND	6/21/2010	6518493.103400	6518493.103400	1802942.740750	246102	7594	sf	475	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9517 STOAKES	6/21/2010	6525287.319840	6525287.319840	1806612.266920	246103	7594	sf	475	cf
Infiltration BMP	Existing	12133 ANDERBERG	6/26/2009	6518010.879310	6518010.879310	1796818.463370	245115	6328	sf	396	cf
Infiltration BMP	Existing	9115 BROCK	6/21/2010	6524898.717190	6524898.717190	1808433.166330	246106	6328	sf	396	cf
Infiltration BMP	Existing	9541 CECILIA	6/23/2010	6528302.087900	6528302.087900	1798262.111790	245126	6328	sf	396	cf
Infiltration BMP	Existing	10243 CORD	11/4/2008	6528334.164460	6528334.164460	1801344.678940	245126	6328	sf	396	cf
Infiltration BMP	Existing	13108 CORNUTA	6/21/2010	6525701.475550	6525701.475550	1790449.882450	245113	6328	sf	396	cf
Infiltration BMP	Existing	8129 DACOSTA	8/5/2008	6523736.839560	6523736.839560	1805716.362640	246103	6328	sf	396	cf
Infiltration BMP	Existing	7247 DINWIDDIE	6/22/2010	6515896.418780	6515896.418780	1804170.223670	246104	6328	sf	396	cf
Infiltration BMP	Existing	12002A DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	6328	sf	396	cf
Infiltration BMP	Existing	12002C DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	6328	sf	396	cf
Infiltration BMP	Existing	8529 EUCALYPTUS	6/18/2010	6519136.171020	6519136.171020	1794210.333930	245115	6328	sf	396	cf
Infiltration BMP	Existing	9204 LA REINA	6/22/2010	6525799.255250	6525799.255250	1808110.827020	246103	6328	sf	396	cf
Infiltration BMP	Existing	9241 LUBEC	6/21/2010	6528410.398740	6528410.398740	1803633.947240	245125	6328	sf	396	cf
Infiltration BMP	Existing	10051 MATTOCK	9/25/2008	6530040.953970	6530040.953970	1801237.222590	245125	6328	sf	396	cf
Infiltration BMP	Existing	12273 PLANETT	6/21/2010	6518942.439290	6518942.439290	1795136.426680	245115	6328	sf	396	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9075 RAVILLER	4/9/2007	6527819.498980	6527819.498980	1805031.907810	245125	6328	sf	396	cf
Infiltration BMP	Existing	7149 ADWEN	5/31/2006	6514275.907390	6514275.907390	1803122.312290	246079	5062	sf	316	cf
Infiltration BMP	Existing	8703 ALAMEDA	9/14/2005	6520830.700880	6520830.700880	1795016.469260	245115	4594	sf	287	cf
Infiltration BMP	Existing	9242 APPLEBY	11/21/2008	6528866.478730	6528866.478730	1804798.824690	245125	5062	sf	316	cf
Infiltration BMP	Existing	9926 BELLDER	3/19/2007	6525715.329050	6525715.329050	1804487.716960	245125	5062	sf	316	cf
Infiltration BMP	Existing	11715 BELLFLOWER	6/15/2009	6523530.688010	6523530.688010	1796655.823230	245114	5062	sf	316	cf
Infiltration BMP	Existing	8019 BERGMAN	10/22/2008	6517711.829130	6517711.829130	1797726.503570	246077	5062	sf	316	cf
Infiltration BMP	Existing	8417 BIGBY	7/23/2007	6523908.146010	6523908.146010	1803525.055670	245119	5062	sf	316	cf
Infiltration BMP	Existing	10004 BIRCHDALE	1/23/2006	6525798.638290	6525798.638290	1803985.957400	245125	5062	sf	316	cf
Infiltration BMP	Existing	9951 BROOKSHIRE	6/18/2010	6525004.036100	6525004.036100	1804835.952720	246103	5062	sf	316	cf
Infiltration BMP	Existing	10927 BROOKSHIRE AV	2/14/2014	6522640.981090	6522640.981090	1800949.695110	245114	5062	sf	316	cf
Infiltration BMP	Existing	10304 CLANCEY	9/19/2008	6526762.243870	6526762.243870	1802017.295250	245119	5062	sf	316	cf
Infiltration BMP	Existing	7213 DINWIDDIE	6/21/2010	6515644.523280	6515644.523280	1804333.457340	246104	5062	sf	316	cf
Infiltration BMP	Existing	9245 DOWNEY	9/19/2007	6525582.317560	6525582.317560	1807792.114420	246103	5062	sf	316	cf
Infiltration BMP	Existing	12002B DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	5062	sf	316	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12002D DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	5062	sf	316	cf
Infiltration BMP	Existing	10250 EGLISE AV	2/14/2014	6528202.138900	6528202.138900	1801366.096440	245126	5062	sf	316	cf
Infiltration BMP	Existing	8719 ELMONT	6/18/2010	6526144.563940	6526144.563940	1809393.110180	246106	5062	sf	316	cf
Infiltration BMP	Existing	9355 FLORENCE	7/30/2007	6528769.559400	6528769.559400	1801814.385750	245125	5062	sf	316	cf
Infiltration BMP	Existing	9252 GALLATIN	3/29/2006	6528859.757520	6528859.757520	1804394.594600	245125	5062	sf	316	cf
Infiltration BMP	Existing	9553 GALLATIN	7/28/2004	6530910.776140	6530910.776140	1803037.898220	245125	5062	sf	316	cf
Infiltration BMP	Existing	9724 GARNISH	1/14/2008	6529062.109120	6529062.109120	1803453.035240	245125	5062	sf	316	cf
Infiltration BMP	Existing	8610 GUATEMALA	10/24/2006	6524386.905480	6524386.905480	1811339.167280	246106	5062	sf	316	cf
Infiltration BMP	Existing	10214 HORLEY	8/14/2007	6520372.544870	6520372.544870	1806355.591210	246102	5062	sf	316	cf
Infiltration BMP	Existing	10513 JULIUS	1/22/2009	6518877.932890	6518877.932890	1805532.376750	246102	5062	sf	316	cf
Infiltration BMP	Existing	9204 LA REINA	4/18/2007	6525799.255250	6525799.255250	1808110.827020	246103	5062	sf	316	cf
Infiltration BMP	Existing	9528 LEMORAN	8/29/2008	6529000.799820	6529000.799820	1804066.473220	245125	5062	sf	316	cf
Infiltration BMP	Existing	7334 LUXOR	4/25/2007	6514999.892740	6514999.892740	1801407.207050	246079	5062	sf	316	cf
Infiltration BMP	Existing	9226 MANZANAR	7/8/2005	6526470.419470	6526470.419470	1806685.422630	246103	5062	sf	316	cf
Infiltration BMP	Existing	10524 MATTOCK	2/5/2009	6528788.349750	6528788.349750	1799096.345380	245126	5062	sf	316	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12123 ORIZABA	12/28/2005	6517943.193960	6517943.193960	1797041.752750	245115	5062	sf	316	cf
Infiltration BMP	Existing	7130 PELLET	6/4/2008	6515276.387650	6515276.387650	1804845.311440	246104	5062	sf	316	cf
Infiltration BMP	Existing	8322 PURITAN	6/14/2007	6516164.281440	6516164.281440	1791774.558840	245524	5062	sf	316	cf
Infiltration BMP	Existing	7312 RIO FLORA	6/18/2010	6516577.089870	6516577.089870	1804589.040390	246104	5062	sf	316	cf
Infiltration BMP	Existing	9331 SAMOLINE	2/17/2006	6523511.819100	6523511.819100	1808307.819060	246106	5062	sf	316	cf
Infiltration BMP	Existing	8015 SEVENTH	8/16/2005	6521322.893520	6521322.893520	1803640.949260	246103	5062	sf	316	cf
Infiltration BMP	Existing	7821 SIXTH	12/6/2005	6519846.881130	6519846.881130	1804004.436800	246102	5062	sf	316	cf
Infiltration BMP	Existing	8409 SIXTH	12/10/2008	6523050.669740	6523050.669740	1802016.668700	245114	5062	sf	316	cf
Infiltration BMP	Existing	9317 STAMPS	1/30/2007	6525356.702810	6525356.702810	1807182.805460	246103	5062	sf	316	cf
Infiltration BMP	Existing	9322 STAMPS	3/16/2006	6525453.602600	6525453.602600	1807062.934260	246103	5062	sf	316	cf
Infiltration BMP	Existing	10443 STAMPS	5/21/2008	6523061.022110	6523061.022110	1803394.248860	246103	5062	sf	316	cf
Infiltration BMP	Existing	10517 STAMPS	6/18/2010	6522812.240000	6522812.240000	1803043.757460	246103	5062	sf	316	cf
Infiltration BMP	Existing	9444 STOAKES	5/22/2007	6525587.983230	6525587.983230	1806625.551490	246103	5062	sf	316	cf
Infiltration BMP	Existing	8329 VISTA DEL RIO	6/18/2010	6526300.133280	6526300.133280	1808123.116520	246103	5062	sf	316	cf
Infiltration BMP	Existing	8368 VISTA DEL RIO	6/1/2007	6526427.553640	6526427.553640	1807729.596630	246103	5062	sf	316	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8543 ALBIA	1/1/2006	6520215.566510	6520215.566510	1795689.212970	245115	3797	sf	237	cf
Infiltration BMP	Existing	7162 BENARES	1/1/2008	6514067.610360	6514067.610360	1802493.217160	246079	3797	sf	237	cf
Infiltration BMP	Existing	12812 BLODGETT	6/8/2009	6518629.647540	6518629.647540	1791208.759970	245115	3797	sf	237	cf
Infiltration BMP	Existing	9503 BROCK AV	2/14/2014	6524115.247920	6524115.247920	1807488.010330	246106	3797	sf	237	cf
Infiltration BMP	Existing	9045 BUCKLES	12/11/2008	6523278.581350	6523278.581350	1796905.300470	245114	3797	sf	237	cf
Infiltration BMP	Existing	10045 CHANEY	7/5/2007	6527656.534860	6527656.534860	1802672.871800	245125	3797	sf	237	cf
Infiltration BMP	Existing	8714 CHEROKEE	5/1/2007	6525056.428300	6525056.428300	1801833.489170	245119	3797	sf	237	cf
Infiltration BMP	Existing	10729 CLANCEY	7/5/2007	6525292.127080	6525292.127080	1799996.460370	245119	3797	sf	237	cf
Infiltration BMP	Existing	8215 COMOLETTE	5/18/2006	6516024.585540	6516024.585540	1792904.896040	246077	3563	sf	223	cf
Infiltration BMP	Existing	7809 DACOSTA	10/5/2007	6521756.096640	6521756.096640	1806979.884160	246106	3797	sf	237	cf
Infiltration BMP	Existing	10424 DOLAN AV	2/14/2014	6523609.999510	6523609.999510	1803226.099470	245119	3797	sf	237	cf
Infiltration BMP	Existing	12337 DUNROBIN	6/21/2010	6524854.924990	6524854.924990	1793158.910710	245114	3797	sf	237	cf
Infiltration BMP	Existing	13234 DUNROBIN	9/30/2005	6525046.618370	6525046.618370	1789885.630870	245114	3797	sf	237	cf
Infiltration BMP	Existing	12612 EASTBROOK	5/30/2006	6525374.680490	6525374.680490	1791988.629320	245114	3797	sf	237	cf
Infiltration BMP	Existing	9400 FLORENCE	7/8/2005	6528900.299250	6528900.299250	1801380.002980	245126	3797	sf	237	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7823 FOURTH PL	9/16/2005	6519381.530610	6519381.530610	1803107.418050	246102	3797	sf	237	cf
Infiltration BMP	Existing	7826 GAINFORD	10/13/2005	6521963.408230	6521963.408230	1806968.662960	246106	3797	sf	237	cf
Infiltration BMP	Existing	7909 GALLATIN	4/27/2006	6523955.572760	6523955.572760	1809190.106160	246106	3797	sf	237	cf
Infiltration BMP	Existing	9118 GARNISH	6/21/2010	6529677.777690	6529677.777690	1805040.238300	245125	3797	sf	237	cf
Infiltration BMP	Existing	12752 GLYNN	6/18/2010	6516929.257070	6516929.257070	1792615.717350	245524	3797	sf	237	cf
Infiltration BMP	Existing	9116 HALEDON	3/2/2006	6528925.738880	6528925.738880	1805732.953010	245125	3797	sf	237	cf
Infiltration BMP	Existing	12819 IBBETSON	11/23/2005	6525827.025010	6525827.025010	1791350.711010	245114	3797	sf	237	cf
Infiltration BMP	Existing	9528 LEMORAN	8/26/2008	6528914.390000	6528914.390000	1804053.870620	245125	3797	sf	237	cf
Infiltration BMP	Existing	10514 LESTERFORD	2/14/2006	6529382.491640	6529382.491640	1798787.162960	245126	3797	sf	237	cf
Infiltration BMP	Existing	9030 LUBEC	2/9/2006	6526996.357320	6526996.357320	1804242.372880	245125	3797	sf	237	cf
Infiltration BMP	Existing	9264 LUBEC	4/19/2006	6528519.099740	6528519.099740	1803331.221940	245125	3797	sf	237	cf
Infiltration BMP	Existing	8545 LUBEC ST	2/14/2014	6525866.355120	6525866.355120	1805123.134500	246103	3797	sf	237	cf
Infiltration BMP	Existing	9247 MANZANAR	10/30/2006	6526227.935330	6526227.935330	1806695.994430	246103	3797	sf	237	cf
Infiltration BMP	Existing	7866 MELVA	6/20/2006	6516126.027390	6516126.027390	1797191.628010	246079	3797	sf	237	cf
Infiltration BMP	Existing	12109 MORNING	5/16/2006	6516408.716280	6516408.716280	1797765.727430	246079	3797	sf	237	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7332 NADA	6/18/2007	6514319.703850	6514319.703850	1800394.247560	246079	3797	sf	237	cf
Infiltration BMP	Existing	7334 NADA	6/18/2007	6514319.703850	6514319.703850	1800394.247560	246079	3797	sf	237	cf
Infiltration BMP	Existing	9821 NEWVILLE	7/30/2007	6530987.438110	6530987.438110	1802116.080780	245125	3797	sf	237	cf
Infiltration BMP	Existing	10268 NEWVILLE	4/24/2007	6529747.604150	6529747.604150	1800228.046080	245126	3797	sf	237	cf
Infiltration BMP	Existing	12280 ORIZABA	6/18/2010	6517505.248620	6517505.248620	1795784.740290	246077	3797	sf	237	cf
Infiltration BMP	Existing	10404 PANGBORN	6/18/2010	6528952.556500	6528952.556500	1800031.154520	245126	3797	sf	237	cf
Infiltration BMP	Existing	12531 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	3797	sf	237	cf
Infiltration BMP	Existing	12537 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	3797	sf	237	cf
Infiltration BMP	Existing	11994 POMERING	2/23/2005	6514993.390330	6514993.390330	1799517.781680	246079	3797	sf	237	cf
Infiltration BMP	Existing	9525 QUINN	2/8/2007	6528803.711540	6528803.711540	1799421.544220	245126	3797	sf	237	cf
Infiltration BMP	Existing	8048 QUOIT	1/21/2009	6516443.407630	6516443.407630	1795348.218010	246077	3797	sf	237	cf
Infiltration BMP	Existing	12326 SAMOLINE	8/29/2008	6516269.535370	6516269.535370	1796118.615320	246077	3797	sf	237	cf
Infiltration BMP	Existing	12504 SMALLWOOD	9/30/2008	6515227.996100	6515227.996100	1795705.820110	246079	3797	sf	237	cf
Infiltration BMP	Existing	9520 STEWART & GRAY	4/10/2008	6526628.650930	6526628.650930	1796061.800920	245118	3797	sf	237	cf
Infiltration BMP	Existing	7411 THIRD	6/2/2006	6517216.302090	6517216.302090	1804140.837740	246102	3797	sf	237	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12706 WHITEWOOD	9/20/2007	6520505.791550	6520505.791550	1791390.733010	245115	3797	sf	237	cf
Infiltration BMP	Existing	9049 HALL ROAD	2/9/2007	6523684.587500	6523684.587500	1797586.831540	245114	2531	sf	158	cf
Infiltration BMP	Existing	7118 ADWEN	1/27/2006	6513895.884030	6513895.884030	1803086.756410	246100	2531	sf	158	cf
Infiltration BMP	Existing	13202 BARLIN	2/14/2007	6517303.317510	6517303.317510	1789688.349400	245524	2531	sf	158	cf
Infiltration BMP	Existing	10216 BELLMAN	1/5/2009	6525703.110200	6525703.110200	1803293.056930	245119	2531	sf	158	cf
Infiltration BMP	Existing	11809 BELLMAN	2/8/2006	6521732.804620	6521732.804620	1797303.369450	245114	2531	sf	158	cf
Infiltration BMP	Existing	7117 BENARES	8/10/2006	6513814.981610	6513814.981610	1802936.506930	246079	2531	sf	158	cf
Infiltration BMP	Existing	9108 BIGBY	11/23/2005	6526215.785230	6526215.785230	1801649.270450	245119	2531	sf	158	cf
Infiltration BMP	Existing	10213 BIRCHDALE	4/19/2006	6525304.414970	6525304.414970	1803562.084330	245119	2531	sf	158	cf
Infiltration BMP	Existing	9004 BIRCHLEAF	3/7/2007	6527047.235450	6527047.235450	1808159.837050	246103	2531	sf	158	cf
Infiltration BMP	Existing	13126 BLODGETT	8/18/2005	6517829.686700	6517829.686700	1789824.186060	245115	2531	sf	158	cf
Infiltration BMP	Existing	9508 BROCK	2/27/2006	6524228.012180	6524228.012180	1807355.118100	246103	2531	sf	158	cf
Infiltration BMP	Existing	7418 BROOKMILL	7/25/2008	6515791.043440	6515791.043440	1801624.672750	246079	2531	sf	158	cf
Infiltration BMP	Existing	12201 BROOKSHIRE	6/22/2010	6519506.452440	6519506.452440	1795585.950880	245115	2531	sf	158	cf
Infiltration BMP	Existing	7942 BRUNACHE	11/28/2005	6517219.149000	6517219.149000	1798061.073260	246079	2531	sf	158	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9349 CECILIA	9/25/2008	6527282.306940	6527282.306940	1798988.874460	245126	2531	sf	158	cf
Infiltration BMP	Existing	9365 CECILIA	6/18/2010	6527411.791310	6527411.791310	1798910.665650	245126	2531	sf	158	cf
Infiltration BMP	Existing	9608 CECILIA	1/1/2007	6528406.351870	6528406.351870	1798010.127160	245126	2531	sf	158	cf
Infiltration BMP	Existing	9624 CEDARTREE	8/8/2005	6531911.946630	6531911.946630	1804673.812930	245127	2531	sf	158	cf
Infiltration BMP	Existing	8519 CLETA	9/10/2007	6521470.081710	6521470.081710	1798172.541560	245114	2531	sf	158	cf
Infiltration BMP	Existing	7803 CONKLIN	9/2/2005	6513317.560580	6513317.560580	1793980.901190	246077	2297	sf	144	cf
Infiltration BMP	Existing	12816 CORNUTA	10/9/2006	6525701.592160	6525701.592160	1791350.505200	245114	2531	sf	158	cf
Infiltration BMP	Existing	8018 DANVERS	1/26/2009	6524882.345060	6524882.345060	1809453.159850	246106	2531	sf	158	cf
Infiltration BMP	Existing	8517 DEVENIR	10/11/2005	6517399.640210	6517399.640210	1791811.493450	245115	2531	sf	158	cf
Infiltration BMP	Existing	8049 DINSDALE	6/15/2006	6522974.989820	6522974.989820	1805624.556380	246103	2531	sf	158	cf
Infiltration BMP	Existing	9317 DINSDALE	11/5/2008	6528560.545810	6528560.545810	1802232.852640	245125	2531	sf	158	cf
Infiltration BMP	Existing	8510 DONOVAN	7/5/2005	6519046.837890	6519046.837890	1794446.597550	245115	2531	sf	158	cf
Infiltration BMP	Existing	8415 DONOVAN ST	2/14/2014	6518508.946270	6518508.946270	1795018.898890	245115	2531	sf	158	cf
Infiltration BMP	Existing	9635 DOWNEY	7/15/2004	6524420.085960	6524420.085960	1806308.452290	246103	2531	sf	158	cf
Infiltration BMP	Existing	9830 DOWNEY	1/1/2006	6524176.121770	6524176.121770	1805651.929490	246103	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12718 DOWNEY	8/30/2007	6516814.229160	6516814.229160	1793075.140590	245524	2531	sf	158	cf
Infiltration BMP	Existing	12650 DUNROBIN	7/27/2007	6525045.587920	6525045.587920	1791614.482510	245114	2531	sf	158	cf
Infiltration BMP	Existing	9067 EGLISE	9/30/2005	6530265.716940	6530265.716940	1805184.414240	245127	2531	sf	158	cf
Infiltration BMP	Existing	9131 EGLISE	1/16/2009	6529904.336320	6529904.336320	1804464.041860	245125	2531	sf	158	cf
Infiltration BMP	Existing	8573 ELEVENTH	4/24/2006	6525253.900610	6525253.900610	1803595.328980	245119	2531	sf	158	cf
Infiltration BMP	Existing	9061 FARM ST	2/14/2014	6526099.027600	6526099.027600	1801582.141470	245119	2531	sf	158	cf
Infiltration BMP	Existing	7936 FOURTH	1/26/2006	6520005.666040	6520005.666040	1802880.634680	246103	2531	sf	158	cf
Infiltration BMP	Existing	7829 FOURTH PL	2/14/2014	6519381.530610	6519381.530610	1803107.418050	246102	2531	sf	158	cf
Infiltration BMP	Existing	7528 GAINFORD	6/18/2010	6520331.076350	6520331.076350	1807734.704270	246106	1266	sf	79	cf
Infiltration BMP	Existing	8150 GALLATIN	1/14/2008	6524851.065410	6524851.065410	1807922.731550	246103	2531	sf	158	cf
Infiltration BMP	Existing	9068 GALLATIN	7/18/2005	6527754.167230	6527754.167230	1805244.499940	245125	2531	sf	158	cf
Infiltration BMP	Existing	12703 GLENSHIRE	8/18/2006	6520090.968440	6520090.968440	1791341.816710	245115	2531	sf	158	cf
Infiltration BMP	Existing	8703 GUATEMALA	6/18/2010	6523747.929510	6523747.929510	1811239.685330	246111	2531	sf	158	cf
Infiltration BMP	Existing	9903 GUATEMALA	6/21/2010	6519189.043810	6519189.043810	1808530.913060	246111	2531	sf	158	cf
Infiltration BMP	Existing	9208 HALEDON	3/29/2007	6528788.981770	6528788.981770	1805412.621690	245125	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9083 HALL	12/8/2005	6524025.781090	6524025.781090	1797583.104370	245114	2531	sf	158	cf
Infiltration BMP	Existing	10348 HASTY	9/14/2006	6528480.545700	6528480.545700	1800482.839460	245126	2531	sf	158	cf
Infiltration BMP	Existing	7844 HONDO	7/8/2005	6515417.898670	6515417.898670	1796530.778030	246079	2531	sf	158	cf
Infiltration BMP	Existing	9244 HORLEY	6/22/2006	6522498.248530	6522498.248530	1809199.750130	246111	2531	sf	158	cf
Infiltration BMP	Existing	12612 IBBETSON	2/9/2007	6526008.655610	6526008.655610	1792000.536540	245114	2531	sf	158	cf
Infiltration BMP	Existing	7214 IRWINGROVE	8/17/2007	6517736.835580	6517736.835580	1807424.228480	246104	2531	sf	158	cf
Infiltration BMP	Existing	10209 JULIUS	6/21/2010	6519702.452650	6519702.452650	1806880.883230	246102	2531	sf	158	cf
Infiltration BMP	Existing	10341 JULIUS	6/4/2008	6519700.000000	6519700.000000	1806100.000000	246102	2531	sf	158	cf
Infiltration BMP	Existing	12313 JULIUS	6/21/2010	6514155.209020	6514155.209020	1797936.932020	246079	2531	sf	158	cf
Infiltration BMP	Existing	7944 KINGBEE	5/31/2007	6516311.045420	6516311.045420	1796702.710410	246079	2531	sf	158	cf
Infiltration BMP	Existing	9605 LA REINA	6/18/2010	6524325.141120	6524325.141120	1806744.664340	246103	2531	sf	158	cf
Infiltration BMP	Existing	10074 LESTERFORD	4/12/2006	6530716.286370	6530716.286370	1800772.683680	245125	2531	sf	158	cf
Infiltration BMP	Existing	9626 LUBEC	6/21/2005	6530889.535260	6530889.535260	1801910.718740	245125	2531	sf	158	cf
Infiltration BMP	Existing	7156 LUXOR	10/28/2005	6513800.826420	6513800.826420	1802169.595300	246100	2531	sf	158	cf
Infiltration BMP	Existing	9202 MANZANAR	4/13/2004	6526663.177850	6526663.177850	1806830.315690	246103	2531	sf	158	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9020 MARGARET	10/2/2006	6523822.925930	6523822.925930	1798066.530690	245114	2531	sf	158	cf
Infiltration BMP	Existing	9127 MELDAR	4/29/2004	6526710.714590	6526710.714590	1807437.827920	246103	2531	sf	158	cf
Infiltration BMP	Existing	11814 MORNING	9/2/2005	6517648.916460	6517648.916460	1799680.107480	246077	2531	sf	158	cf
Infiltration BMP	Existing	7440 MULLER	11/7/2006	6518162.654940	6518162.654940	1805120.460880	246102	2531	sf	158	cf
Infiltration BMP	Existing	12334 ORIZABA	5/5/2005	6517231.678930	6517231.678930	1795384.927500	246077	2531	sf	158	cf
Infiltration BMP	Existing	9311 OTTO	2/2/2008	6528809.245500	6528809.245500	1802513.951810	245125	2531	sf	158	cf
Infiltration BMP	Existing	10436 PANGBORN	7/6/2006	6528781.443840	6528781.443840	1799746.387720	245126	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12531 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12531 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12537 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12537 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	9008 PARROT	6/22/2010	6524997.125330	6524997.125330	1808680.720210	246106	2531	sf	158	cf
Infiltration BMP	Existing	9530 PARROT	10/11/2006	6523866.950960	6523866.950960	1807305.627380	246103	2531	sf	158	cf
Infiltration BMP	Existing	7125 PELLET	11/21/2005	6515366.521160	6515366.521160	1805107.133170	246104	2531	sf	158	cf
Infiltration BMP	Existing	7335 PELLET	2/15/2007	6516661.302200	6516661.302200	1804268.401510	246104	2531	sf	158	cf
Infiltration BMP	Existing	7348 PELLET	6/22/2010	6516619.400060	6516619.400060	1803975.379460	246102	2531	sf	158	cf
Infiltration BMP	Existing	10433 PICO VISTA	6/21/2010	6529704.381130	6529704.381130	1799155.408730	245126	2531	sf	158	cf
Infiltration BMP	Existing	7629 PIVOT	6/4/2008	6517523.064870	6517523.064870	1802428.507060	246079	2531	sf	158	cf
Infiltration BMP	Existing	11962 POMERING	2/24/2006	6515175.131420	6515175.131420	1799743.806870	246079	2531	sf	158	cf
Infiltration BMP	Existing	8133 PRISCILLA	6/22/2010	6515078.400000	6515078.400000	1792153.440000	246077	2531	sf	158	cf
Infiltration BMP	Existing	7603 QUILL	2/28/2007	6514155.935840	6514155.935840	1797151.984960	246079	2531	sf	158	cf
Infiltration BMP	Existing	11539 RICHEON	7/8/2005	6517174.382020	6517174.382020	1801464.078770	246079	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	6545 RIVERGROVE	10/11/2005	6520696.757140	6520696.757140	1811248.378990	246111	2531	sf	158	cf
Infiltration BMP	Existing	9320 SAMOLINE	11/3/2006	6523716.410960	6523716.410960	1808296.703240	246106	2531	sf	158	cf
Infiltration BMP	Existing	9602 SAMOLINE	11/23/2005	6523146.135200	6523146.135200	1807399.732010	246103	2531	sf	158	cf
Infiltration BMP	Existing	12015 SAMOLINE	9/29/2008	6517129.601540	6517129.601540	1798409.043860	246079	2531	sf	158	cf
Infiltration BMP	Existing	12048 SAMOLINE	6/22/2010	6517021.712450	6517021.712450	1798014.455830	246079	2531	sf	158	cf
Infiltration BMP	Existing	7962 SECOND	10/3/2007	6519694.108620	6519694.108620	1801968.426700	246102	2531	sf	158	cf
Infiltration BMP	Existing	7712 SEVERY ST	1/1/2008	6524575.222650	6524575.222650	1807124.160130	246103	2531	sf	158	cf
Infiltration BMP	Existing	7331 SHADYOAK	1/16/2009	6521597.847660	6521597.847660	1810725.646550	246111	2531	sf	158	cf
Infiltration BMP	Existing	9103 SHERIDELL	10/29/2007	6528594.889520	6528594.889520	1806159.584670	245125	2531	sf	158	cf
Infiltration BMP	Existing	8345 SIXTH	4/23/2008	6522663.428460	6522663.428460	1802257.170290	245114	2531	sf	158	cf
Infiltration BMP	Existing	9124 STOAKES	4/29/2004	6526659.033140	6526659.033140	1807538.875170	246103	2531	sf	158	cf
Infiltration BMP	Existing	9906 TECUM	8/26/2008	6519710.324270	6519710.324270	1808196.223590	246111	2531	sf	158	cf
Infiltration BMP	Existing	9520 TELEGRAPH	12/4/2008	6531301.476840	6531301.476840	1805512.099740	245127	2531	sf	158	cf
Infiltration BMP	Existing	8302 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1840	sf	115	cf
Infiltration BMP	Existing	8304 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8306 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8308 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8310 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8312 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8314 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8316 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8318 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8320 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8322 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8324 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8326 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8328 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8330 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8332 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8334 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8336 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8338 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8340 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8342 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8344 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8346 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8348 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8350 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8352 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	7438 THIRD	11/10/2005	6517353.808450	6517353.808450	1803828.489190	246102	2531	sf	158	cf
Infiltration BMP	Existing	7955 THIRD	1/30/2006	6519871.299810	6519871.299810	1802440.525110	246103	2531	sf	158	cf
Infiltration BMP	Existing	9819 TRISTAN	11/19/2007	6526302.584780	6526302.584780	1804524.383680	245125	2531	sf	158	cf
Infiltration BMP	Existing	8555 VIA AMORITA	10/27/2008	6524751.467620	6524751.467620	1803150.610950	245119	2531	sf	158	cf
Infiltration BMP	Existing	9631 WILEY BURKE	3/27/2006	6521095.475640	6521095.475640	1808618.175130	246106	2531	sf	158	cf
Infiltration BMP	Existing	10419 WILEY BURKE	3/7/2008	6519382.492080	6519382.492080	1805731.311650	246102	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7319 ADWEN	2/22/2006	6515346.754980	6515346.754980	1802425.342900	246079	1266	sf	79	cf
Infiltration BMP	Existing	13033 AIRPOINT	6/14/2010	6517837.198260	6517837.198260	1790420.981040	245115	1266	sf	79	cf
Infiltration BMP	Existing	8446 ALAMEDA	6/24/2005	6519341.878190	6519341.878190	1795502.737620	245115	1266	sf	79	cf
Infiltration BMP	Existing	9336 APPLEBY	3/9/2006	6529377.514420	6529377.514420	1804389.744220	245125	1266	sf	79	cf
Infiltration BMP	Existing	9540 ARDINE	1/1/2006	6527800.346060	6527800.346060	1797420.079620	245119	1266	sf	79	cf
Infiltration BMP	Existing	7849 ARNETT	7/8/2005	6518395.700160	6518395.700160	1801138.921810	246079	1266	sf	79	cf
Infiltration BMP	Existing	8645 BAYSINGER	11/10/2005	6525612.031290	6525612.031290	1803108.706240	245119	1266	sf	79	cf
Infiltration BMP	Existing	9210 BELCHER	10/12/2006	6519891.840050	6519891.840050	1789806.904790	245115	1266	sf	79	cf
Infiltration BMP	Existing	9245 BELCHER	9/4/2007	6520247.532430	6520247.532430	1789967.036150	245115	1266	sf	79	cf
Infiltration BMP	Existing	10234 BELCHER	6/18/2010	6527119.239350	6527119.239350	1789810.183210	245113	1266	sf	79	cf
Infiltration BMP	Existing	10285 BELCHER	6/21/2010	6527612.081010	6527612.081010	1789959.646450	245118	1266	sf	79	cf
Infiltration BMP	Existing	10028 BELLDER	1/1/2006	6525360.965940	6525360.965940	1803913.208580	245125	1266	sf	79	cf
Infiltration BMP	Existing	10304 BELLMAN	6/1/2005	6525418.498520	6525418.498520	1803041.069680	245119	1266	sf	79	cf
Infiltration BMP	Existing	11014 BENFIELD	6/24/2008	6531918.630750	6531918.630750	1797937.959120	245122	1266	sf	79	cf
Infiltration BMP	Existing	9324 BIRCHBARK	10/7/2005	6524879.129350	6524879.129350	1807661.831210	246103	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7847 BLANDWOOD	6/29/2006	6525016.522210	6525016.522210	1811074.341940	246106	1266	sf	79	cf
Infiltration BMP	Existing	8415 BORSON	10/9/2006	6517421.536650	6517421.536650	1792735.849280	245115	1266	sf	79	cf
Infiltration BMP	Existing	8710 BOYNE	6/29/2006	6521119.595500	6521119.595500	1795272.757840	245115	1266	sf	79	cf
Infiltration BMP	Existing	8910 BROCK	2/3/2009	6525582.226600	6525582.226600	1808734.892600	246106	1266	sf	79	cf
Infiltration BMP	Existing	9702 BROCK	9/25/2006	6523765.203820	6523765.203820	1806580.253440	246103	1266	sf	79	cf
Infiltration BMP	Existing	9730 BROCK	10/16/2009	6523625.354460	6523625.354460	1806340.478590	246103	1266	sf	79	cf
Infiltration BMP	Existing	7550 BROOKMILL	9/25/2006	6516432.435790	6516432.435790	1801137.496710	246079	1266	sf	79	cf
Infiltration BMP	Existing	10360 BROOKSHIRE	8/2/2005	6524254.056510	6524254.056510	1803200.425100	245119	1266	sf	79	cf
Infiltration BMP	Existing	9336 BUELL	5/4/2007	6527241.052050	6527241.052050	1799190.479610	245126	1266	sf	79	cf
Infiltration BMP	Existing	9408 BUELL	1/1/2007	6527563.840160	6527563.840160	1798993.546660	245126	1266	sf	79	cf
Infiltration BMP	Existing	10210 CASANES	7/20/2005	6529273.829610	6529273.829610	1801143.143100	245125	1266	sf	79	cf
Infiltration BMP	Existing	10308 CASANES	6/9/2005	6528827.020030	6528827.020030	1800415.364480	245126	1266	sf	79	cf
Infiltration BMP	Existing	10845 CASANES	12/4/2007	6527288.943480	6527288.943480	1798213.890680	245119	1266	sf	79	cf
Infiltration BMP	Existing	10922 CASANES	8/3/2005	6527279.490710	6527279.490710	1797849.792160	245119	1266	sf	79	cf
Infiltration BMP	Existing	8715 CAVEL	6/22/2010	6521261.550160	6521261.550160	1795688.489420	245115	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9707 CEDARTREE	5/25/2006	6532283.863380	6532283.863380	1804587.051690	245127	1266	sf	79	cf
Infiltration BMP	Existing	10260 CHANEY	6/21/2010	6527337.911630	6527337.911630	1801874.691650	245119	1266	sf	79	cf
Infiltration BMP	Existing	10362 CHANEY	9/4/2007	6526983.558290	6526983.558290	1801306.071650	245119	1266	sf	79	cf
Infiltration BMP	Existing	9246 CLANCEY	5/1/2007	6528479.118010	6528479.118010	1805448.947460	245125	1266	sf	79	cf
Infiltration BMP	Existing	10546 CLANCEY	5/26/2005	6525904.831900	6525904.831900	1800674.595520	245119	1266	sf	79	cf
Infiltration BMP	Existing	12658 COLDBROOK	6/25/2009	6524501.637760	6524501.637760	1791525.543010	245114	1266	sf	79	cf
Infiltration BMP	Existing	8111 COMOLETTE	12/18/2006	6515465.796840	6515465.796840	1793242.397990	246077	1266	sf	79	cf
Infiltration BMP	Existing	8140 COMOLETTE	12/2/2008	6515640.775000	6515640.775000	1792943.865000	246077	1266	sf	79	cf
Infiltration BMP	Existing	8316 COMOLETTE	5/23/2005	6516475.681440	6516475.681440	1792370.081790	245524	1266	sf	79	cf
Infiltration BMP	Existing	9325 CORD	3/21/2008	6529940.912480	6529940.912480	1803762.584020	245125	1266	sf	79	cf
Infiltration BMP	Existing	7732 COREY	1/8/2009	6515481.796500	6515481.796500	1798137.416600	246079	1266	sf	79	cf
Infiltration BMP	Existing	11810 CORRIGAN	3/4/2009	6523411.287590	6523411.287590	1796210.739300	245114	1266	sf	79	cf
Infiltration BMP	Existing	10925 CROSSDALE	6/9/2005	6532012.125130	6532012.125130	1798163.740010	245122	1266	sf	79	cf
Infiltration BMP	Existing	7757 DACOSTA	6/7/2005	6521506.383470	6521506.383470	1807138.583520	246106	1266	sf	79	cf
Infiltration BMP	Existing	8324 DAVIS	6/15/2005	6520852.481770	6520852.481770	1799213.987880	245114	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8517 DEVENIR	2/19/2008	6517399.640210	6517399.640210	1791811.493450	245115	1266	sf	79	cf
Infiltration BMP	Existing	7345 DINSDALE	9/29/2005	6519203.299320	6519203.299320	1808002.090250	246111	1266	sf	79	cf
Infiltration BMP	Existing	8330 DINSDALE	6/21/2010	6524002.238290	6524002.238290	1804838.107610	246103	1266	sf	79	cf
Infiltration BMP	Existing	10340 DOLAN	8/15/2007	6523856.967630	6523856.967630	1803630.622810	245119	1266	sf	79	cf
Infiltration BMP	Existing	12260 DOLAN	4/5/2006	6518910.565000	6518910.565000	1795264.305000	245115	1266	sf	79	cf
Infiltration BMP	Existing	12521 DOLAN	7/19/2007	6517914.404040	6517914.404040	1794175.419610	245115	1266	sf	79	cf
Infiltration BMP	Existing	12621 DOLAN	8/17/2007	6517501.190610	6517501.190610	1793293.644730	245115	1266	sf	79	cf
Infiltration BMP	Existing	12308 DOWNEY	4/19/2007	6518251.608680	6518251.608680	1795363.261670	245115	1266	sf	79	cf
Infiltration BMP	Existing	12532 DOWNEY	10/11/2005	6517442.718730	6517442.718730	1794104.887260	245115	1266	sf	79	cf
Infiltration BMP	Existing	12820 DOWNEY	5/17/2007	6516486.923440	6516486.923440	1792584.707230	245524	1266	sf	79	cf
Infiltration BMP	Existing	12603 DUNROBIN	6/22/2010	6524864.880980	6524864.880980	1792095.613000	245114	1266	sf	79	cf
Infiltration BMP	Existing	12643 DUNROBIN	11/21/2006	6524865.889210	6524865.889210	1791696.268120	245114	1266	sf	79	cf
Infiltration BMP	Existing	12818 DUNROBIN	12/15/2006	6525044.191110	6525044.191110	1791331.787300	245114	1266	sf	79	cf
Infiltration BMP	Existing	12823 DUNROBIN	2/12/2008	6524866.593650	6524866.593650	1791299.463030	245114	1266	sf	79	cf
Infiltration BMP	Existing	13024 DUNROBIN	5/24/2005	6525048.058670	6525048.058670	1790633.750860	245114	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	13240 DUNROBIN	10/1/2008	6525046.731200	6525046.731200	1789833.348360	245114	1266	sf	79	cf
Infiltration BMP	Existing	13638 EARNSHAW	9/16/2005	6516330.576340	6516330.576340	1788317.037630	245524	1266	sf	79	cf
Infiltration BMP	Existing	12155 EASTBROOK	9/16/2005	6525128.882510	6525128.882510	1794289.182720	245114	2297	sf	144	cf
Infiltration BMP	Existing	9125 EGLISE	1/24/2007	6529928.564580	6529928.564580	1804520.963270	245125	1266	sf	79	cf
Infiltration BMP	Existing	10213 EGLISE	10/14/2008	6528271.447820	6528271.447820	1801803.093100	245126	1266	sf	79	cf
Infiltration BMP	Existing	8331 EVEREST	2/21/2007	6517984.856770	6517984.856770	1794526.994330	245115	1266	sf	79	cf
Infiltration BMP	Existing	9037 FARM	6/18/2010	6525882.141210	6525882.141210	1801714.480720	245119	1266	sf	79	cf
Infiltration BMP	Existing	9542 FARM	11/15/2005	6529019.221950	6529019.221950	1799423.700160	245126	1266	sf	79	cf
Infiltration BMP	Existing	8445 FIFTH	6/24/2005	6523180.907390	6523180.907390	1801530.163340	245114	1266	sf	79	cf
Infiltration BMP	Existing	8529 FIFTH	9/23/2005	6523578.003250	6523578.003250	1801288.543780	245114	1266	sf	79	cf
Infiltration BMP	Existing	9221 FOSTER	2/16/2008	6519835.324440	6519835.324440	1789377.664880	245115	1266	sf	79	cf
Infiltration BMP	Existing	9303 FOSTER	8/9/2006	6520280.515660	6520280.515660	1789513.941670	245115	1266	sf	79	cf
Infiltration BMP	Existing	9536 FOSTORIA	10/13/2005	6527900.524680	6527900.524680	1797686.001250	245119	1266	sf	79	cf
Infiltration BMP	Existing	7339 GAINFORD	11/5/2007	6519739.997490	6519739.997490	1808338.936030	246111	1266	sf	79	cf
Infiltration BMP	Existing	8426 GAINFORD	1/7/2008	6524961.213810	6524961.213810	1805124.602410	246103	1266	sf	79	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9315 GAINFORD	7/5/2005	6528715.710300	6528715.710300	1803034.881460	245125	1266	sf	79	cf
Infiltration BMP	Existing	9641 GAINFORD	10/16/2006	6530976.949360	6530976.949360	1801752.372100	245125	1266	sf	79	cf
Infiltration BMP	Existing	9357 GALLATIN	4/17/2006	6529509.957360	6529509.957360	1804133.004270	245125	1266	sf	79	cf
Infiltration BMP	Existing	8411 GALT	7/18/2007	6520931.662600	6520931.662600	1798681.676310	245114	1266	sf	79	cf
Infiltration BMP	Existing	8125 GARDENDALE	10/3/2007	6514840.842010	6514840.842010	1791988.219650	246077	1266	sf	79	cf
Infiltration BMP	Existing	7553 GLENCLIFF	11/5/2008	6521939.189570	6521939.189570	1809565.009220	246111	1266	sf	79	cf
Infiltration BMP	Existing	12615 GURLEY	9/8/2008	6516705.632650	6516705.632650	1793818.816440	246077	1266	sf	79	cf
Infiltration BMP	Existing	10557 HALEDON	3/22/2006	6525946.687500	6525946.687500	1800529.637640	245119	1266	sf	79	cf
Infiltration BMP	Existing	10714 HALEDON	7/11/2008	6525734.412480	6525734.412480	1799854.605530	245119	1266	sf	79	cf
Infiltration BMP	Existing	9101 HALL	7/19/2007	6524088.768660	6524088.768660	1797585.986810	245114	1266	sf	79	cf
Infiltration BMP	Existing	7416 HONDO	11/21/2007	6513414.170490	6513414.170490	1797767.919490	246079	1266	sf	79	cf
Infiltration BMP	Existing	7927 HONDO	1/8/2007	6515926.722240	6515926.722240	1796435.751150	246079	1266	sf	79	cf
Infiltration BMP	Existing	9228 HORLEY	7/20/2005	6522584.029360	6522584.029360	1809343.702000	246111	1266	sf	79	cf
Infiltration BMP	Existing	9929 HORLEY	6/23/2005	6520827.895940	6520827.895940	1807104.698370	246106	1266	sf	79	cf
Infiltration BMP	Existing	12316 HORLEY	1/1/2007	6515085.680000	6515085.680000	1797312.060000	246079	1266	sf	79	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11544 HORTON	5/1/2006	6517050.314050	6517050.314050	1801482.158860	246079	1266	sf	79	cf
Infiltration BMP	Existing	12619 IBBETSON	12/26/2007	6525826.717640	6525826.717640	1791950.694670	245114	1266	sf	79	cf
Infiltration BMP	Existing	12816 IBBETSON	11/23/2005	6526008.922590	6526008.922590	1791350.504040	245114	1266	sf	79	cf
Infiltration BMP	Existing	9030 IOWA	8/29/2007	6523719.000250	6523719.000250	1797706.215730	245114	1266	sf	79	cf
Infiltration BMP	Existing	9036 IOWA	1/23/2006	6523761.535660	6523761.535660	1797679.990250	245114	1266	sf	79	cf
Infiltration BMP	Existing	7214 IRWINGROVE	2/7/2008	6517736.835580	6517736.835580	1807424.228480	246104	1266	sf	79	cf
Infiltration BMP	Existing	7425 IRWINGROVE	11/22/2005	6519037.305040	6519037.305040	1806826.286520	246102	1266	sf	79	cf
Infiltration BMP	Existing	7431 IVO	5/23/2005	6520452.019960	6520452.019960	1808862.657860	246106	1266	sf	79	cf
Infiltration BMP	Existing	12258 IZETTA	11/19/2008	6524718.529730	6524718.529730	1793607.751080	245114	1266	sf	79	cf
Infiltration BMP	Existing	11427 JULIUS	10/6/2005	6517068.729490	6517068.729490	1802337.821610	246079	1266	sf	79	cf
Infiltration BMP	Existing	7863 KINGBEE	6/2/2005	6515998.395150	6515998.395150	1797104.463380	246079	1266	sf	79	cf
Infiltration BMP	Existing	10633 LA REINA	6/7/2005	6521844.406030	6521844.406030	1802801.159980	246103	1266	sf	79	cf
Infiltration BMP	Existing	10726 LA REINA	9/20/2005	6521763.725850	6521763.725850	1802369.001800	246103	1266	sf	79	cf
Infiltration BMP	Existing	10717 LAKEWOOD	1/1/2005	6524762.764130	6524762.764130	1800632.321080	245119	1266	sf	79	cf
Infiltration BMP	Existing	13229 LAKEWOOD	8/30/2005	6518145.854860	6518145.854860	1789091.323220	245115	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8248 LANKIN	5/16/2007	6517152.534650	6517152.534650	1794608.293130	246077	1266	sf	79	cf
Infiltration BMP	Existing	13413 LAURELDALE	9/4/2007	6516097.983610	6516097.983610	1789503.029570	245524	1266	sf	79	cf
Infiltration BMP	Existing	9040 LEMORAN	9/16/2005	6529896.207920	6529896.207920	1805874.052840	245125	1266	sf	79	cf
Infiltration BMP	Existing	10225 LESTERFORD	12/22/2005	6530244.844140	6530244.844140	1800567.187010	245126	1266	sf	79	cf
Infiltration BMP	Existing	10415 LESTERFORD	6/22/2010	6529502.521580	6529502.521580	1799500.525910	245126	1266	sf	79	cf
Infiltration BMP	Existing	10730 LESTERFORD	6/8/2005	6528927.837490	6528927.837490	1798058.051080	245126	1266	sf	79	cf
Infiltration BMP	Existing	8020 LUBEC	3/8/2007	6523117.786070	6523117.786070	1806398.918760	246103	1266	sf	79	cf
Infiltration BMP	Existing	9230 LUBEC	9/30/2005	6528205.943320	6528205.943320	1803519.420650	245125	1266	sf	79	cf
Infiltration BMP	Existing	7259 LUXOR	1/1/2007	6514801.884280	6514801.884280	1801808.218080	246079	1266	sf	79	cf
Infiltration BMP	Existing	7315 LUXOR	3/16/2006	6514953.117040	6514953.117040	1801695.155730	246079	1266	sf	79	cf
Infiltration BMP	Existing	8444 LUXOR	11/10/2005	6520775.356850	6520775.356850	1797851.842110	245114	1266	sf	79	cf
Infiltration BMP	Existing	9102 MANZANAR	7/20/2005	6527192.246670	6527192.246670	1807219.965690	246103	1266	sf	79	cf
Infiltration BMP	Existing	10434 MANZANAR	6/7/2005	6523771.930100	6523771.930100	1803007.033470	245119	1266	sf	79	cf
Infiltration BMP	Existing	11109 MARBEL	7/20/2006	6523692.717760	6523692.717760	1799490.635090	245119	1266	sf	79	cf
Infiltration BMP	Existing	12108 MARBEL	1/31/2006	6521445.538760	6521445.538760	1795214.942010	245115	1266	sf	79	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7830 MELVA	1/1/2006	6515802.415360	6515802.415360	1797387.108860	246079	1266	sf	79	cf
Infiltration BMP	Existing	7844 MELVA	1/5/2006	6515910.196660	6515910.196660	1797321.983490	246079	1266	sf	79	cf
Infiltration BMP	Existing	12120 MORNING	8/14/2008	6516533.621320	6516533.621320	1797558.681060	246079	1266	sf	79	cf
Infiltration BMP	Existing	7339 NADA	7/8/2005	6514489.286480	6514489.286480	1800567.411080	246079	1266	sf	79	cf
Infiltration BMP	Existing	7351 NADA	6/23/2008	6514590.536380	6514590.536380	1800503.774190	246079	1266	sf	79	cf
Infiltration BMP	Existing	8202 NADA	1/9/2006	6518631.371590	6518631.371590	1797835.542430	245115	1266	sf	79	cf
Infiltration BMP	Existing	7415 NOREN	7/26/2005	6520794.671000	6520794.671000	1809286.272790	246111	1266	sf	79	cf
Infiltration BMP	Existing	9921 NORLAIN	11/3/2008	6519614.140210	6519614.140210	1807835.435830	246111	1266	sf	79	cf
Infiltration BMP	Existing	8127 ORANGE	6/23/2010	6517401.744430	6517401.744430	1796403.841780	246077	1266	sf	79	cf
Infiltration BMP	Existing	9554 ORIZABA	8/19/2005	6524235.753500	6524235.753500	1806817.618650	246103	1266	sf	79	cf
Infiltration BMP	Existing	12333 ORIZABA	1/23/2006	6517077.475660	6517077.475660	1795538.435260	246077	1266	sf	79	cf
Infiltration BMP	Existing	10834 PANGBORN	9/17/2007	6527760.431910	6527760.431910	1798051.772160	245119	1266	sf	79	cf
Infiltration BMP	Existing	7156 PELLET	6/22/2010	6515507.126970	6515507.126970	1804695.751890	246104	1266	sf	79	cf
Infiltration BMP	Existing	9466 PELLET	5/26/2005	6527082.799410	6527082.799410	1797550.782940	245119	1266	sf	79	cf
Infiltration BMP	Existing	10238 PICO VISTA	7/22/2008	6530559.495000	6530559.495000	1800212.246520	245126	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7706 PIVOT	6/18/2010	6517776.543940	6517776.543940	1802077.153370	246079	1266	sf	79	cf
Infiltration BMP	Existing	11951 POMERING	6/18/2010	6515072.562230	6515072.562230	1799936.867790	246079	1266	sf	79	cf
Infiltration BMP	Existing	12010 POMERING	9/20/2005	6514897.027930	6514897.027930	1799318.472210	246079	1266	sf	79	cf
Infiltration BMP	Existing	7803 PURITAN	6/22/2010	6513186.710850	6513186.710850	1793767.422040	246077	1266	sf	79	cf
Infiltration BMP	Existing	8249 QUOIT	5/17/2007	6517406.484080	6517406.484080	1795006.472870	246077	1266	sf	79	cf
Infiltration BMP	Existing	8506 RAVILLER	6/22/2010	6526200.032280	6526200.032280	1805944.598850	246103	1266	sf	79	cf
Infiltration BMP	Existing	9441 RAVILLER	10/7/2005	6529831.524430	6529831.524430	1803323.207760	245125	1266	sf	79	cf
Infiltration BMP	Existing	7110 RIO FLORA	6/1/2010	6515643.202310	6515643.202310	1805187.382260	246104	1266	sf	79	cf
Infiltration BMP	Existing	7371 RIO HONDO PL	7/11/2005	6517283.740950	6517283.740950	1804924.767440	246104	1266	sf	79	cf
Infiltration BMP	Existing	10802 RIVES	3/23/2007	6519422.470020	6519422.470020	1803623.413330	246102	1266	sf	79	cf
Infiltration BMP	Existing	11916 RIVES	2/6/2007	6516737.168290	6516737.168290	1799258.165990	246079	1266	sf	79	cf
Infiltration BMP	Existing	10912 RYERSON	7/14/2005	6515882.754330	6515882.754330	1804962.955590	246104	1266	sf	79	cf
Infiltration BMP	Existing	9505 SAMOLINE	6/21/2010	6523279.038200	6523279.038200	1807936.970620	246106	1266	sf	79	cf
Infiltration BMP	Existing	9631 SAMOLINE	9/4/2007	6522855.010000	6522855.010000	1807250.890000	246103	1266	sf	79	cf
Infiltration BMP	Existing	12030 SAMOLINE	9/23/2005	6517133.868790	6517133.868790	1798177.361600	246079	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12238 SAMOLINE	9/8/2006	6516738.176240	6516738.176240	1796883.684630	246079	1266	sf	79	cf
Infiltration BMP	Existing	7915 SECOND	3/23/2006	6519374.854020	6519374.854020	1802382.905560	246102	1266	sf	79	cf
Infiltration BMP	Existing	7816 SEVENTH	3/27/2007	6519884.790380	6519884.790380	1804163.292550	246102	1266	sf	79	cf
Infiltration BMP	Existing	8646 SEVENTH	1/3/2006	6524439.566780	6524439.566780	1801605.289810	245119	1266	sf	79	cf
Infiltration BMP	Existing	9225 SIDEVIEW	4/24/2006	6531114.889310	6531114.889310	1804872.365930	245127	1266	sf	79	cf
Infiltration BMP	Existing	8810 SMALLWOOD	6/20/2005	6524153.815510	6524153.815510	1810188.858090	246106	1266	sf	79	cf
Infiltration BMP	Existing	9264 SONGFEST	6/10/2008	6531394.983570	6531394.983570	1804360.661210	245127	1266	sf	79	cf
Infiltration BMP	Existing	7838 SPRINGER	11/21/2006	6515530.871940	6515530.871940	1796818.950680	246079	1266	sf	79	cf
Infiltration BMP	Existing	7844 SPRINGER	3/18/2008	6515582.250000	6515582.250000	1796787.835000	246079	1266	sf	79	cf
Infiltration BMP	Existing	10517 STAMPS	8/18/2005	6522812.240000	6522812.240000	1803043.757460	246103	1266	sf	79	cf
Infiltration BMP	Existing	9520 STEWART & GRAY	2/27/2009	6526628.650930	6526628.650930	1796061.800920	245118	1266	sf	79	cf
Infiltration BMP	Existing	8840 STOAKES	7/15/2005	6527643.045070	6527643.045070	1808263.273840	245125	1266	sf	79	cf
Infiltration BMP	Existing	11831 SUSAN	5/25/2006	6514568.915250	6514568.915250	1801466.560490	246079	1266	sf	79	cf
Infiltration BMP	Existing	8354 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8356 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8358 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8360 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8362 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8364 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8366 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8368 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	7420 THIRD	9/20/2007	6517202.761340	6517202.761340	1803926.714420	246102	1266	sf	79	cf
Infiltration BMP	Existing	7964 THIRD	2/21/2006	6519886.681280	6519886.681280	1802225.378910	246102	1266	sf	79	cf
Infiltration BMP	Existing	9532 TWEEDY	4/20/2007	6523025.939870	6523025.939870	1807743.953100	246106	1266	sf	79	cf
Infiltration BMP	Existing	7347 VIA RIO NIDO	8/1/2007	6518199.953350	6518199.953350	1806523.073370	246104	1266	sf	79	cf
Infiltration BMP	Existing	10419 WILEY BURKE	1/2/2008	6519382.492080	6519382.492080	1805731.311650	246102	1266	sf	79	cf
Infiltration BMP	Existing	10442 WILEY BURKE	1/1/2007	6519428.439440	6519428.439440	1805422.866650	246102	1266	sf	79	cf
Infiltration BMP	Existing	12639 WOODRUFF	12/22/2006	6526127.737740	6526127.737740	1791800.878460	245113	1266	sf	79	cf
Infiltration BMP	Existing	12356 DOWNEY	4/29/2004	6518006.757310	6518006.757310	1794978.083160	245115	5062	sf	316	cf
Infiltration BMP	Existing	10613 NEWVILLE	4/21/2004	6528761.027810	6528761.027810	1798786.621380	245126	2531	sf	158	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10627 OLD RIVER SCHOOL	7/24/2003	6515233.048270	6515233.048270	1805631.128330	246104	174752	sf	10922	cf
Infiltration BMP	Existing	9215 HALL	12/9/2002	6524758.793890	6524758.793890	1797647.866960	245113	74592	sf	4662	cf
Infiltration BMP	Existing	10933 LAKEWOOD BLVD	10/5/2005	6524600.000000	6524600.000000	1800100.000000	245119	6400	sf	400	cf
Infiltration BMP	Existing	12322 SAMOLINE	7/8/2005	6516301.814120	6516301.814120	1796169.128220	246077	4256	sf	266	cf
Infiltration BMP	Existing	12731 LAKEWOOD	9/17/2003	6519215.285000	6519215.285000	1791371.090000	245115	2128	sf	133	cf
Infiltration BMP	Existing	12739 LAKEWOOD	9/17/2003	6519200.000000	6519200.000000	1791100.000000	245115	2128	sf	133	cf
Infiltration BMP	Existing	8927 BIRCHLEAF	7/11/2006	6527008.160170	6527008.160170	1808327.449830	246103	1056	sf	66	cf
Infiltration BMP	Existing	11929 POMERING	5/1/2006	6515108.241040	6515108.241040	1800149.473170	246079	1056	sf	66	cf
Infiltration BMP	Existing	12240 WOODRUFF	3/19/2010	6526758.991120	6526758.991120	1793878.747920	245118	300224	sf	18764	cf
Infiltration BMP	Existing	12222 WOODRUFF	9/14/2009	6526625.121210	6526625.121210	1794009.479990	245118	70200	sf	4388	cf
Infiltration BMP	Existing	7624 FIRESTONE	1/1/2008	6517500.000000	6517500.000000	1802600.000000	246079	41632	sf	2602	cf
Infiltration BMP	Existing	7714 STEWART & GRAY	4/9/2007	6516397.756580	6516397.756580	1799563.749470	246079	30016	sf	1876	cf
Infiltration BMP	Existing	9637 LAKEWOOD	10/2/2008	6526780.802630	6526780.802630	1805111.536210	245125	15136	sf	946	cf
Infiltration BMP	Existing	12428 BENEDICT	6/14/2007	6525687.022380	6525687.022380	1792528.538110	245114	8080	sf	505	cf
Infiltration BMP	Existing	7774 DINSDALE	2/14/2014	6521332.495780	6521332.495780	1806385.183840	246103	4680	sf	293	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8030 IMPERIAL HWY	2/14/2014	6515729.368090	6515729.368090	1794471.493939	246077	41789	sf	2000	cf
Infiltration BMP	Existing	9623 IMPERIAL HWY	2/14/2014	6524482.209740	6524482.209740	1792569.983950	245114	35408	sf	2213	cf
Infiltration BMP	Existing	10531 LAKEWOOD BL	2/14/2014	6525178.634060	6525178.634060	1801497.338680	245119	5840	sf	365	cf
Infiltration BMP	Existing	8121 FOURTH ST	2/14/2014	6521147.926450	6521147.926450	1802216.858440	246103	4680	sf	293	cf
Infiltration BMP	Existing	8123 FOURTH ST	2/14/2014	6521147.926450	6521147.926450	1802216.858440	246103	4680	sf	293	cf
Infiltration BMP	Existing	8555 TENTH ST	2/14/2014	6524962.328390	6524962.328390	1803501.510410	245119	4680	sf	293	cf
Infiltration BMP	Existing	9356 BUELL ST	2/14/2014	6527425.774610	6527425.774610	1799078.145910	245126	3120	sf	195	cf
Infiltration BMP	Existing	8449 COLE ST	2/14/2014	6520362.597670	6520362.597670	1796910.373080	245115	1560	sf	98	cf

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D1.3. City of Lakewood

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Filterra Tree Wells (2)		Paramount & Arbor	33.843398	-118.159673	445521				
Infiltration BMP	Existing	Retention Basin at Cherry Cove Park			33.850296	-118.165478	446014				

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D1.4. City of Paramount

Type of BMP	Existing or Planned ?	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioswales	Existing	Landscape Swale	2012	Texaco/Alondra	33.889066	-118.171849	606071	37,500	sf	2109	cf
Bioswales	Existing	Landscape Swale	2012	Orange/Windmill	33.891602	-118.177436	606072	0.6	ac	1470	cf

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D1.5. City of Pico Rivera

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Site-Scale Detention Basin	Existing	French drains at Smith Park	2013	6016 Rosemead Blvd				16	ac		
Site-Scale Detention Basin	Existing	French drains at Rio Vista	2013	Coffman Pico Road				7	ac		
Bioswales	Existing	Beverly Boulevard medians	2012	Beverly Blvd				5280	sf		
Permeable Pavement	Existing	Pico Park permeable pavement	2012	9528 Beverly Blvd				12	ac		
Bioswales	Existing	Telegraph Road medians	2013	Telegraph Rd from Rosemead Blvd to Eastside limit				5280	sf		
Bioswales	Planned	Paramount Blvd medians	2016	Paramount Blvd from Whittier Blvd to Mines Ave				5280	sf		
Infiltration BMPs	Planned	Two (2) Filterra Systems	2016	various				1	ac		
Infiltration BMPs	Existing	City of Pico Rivera City Hall	2011	8615 Passons Blvd				2.75	ac		
Infiltration BMPs	Existing	Rivera Park	2012	9530 Shade Lane				16	ac		

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D1.6. City of Signal Hill

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration		Palm Drive Business Center	2/19/2008	2445 N Palm Drive	33.801973	-118.157962	775510	1	ac		
Bioretention / Biofiltration		Aragon Townhomes & Duplexes (City View)	3/9/2007	1902 (1890) Oribaza Ave	33.790924	-118.156725	776003	93,780	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2755 California Avenue	33.807881	-118.181769	776011	9,583	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2756 California Avenue	33.807881	-118.181769	776011	17,424	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2757 California Avenue	33.807881	-118.181769	776011	33,106	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2758 California Avenue	33.807881	-118.181769	776011	10,454	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2759 California Avenue	33.807881	-118.181769	776011	78,486	sf		
Bioretention / Biofiltration		2-Story Building and Parking Lot	12/28/2010	2653 Walnut Avenue	33.805754	-118.171978	776012	0.51	ac		
Bioretention / Biofiltration		EDCO Administrative Terminal	8/1/2011	950 27th Street	33.806179	-118.1812	776012	9583	sf	0.06	cfs
Bioretention / Biofiltration		EDCO Administrative Terminal	8/2/2011	951 27th Street	33.806179	-118.1812	776012	17424	sf	0.08	cfs
Bioretention / Biofiltration		EDCO Administrative Terminal	8/3/2011	952 27th Street	33.806179	-118.1812	776012	33106	sf	0.14	cfs
Bioretention / Biofiltration		EDCO Administrative Terminal	8/4/2011	953 27th Street	33.806179	-118.1812	776012	10454	sf	0.08	cfs
Bioretention / Biofiltration		Fantasy Castle	6/30/2009	2801 Walnut Ave	33.808289	118.171777		1,584	sf		
Bioswales	Existing	Fresh and Easy Neighborhood Market	11/16/2010	3300 Atlantic Avenue	33.817504	-118.184643	485510	18,000	sf	931	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioswales	Existing	Fresh and Easy Neighborhood Market	11/17/2010	3301 Atlantic Avenue	33.817504	-118.184643	485510	120	sf	7	cf
Bioswales	Existing	Fresh and Easy Neighborhood Market	11/18/2010	3302 Atlantic Avenue	33.817504	-118.184643	485510	10,904	sf	542	cf
Bioswales	Existing	Signal Hill Police Station and Emergency Operation	5/26/2011	2745 Walnut Avenue	33.807067	-118.171984	775510	115,870	sf		
Bioswales	Existing	Jack in the Box	10/21/2008	802 Spring Street	33.812049	-118.182595	775510	12,000	sf		
Bioswales		Boiler Tech Warehouse	10/2/2009	2503 Cerritos Avenue	33.802564	-118.177391	776002	6,754	sf		
Bioswales		Aragon Townhomes & Duplexes (City View)	3/11/2007	1904 (1890) Oribaza Ave	33.790924	-118.156725	776003	31,100	sf		
Bioswales		Fantasy Castle	6/29/2009	2800 Walnut Ave	33.808289	118.171777		32,883	sf		
Flow-Through Treatment BMP	Existing	Petco, Party City	3/3/2009	3100 Atlantic Ave	33.813946	-118.184789	485510				
Flow-Through Treatment BMP	Existing	Petco, Party City	3/4/2009	3101 Atlantic Ave	33.813946	-118.184789	485510				
Flow-Through Treatment BMP	Existing	The Home Depot		3100 Atlantic Avenue	33.813946	-118.184789	485510	3.65	ac		
Flow-Through Treatment BMP	Existing	The Home Depot		3101 Atlantic Avenue	33.813946	-118.184789	485510	7.99	ac		
Flow-Through Treatment BMP	Existing	The Home Depot		3102 Atlantic Avenue	33.813946	-118.184789	485510	3.28	ac		

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	The Home Depot		3103 Atlantic Avenue	33.813946	-118.184789	485510	4.79	ac		
Flow-Through Treatment BMP		Palm Drive Business Center	2/20/2008	2446 N Palm Drive	33.801973	-118.157962	775510	7,000	sf		
Flow-Through Treatment BMP	Existing	Fresh & Easy	11/17/2009	2475 Cherry Avenue	33.802363	-118.168152	775510	0.68	ac		
Flow-Through Treatment BMP	Existing	Fresh & Easy	11/18/2009	2476 Cherry Avenue	33.802363	-118.168152	775510	0.58	ac		
Flow-Through Treatment BMP	Existing	US Bank	9/17/2008	2615 Cherry Ave	33.804856	-118.167999	775510	18732	sf		
Flow-Through Treatment BMP	Existing	Signal Hill Industrial Center		2665-2745 Temple Ave	33.80648	-118.159782	775510	143,312	sf		
Flow-Through Treatment BMP	Existing	Tanker Interior Washing Facility		1710 E 29th Street	33.80935	-118.170824	775510	10,000	sf		
Flow-Through Treatment BMP	Existing	Delius Restaurant	7/14/2006	2951 Cherry Ave	33.81111	-118.168077	775510	32,000	sf		
Flow-Through Treatment BMP	Existing	Jack in the Box	10/20/2008	801 Spring Street	33.812049	-118.182595	775510	12,000	sf		

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Target (T-2319)	2/13/2007	950 E 33rd Street	33.816767	-118.181488	775510	178,600	sf		
Flow-Through Treatment BMP	Existing	Hawk Industries	5/8/2007	1245 E. 23rd Street	33.799126	-118.17577	776002	27,322	sf		
Flow-Through Treatment BMP	Existing	Hawk Industries	5/9/2007	1246 E. 23rd Street	33.799126	-118.17577	776002	1575	sf		
Flow-Through Treatment BMP		Boiler Tech Warehouse	9/30/2009	2501 Cerritos Avenue	33.802564	-118.177391	776002	6,754	sf		
Flow-Through Treatment BMP	Existing	Las Brisas II Community Housing	1/11/2006	2400-2418 California Ave	33.803504	-118.180639	776002	16,247	sf		
Flow-Through Treatment BMP	Existing	Las Brisas II Community Housing	1/12/2006	2400-2418 California Ave	33.803504	-118.180639	776002	25,047	sf		
Flow-Through Treatment BMP	Existing	Villagio	12/5/2005	2550 Gundry Ave	33.803577	-118.173289	776002	61,000	sf		
Flow-Through Treatment BMP	Existing	Villagio	12/6/2005	2551 Gundry Ave	33.803577	-118.173289	776002	30,492	sf		
Flow-Through Treatment BMP	Existing	Villagio	12/7/2005	2552 Gundry Ave	33.803577	-118.173289	776002	4,356	sf		

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP		Aragon Townhomes & Duplexes (City View)	3/6/2007	1899 (1890) Oribaza Ave	33.790924	-118.156725	776003	31,350	sf		
Flow-Through Treatment BMP		Aragon Townhomes & Duplexes (City View)	3/7/2007	1900 (1890) Oribaza Ave	33.790924	-118.156725	776003	63,400	sf		
Flow-Through Treatment BMP		In-N-Out Burger	5/27/2011	799 E. Spring Street	33.812066	-118.183197	776011	65,220	sf		
Flow-Through Treatment BMP		Shoreline Fabricators	8/1/2007	2652 Gundry Ave	33.805493	-118.173804	776012	16,300	sf		
Flow-Through Treatment BMP		Shoreline Fabricators	8/2/2007	2653 Gundry Ave	33.805493	-118.173804	776012	1,395	sf		
Flow-Through Treatment BMP		2-Story Building and Parking Lot	12/29/2010	2654 Walnut Avenue	33.805754	-118.171978	776012				
Flow-Through Treatment BMP		Islamic Center	5/29/2009	996 27th St	33.806216	-118.180729	776012	5000	sf		
Flow-Through Treatment BMP		Crescent Square Development	8/10/2007	1600-1799 Green House Place				136,955	sf		
Infiltration BMPs	Existing	Fresh & Easy	11/19/2009	2477 Cherry Avenue	33.802363	-118.168152	775510	76,143	sf		
Infiltration BMPs	Existing	US Bank	9/19/2008	2617 Cherry Ave	33.804856	-118.167999	775510	18732	sf		

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMPs	Planned	Applebee's	3/12/2013	899 E. Spring Street	33.812089	-118.181855	775510	23,580	sf		
Infiltration BMPs	Existing	Hawk Industries	5/10/2007	1247 E. 23rd Street	33.799126	-118.17577	776002	27,322	sf		
Infiltration BMPs		Boiler Tech Warehouse	10/1/2009	2502 Cerritos Avenue	33.802564	-118.177391	776002	6,754	sf		
Infiltration BMPs		Pacific Walk	1/4/2011	PCH and Orizaba Avenue	33.789847	-118.156748	776003	100,200	sf		
Infiltration BMPs		Pacific Walk	1/5/2011	PCH and Orizaba Avenue	33.789847	-118.156748	776003	149,015	sf		
Infiltration BMPs		Pacific Walk	1/6/2011	PCH and Orizaba Avenue	33.789847	-118.156748	776003	1,300	sf		
Infiltration BMPs		Aragon Townhomes & Duplexes (City View)	3/8/2007	1901 (1890) Oribaza Ave	33.790924	-118.156725	776003	94,750	sf		
Infiltration BMPs		Aragon Townhomes & Duplexes (City View)	3/10/2007	1903 (1890) Oribaza Ave	33.790924	-118.156725	776003	93,780	sf		
Infiltration BMPs	Planned	Willow Street Medical Office Building	12/9/2013	845 E. Willow Street	33.804664	-118.182279	776009	22,651	sf	1095	cf
Infiltration BMPs	Planned	Willow Street Medical Office Building	12/10/2013	846 E. Willow Street	33.804664	-118.182279	776009	37,304	sf	1890	cf
Infiltration BMPs		In-N-Out Burger	5/28/2011	800 E. Spring Street	33.812066	-118.183197	776011	65,220	sf	3425	cf
Infiltration BMPs		Shoreline Fabricators	8/3/2007	2654 Gundry Ave	33.805493	-118.173804	776012	16,300	sf		
Infiltration BMPs		Islamic Center	5/28/2009	995 27th St	33.806216	-118.180729	776012	5000	sf		
Infiltration BMPs	Existing	A & A Ready Mix Concrete	8/1/2007	900 E. Patterson	33.806664	-118.182206	776012	2	ac		
Permeable Pavement	Existing	US Bank	9/18/2008	2616 Cherry Ave	33.804856	-118.167999	775510	60	sf		

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Permeable Pavement	Existing	Hawk Industries	5/11/2007	1248 E. 23rd Street	33.799126	-118.17577	776002	5,628	sf		

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D1.7. City of South Gate

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration		Self Storage	9/15/2008	2405 Southern Ave	33.953436	-118.229363	796034	0.25	ac		
Bioretention / Biofiltration		Hollydale Plaza	3/30/2010	12222 Garfield Avenue	33.915655	-118.168383	796076	15,278	sf		
Bioretention / Biofiltration		Atlantic Avenue Improvements	4/21/2010	Atlantice from Abbott to Firestone	33.943066	-118.181112	796084	7.44	ac		
Bioretention / Biofiltration	Planned	azalea	11/25/2012	4641 Firestone Blvd.	33.952413	-118.187909	796084	7,328	sf	0.22	cfs
Bioswales		South Gate McDonald's	9/30/2013	3313 Tweedy Boulevard	33.945113	-118.211464	796034	5,119	sf		
Bioswales		South Gate McDonald's	10/1/2013	3314 Tweedy Boulevard	33.945113	-118.211464	796034	5,545	sf		
Bioswales		Commercial Center	10/4/2010	9200 Califlornia Avenue	33.950805	-118.206221	796034	12,367	sf		
Bioswales		Commercial Center	10/5/2010	9201 Califlornia Avenue	33.950805	-118.206221	796034	4,263	sf		
Bioswales		Hot Mix Asphalt Plant	5/11/2001	5626 Southern Avenue	33.944913	-118.168148	796083	2.7	ac		
Bioswales		Goals Soccer Centers - South Gate	2/9/2010	9599 Pinehurst Avenue	33.945107	-118.182378	796084	53,142	sf		
Flow-Through Treatment BMP	Existing	South Gate McDonald's	9/26/2013	3309 Tweedy Boulevard	33.945113	-118.211464	796034	2,394	sf		
Flow-Through Treatment BMP		South Gate McDonald's	9/28/2013	3311 Tweedy Boulevard	33.945113	-118.211464	796034	2,436	sf		

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Walgreens	7/24/2006	9830 Long Beach	33.946082	-118.215937	796034	48,725	sf		
Flow-Through Treatment BMP	Existing	King's Car Wash	11/29/2006	9801-9807 Long Beach Blvd	33.946452	-118.216775	796034	10,461	sf		
Flow-Through Treatment BMP		King's Car Wash	12/1/2006	9801-9807 Long Beach Blvd	33.946452	-118.216775	796034				
Flow-Through Treatment BMP	Existing	Sarina Townhomes	2/12/2007	9321 State Street	33.950368	-118.21325	796034	14,375	sf		
Flow-Through Treatment BMP		Commercial Center	10/6/2010	9202 Califlornia Avenue	33.950805	-118.206221	796034	16,630	sf		
Flow-Through Treatment BMP		Office Bldg	12/20/2007	3830 Firestone Blvd	33.953324	-118.201934	796034	1,000	sf		
Flow-Through Treatment BMP		Office Bldg	12/21/2007	3831 Firestone Blvd	33.953324	-118.201934	796034	112,000	sf		
Flow-Through Treatment BMP		Office Bldg	12/20/2007	3800 Firestone Blvd	33.95348	-118.202386	796034	1,000	sf		
Flow-Through Treatment BMP		Office Bldg	12/21/2007	3801 Firestone Blvd	33.95348	-118.202386	796034	112,000	sf		

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Planned	Calden Court Appartments	9/27/2013	8901 Calden Avenue	33.95515	-118.228736	796034	219,543	sf		
Flow-Through Treatment BMP		Hollydale Plaza	3/31/2010	12223 Garfield Avenue	33.915655	-118.168383	796076	27,381	sf		
Flow-Through Treatment BMP	Existing	Sherwin Inc	4/10/2007	5530 Borwick Ave	33.925749	-118.172611	796082	7,892	sf		
Flow-Through Treatment BMP		Hot Mix Asphalt Plant	5/10/2001	5625 Southern Avenue	33.944913	-118.168148	796083	9.5	ac		
Flow-Through Treatment BMP		Atlantic Avenue Improvements	4/22/2010	Atlantice from Abbott to Firestone	33.943066	-118.181112	796084	13.32	ac		
Flow-Through Treatment BMP		Goals Soccer Centers - South Gate	2/11/2010	9601 Pinehurst Avenue	33.945107	-118.182378	796084	70,036	sf		
Flow-Through Treatment BMP		Goals Soccer Centers - South Gate	2/12/2010	9602 Pinehurst Avenue	33.945107	-118.182378	796084	37,897	sf		
Flow-Through Treatment BMP		Goals Soccer Centers - South Gate	2/13/2010	9603 Pinehurst Avenue	33.945107	-118.182378	796084	63,400	sf		
Flow-Through Treatment BMP	Planned	azalea	11/24/2012	4640 Firestone Blvd.	33.952413	-118.187909	796084	1,583,819	sf		

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Interior Removal Specialist Demolition	5/21/2007	9309 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Interior Removal Specialist Demolition	5/22/2007	9310 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Interior Removal Specialist Demolition	5/23/2007	9311 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Interior Removal Specialist Demolition	5/24/2007	9312 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Petrochem Manufacturing	12/18/2006	8401 Quartz	33.957949	-118.191835	796090	162,305	sf		
Flow-Through Treatment BMP		Petrochem Manufacturing	12/19/2006	8402 Quartz	33.957949	-118.191835	796090	51,401	sf		
Infiltration BMPs		South Gate McDonald's	9/27/2013	3310 Tweedy Boulevard	33.945113	-118.211464	796034	2,394	sf		
Infiltration BMPs		South Gate McDonald's	9/29/2013	3312 Tweedy Boulevard	33.945113	-118.211464	796034	2,436	sf		
Infiltration BMPs		South Gate McDonald's	10/4/2013	3317 Tweedy Boulevard	33.945113	-118.211464	796034	3,743	sf		
Infiltration BMPs		King's Car Wash	11/30/2006	9801-9807 Long Beach Blvd	33.946452	-118.216775	796034	3,047	sf		
Infiltration BMPs		Sarina Townhomes	2/13/2007	9322 State Street	33.950368	-118.21325	796034	17,519	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMPs		Office Bldg	12/22/2007	3832 Firestone Blvd	33.953324	-118.201934	796034	112,000	sf		
Infiltration BMPs		Office Bldg	12/22/2007	3802 Firestone Blvd	33.95348	-118.202386	796034	112,000	sf		
Infiltration BMPs	Existing	Family Dollar	10/8/2012	3610 Firestone	33.95374	-118.204546	796034		sf		
Infiltration BMPs	Planned	Calden Court Appartments	9/28/2013	8902 Calden Avenue	33.95515	-118.228736	796034	219,543	sf		
Infiltration BMPs		South Gate Ward Building New Parking Lot	10/15/2010	2771 Liberty Boulevard	33.961969	-118.220918	796034	14,811	sf		
Infiltration BMPs		Sherwin Inc	4/11/2007	5531 Borwick Ave	33.925749	-118.172611	796082	7,892	sf		
Infiltration BMPs		Atlantic Avenue Improvements	4/23/2010	Atlantice from Abbott to Firestone	33.943066	-118.181112	796084	22,400	sf		
Infiltration BMPs		Batting Cages	11/4/2010	9599 Pinehurst Avenue	33.945107	-118.182378	796084	7,953	sf		
Infiltration BMPs		Goals Soccer Centers - South Gate	2/10/2010	9600 Pinehurst Avenue	33.945107	-118.182378	796084	113	sf		
Infiltration BMPs		Goals Soccer Centers - South Gate	2/14/2010	9604 Pinehurst Avenue	33.945107	-118.182378	796084	171,333	sf		
Infiltration BMPs	Planned	azalea	11/19/2012	4635 Firestone Blvd.	33.952413	-118.187909	796084	444,636	sf	31,365	cf
Infiltration BMPs	Planned	azalea	11/20/2012	4636 Firestone Blvd.	33.952413	-118.187909	796084	110,869	sf	12,946	cf
Infiltration BMPs	Planned	azalea	11/21/2012	4637 Firestone Blvd.	33.952413	-118.187909	796084	582,860	sf	72,234	cf
Infiltration BMPs	Planned	azalea	11/22/2012	4638 Firestone Blvd.	33.952413	-118.187909	796084	222,727	sf	25,348	cf
Infiltration BMPs	Planned	azalea	11/23/2012	4639 Firestone Blvd.	33.952413	-118.187909	796084	222,727	sf	64,314	cf

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Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMPs	Existing	New South Central Properties, LLC	5/28/2009	8600 Rheem Ave	33.955566	-118.192042	796084	20,960	sf		
Infiltration BMPs		LA Water	8/4/2010	9415 Burtis	33.947369	-118.176109	796350	154,538	sf		
Permeable Pavement		South Gate McDonald's	10/2/2013	3315 Tweedy Boulevard	33.945113	-118.211464	796034	8,697	sf		
Permeable Pavement		South Gate McDonald's	10/3/2013	3316 Tweedy Boulevard	33.945113	-118.211464	796034	3,550	sf		

D1.8. City of Whittier

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration	Planned	GWT Biolswale	2014	Greenway Trail from to	33.972121	-118.044253	895098				
Bioretention / Biofiltration	Planned	Whittier Blvd Widening and Bioswale	2017	Whittier Blvd from to							
Green Streets (Describe)	Planned	Lower Uptown reverse drains	2014	Milton, Newlin, Comstock from La Cuarta to Walnut	33.970199	-118.039721	895098		TBD		TBD
Site-Scale Detention Basin	Existing	Police Building and City Hall Storm Drainage	2010	13230 Penn St	33.974748	-118.03371	895098				

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Attachment E: SUPPORTING CALIBRATION DATA

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

June 6, 2014

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1. Lower San Gabriel River

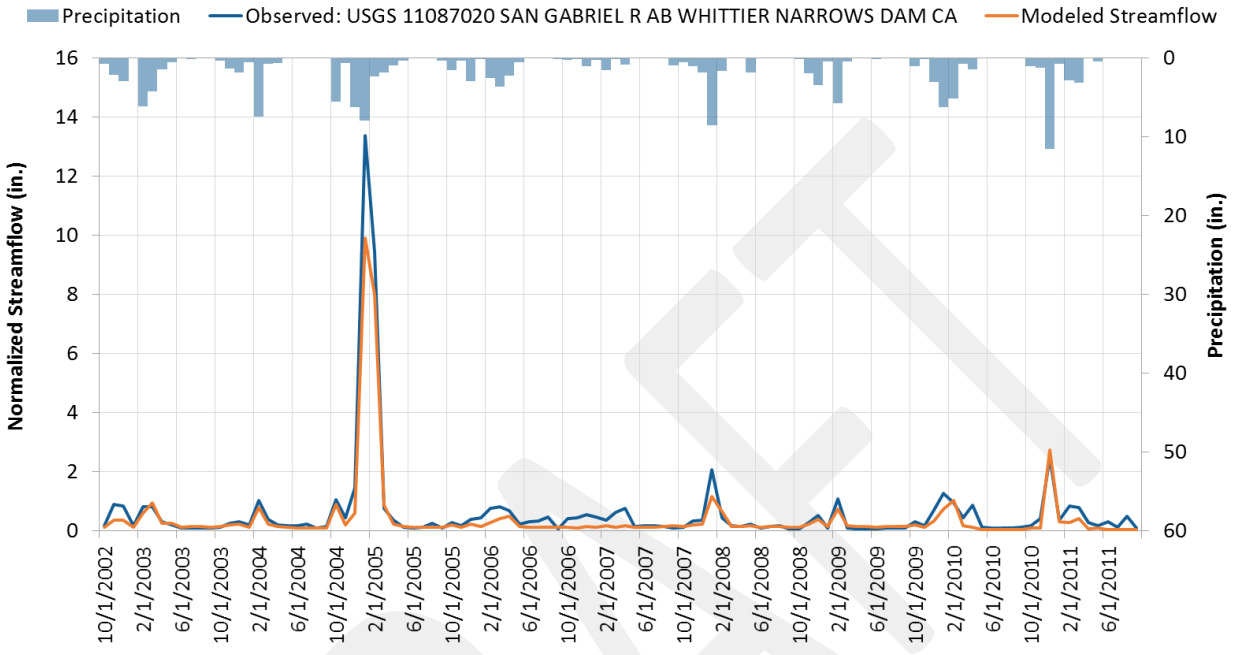


Figure 1. Monthly hydrograph for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

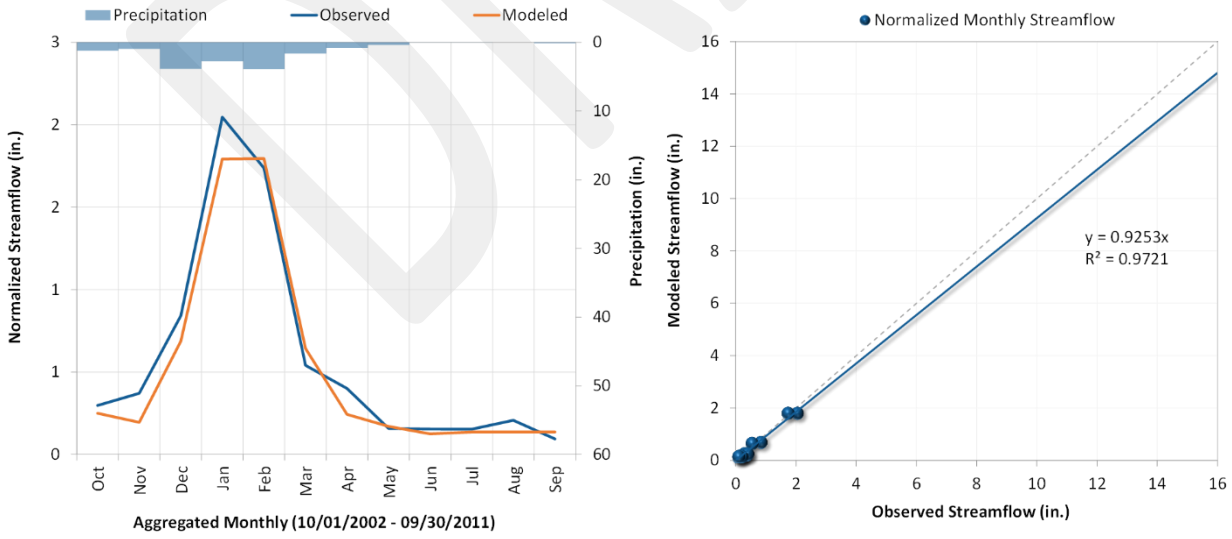


Figure 2. Aggregated monthly hydrograph for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

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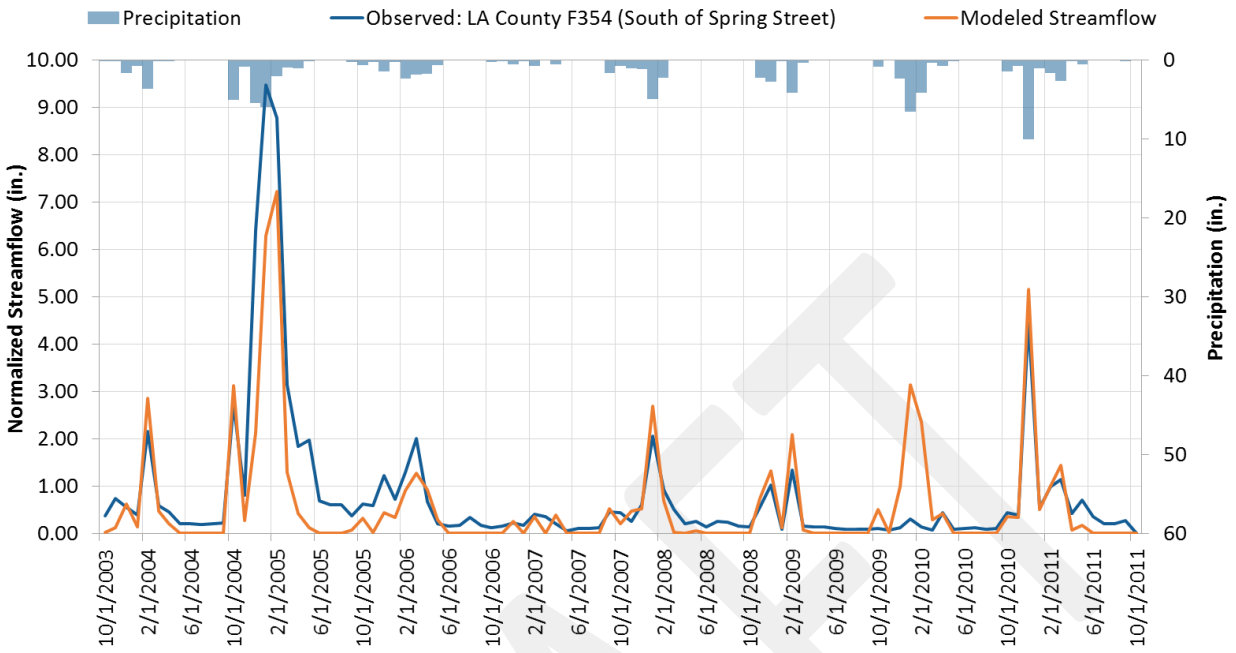


Figure 3. Monthly hydrograph for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

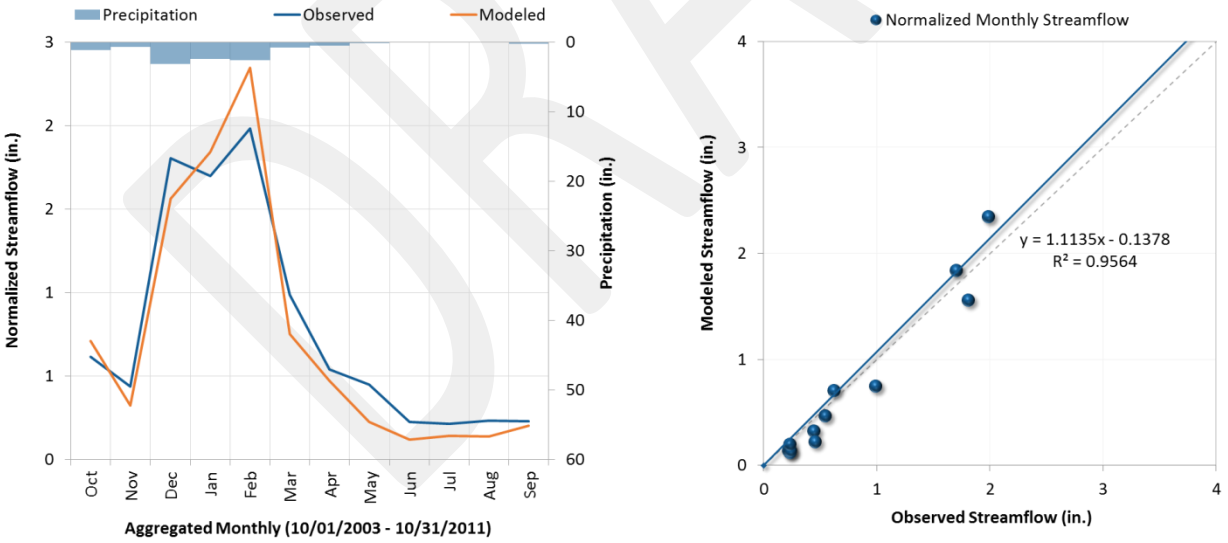


Figure 4. Aggregated monthly hydrograph for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

Table 1. Summary of water quality data evaluated for the Lower San Gabriel River

Gage	Constituent	Minimum	Q1	Median	Q3	Maximum
S14	Total Copper (ug/l)	5.0	10.5	13.1	23.9	81.4
S13	Total Copper (ug/l)	0.5	11.8	28.1	48.3	351.0
S14	Total Lead (ug/l)	0.7	1.4	2.9	8.2	56.0
S13	Total Lead (ug/l)	0.2	1.1	10.2	19.2	147.0
S14	TSS (mg/L)	5.0	16.8	38.0	169.8	1258.0
S13	TSS (mg/L)	1.0	48.0	97.0	230.5	1556.0
S14	Total Zinc (ug/l)	19.8	36.6	61.0	86.9	440.0
S13	Total Zinc (ug/l)	1.0	62.0	135.0	241.5	2010.0
S14	Fecal Coliform (MPN/100mL)	20	300	1,300	50,000	16,000,000
S13	FC (MPN/100mL)	20	1,300	16,000	90,000	2,200,000
S14	Total Nitrogen (mg/l)	-	-	-	-	-
S13	Total Nitrogen (mg/l)	-	-	-	-	-
S14	Total Phosphorous (mg/l)	0.05	0.11	0.18	0.41	0.86
S13	Total Phosphorous (mg/l)	-	-	-	-	-

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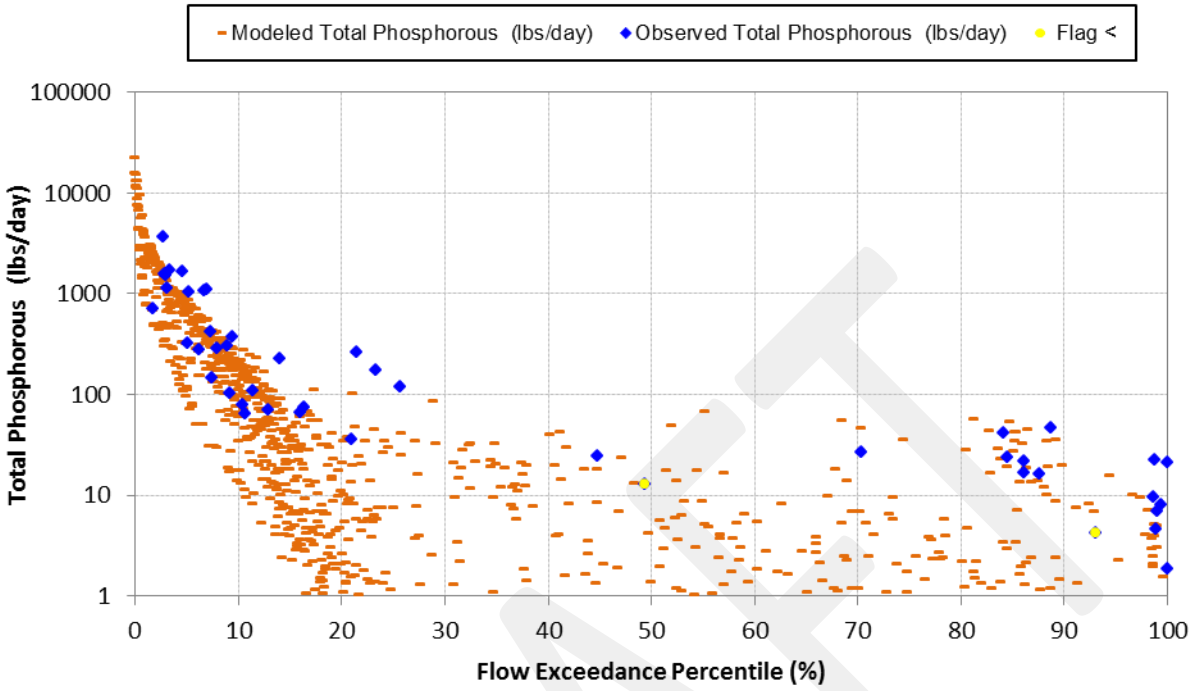


Figure 5. Simulated vs. observed load duration plots for Total Phosphorous (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

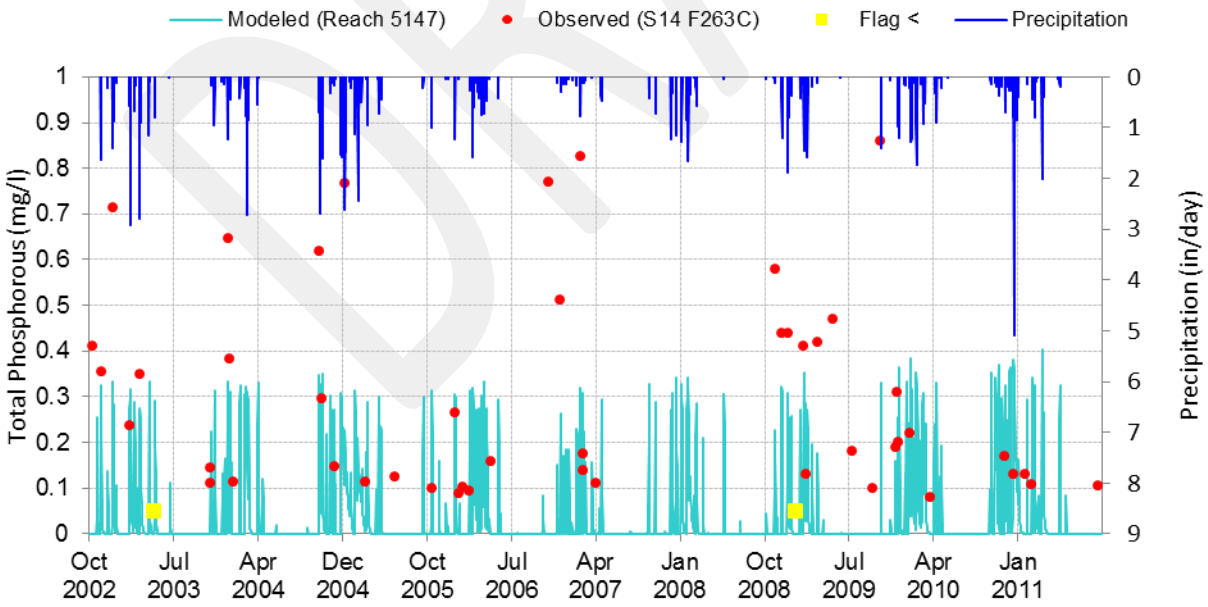


Figure 6. Simulated vs. observed time series plots for Total Phosphorous (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

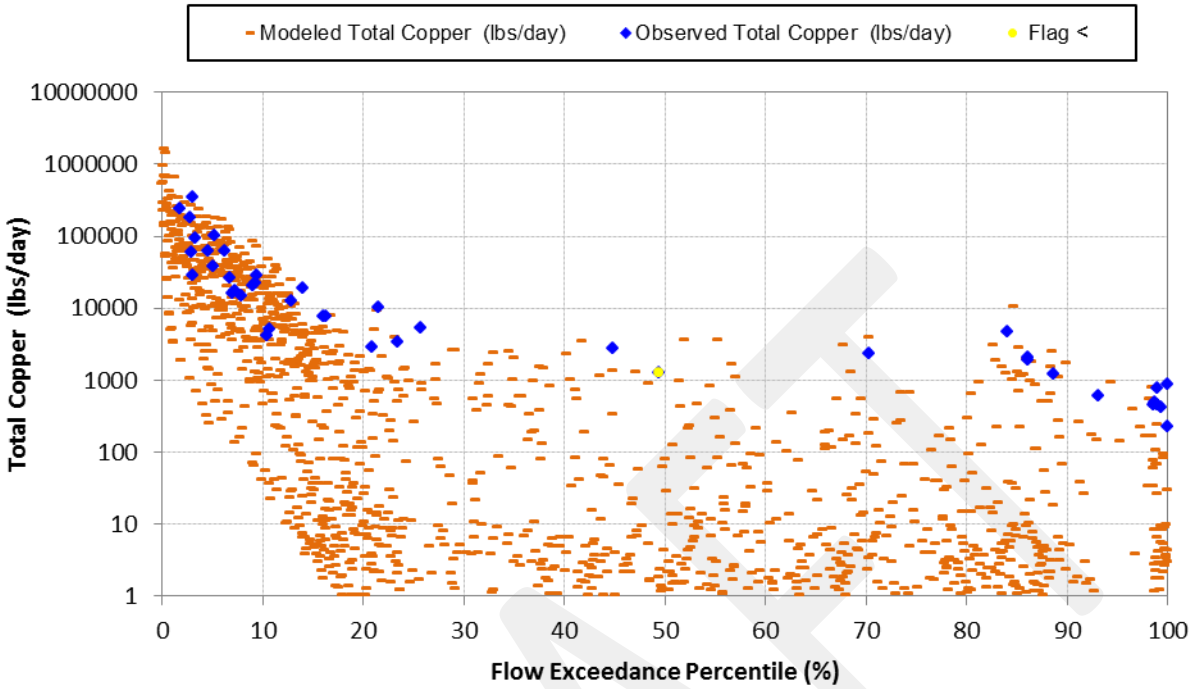


Figure 7. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

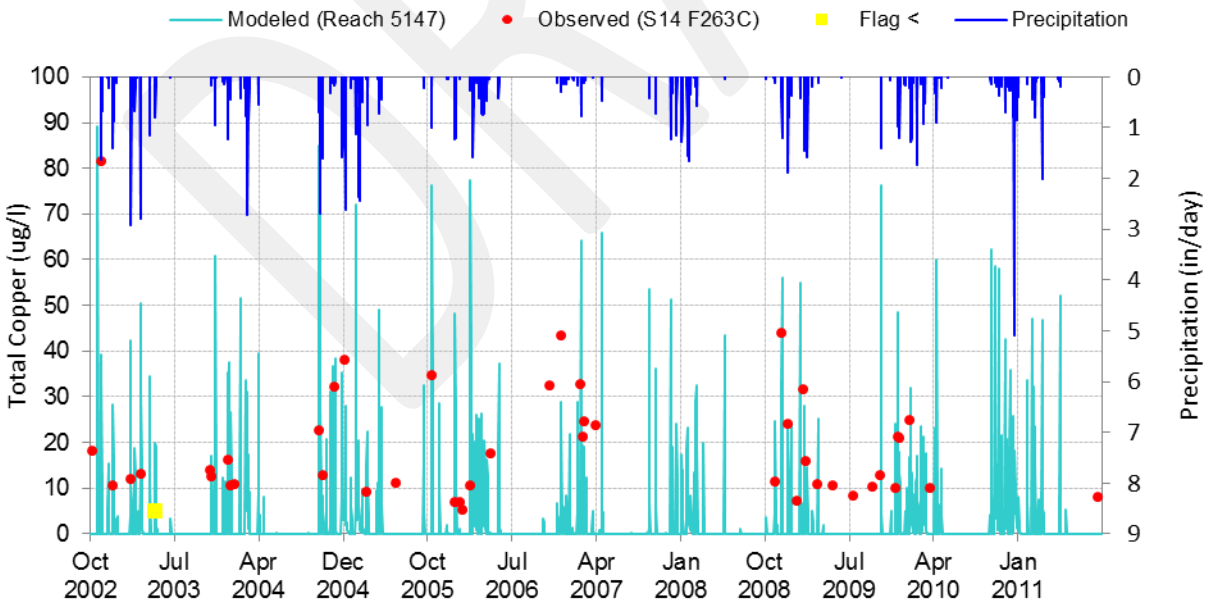


Figure 8. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

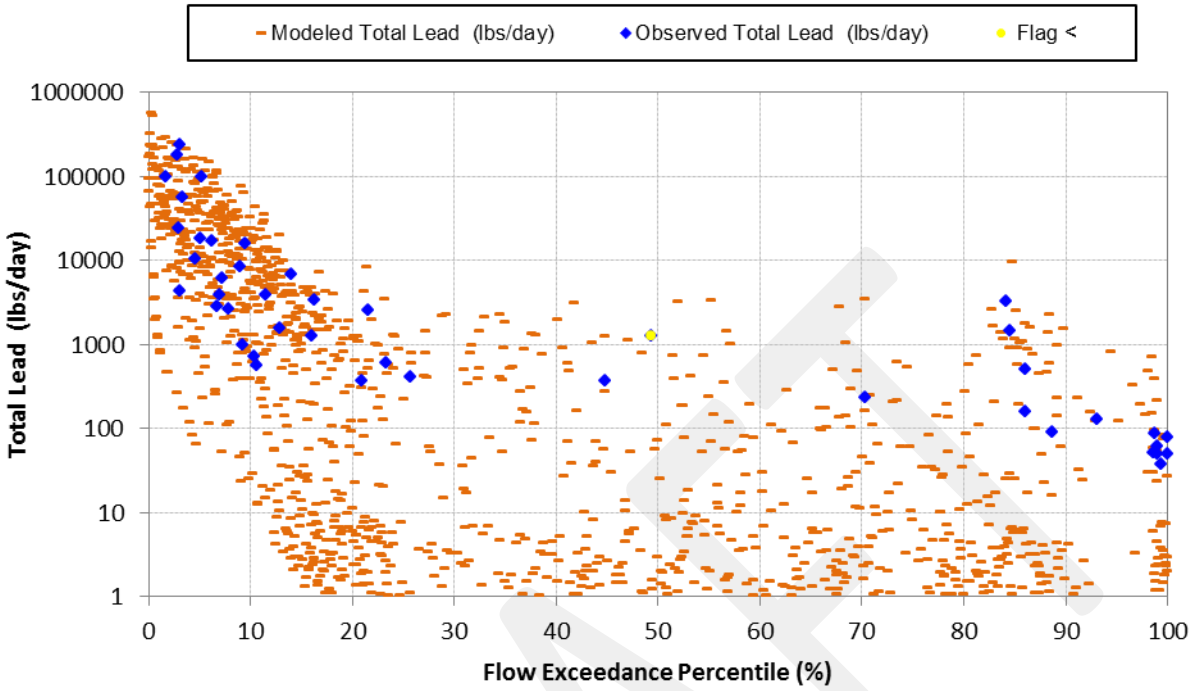


Figure 9. Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

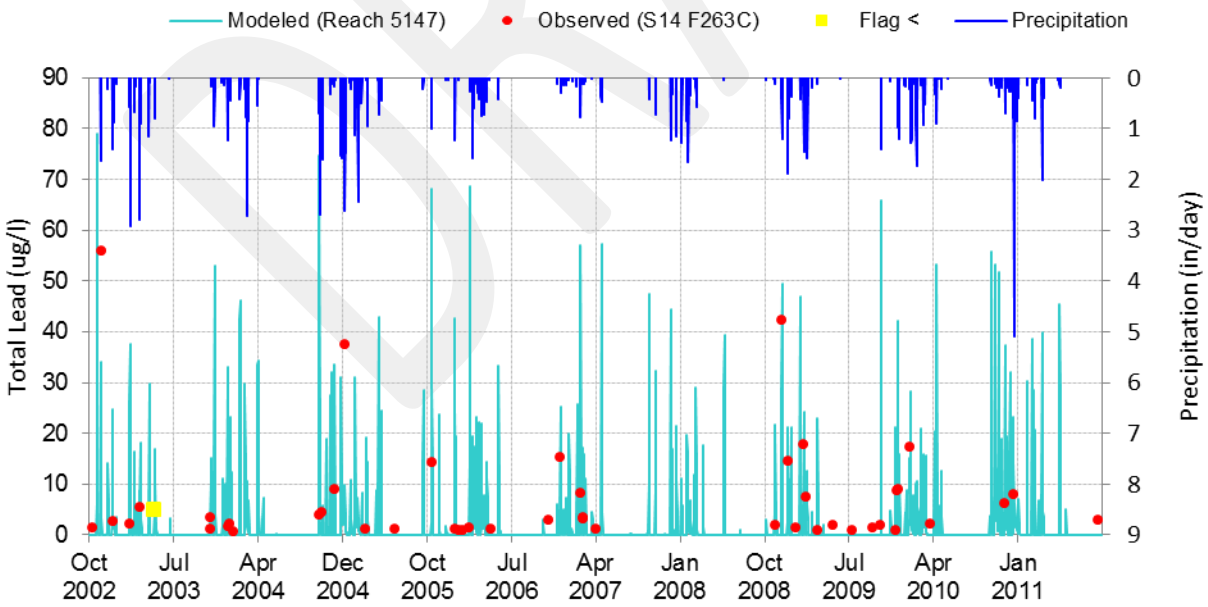


Figure 10. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

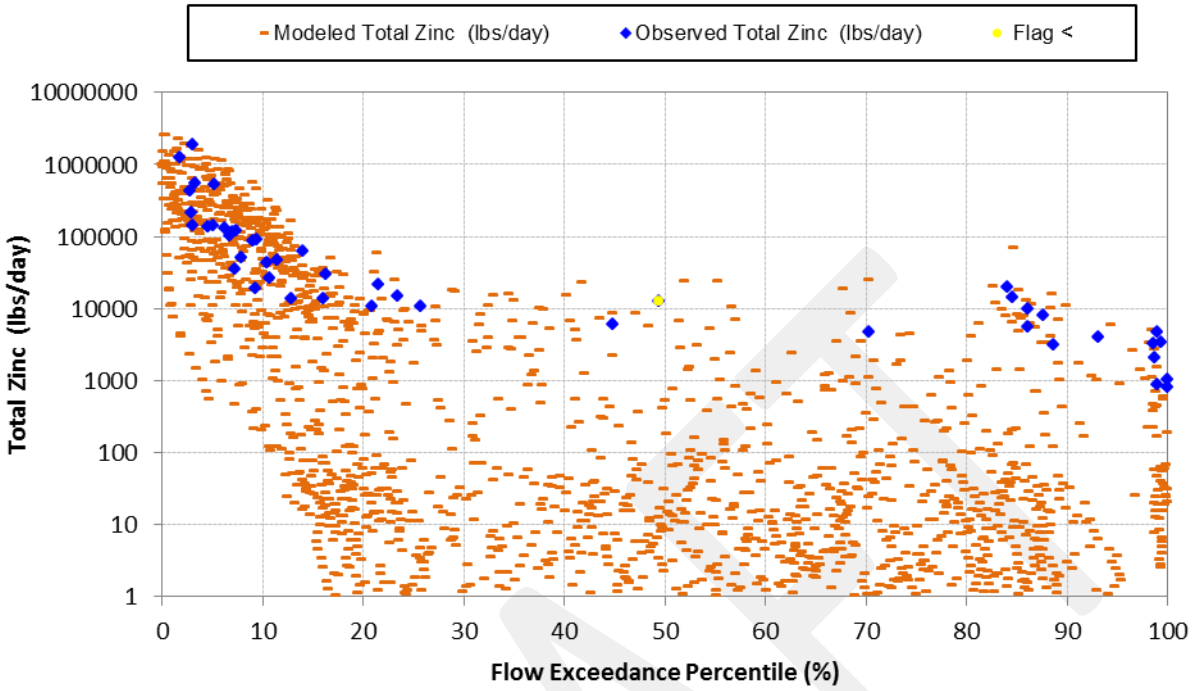


Figure 11. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

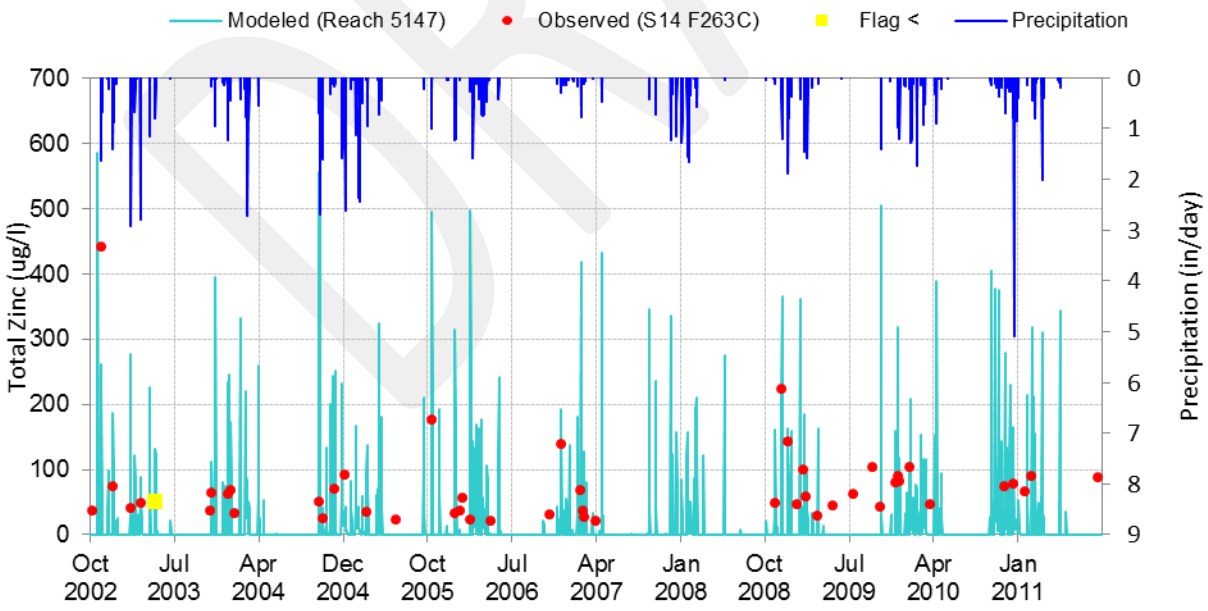


Figure 12. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

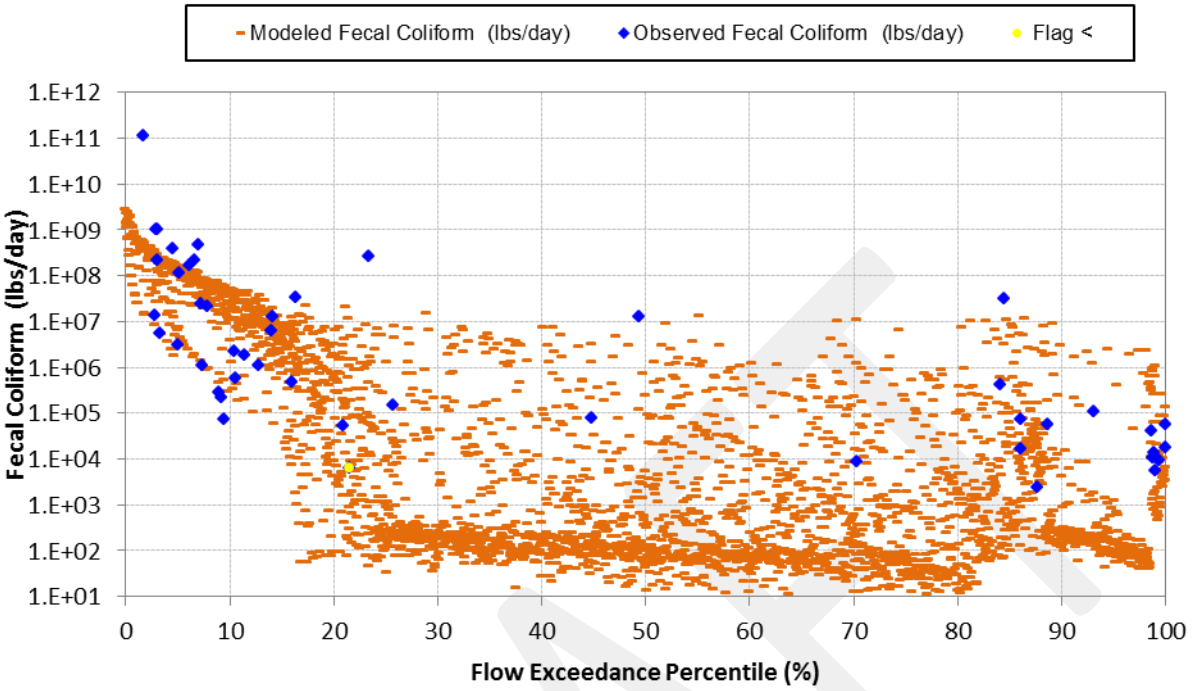


Figure 13. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011).

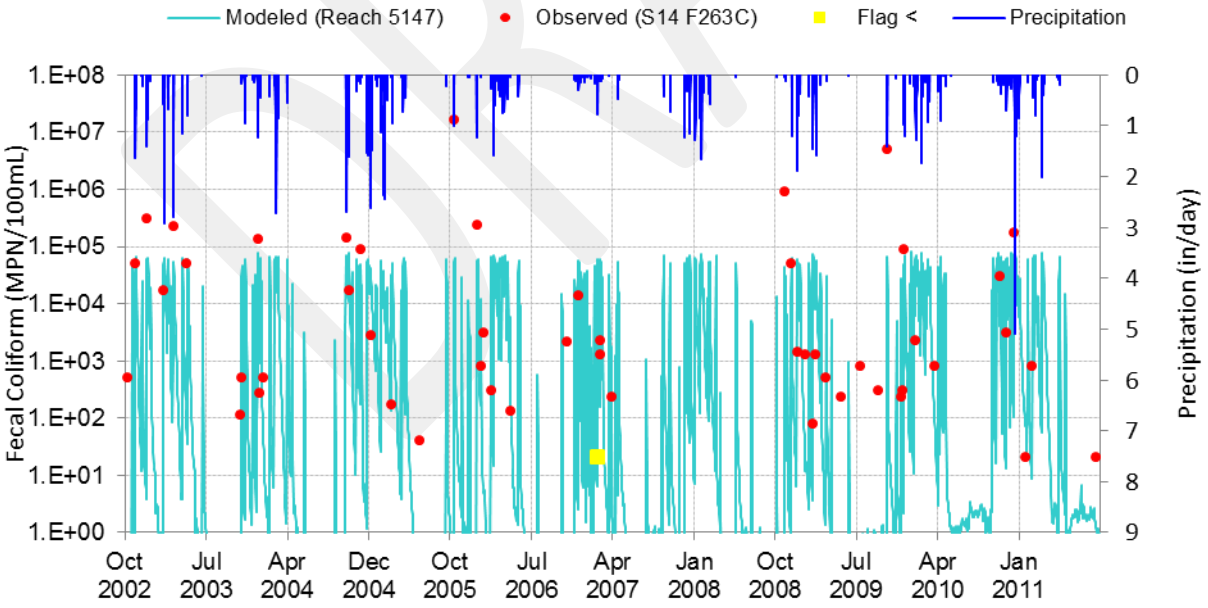


Figure 14. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011).

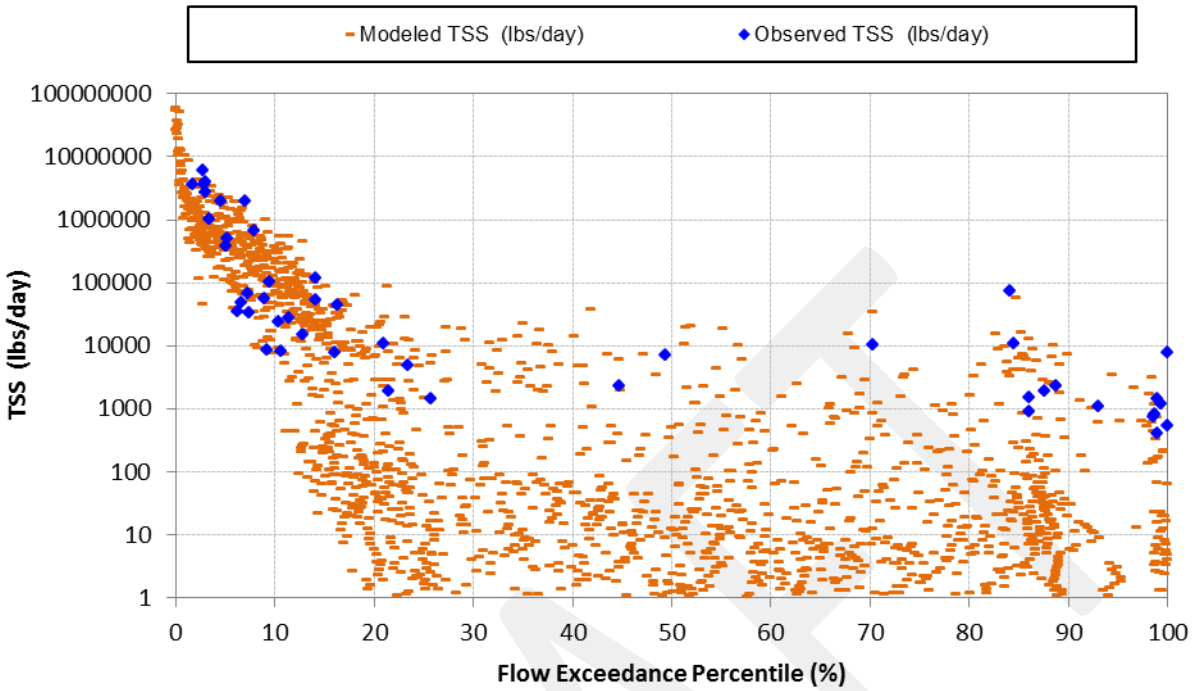


Figure 15. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011).

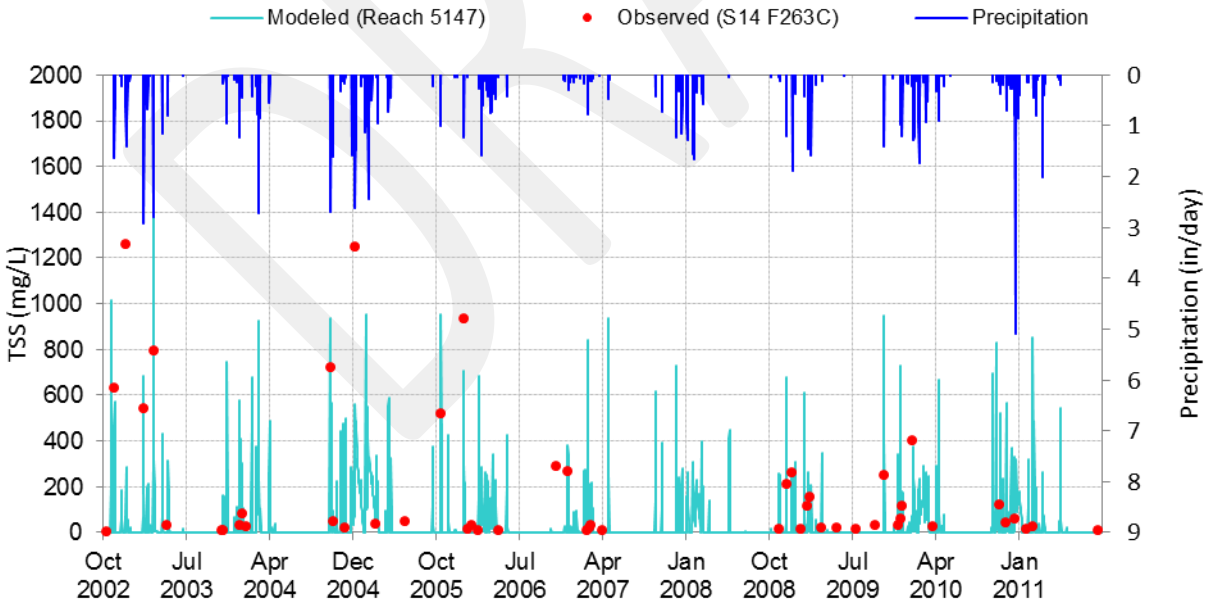


Figure 16. Simulated vs. observed time series plots for Total Sediment (10/1/2002 through 9/30/2011).

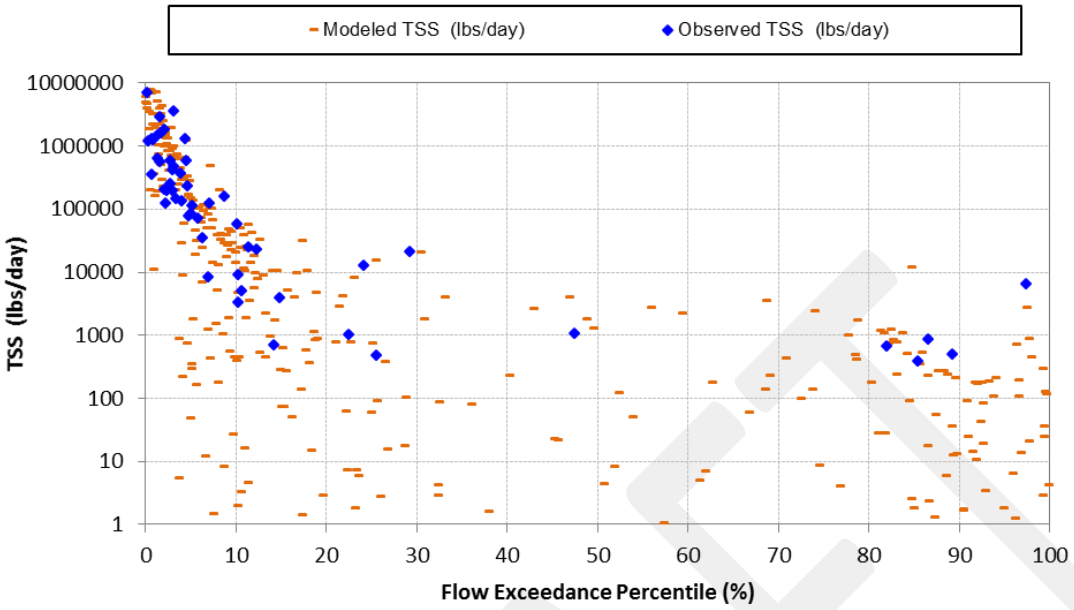


Figure 17. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

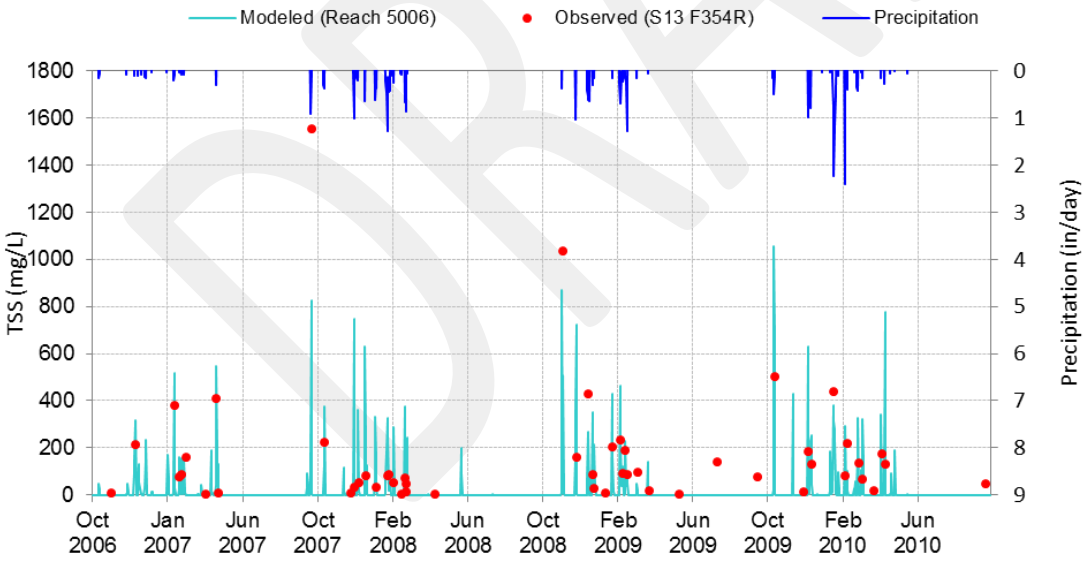


Figure 18. Simulated vs. observed timeseries plots for Total Sediment (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

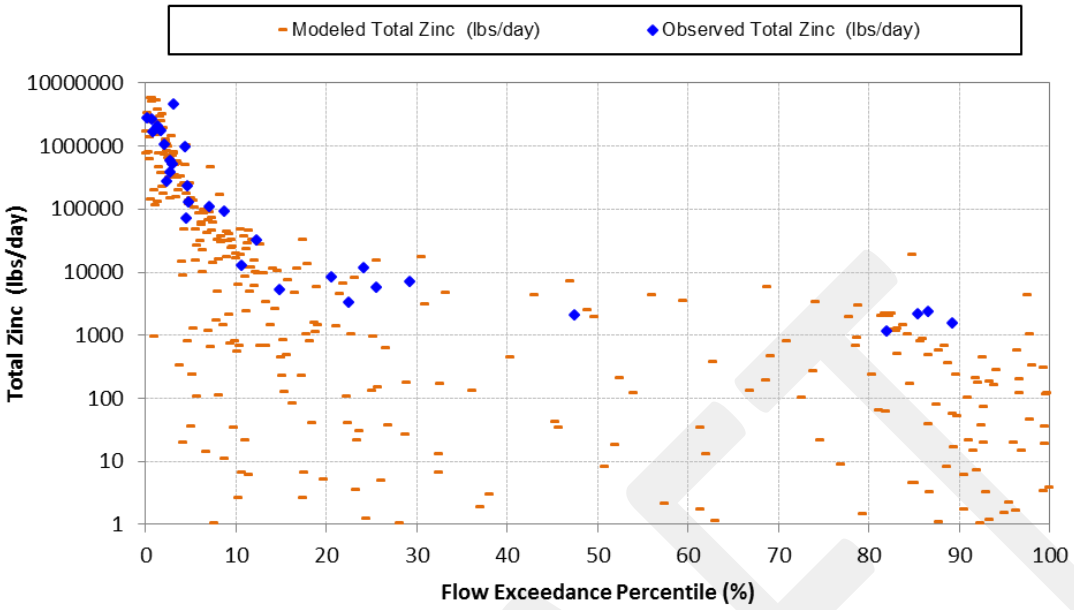


Figure 19. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

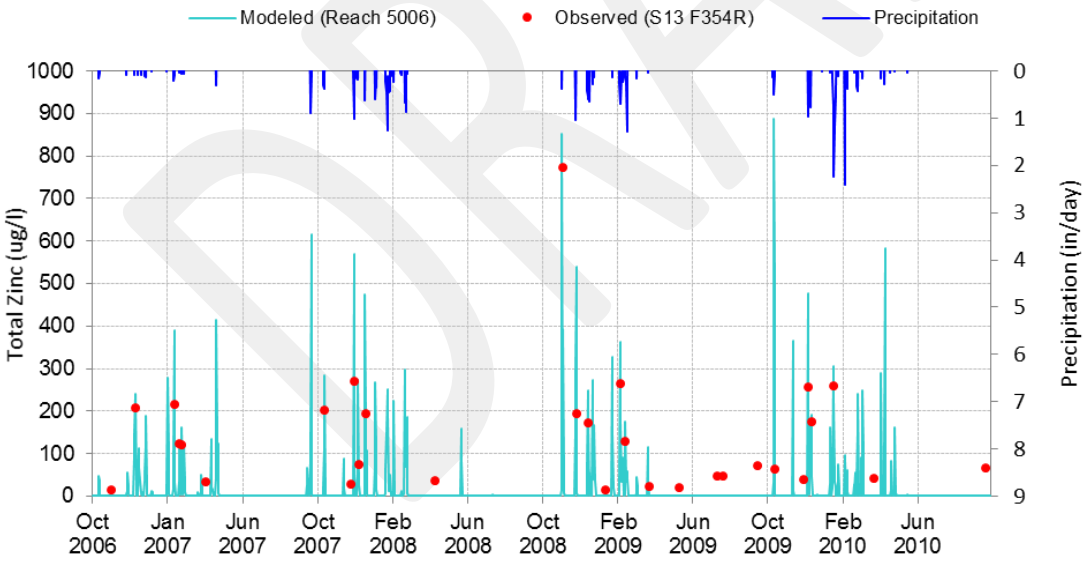


Figure 20. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

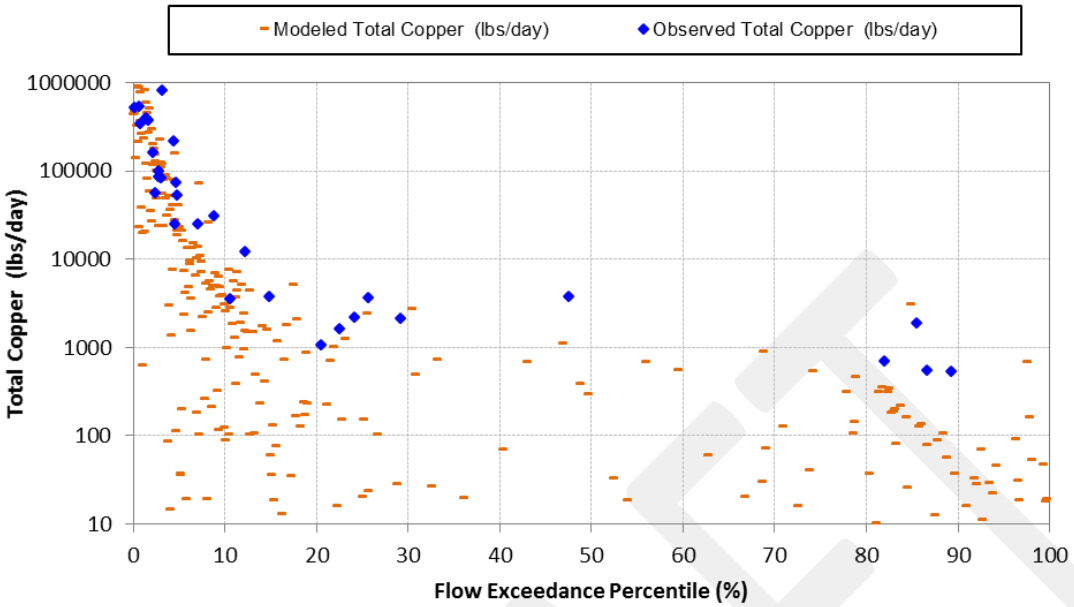


Figure 21. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

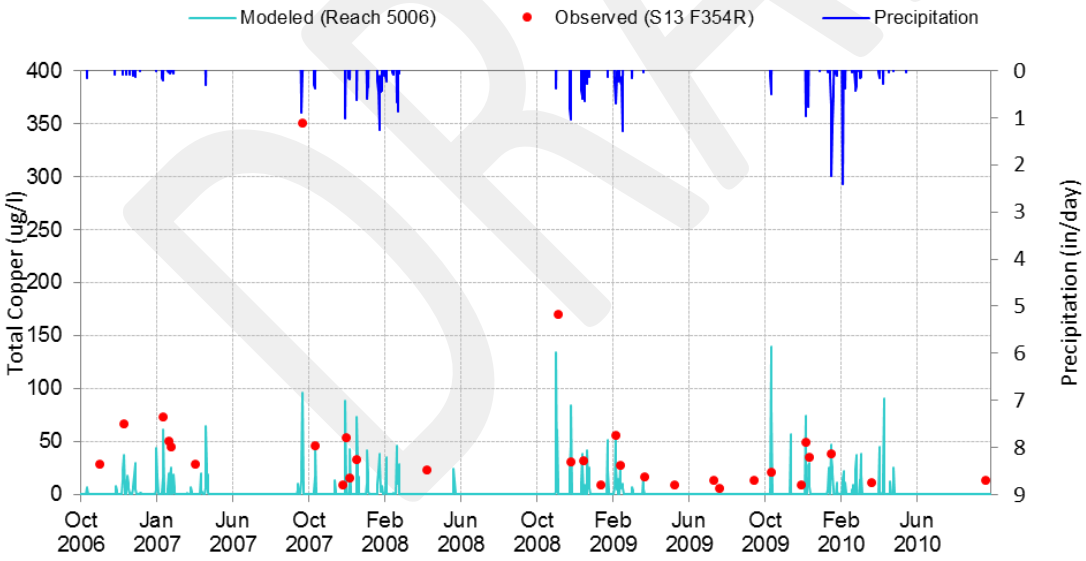


Figure 22. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

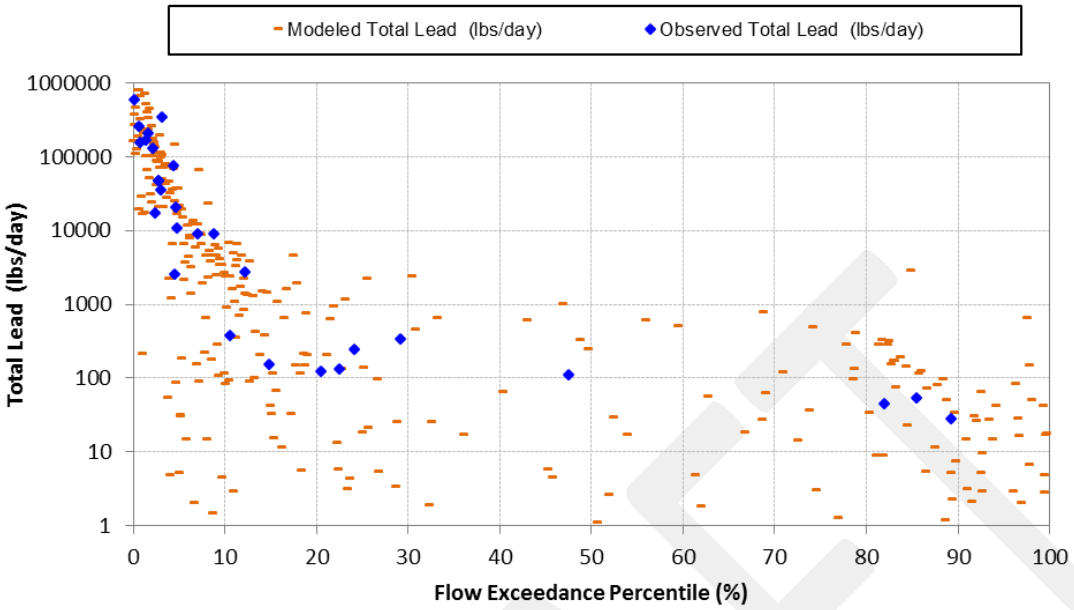


Figure 23 Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

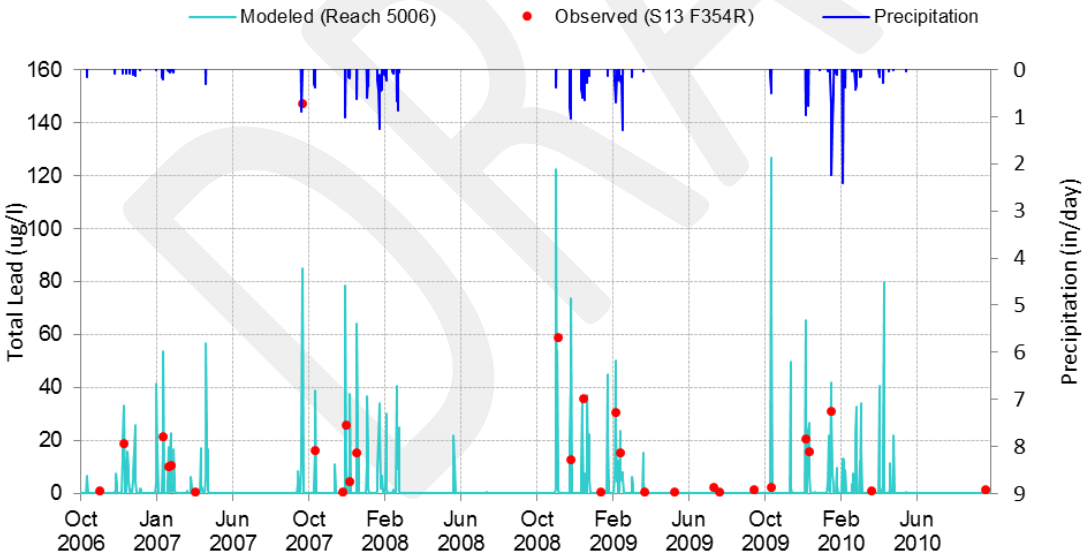


Figure 24. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

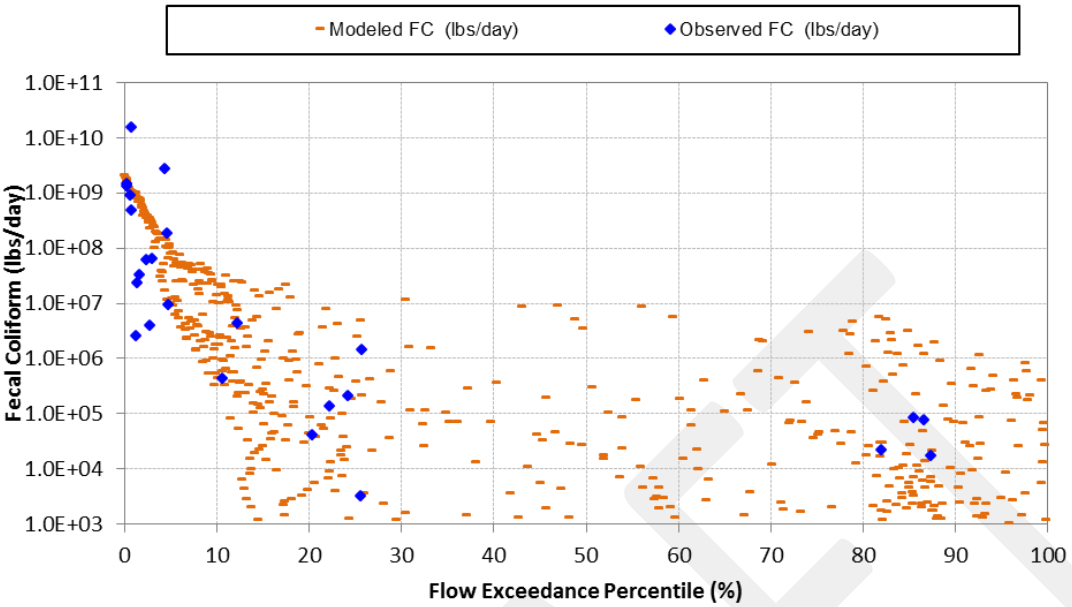


Figure 25. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

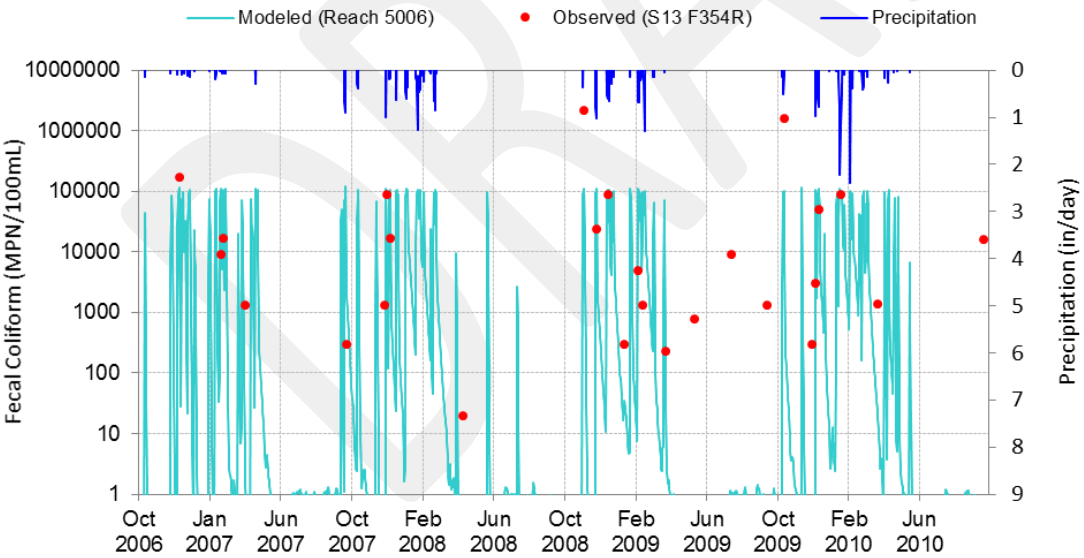


Figure 26. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

2. Lower Los Angeles River

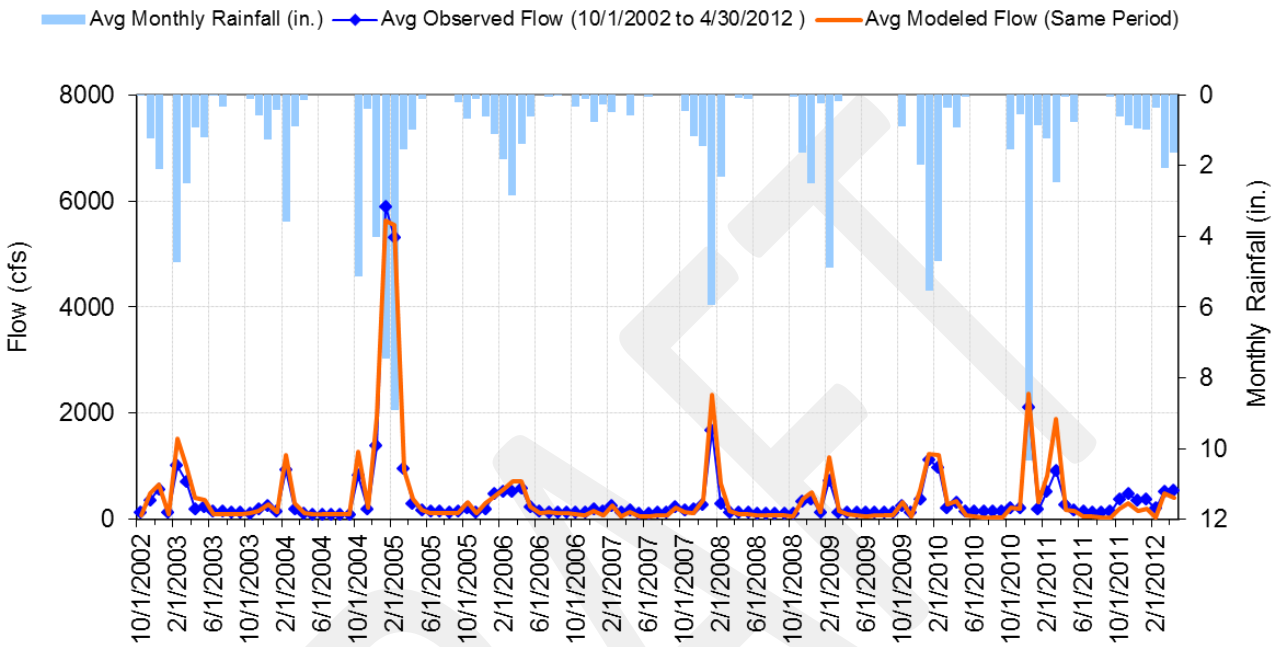


Figure 27. Monthly hydrograph for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

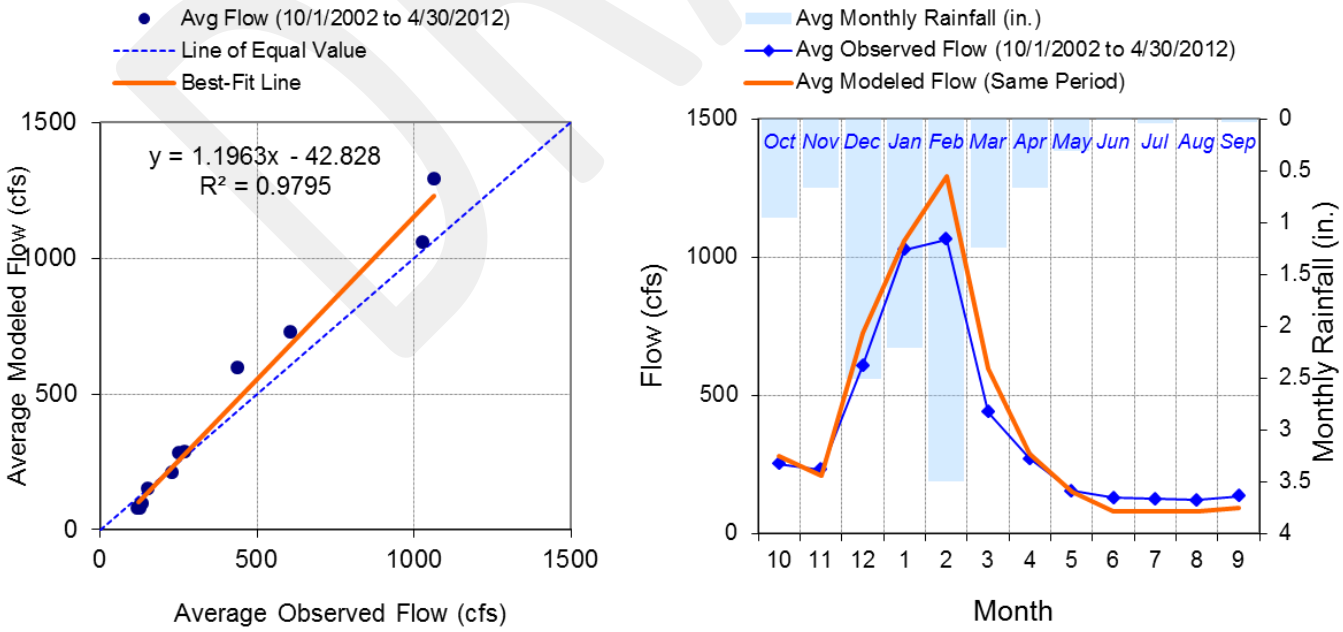


Figure 28. Aggregated monthly hydrograph for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

Table 2. Summary of water quality data evaluated for the Lower Los Angeles River

Gage	Constituent	Minimum	Q1	Median	Q3	Maximum
S10	Total Copper (ug/l)	0.5	12.975	25.8	49.55	424
S10	Total Lead (ug/l)	0.2	2.45	15.6	35.775	1070
S10	TSS (mg/L)	1	63	142.5	295	2280
S10	Total Zinc (ug/l)	22.3	63.85	124	261.75	2590
S10	Fecal Coliform (MPN/100mL)	20	500	24000	240000	24000000
S10	Total Nitrogen (mg/l)	0.03	0.60245	1.064	1.725	6.75
S10	Total Phosphorous (mg/l)	0.05	0.24	0.3785	0.538	8.24

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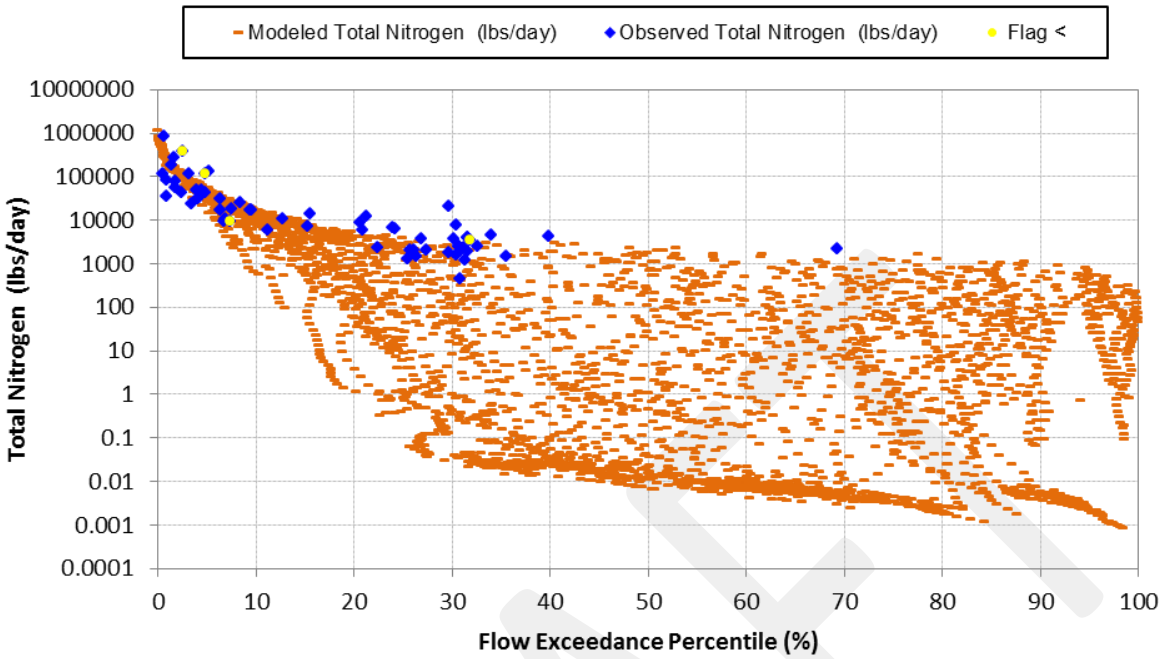


Figure 29. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

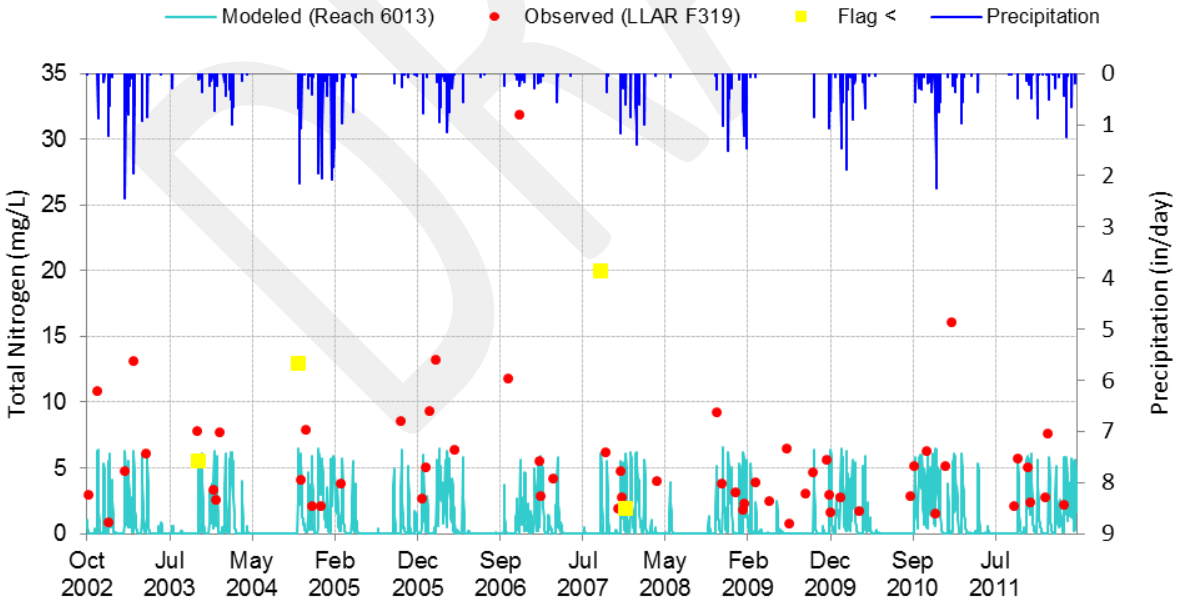


Figure 30. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

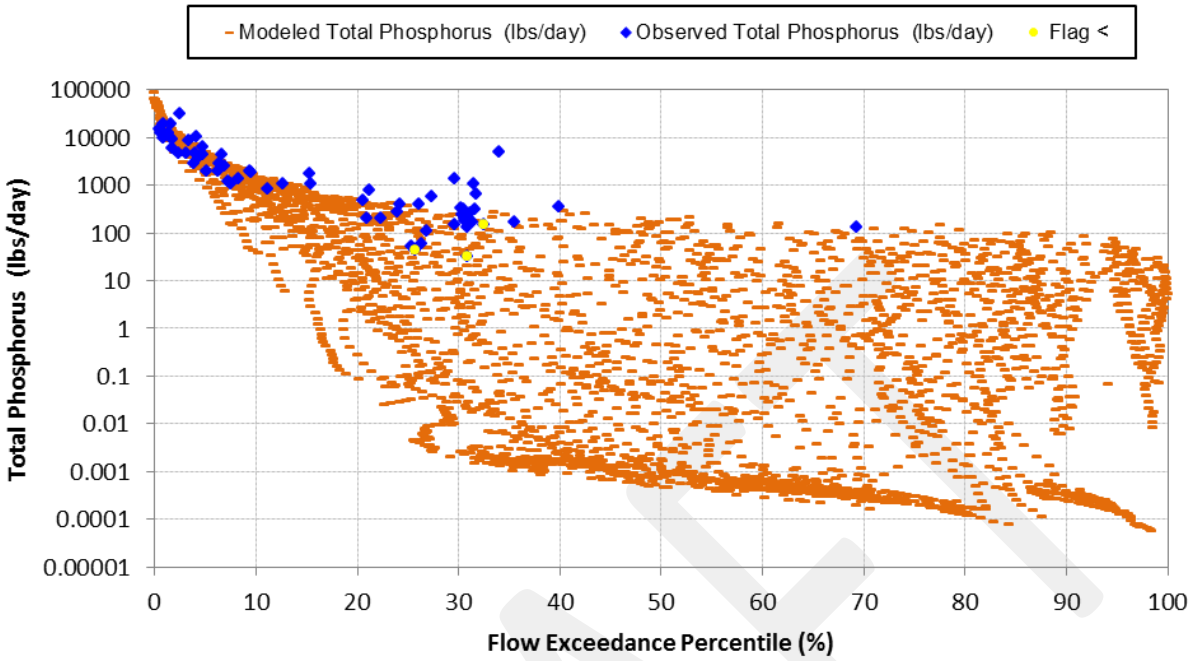


Figure 31. Simulated vs. observed load duration plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

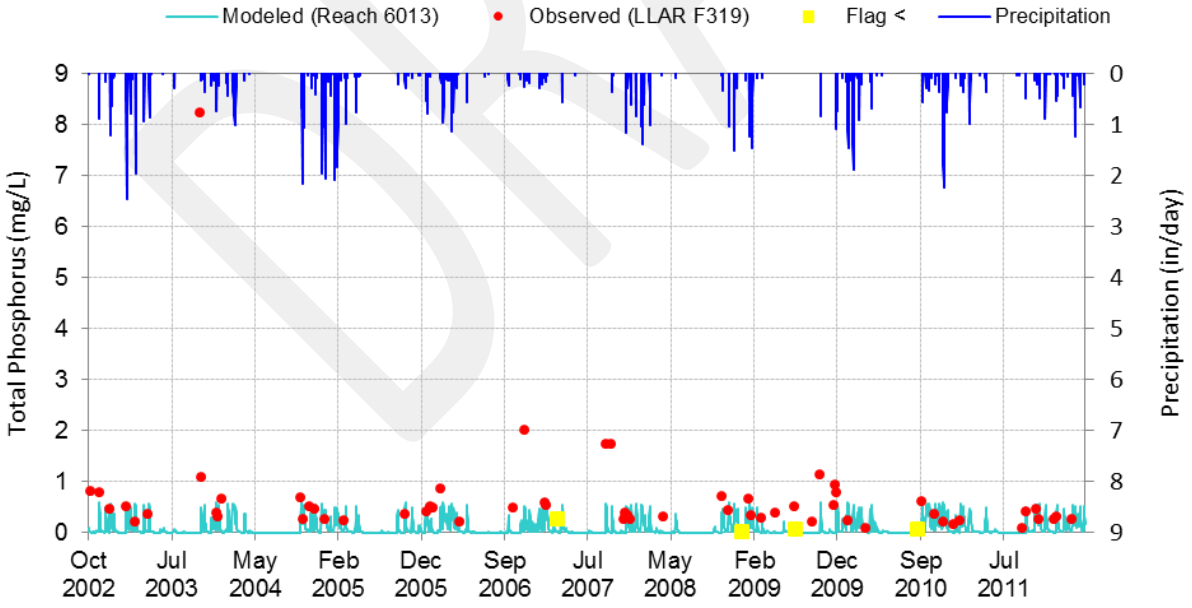


Figure 32. Simulated vs. observed time series plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

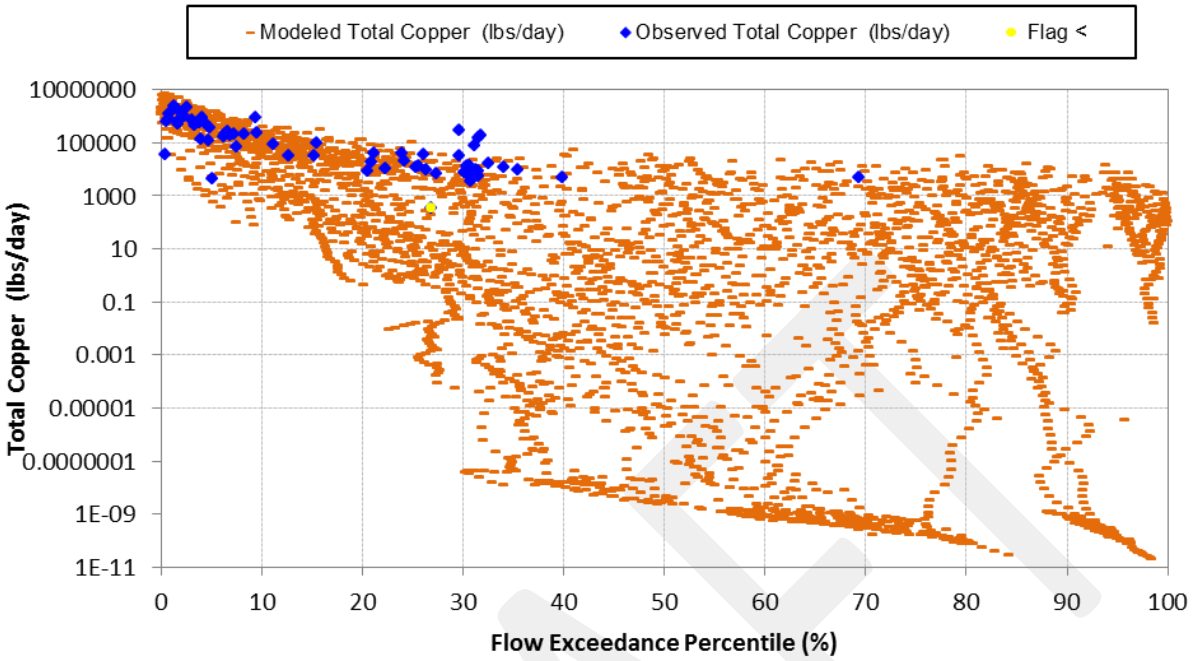


Figure 33. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

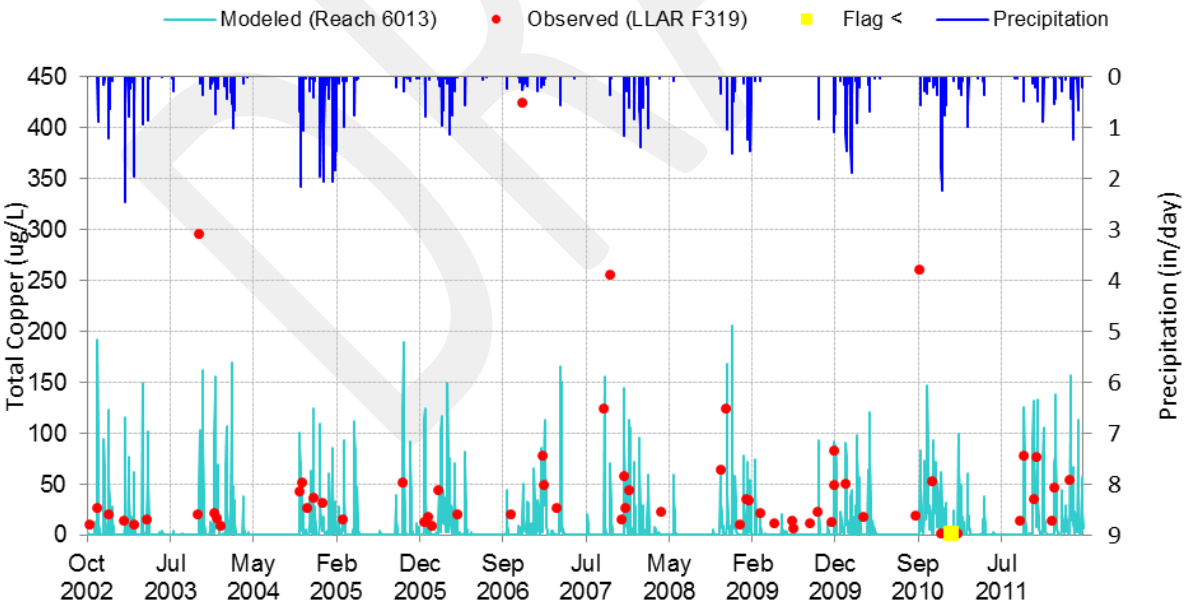


Figure 34. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

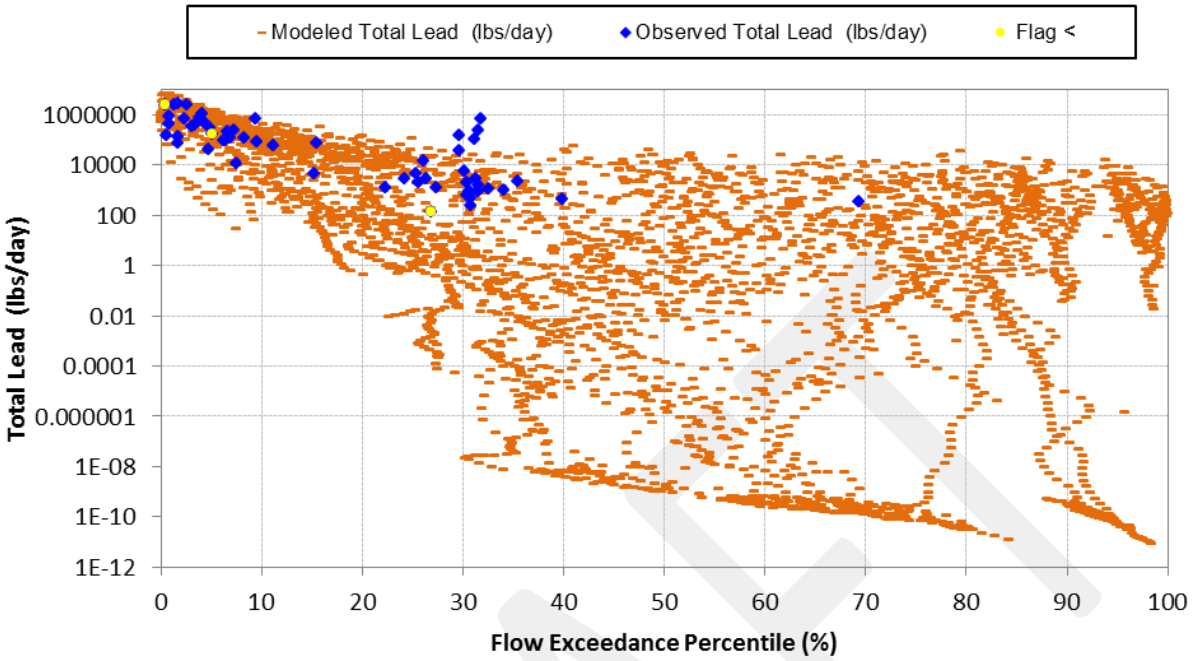


Figure 35. Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

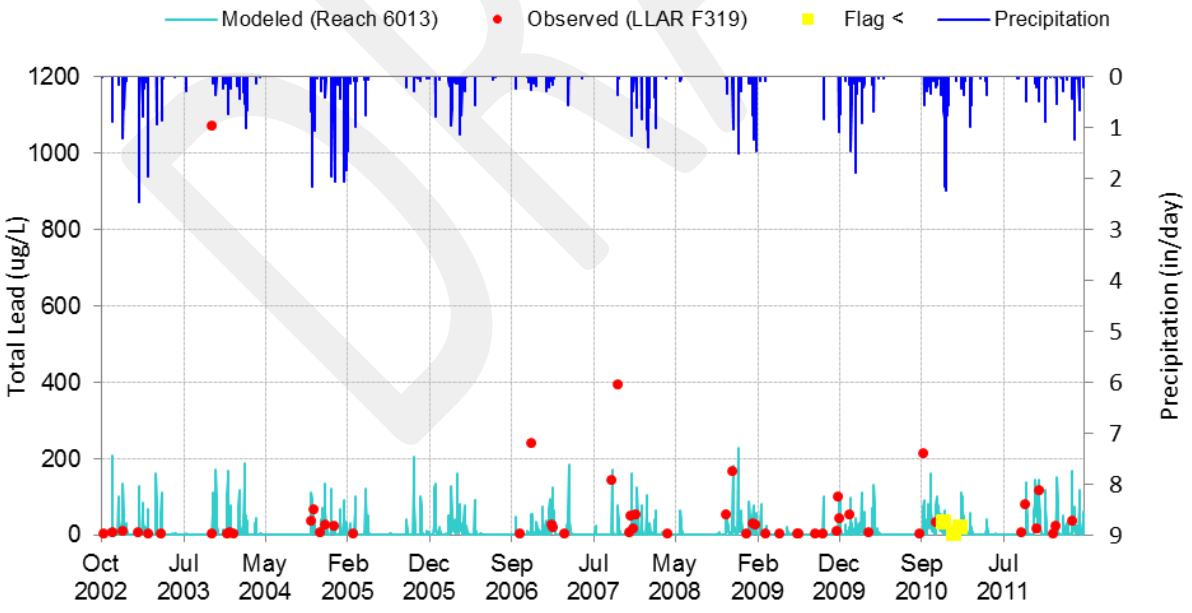


Figure 36. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

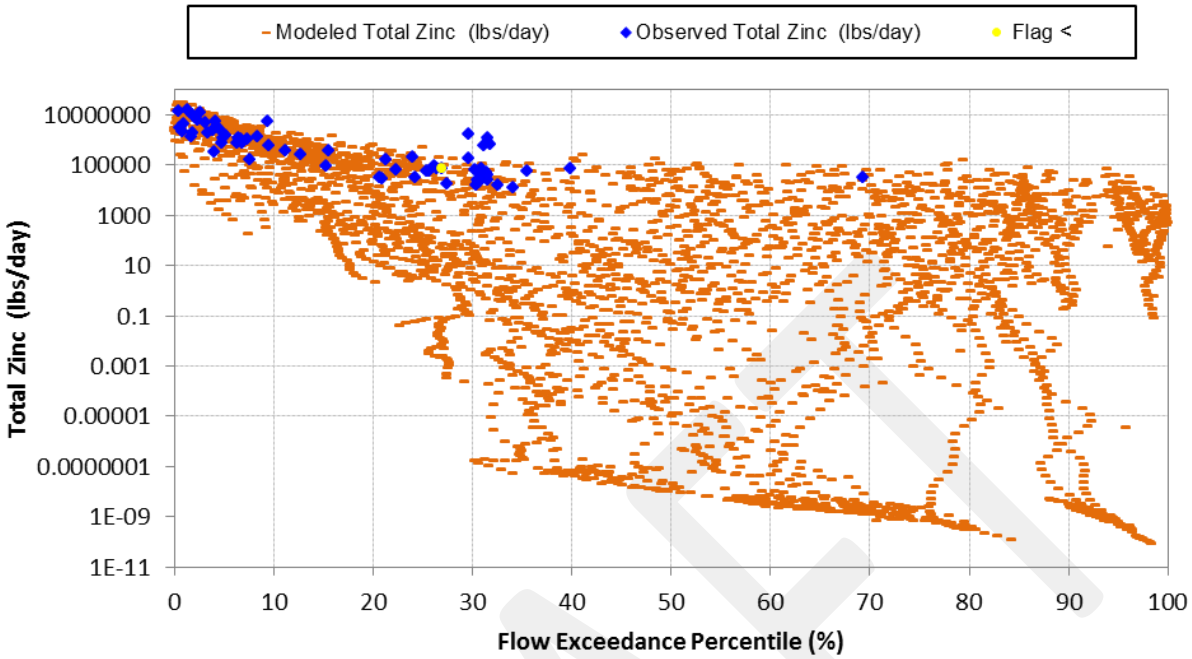


Figure 37. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

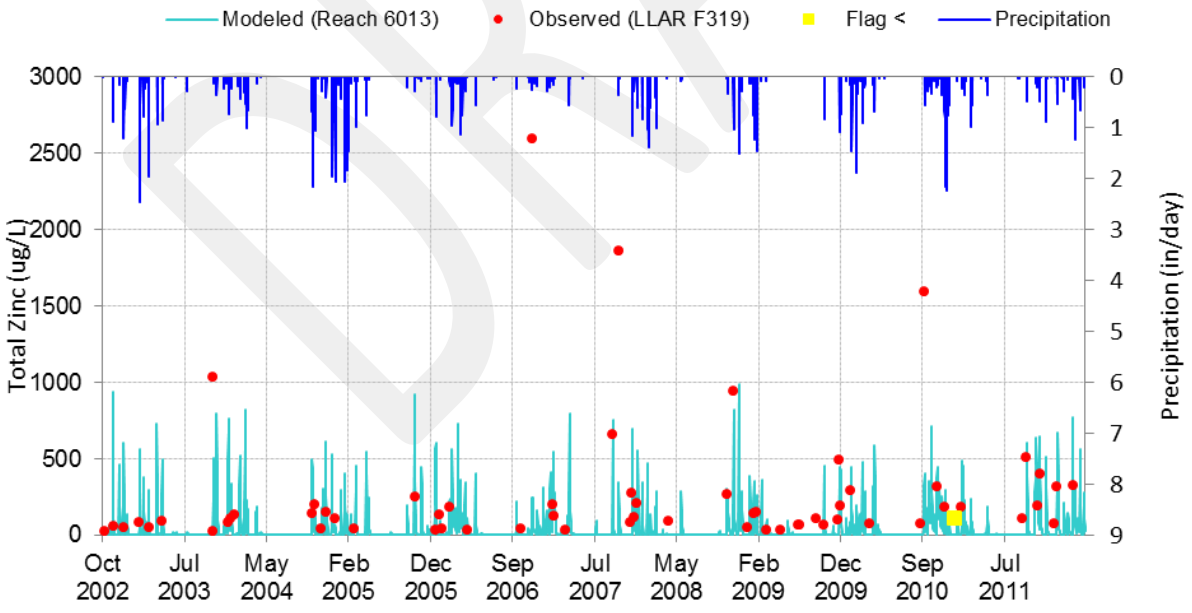


Figure 38. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

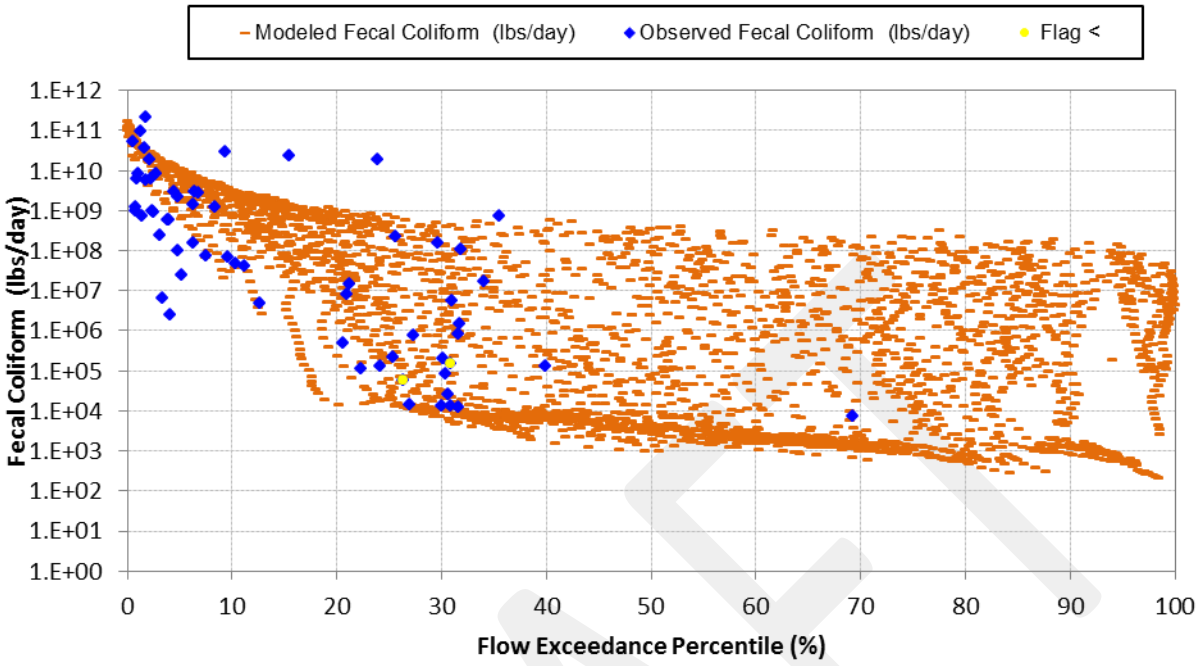


Figure 39. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

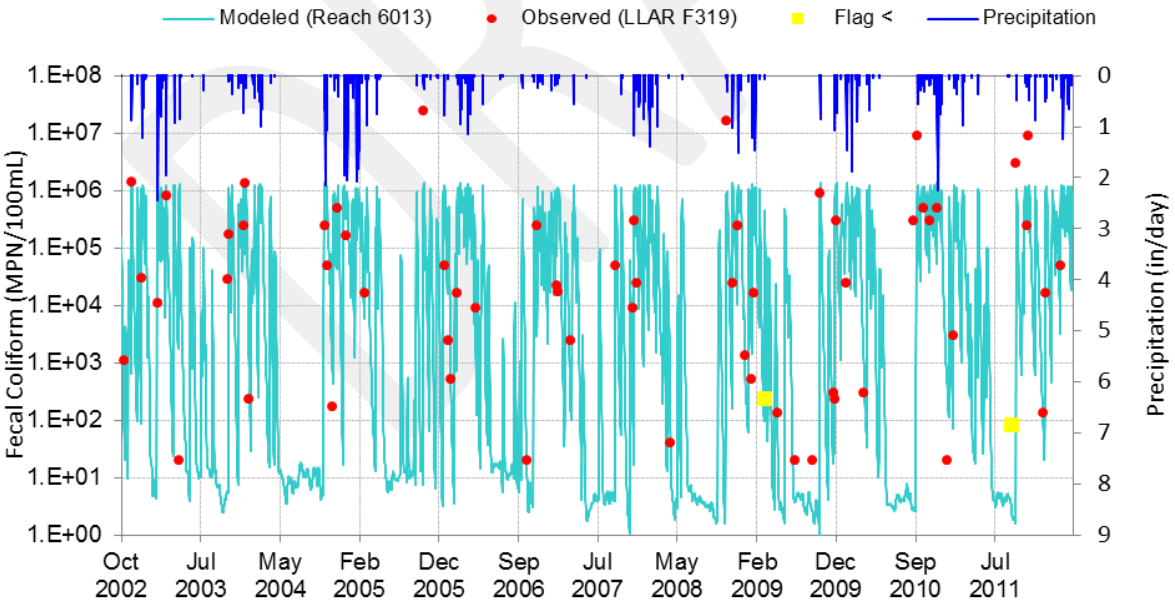


Figure 40. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

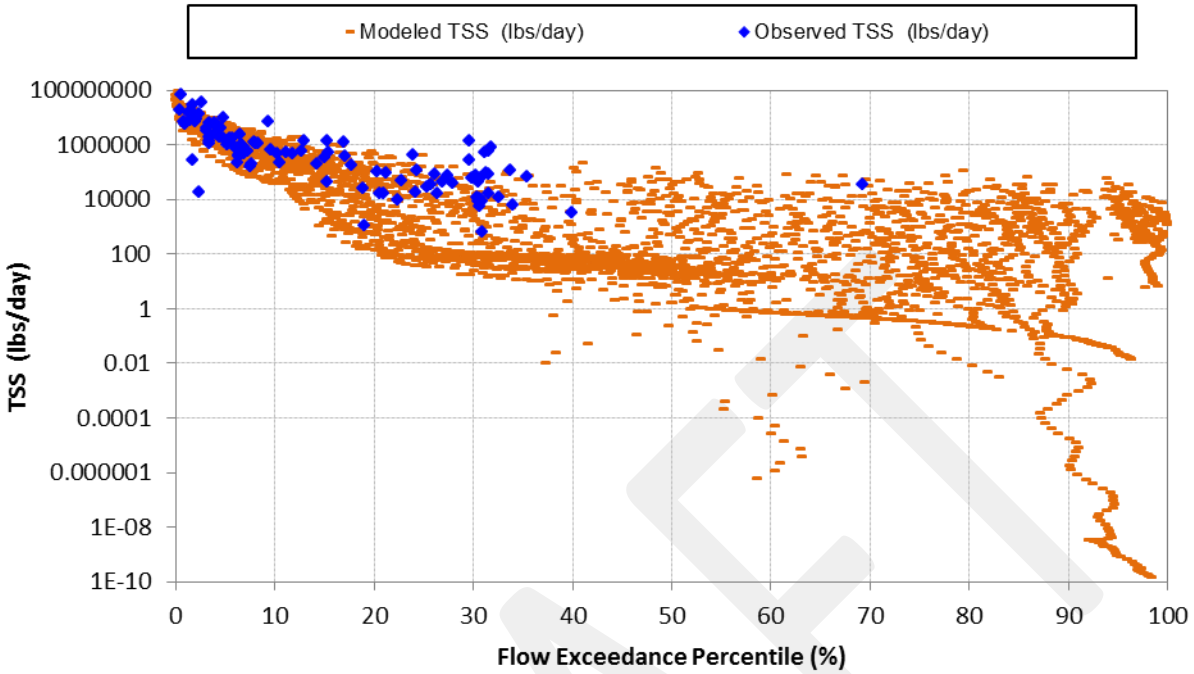


Figure 41. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

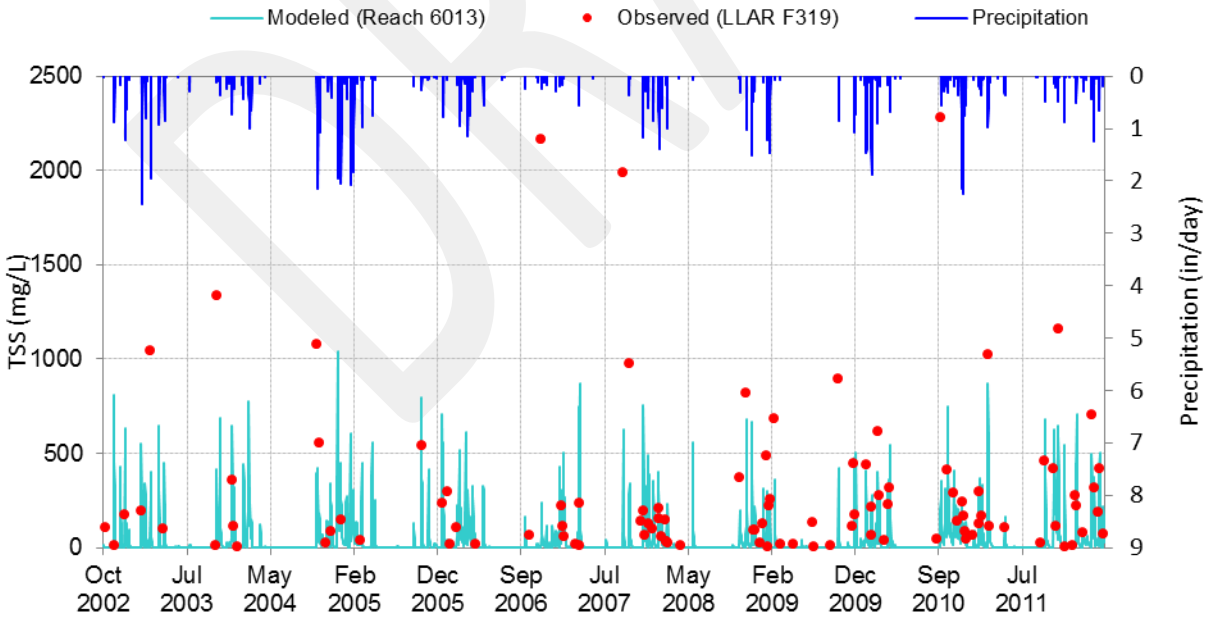


Figure 42. Simulated vs. observed time series plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

3. Los Cerritos Channel

Table 3. Summary of water quality data evaluated for Los Cerritos Channel

Gage	Constituent	Minimum	Q1	Median	Q3	Maximum
Stearns St.	Total Copper (ug/l)	8.4	17.25	25	43.5	240
Stearns St.	Total Lead (ug/l)	0.78	3.025	17	41.75	370
Stearns St.	TSS (mg/L)	2	52.5	110	210	1700
Stearns St.	Total Zinc (ug/l)	9.5	33	180	390	2600
Stearns St.	Fecal Coliform (MPN/100mL)	18	2275	8000	28500	1600000
Stearns St.	Total Nitrogen (mg/l)	0.9	2.147	3.292	4.532	23.7
Stearns St.	Total Phosphorous (mg/l)	0.083	0.22	0.53	0.91	6.2

DRAFT

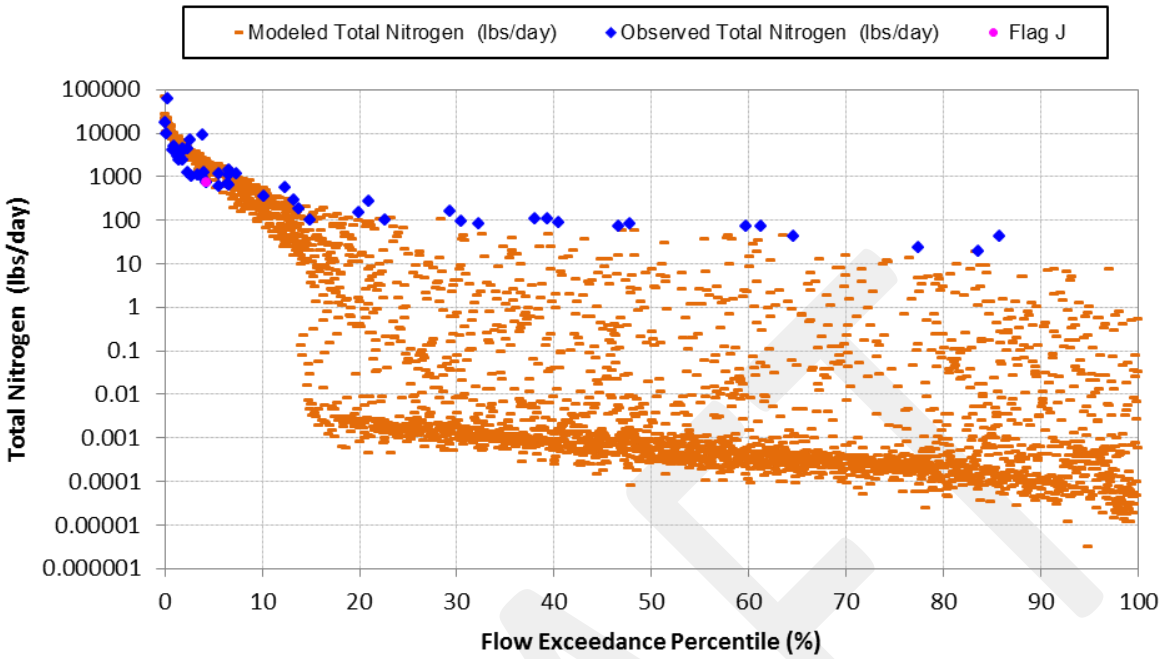


Figure 43. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

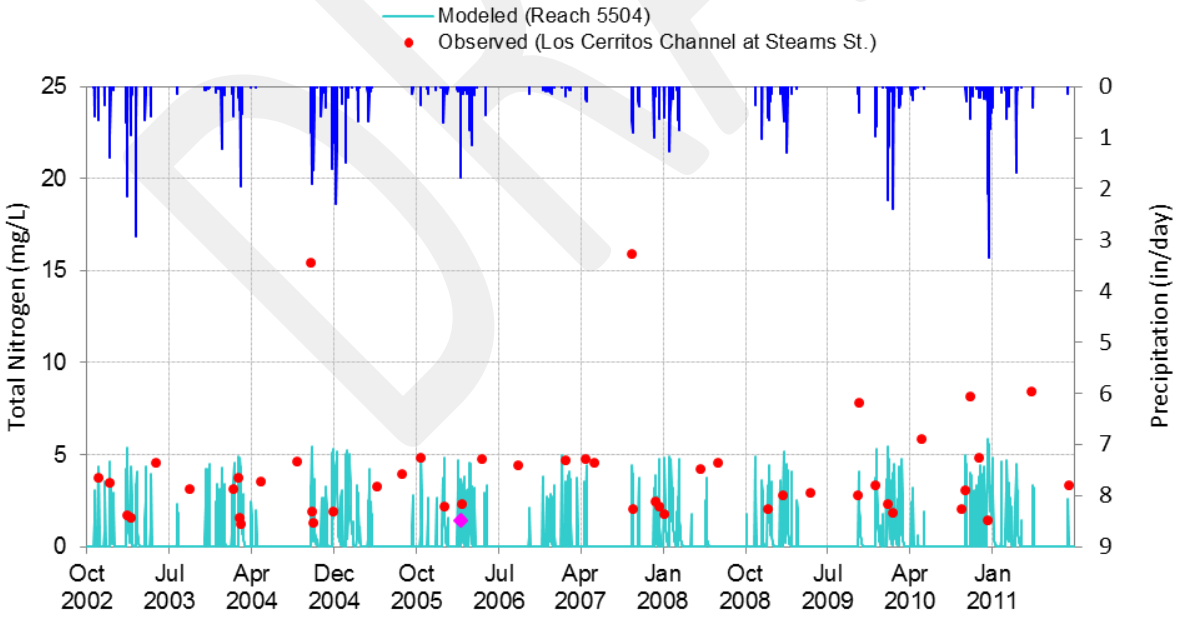


Figure 44. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

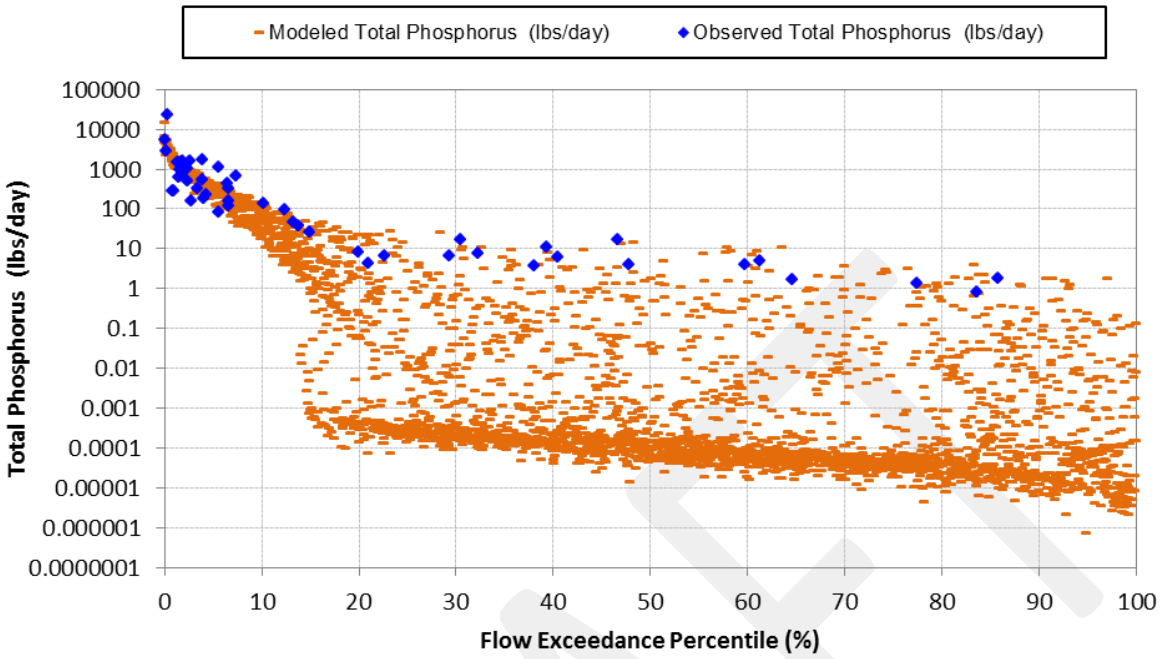


Figure 45. Simulated vs. observed load duration plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

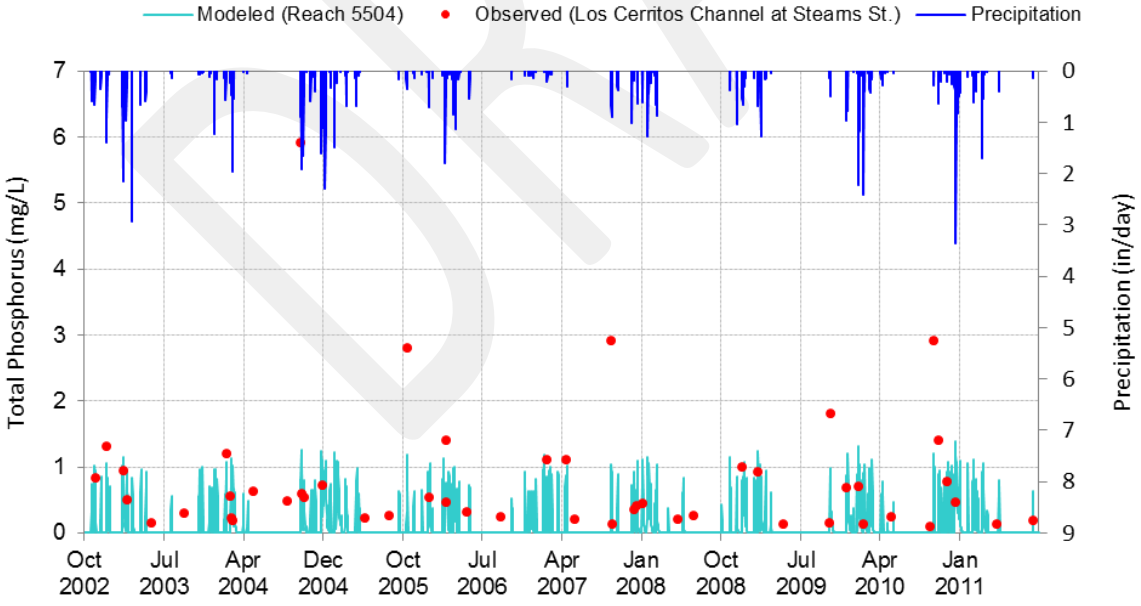


Figure 46. Simulated vs. observed time series plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

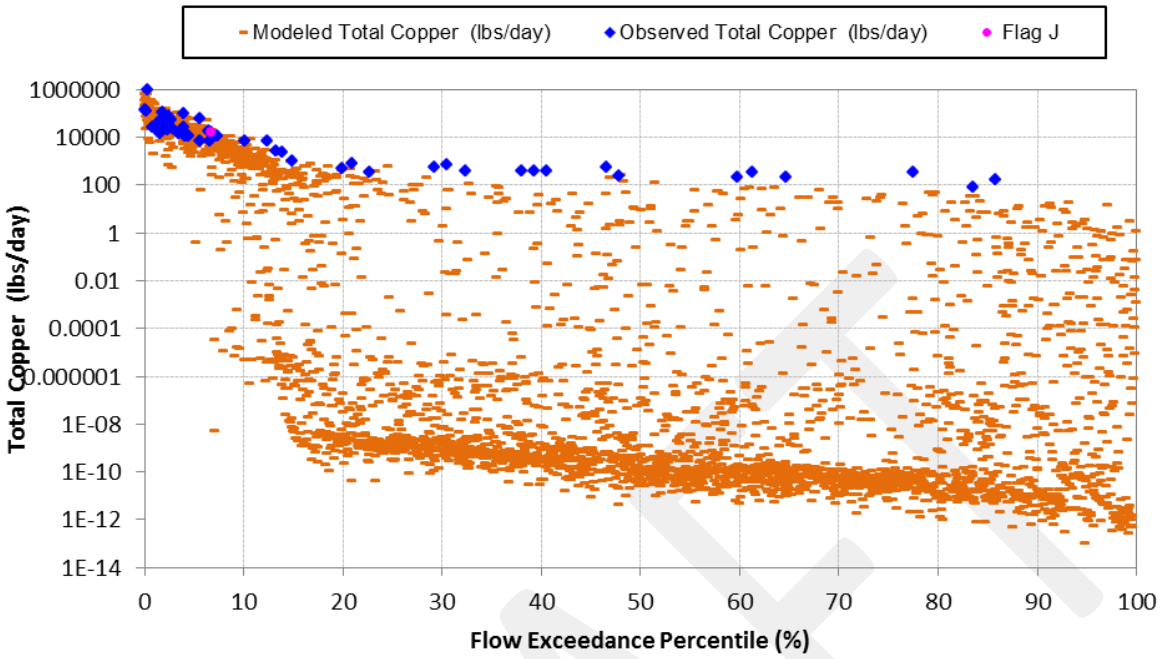


Figure 47. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

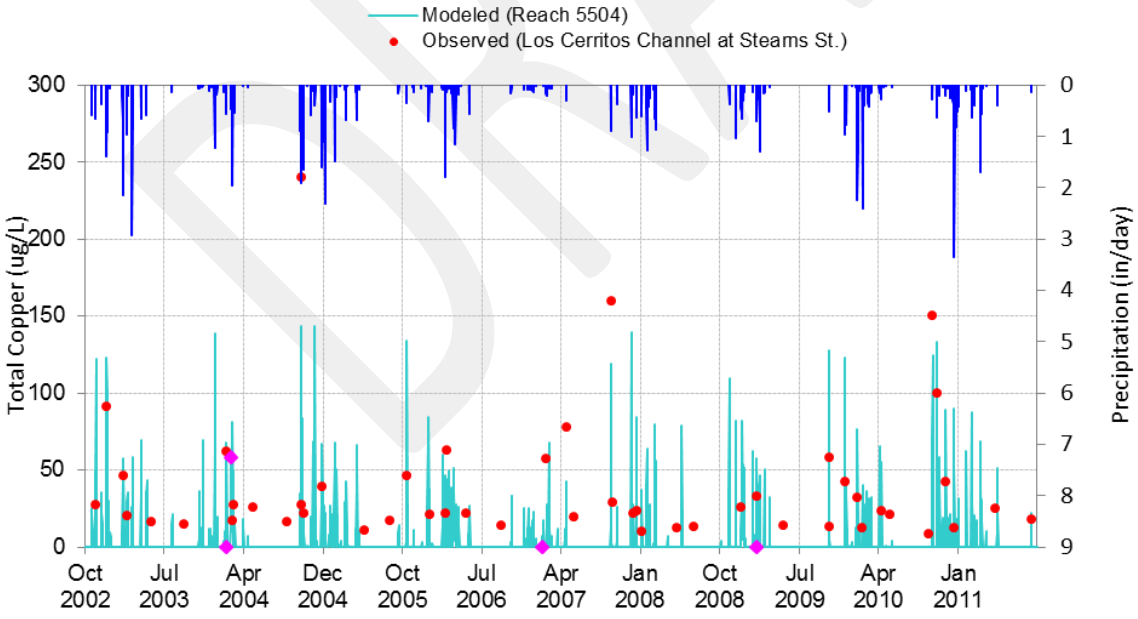


Figure 48. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

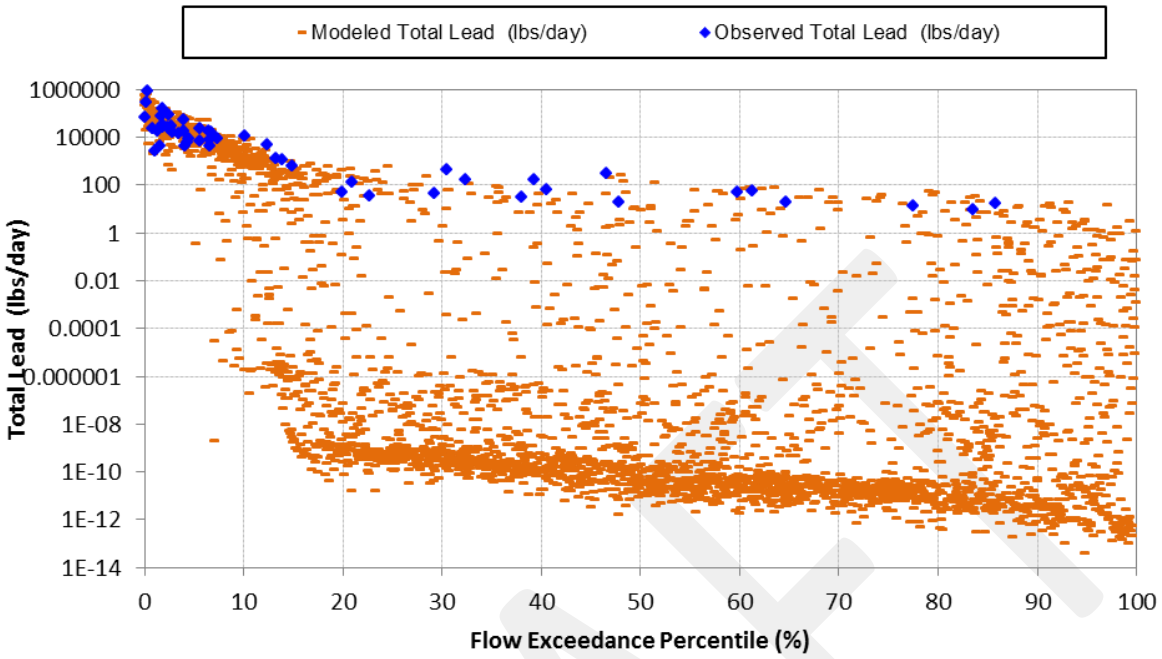


Figure 49. Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

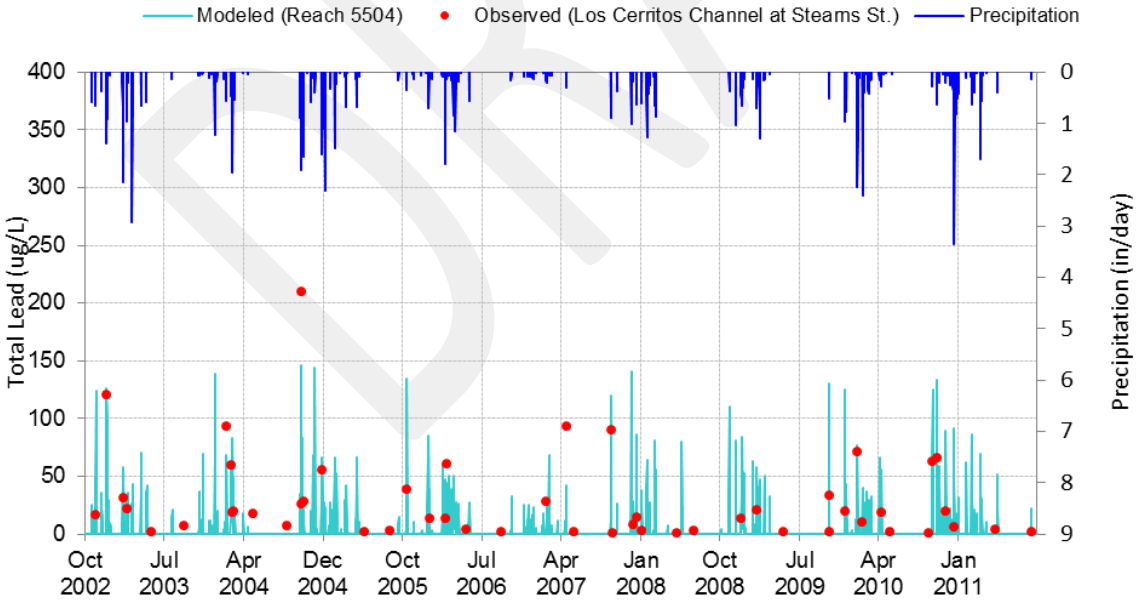


Figure 50. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

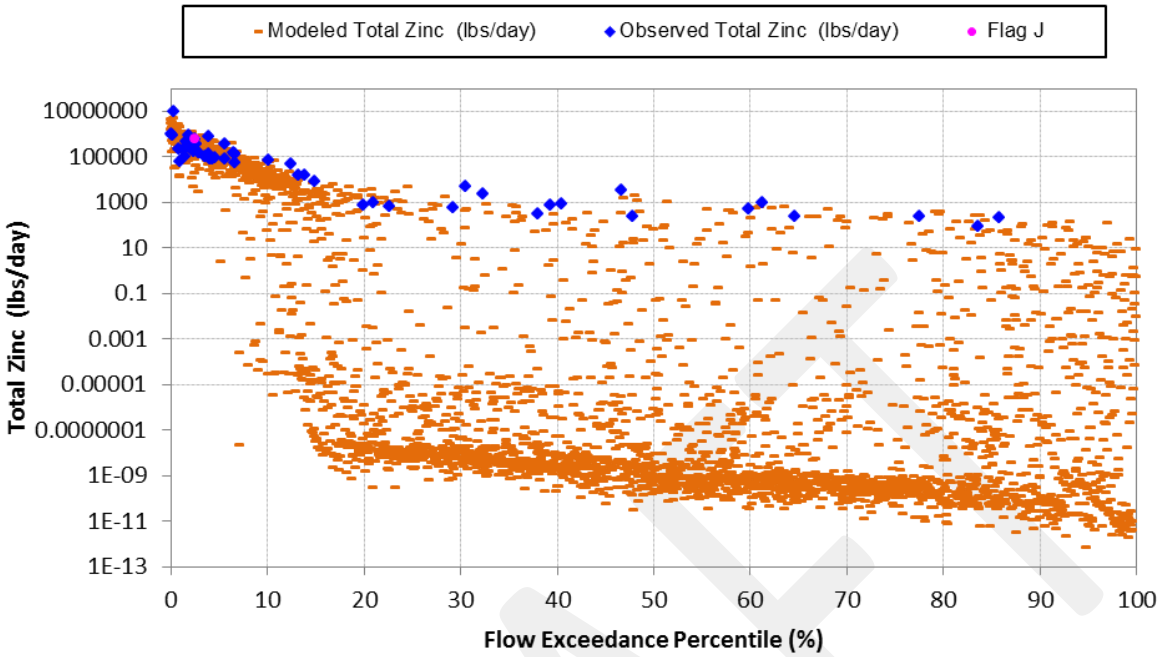


Figure 51. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

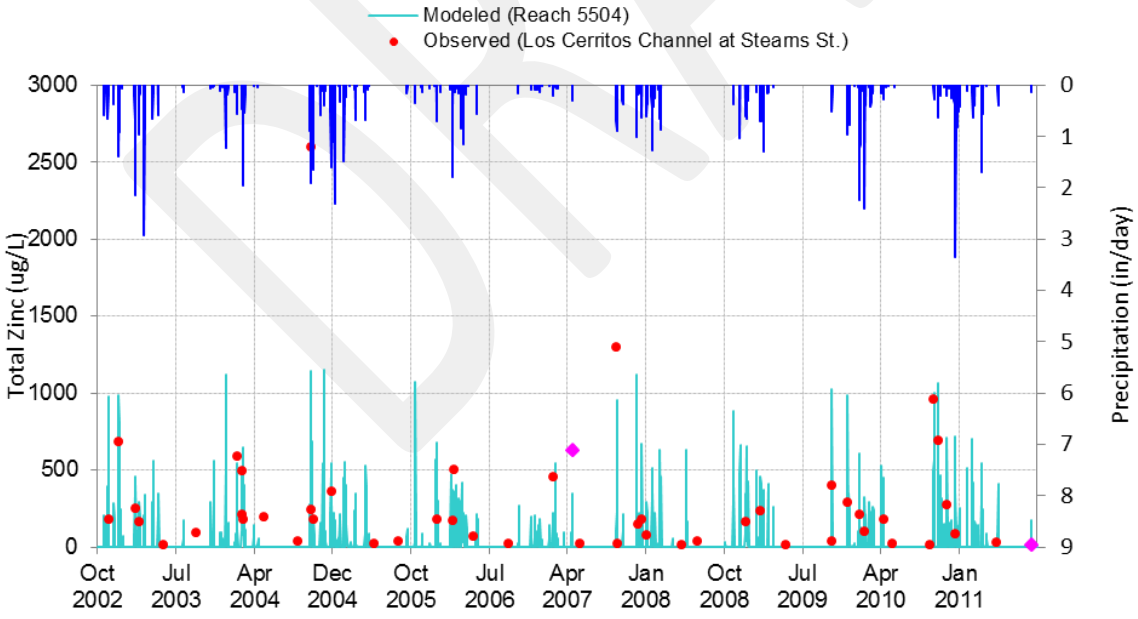


Figure 52. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

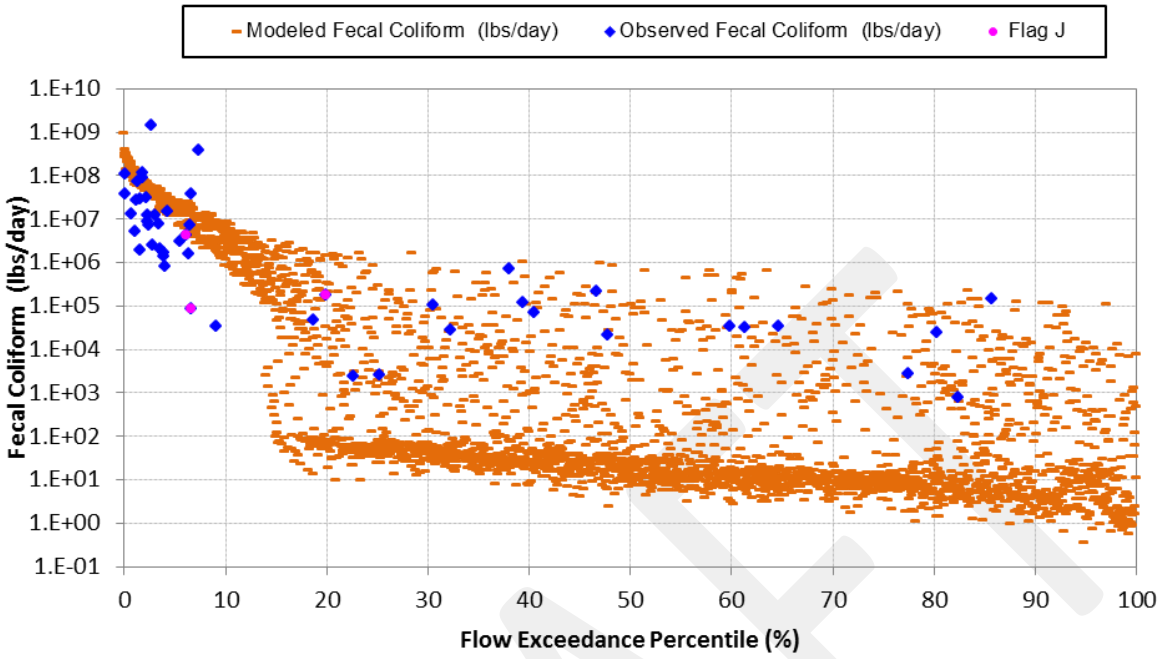


Figure 53. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

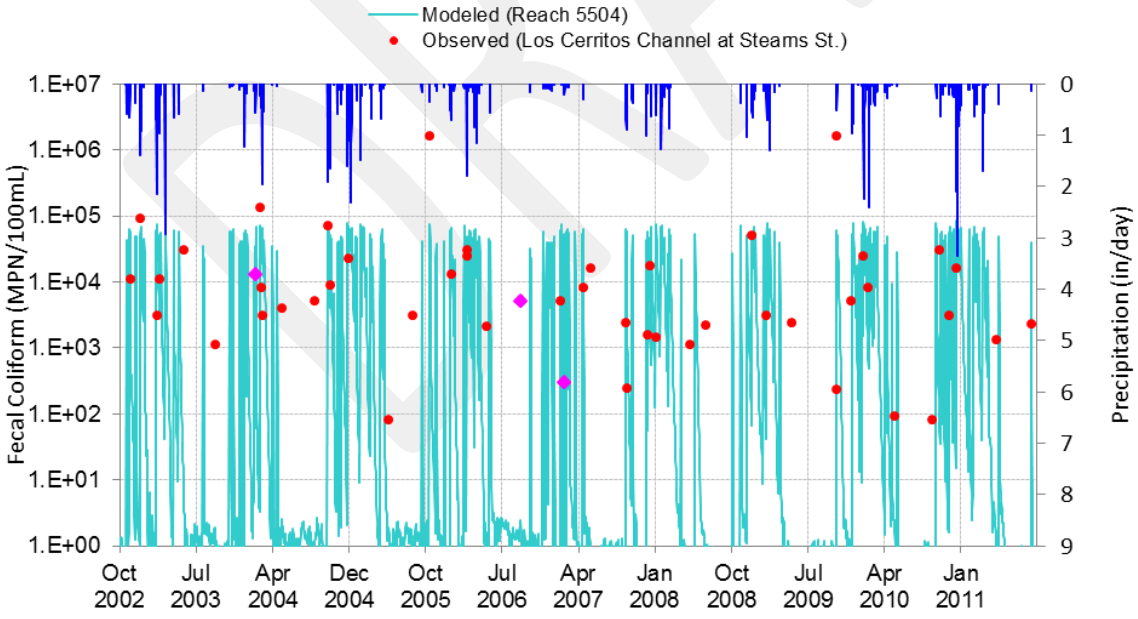


Figure 54. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

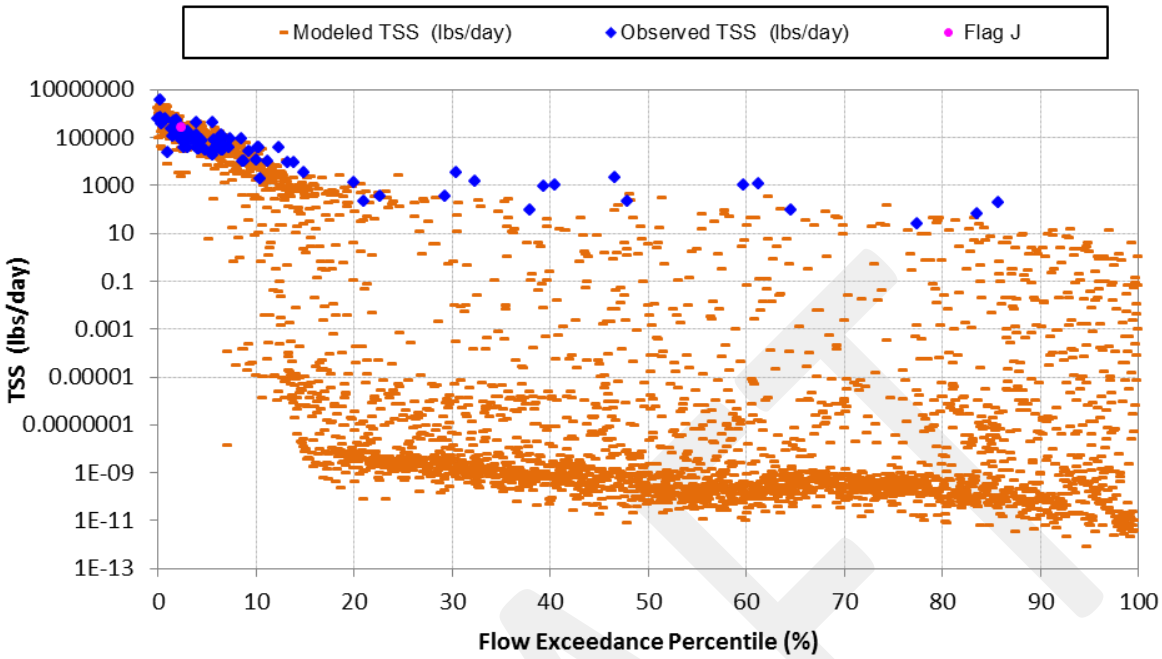


Figure 55. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

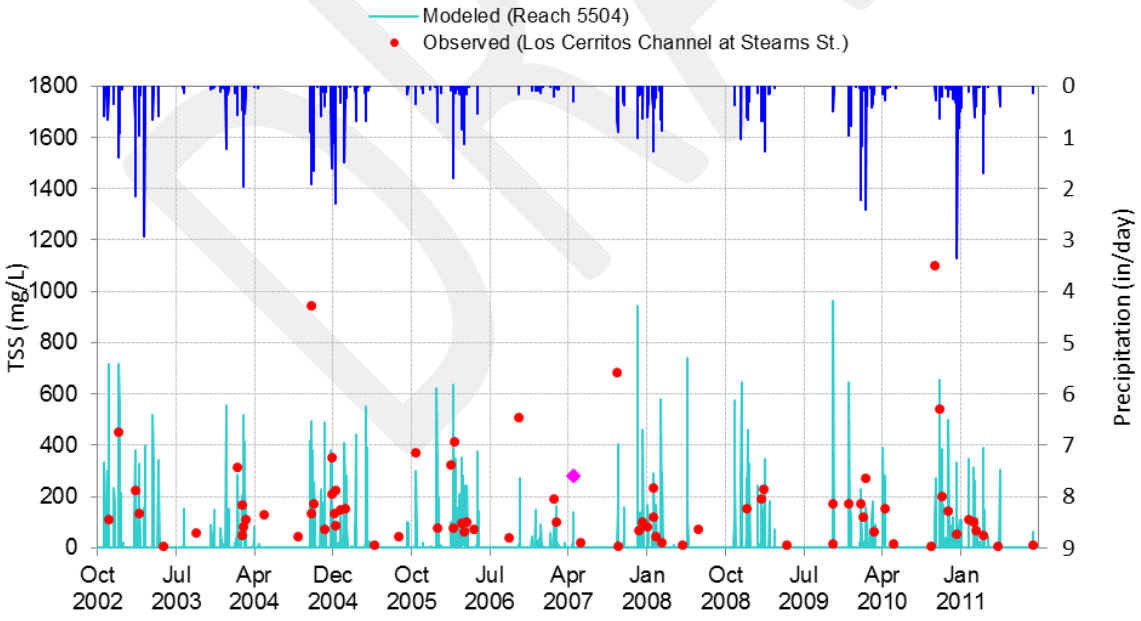


Figure 56. Simulated vs. observed time series plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

Watershed Management Program Appendix 7

A-7-1 Legal Authority Letters

DRAFT

City of Downey

FUTURE UNLIMITED

YVETTE M. ABICH GARCIA
City Attorney

December 12, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013-1105

RE: Legal Authority Certification for the City of Downey

Dear Mr. Unger:

As the City Attorney for the City of Downey, I have reviewed the City's existing ordinances, applicable statutes, and/or applicable contracts and have determined that as of the date of this letter, the City can operate pursuant to the legal authority required in 40 CFR 122.26(d)(2)(i)(A)-(F) and Part VI.A.2 of Order No. R4-2012-0175, issued by the Regional Water Quality Control Board – Los Angeles Region ("RWQCB"), adopted on December 28, 2012 and entitled "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach (MS4)" [NPDES No. CAS004001] (the "2012 NPDES Permit"). Enforcement of the City's storm water ordinances can be completed administratively or, if necessary, through the judicial system.

This letter is limited to the matters contained herein, and should not be read as expressing any opinion on any other matter except on the matters expressly set forth herein.

Please call the undersigned if you have any questions.

Sincerely,

CITY OF DOWNEY

Yvette M. Abich Garcia
City Attorney

cc: John L. Hunter & Associates

RB-AR10791

COUNTY OF LOS ANGELES
OFFICE OF THE COUNTY COUNSEL
648 KENNETH HAHN HALL OF ADMINISTRATION
500 WEST TEMPLE STREET
LOS ANGELES, CALIFORNIA 90012-2713

TELEPHONE
(213) 974-1923
FACSIMILE
(213) 687-7337
TDD
(213) 633-0901

JOHN F. KRATTLI
County Counsel

December 16, 2013

Mr. Samuel Unger, P.E., Executive Officer
California Regional Water Quality Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-2343

Attention: Mr. Ivar Ridgeway

Re: Certification By Legal Counsel For Los Angeles County Flood Control District's Annual Report

Dear Mr. Unger:

Pursuant to the requirements of Part VI(A)(2)(b) of Order No. R4-2012-0175 (the "Order"), the Office of the County Counsel of the County of Los Angeles makes the following certification in support of the Annual Report of the Los Angeles County Flood Control District ("LACFCD"):

Certification Pursuant To Order Part VI(A)(2)(b)

"*Each Permittee must submit a statement certified by its chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and this Order.*"

LACFCD has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order.

Order Part VI(A)(2)(b)(i)

"*Citation of applicable municipal ordinances or other appropriate legal authorities and their relationship to the requirements of 40 CFR §122.26(d)(2)(i)(A-F) and this Order*"

Citations Of Applicable Ordinances Or Other Legal Authorities

Although many portions of State law, the Charter of the County of Los Angeles, the Los Angeles County Code and LACFCD's Flood Control District Code ("Code") are potentially applicable to the implementation and enforcement of these requirements, the primary applicable laws and ordinances are as follows:

Los Angeles County Code, Title 12, Chapter 12.80 STORMWATER AND RUNOFF POLLUTION CONTROL, including:

§12.80.010 - §12.80.360 Definitions

§12.80.370 Short title.

§12.80.380 Purpose and intent.

§12.80.390 Applicability of this chapter.

§12.80.400 Standards, guidelines and criteria.

§12.80.410 Illicit discharges prohibited.

§12.80.420 Installation or use of illicit connections prohibited.

§12.80.430 Removal of illicit connection from the storm drain system.

§12.80.440 Littering and other discharge of polluting or damaging substances prohibited.

§12.80.450 Stormwater and runoff pollution mitigation for construction activity.

§12.80.460 Prohibited discharges from industrial or commercial activity.

§12.80.470 Industrial/commercial facility sources required to obtain a NPDES permit.

§12.80.480 Public facility sources required to obtain a NPDES permit.

§12.80.490 Notification of uncontrolled discharges required.

§12.80.500 Good housekeeping provisions.

§12.80.510 Best management practices for construction activity.

§12.80.520 Best management practices for industrial and commercial facilities.

§12.80.530 Installation of structural BMPs.

§12.80.540 BMPs to be consistent with environmental goals.

§12.80.550 Enforcement—Director's powers and duties.

§12.80.560 Identification for inspectors and maintenance personnel.

§12.80.570 Obstructing access to facilities prohibited.

§12.80.580 Inspection to ascertain compliance—Access required.

§12.80.590 Interference with inspector prohibited.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.80.650 Conflicts with other code sections.

§12.80.660 Severability.

§12.80.700 Purpose.

§12.80.710 Applicability.

§12.80.720 Registration required.

§12.80.730 Exempt facilities.

§12.80.740 Certificate of inspection—Issuance by the director.

§12.80.750 Certificate of inspection—Suspension or revocation.

§12.80.760 Certificate of inspection—Termination.

§12.80.770 Service fees.

§12.80.780 Fee schedule.

§12.80.790 Credit for overlapping inspection programs.

§12.80.800 Annual review of fees.

Los Angeles County Code, Title 12, Chapter 12.84 LOW IMPACT DEVELOPMENT STANDARDS, including:

§12.84.410 Purpose.

§12.84.420 Definitions.

§12.84.430 Applicability.

§12.84.440 Low Impact Development Standards.

§12.84.445 Hydromodification Control.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Los Angeles County Code, Title 22 PLANNING AND ZONING, Part 6 ENFORCEMENT PROCEDURES, including:

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

Los Angeles County Code, Title 26 BUILDING CODE, including:

§26.103 Violations And Penalties

§26.104 Organization And Enforcement

§26.105 Appeals Boards

§26.106 Permits

§26.107 Fees

§26.108 Inspections

LACFCD Code Chapter 21 - STORMWATER AND RUNOFF POLLUTION CONTROL including:

§21.01 Purpose and Intent

§21.03 Definitions

§21.05 Standards, Guidelines, and Criteria

§21.07 Prohibited Discharges

§21.09 Installation or Use of Illicit Connections Prohibited

§21.11 Littering Prohibited

§21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity

§21.15 Notification of Uncontrolled Discharges Required

§21.17 Requirement to Monitor and Analyze

§21.19 Conflicts With Other Code Sections

§21.21 Severability

§21.23 Violation a Public Nuisance

California Government Code §6502

California Government Code §23004

California Water Code §8100 *et. seq.*

Relationship Of Applicable Ordinances Or Other Legal Authorities To The Requirements of 40 CFR §122.26(d)(2)(i)(A-F) And The Order

Although, depending upon the particular issue, there may be multiple ways in which particular sections of the County of Los Angeles' ordinances, LACFCD's ordinances, and statutes relate to the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order, the table below indicates the basic relationship with Part VI(A)(2)(a) of the Order:

Order Part VI(A)(2)(a) Items	**Primary Applicable Ordinance/Statute**
i. Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.450 [construction] §12.80.460 [industrial and commercial] §12.80.470 and .480 [industrial and commercial NPDES requirements] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§26.104 [enforcement] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
ii. Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited] LACFCD Code: §21.07 Prohibited Discharges
iii. Prohibit and eliminate illicit discharges and illicit connections to the MS4.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.420 [illicit connections prohibited] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.23 Violation a Public Nuisance

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
iv. Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.440 [littering and other polluting prohibited] LACFCD Code: §19.07 Interference With or Placing Obstructions, Refuse, Contaminating Substances, or Invasive Species in Facilities Prohibited §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
v. Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows).	Los Angeles County Code: §12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.620 [nuisance abatement] §12.80.635 [violation penalty]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§12.80.640 [penalties not exclusive] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties] §26.104 [enforcement] §26.106 [permits] §26.108 [inspections] LACFCD Code: §19.11 Violation a Public Nuisance §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.19 Conflicts With Other Code Sections §21.23 Violation a Public Nuisance
vi. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.	Same as item v., above
vii. Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Copermittees.	California Government Code §6502 California Government Code §23004
viii. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation.	California Government Code §6502 California Government Code §23004
ix. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4.	Los Angeles County Code: §12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.80.620 [nuisance abatement] §12.80.635 [violation penalty] §12.80.640 [penalties not exclusive] §22.60.380 [enforcement.] §26.106 [permits] §26.108 [inspections]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
x. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations.	Los Angeles County Code: §12.80.450 [construction mitigation] §12.80.500 [good housekeeping practices] §12.80.510 [construction BMPs] §12.80.520 [industrial/commercial BMPs] §12.84.440 [LID standards] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
xi. Require that structural BMPs are properly operated and maintained.	Los Angeles County Code: §12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.23 Violation a Public Nuisance
xii. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.	Los Angeles County Code: §12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance

Order Part VI(A)(2)(b)(ii)

"*Identification of the local administrative and legal procedures available to mandate compliance with applicable municipal ordinances identified in subsection (i) above and therefore with the conditions of this Order, and a statement as to whether enforcement actions can be completed administratively or whether they must be commenced and completed in the judicial system.*"

The local administrative and legal procedures available to mandate compliance with the above ordinances are specified in those ordinances, particularly in:

Los Angeles County Code:

§12.80.550 Enforcement—Director's powers and duties.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Title 26, §103 Violations And Penalties

Title 26, §104 Organization And Enforcement

Title 26, §105 Appeals Boards

Title 26, §106 Permits

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

LACFCD Code:

§21.05 Standards, Guidelines, and Criteria

§21.07 Prohibited Discharges

§21.09 Installation or Use of Illicit Connections Prohibited

§21.11 Littering Prohibited

§21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity

§21.15 Notification of Uncontrolled Discharges Required

§21.17 Requirement to Monitor and Analyze

§21.23 Violation a Public Nuisance

LACFCD attempts to first resolve each enforcement action administratively. However, the above cited ordinances also provide LACFCD with the authority to pursue such actions in the judicial system as necessary.

Very truly yours,

JOHN F. KRATTLI
County Counsel

By
JUDITH A. FRIES
Principal Deputy County Counsel
Public Works Division

JAF:jyj

STEVEN N. SKOLNIK

Attorney at Law
15332 Antioch Street, #436
Pacific Palisades, California 90272
Telephone: (310) 459-3418 Facsimile: (310) 606-2775
E-Mail: sskolniklaw@gmail.com

December 9, 2013

Lisa Rapp, Director of Public Works
City of Lakewood
5050 Clark Avenue
Lakewood, CA 90712

Re: Order No. R4-2012-0175
NPDES No. CAS004001

Dear Ms. Rapp:

In my capacity as City Attorney for the City of Lakewood (the "City"), I hereby confirm that the City has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR @ 122.26(d)(2)(i)(A-F) and the Order referenced above. Such legal authority is derived from Article 11, Section 7 of the California Constitution, Section 13002 of the California Water Code, and Section 5801 of the Lakewood Municipal Code, which incorporates by reference the pertinent provisions of the Los Angeles County Code.

The City is authorized to take enforcement action by administrative proceedings or in the judicial system.

Very truly yours,

Steven N. Skolnik

ALESHIRE & WYNDER LLP
ATTORNEYS AT LAW

Respond to Orange County
Fred Galante
fgalante@awattorneys.com
Direct (949) 250-5410

Orange County
18881 Von Karman Ave., Suite 1700
Irvine, CA 92612
P 949.223.1170 • F 949.223.1180

Los Angeles
2361 Rosecrans Ave., Suite 475
El Segundo, CA 90245
P 310.527.6660 • F 310.532.7395

Inland Empire
3880 Lemon Street, Suite 520
Riverside, CA 92501
P 951. 241.7338 • F 951.300.0985

Central Valley
2125 Kern Street, Suite 307
Fresno, CA 93721
P 559.445.1580 • F 888.519.9160

awattorneys.com

December 6, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013-1105

Re: Statement of Legal Authority

Dear Mr. Unger:

This letter is provided to serve as the Statement of Legal Authority for the City of Lynwood (the "City") that must be submitted with its Annual Report pursuant to Part VI.A.2.b. of Order No. R4-2012-0175 for NPDES Permit No. CAS004001. As legal counsel for the City, I am of the considered legal opinion that it has all the necessary legal authority to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order during the reporting period of July 1, 2012 through June 30, 2013, to the extent permitted by State and Federal law, subject to the limitations on municipal action under the California and United States Constitutions.

Per the requirement in Part VI.A.2.b.i., here are citations to the City's Municipal Code, Chapters 14-12 Stormwater and Urban Runoff Pollution Control and 14-13 Standard Urban Storm Water Mitigation Plan for Storm Water Pollution Control Measures for Development Planning and Construction Activities, for each of the following requirements found in Part VI.A.2.a:

i. *Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.*

Municipal Code Sections: 14-12.9 Requirements For Industrial And Commercial Discharges And Construction Activities

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ii. *Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.*

Municipal Code Section: 14-12.6 Prohibited Activities

iii. *Prohibit and eliminate illicit discharges and illicit connections to the MS4.*

Municipal Code Section: 14-12.6 Prohibited Activities

iv. *Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.*

Municipal Code Section: 14-12.6 Prohibited Activities

v. *Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);*

Municipal Code Sections: 14-12.3 Purpose And Intent and 14-12.10 Enforcement

vi. *Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.*

Municipal Code Sections: 14-12.10 Enforcement and 14-13.4 Authority To Inspect And Enforce Storm Water Pollution Control Measures

vii. *Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;*

Municipal Code Sections: 14-12.2 Findings and 14-12.6 Prohibited Activities

viii. *Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;*

Municipal Code Sections: 14-12.2 Findings and 14-12.6 Prohibited Activities

ix. *Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4;*

Municipal Code Sections: 14-12.3 Purpose And Intent, 14-12.10 Enforcement, and 14-13.4 Authority To Inspect And Enforce Storm Water Pollution Control Measures

x. *Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;*

Municipal Code Section: 14-12.8 Good Housekeeping Provisions

xi. *Require that structural BMPs are properly operated and maintained;*

Municipal Code Sections: 14-13.1 Purpose And Scope and 14-13.2 Authority

xii. *Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.*

Municipal Code Sections: 14-13.1 Purpose And Scope and 14-13.2 Authority

Per the requirement in Part VI.A.2.b.ii., the City's legal procedures available to mandate compliance with applicable municipal ordinances identified in the above section, and therefore with the conditions of the Order, can be found in Municipal Code Section 14-12.10 Enforcement. Here is the text of that provision:

14-12.10 Enforcement:

a. Violations Deemed A Public Nuisance:

1. Any condition that is caused or permitted to exist in violation of any of the provisions of this Section is hereby determined to be a threat to the public health, safety, and welfare, is deemed to be a public nuisance, and may be abated by any authorized enforcement officer. In addition, a civil or criminal action to abate, enjoin, or otherwise compel the cessation of that nuisance may be initiated by the City Attorney.

2. The cost of abatement will be borne by the owner of the property. The cost of abatement will be invoiced to the owner of the property in the manner provided by law or ordinance for the recovery of nuisance abatement costs.

3. If any violation of this Section constitutes a seasonal and recurrent nuisance, the Director of Public Works will give written notice of that nuisance. The failure of any person to take appropriate action to prevent stormwater pollution after written notice of a determination under this Subsection constitutes a public nuisance and a violation of this Section.

b. Concealment: Causing, permitting, aiding, abetting, or concealing a violation of any provision of this Section constitutes a violation of that provision.

c. Civil Actions: In addition to all other remedies provided in this Subsection, any violation of this Section may be enforced by civil action brought by the City. In any such action, the City may seek, as appropriate, any or all of the following remedies:

1. A temporary or permanent injunction, or both.

2. Assessment of the violator for the costs of any investigation, inspection, or monitoring survey that led to the determination of the violation, and for the reasonable costs of preparing and bringing legal action under this subsection.

3. Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation.

4. Compensatory damages for the loss of or destruction to water quality, wildlife, and fish and aquatic life.

d. Administrative Enforcement Powers: In addition to the other enforcement powers and remedies established by this Section, an authorized enforcement officer has the authority to use the following administrative remedies:

1. Cease And Desist Orders: When an authorized enforcement officer finds that a discharge has taken place or is likely to take place in violation of this Section, the officer may issue an order to cease and desist such discharge, or any practice or operation that is likely to cause such discharge, and direct that the responsible persons: a) comply with the requirement; b) comply with a time schedule for compliance; and c) take appropriate action to prevent the violation from recurring.

2. Notice To Clean: Whenever an authorized enforcement officer finds any oil, earth, debris, grass, weeds, dead trees, tin cans, rubbish, refuse, waste, or any other material of any kind, upon the sidewalk abutting or adjoining any parcel of land, or upon any parcel of land or grounds, that may result in pollutants entering the Municipal Stormwater System or a nonstormwater discharge to the Municipal Stormwater System, the enforcement officer may give notice to the owner or occupant of the adjacent property to remove such oil, earth, debris, grass, weeds, dead trees, tin cans, rubbish, refuse, waste or other material. The recipient of that notice must undertake the removal activities described in the notice.

e. Penalties: Violation of this Section constitutes a misdemeanor and is punishable as provided in Section 1-5 of this Code.

f. Permit Revocation: If the City makes a provision of this Section or any identified BMP a condition of approval for the issuance of a permit or license, any person in violation of that condition is subject to the permit revocation procedures set forth in this Code.

g. Remedies: Remedies under this Section are in addition to and do not supersede or limit any and all other remedies, civil or criminal. The remedies provided for in this Section are cumulative and not exclusive.

Thus, enforcement actions can be completed administratively or judicially if necessary.

Please contact the undersigned if you have any questions.

Sincerely,

ALESHIRE & WYNDER, LLP

Fred Galante
City Attorney for the City of Lynwood

//0.0

STATEMENT OF LEGAL AUTHORITY

Pursuant to Part VI.A.2.b. of Order No. R4-2012-0175, the City of Paramount has all the necessary legal authority to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order during the reporting period of July 1, 2012 through June 30, 2013. This is made evident by municipal code citation to each of the following requirements found in Part VI.A.2.a:

1. Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial or commercial activity and control the quality of storm water discharged from industrial and commercial sites. This requirement applies both to industrial and commercial sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.
   Municipal Code Section: Sec. 48-3.5. Prohibited discharges from industrial or commercial activity
2. Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited
3. Prohibit and eliminate illicit discharges and illicit connections to the MS4.
   Municipal Code Section: Sec. 48-3. Illicit discharges prohibited and Sec. 48-3.1. Installation or use of illicit connections prohibited
4. Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited
5. Require compliance with applicable Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);
   Municipal Code Section: Sec. 48-3.8. Notification of uncontrolled discharges required.
6. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.
   Municipal Code Section: Sec. 48-5. Enforcement - Director's powers and duties
7. Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited and Sec. 48-2.1. Purpose and Intent.
8. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited and Sec. 48-2.1. Purpose and Intent.

RB-AR10813

9. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4;
   Municipal Code Section: Sec. 48-5.3. Inspection to ascertain compliance - Access
10. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;
    Municipal Code Section: Sec. 48-5.4. Notice to correct violations - Director may take action
11. Require that structural BMPs are properly operated and maintained.
    Municipal Code Section: Sec. 48-4.1. Best management practices for construction activity, 48-42, best managerial practices for industrial and commercial facilities.
12. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.
    Municipal Code Section: Sec. 48-4.3. Installation of structural BMPs

The City of Paramount legal procedures available to mandate compliance with applicable municipal ordinances identified in the above section, and therefore with the conditions of the Order, can be found in Section *Sec. 48-5. Enforcement - Director's powers and duties*. Violations of this section are deemed a "Public Nuisance" in section 48-5.5, where any discharge in violation of this chapter, any illicit connection, and/or any violation of runoff management requirements shall constitute a threat to public health and safety.

Signature: _____
John E. Cavanaugh, City Attorney

Date: 12-3-13

RB-AR10814

ALVAREZ-GLASMAN & COLVIN

ATTORNEYS AT LAW

13181 Crossroads Parkway North
Suite 400-West Tower
City of Industry, CA 91746
Tel: 562.699.5500
Fax: 562.692.2244
www.agclawfirm.com

December 13, 2013

Sam Unger, P.E., Executive Officer
California Regional Water Quality
Control Board -- Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-1105

Subject: Certification of Legal Authority

Dear Mr. Unger:

Alvarez-Glasman & Colvin serves as the City Attorney's Office for the City of Pico Rivera. As the City Attorney for the City of Pico Rivera (the "City"), I am aware of the following legal authority requirements specified in VI.A.2.b, of the MS4 Permit for Los Angeles County, Order No. R4-2012-0175, NPDES Permit No. CAS004001:

Each Permittee must submit a statement certified by its chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order. Each Permittee shall submit this certification annually as part of its Annual Report beginning with the first Annual Report required under this Order. These statements must include:

i. Citation of applicable municipal ordinances or other appropriate legal authorities and their relationship to the requirements of 40 CFR § 122.26(d)(2)(i)(A)-(F) and of this Order; and

ii. Identification of the local administrative and legal procedures available to mandate compliance with applicable municipal ordinances identified in subsection (i) above and therefore with the conditions of this Order, and a statement as to whether enforcement actions can be completed administratively or whether they must be commenced and completed in the judicial system.

The City has the legal authority to require compliance with the requirements associated with 40 CFR § 122.26(d)(2)(i)(A-F) and applicable provisions of the Order per Chapter 16.04 Storm Water and Urban Runoff Pollution Prevention of the City of Pico Rivera Municipal Code. The City has had such legal authority since 2002.

The City's Municipal Code provides for both administrative enforcement and legal enforcement of violations, which may result in administrative, civil, or criminal penalties. Section 16.04.140 provides that in the event the City serves a person with a notice of violation, and that person fails to comply within the given time period, the City has multiple remedies which are not listed to be exclusive or exhaustive, including: seeking prosecution of violations as a misdemeanor resulting in fines or imprisonment; seeking restitution of costs incurred by the City in the investigation and enforcement of compliance; and prosecution of violations as nuisance abatement resulting in liens and cost recovery.

Should you have any questions regarding this matter, please feel free to contact Deputy City Attorney Teresa Chen at (562) 699-5500.

Sincerely,

ALVAREZ-GLASMAN & COLVIN

Arnold M. Alvarez-Glasman
City Attorney

ALESHIRE & WYNDER LLP
ATTORNEYS AT LAW

Respond to Orange County
David J. Aleshire
daleshire@awattorneys.com
Direct (949) 250-5409

Orange County
18881 Von Karman Ave., Suite 1700
Irvine, CA 92612
P 949.223.1170 • F 949.223.1180

Los Angeles
2361 Rosecrans Ave., Suite 475
El Segundo, CA 90245
P 310.527.6660 • F 310.532.7395

Inland Empire
3880 Lemon Street, Suite 520
Riverside, CA 92501
P 951. 241.7338 • F 951.300.0985

Central Valley
2125 Kern Street, Suite 307
Fresno, CA 93721
P 559.445.1580 • F 888.519.9160

awattorneys.com

December 3, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013-1105

Re: Legal Authority Statement

Dear Mr. Unger:

This letter is provided to serve as the Statement of Legal Authority for the City of Signal Hill (the "City") that must be submitted with its Annual Report pursuant to Part VI.A.2.b. of Order No. R4-2012-0175 for NPDES Permit No. CAS004001. As legal counsel for the City, I have determined that it has all the necessary legal authority to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order during the reporting period of July 1, 2012 through June 30, 2013, to the extent permitted by State and Federal law, subject to the limitations on municipal action under the California and United States Constitutions.

Per the requirement in Part VI.A.2.b.i., here are citations to the City's Municipal Code for each of the following requirements found in Part VI.A.2.a:

i. *Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.*

   Municipal Code Sections: 12.16.060 Illicit discharges, 12.16.100 Compliance with state and federal discharge requirements, and 12.16.112 Construction pollutant reduction

ii. *Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.*

Municipal Code Section: 12.16.060 Illicit discharges

iii. *Prohibit and eliminate illicit discharges and illicit connections to the MS4.*

Municipal Code Sections: 12.16.050 Illicit connections prohibited and 12.16.060 Illicit discharges

iv. *Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.*

Municipal Code Sections: 12.16.060 Illicit discharges and 12.16.080 Littering

v. *Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);*

Municipal Code Section: 12.16.120 Inspection and enforcement

vi. *Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.*

Municipal Code Section: 12.16.120 Inspection and enforcement

vii. *Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;*

Municipal Code Sections: 12.16.020 Purpose and intent and 12.16.120 Inspection and enforcement

viii. *Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;*

Municipal Code Sections: 12.16.020 Purpose and intent and 12.16.120 Inspection and enforcement

ix. *Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take*

measurements, review and copy records, and require regular reports from entities discharging into its MS4;

Municipal Code Section: 12.16.120 Inspection and enforcement

x. *Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;*

Municipal Code Sections: 12.16.060 Illicit discharges, 12.16.114 New development/redevelopment pollutant reduction, and 12.16.116 Small site new development/ redevelopment pollutant reduction

xi. *Require that structural BMPs are properly operated and maintained;*

Municipal Code Sections: 12.16.114 New development/redevelopment pollutant reduction and 12.16.116 Small site new development/ redevelopment pollutant reduction

xii. *Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.*

Municipal Code Section: 12.16.114 New development/redevelopment pollutant reduction and 12.16.116 Small site new development/ redevelopment pollutant reduction

Per the requirement in Part VI.A.2.b.ii., the City's legal procedures available to mandate compliance with applicable municipal ordinances identified in the above section, and therefore with the conditions of the Order, can be found in Municipal Code Section 12.16.120 Inspection and enforcement. Here is the relevant text of that provision:

"12.16.120 Inspection and enforcement.

[...]

B. Enforcement.

1. Any violation of this chapter is a misdemeanor and shall be punishable by either a fine of up to one thousand dollars or six months in the county jail, or both.

2. Any person who may otherwise be charged with a misdemeanor as a result of a violation of this chapter may be charged, at the discretion of the prosecuting attorney, with an infraction punishable by a fine of not more than one

hundred dollars for the first violation, two hundred dollars for the second violation, and two hundred fifty dollars for each additional violation thereafter.

3. As a part of any sentence or other penalty imposed or the award of any damage, the court may also order that restitution be paid to the City or any injured person, or, in the case of a violator who is a minor, by the minor's parent or lawfully designated guardian or custodian. Restitution may include the amount of any reward.

4. Any person violating the provisions of this chapter shall reimburse the City for any and all costs incurred by the City in responding to, investigating, assessing, monitoring, treating, cleaning, removing, or remediating any Illicit Discharge or Pollutant from the municipal storm drain system; rectifying any Illicit Connection; or remediating any violation of this chapter.

Such costs to be paid to the City include all administrative expenses and all legal expenses, including costs and attorneys' fees, in obtaining compliance, and in litigation including all costs and attorneys' fees on any appeal. The costs to be recovered in this Section 12.16.120 shall be recoverable from any and all persons violating this chapter.

5. In the event any violation of this chapter constitutes an imminent danger to public health, safety, or the environment, the City Manager or Director, or any authorized agent thereof, may enter upon the premises from which the violation emanates, abate the violation and danger created to the public safety or the environment, and restore any premises affected by the alleged violation, without notice to or consent from the owner or occupant of the premises. An imminent danger shall include but is not limited to exigent circumstances created by the Discharge of Pollutants, where such Discharge presents a significant and immediate threat to the public health or safety, or the environment.

6. Violations of this chapter may further be deemed to be a public nuisance which may be abated by administrative or civil or criminal action in accordance with the terms and provisions of this code and state law.

7. All costs and fees incurred by the City as a result of any violation of this chapter which constitute a nuisance, including all administrative fees and expenses and legal fees and expenses, shall become a lien against the subject premises from which the nuisance emanated and a personal obligation against the owner, in accordance with Government Code Sections 38773.1 and 38773.5. The owner of record of the premises subject to any lien shall receive notice of the lien prior to recording, as required by Government Code Section 38773.1. The City Attorney is authorized to collect nuisance abatement costs or enforce a nuisance lien in an action brought for money judgment, or by delivery to the county

assessor of a special assessment against the premises in accordance with the conditions and requirements of Government Code Section 38773.5.

8. Any person acting in violation of this chapter may also be acting in violation of the Clean Water Act or the California Porter-Cologne Act (California Water Code Section 13000 et seq.) and the regulations thereunder, and other laws and regulations, and may be subject to damages, fines and penalties, including civil liability under such other laws. The City Attorney is authorized to file a citizen's suit pursuant to the Clean Water Act, seeking penalties, damages and orders compelling compliance and appropriate relief.

9. The City Attorney is authorized to file in a court of competent jurisdiction a civil action seeking an injunction against any violation or threatened or continuing violation of this chapter. Any temporary, preliminary or permanent injunction issued pursuant hereto may include an order for reimbursement to the City for all costs incurred in enforcing this chapter, including costs of inspection, investigation, monitoring, treatment, abatement, removal or remediation undertaken by or at the expense of the city, and may include all legal expenses and fees and any and all costs incurred relating to the restoration or remediation of the environment.

10. Each separate Discharge in violation of this chapter and each day a violation of this chapter exists, without correction, shall constitute a new and separate violation punishable as a separate infraction, misdemeanor and/or civil violation.

11. Whenever necessary, interagency coordination will be employed to enforce the provisions of this chapter.

12. The City may utilize any and all other remedies as otherwise provided by law."

Thus, enforcement actions can be completed administratively or judicially if necessary.

Please contact the undersigned if you have any questions.

Sincerely,

ALESHIRE & WYNDER, LLP

David J. Aleshire
City Attorney for the City of Signal Hill

City of South Gate

8650 CALIFORNIA AVENUE • SOUTH GATE, CA 90280-3075 • (323) 563-9538
FAX (323) 357-9643

RAUL SALINAS
CITY ATTORNEY

December 3, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013-1105

RE: Legal Authority Certification for the City of South Gate

Dear Mr. Unger:

As legal counsel for the City of South Gate, I have reviewed its existing ordinances including Title 6 (Health and Sanitation), Chapter 6.67 (Storm Drains), of the South Gate Municipal Code, and have determined that the City can operate pursuant to the legal authority required in 40 CFR 122.26(d)(2)(Storm Water discharge applicable to State NPDES programs), including subdivision 122.26(d)(2)(i)(A)-(F), and Part VI.A.2 of Order No. R4-2012-0175, issued by the Regional Water Quality Control Board – Los Angeles Region ("RWQCB"), adopted on December 28, 2012 and entitled "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County.

Enforcement of the City's stormwater ordinances can be completed administratively or, if necessary, through the judicial system.

Please call the undersigned if you have any questions.

Sincerely,

CITY OF SOUTH GATE

Raul F. Salinas, City Attorney

cc: John L. Hunter & Associates

Watershed Management Program Appendix 8

A-8-1 Coordinated Integrated Monitoring Program

INCLUDED AS A SEPARATE SUBMITTAL

DRAFT

Lower Los Angeles River

Coordinated Integrated Monitoring Program

PARTICIPANTS

- Downey
- Lakewood
- Long Beach
- Lynwood
- Los Angeles County Flood Control District
- Pico Rivera
- Signal Hill
- South Gate
- Paramount



Prepared by:

KINNETIC LABORATORIES INCORPORATED

RB-AR10824

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ACRONYMS

ALERT	Automatic Local Evaluation in Real Time
AMEL	Average Monthly Effluent Limitation
Basin Plan	*Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand 5-day @ 20 °C
CIMP	Coordinated Integrated Monitoring Program
CL	Control Limit
COD	Chemical Oxygen Demand
CTR	California Toxics Rule
CV	Coefficient of Variation
CWA	Clean Water Act
CWC	California Water Code
Discharger	Los Angeles County MS4 Permittees
DNQ	Detected But Not Quantified
EFA	Effective Filtration Area
ELAP	California Department of Public Health Environmental Laboratory Accreditation Program
Facility	Los Angeles County MS4s
GIS	Geographical Information System
gpd	gallons per day
HUC	Hydrologic Unit Code
IC50	Concentration at which the organism is 50% inhibited
IC/ID	Illicit Connection and Illicit Discharge Elimination
LA	Load Allocations
LARWQCB	Regional Water Quality Control Board, Los Angeles
LID	Low Impact Development
LOEC	Lowest Observed Effect Concentration
MAL	Municipal Action Limits
MCM	Minimum Control Measure
mg/L	milligrams per Liter
MDEL	Maximum Daily Effluent Limitation
µg/L	micrograms per Liter
MGD	Million Gallons Per Day
ML	Minimum Level
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
ND	Not Detected
NOEC	No Observable Effect Concentration
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
Ocean Plan	Water Quality Control Plan for Ocean Waters of California
ORI	Outfall Reconnaissance Inventory
PES	Polyester-reinforced polysulfone
RAP	Reasonable Assurance Program
Regional Water Board	California Regional Water Quality Control Board, Los Angeles Region
RPA	Reasonable Potential Analysis
RWL	Receiving Water Limitations

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SIP	State Implementation Policy (Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California)
SQO	Sediment Quality Objective
SSC	Suspended Sediment Concentration
State Water Board	California State Water Resources Control Board
SVOC	Semivolatile Organic Compounds
TAC	Test Acceptability Criteria
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRE	Toxicity Reduction Evaluation
TSS	Total Suspended Solid
TU_c	Chronic Toxicity Unit
USEPA	United States Environmental Protection Agency
WDR	Waste Discharge Requirements
WET	Whole Effluent Toxicity
WLA	Waste Load Allocations
WMA	Watershed Management Area
WMMS	Watershed Management Modeling System
WMP	Watershed Management Program
WQBELs	Water Quality-Based Effluent Limitations
WQS	Water Quality Standards
%	Percent

COORDINATED INTEGRATED MONITORING PROGRAM (CIMP)

FOR THE

LOWER LOS ANGELES RIVER WATERSHED GROUP

1. INTRODUCTION

The Los Angeles Regional Water Quality Control Board (Regional Board) adopted a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. R4-2012-0175 (Permit) on November 8, 2012 that became effective on December 28, 2012. The purpose of the Permit is to ensure the MS4s in Los Angeles County are not causing or contributing to exceedances of water quality objectives established to protect the beneficial uses in the receiving waters. The Permit included guidance for development of a Monitoring and Reporting Program (MRP- Attachment E) to demonstrate that water quality within the permitted area is compliant with established receiving water limitations (RWLs).

The Permit allows development of a Coordinated Integrated Monitoring Program (CIMP) to specify approaches for addressing the objectives of the MRP. The Lower Los Angeles River (LLAR) Watershed Management Area (WMA) chose to develop and implement a CIMP to address the unique conditions of this region.

The entire Los Angeles River Watershed drains a watershed of 824 square miles. The Los Angeles River WMA is one of the largest in the region and is also one of the most diverse in terms of land use patterns. Approximately 324 square miles of the watershed are covered by forest or open space land including the area near the headwaters, which originate in the Santa Monica, Santa Susana, and San Gabriel Mountains. The remainder of the watershed is highly developed. The river flows through the San Fernando Valley past heavily developed residential and commercial areas. From the confluence with the Arroyo Seco, north of downtown Los Angeles, to the confluence with the Rio Hondo, the river flows through industrial and commercial areas and is bordered by rail yards, freeways, and major commercial and government buildings.

The LLAR Watershed (Figure 1-1) extends from Pico Rivera on the Rio Hondo to the Pacific Ocean. The LLAR Watershed Group encompasses approximately 43.7 square miles (27,981 acres) within Los Angeles County and comprises 5.3% of the drainage area of the Los Angeles River Watershed From the Rio Hondo to the Pacific Ocean, the river flows through industrial, residential, and commercial areas, including major refineries and petroleum products storage facilities, major freeways, rail lines, and rail yards serving the Ports of Los Angeles and Long Beach. The Los Angeles River tidal prism/estuary begins in Long Beach at Willow Street and runs approximately three miles before joining with Queensway Bay. The channel has a soft bottom in this reach with concrete-lined sides.

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The CIMP is required to integrate requirements of the current Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit (LARWQCB, 2012), the City of Long Beach MS4 permit and TMDL monitoring requirements. This new approach represents an expansion and reorganization of monitoring in order to allow better assessment of the effectiveness of control measures using a watershed-based approach. The CIMP is structured to support the WMP's adaptive management process. New information and data resulting from the monitoring program are intended to assist in evaluating the effectiveness of management actions and to regularly re-evaluate the monitoring plan to better identify sources of contaminants. This plan was developed to address five primary objectives which include:

- Assess the chemical, physical, and biological impacts of discharges from the MS4s on receiving waters.
- Assess compliance with receiving water limitations and water quality-based effluent limitations (WQBELs) established to implement TMDL wet and dry weather load allocations
- Characterize pollutant loads in MS4 discharges.

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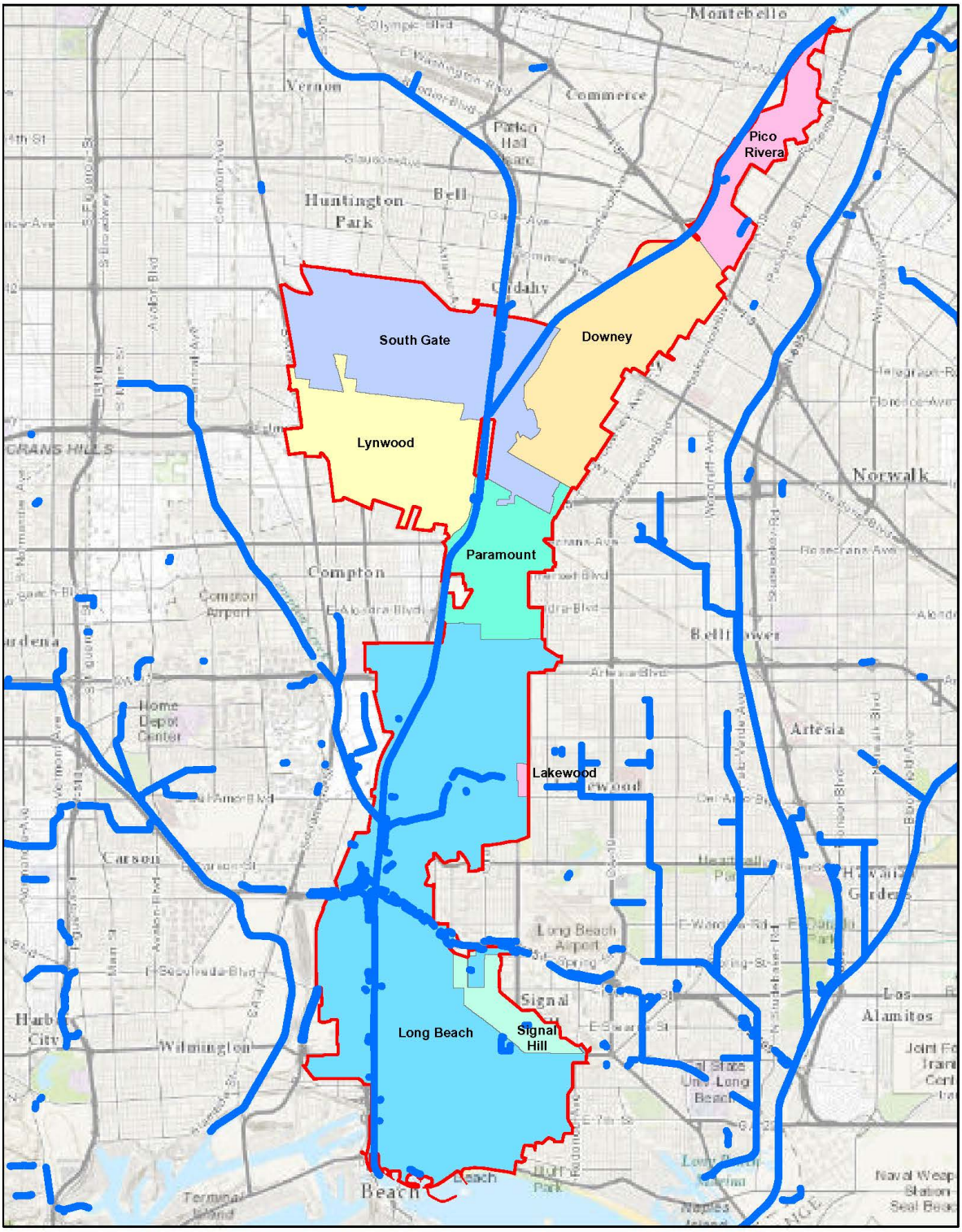


Figure 1-1. Lower Los Angeles River Watershed Group Boundaries.

- Identify sources of pollutants in MS4 discharges.
- Measure and improve the effectiveness of pollutant controls implemented under the new MS4 permits.

The Monitoring and Reporting Plan (MRP; Sections I.C and I.D) provides for development of a CIMP to provide Permittees the flexibility to coordinate monitoring efforts on a watershed or subwatershed basis, leverage monitoring resources to increase cost-efficiency and effectiveness and to closely align monitoring required for TMDLs with monitoring required to support the Watershed Management Program.

2 Water Body-Pollutant Classification

Development of a Watershed Management Program (WMP) requires Permittees to develop water quality priorities within each WMA [Section C.5.a (page 58) of the Permit] that will be used assist in directing implementation of control measures and monitoring to address constituents of concern. These classifications are presented and discussed in Section 2 of the WMP.

The CIMP was developed to focus on existing water quality conditions. With more than 10 years of monitoring, data has shown that most of the constituents listed in Table E-2 of the MRP have never been detected and many more have been detected, but have not been found to exceed any RWLs. This new program is designed to target constituents that have been identified as constituents of concern in the receiving waters. Water body-pollutant combinations were used to classify segments of the LLAR WG into one of the following three categories:

- **Category 1 (Highest Priority):** Water body-pollutant combinations for which water quality-based effluent limitations and/or RWLs are established in Part VI.E and Attachments L through R of the Order.
- **Category 2 (High Priority)**: Pollutants for which data indicate water quality impairment in the receiving water according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) and for which MS4 discharges may be causing or contributing to the impairment.
- **Category 3 (Medium Priority)**: Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable RWLs contained in the Order and for which MS4 discharges may be causing or contributing to exceedances.

Five water bodies were considered for both wet and dry weather conditions while reviewing data potential impairment of the receiving waters (Table 2-1, Table 2-2). These included the Los Angeles River Estuary (LARE), Reaches 1 and 2 of the Los Angeles River (LAR1 and LAR2), Compton Creek (CC) and Reach 1 of the Rio Hondo (RH1). Each of these segments is defined in the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (Basin Plan).

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Table 2-1. Wet Weather Water Body/ Pollutant Classifications for the Lower Los Angeles River WG.

			WATER BODY				
CATEGORY	**POLLUTANT**	**CLASS**	**LARE**	**LAR1**	**LAR2**	**CC**	**RH1**
1	Cadmium	Metal		**X**	**X**	**X**	**X**
	Copper	Metal	**X**	**X**	**X**	**X**	**X**
	Lead	Metal	**X**	**X**	**X**	**X**	**X**
	Zinc	Metal	**X**	**X**	**X**	**X**	**X**
	Trash[1]	Other		**X**	**X**	**X**	**X**
	Nitrogen Compounds[2]	Nutrient		**X**	**X**	**X**	**X**
	DDT	OC Pest	**X**				
	PCBs	OC Pest	**X**				
	PAHs	SVOC	**X**				
	E. coli	Micro		**X**	**X**	**X**	**X**
	Coliform & Enterococcus	Micro	**X**				
2	Chlordane (sediment)	OC Pest	**X**				
	Coliform Bacteria	Micro		**X**	**X**	**X**	**X**
	Aluminum	Metal		**X**			
	Diazinon	OP Pest		**X**			
	Oil	General			**X**		
	Trash	Other	**X**				
	Toxicity	Bioassay					**X**
	Sediment Toxicity	Bioassay	**X**				
	Cyanide	General		**X**			
	MBAS	General		**X**	**X**		
3	Chloride	General					**X**
	Mercury	Metal		**X**			
	Diazinon	OP Pest					**X**
	PAHs	SVOC		**X**	**X**		
	Bis(2-ethylhexylphthalate	SVOC		**X**			
	Cyanide	General					**X**
	pH	General					**X**
	Dissolved Oxygen	General		**X**	**X**		

LAR1= Los Angeles River Reach 1
LAR2= Los Angeles River Reach 2
LARE= Los Angeles River Estuary
CC= Compton Creek
RH1=Rio Hondo Reach 1

Nutrients= nitrogen and phosphorus compounds
OC Pest = organochlorine pesticides
OP Pest = organophosphorus pesticides
Micro = microbiological (fecal indicator bacteria)
SVOC = semivolatile organic compounds (acid, base & neutral

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia was listed in category 2 for LAR1 and LAR2 – included in nitrogen compounds for category 1
3. Nutrients (algae) by nitrogen compounds for category 1.

Table 2-2. Dry Weather Water Body/ Pollutant Classifications for the Lower Los Angeles River WG.

			WATER BODY				
CATEGORY	**POLLUTANT**	**CLASS**	**LARE**	**LAR1**	**LAR2**	**CC**	**RH1**
1	Copper	Metal	**X**	**X**	**X**	**X**	**X**
	Lead	Metal	**X**	**X**	**X**	**X**	**X**
	Zinc	Metal	**X**				**X**
	Trash[1]	Other		**X**	**X**	**X**	**X**
	Nitrogen Compounds[2]	Nutrients		**X**	**X**	**X**	**X**
	DDT	OC Pest	**X**				
	PAHs	SVOC	**X**				
	PCBs	OC Pest	**X**				
	E. coli	Micro		**X**	**X**	**X**	**X**
	Coliform & Enterococcus	Micro	**X**				
2	Chlordane (sediment)	OC Pest	**X**				
	Coliform Bacteria	Micro		**X**	**X**	**X**	**X**
	Aluminum	Metal		**X**			
	Selenium	Metal		**X**	**X**		
	Cyanide	General		**X**			
	Oil	General			**X**		
	Trash	Other	**X**				
	Toxicity	Bioassay					**X**
	Sediment Toxicity	Bioassay	**X**				
3	Chloride	General		**X**	**X**		
	Cyanide	General					**X**
	pH	General					**X**
	Mercury	Metal		**X**			
	Nickel	Metal		**X**			
	Thallium	Metal		**X**	**X**		
	Chlorpyrifos	OP Pest				**X**	
	PAHs	SVOA		**X**	**X**		
	Bis(2-ethylhexylphthalate	SVOA		**X**			

LAR1= Los Angeles River Reach 1
LAR2= Los Angeles River Reach 2
LARE= Los Angeles River Estuary
CC= Compton Creek
RH1=Rio Hondo Reach 1

Nutrients= nitrogen and phosphorus compounds
OC Pest = organochlorine pesticides
OP Pest = organophosphorus pesticides
Micro = microbiological (fecal indicator bacteria)
SVOC = semivolatile organic compounds (acid, base & neutral

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia was listed in category 2 for LAR1 and LAR2 – included in nitrogen compounds for category 1
3. Nutrients (algae) by nitrogen compounds for category 1.

3 Monitoring Sites and Approach

This CIMP addresses monitoring activities required by the Monitoring and Reporting Program (MRP) - No. CI-6948 for Order R4-2012-0175, NPDES Permit No. CAS004001 for the Lower Los Angeles River (LLAR) Watershed Management Group (WMG). Development of this CIMP focused on improving the overall effectiveness of the monitoring program by coordination of sampling efforts.

Final approval of the CIMP is expected late 2014 or early 2015. Existing monitoring will continue to be conducted and beginning summer of 2014, the dry weather screening of major outfalls will commence. For planning purposes, the monitoring described in this CIMP is intended to commence on July 1, 2015 or 90 days after the approval of the CIMP, whichever is later. Majority of the elements will start in the summer of 2015 and the following wet weather season, and the program will be phased in over a three-year period. Non-stormwater (NSW) outfall monitoring efforts are currently underway in order to complete an inventory of all outfalls and allow the program to meet the first major deadline established by the Permit. The Permit requires that source identification surveys be completed for at least 25% of all major outfalls found to convey significant non-stormwater discharges by December 28, 2015.

The approach presented in this CIMP is designed to address objectives of the MRP by incorporating TMDL monitoring requirements and aligning field efforts to increase cost effectiveness. Information on sampling methods, cleaning protocol and QAQC are provided in Appendices B, C and D. The following sections provide a broad overview of the monitoring program. A comprehensive list of monitoring sites (Table 3-1) and the locations of these sites within the LLAR WMG (Figure 3-1) are provided to illustrate the coverage provided for each major element. Later sections will provide detailed monitoring requirements for individual elements of the CIMP. Appendices

3.1 Receiving Water Monitoring

The MRP (Part II.E.1) specifies that receiving water monitoring is to be performed at previously designated mass emission stations as well as TMDL receiving water compliance points, as designated in approved TMDL Monitoring Plans. The objectives of the receiving water monitoring include the following:

- Determine whether the receiving water limitations are being achieved,
- Assess trends in pollutant concentrations over time, or during specified conditions,
- Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring.

In order to achieve these requirements, two types of receiving water monitoring sites are included in the CIMP. These include:

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- Mass Emission (ME) Receiving Water Monitoring - The mass emission station will serve to provide a long-term measure of compliance with receiving water quality criteria and allow for assessment of trends in pollutant concentrations.
- TMDL Receiving Water Monitoring Sites – These sites are intended to evaluate compliance or progress towards attainment of Waste Load Allocation (WLAs) for TMDLs and ultimately provide data to evaluate when objectives are met and determine when sufficient data exist to reevaluate the 303(d) listing.

3.1.1 Mass Emission (ME) Monitoring Site

The Los Angeles River monitoring station (S10) will continue to serve as the ME monitoring station for the LLAR. This site is located in the Los Angeles River at the existing stream gauge station (i.e., Stream Gauge F319-R) between Willow Street and Wardlow Road. This site is located near the bottom of Reach 1 in the City of Long Beach and was originally selected to avoid tidal influences. This site has been monitored by the Los Angeles County Flood Control District (LACFCD) since 1998 and this site will continue to be monitored by LACFCD.

Although S10 serves as the only mass emission monitoring site within the LLAR WMG, it also serves (and has previously served) as a TMDL monitoring site since it is at the base of the watershed and is the last monitoring location for most contaminants of concern before water is discharged to the Estuary (Figure 3-1, Table 3-1)

3.1.2 Total Maximum Daily Load (TMDL) Monitoring Sites

Permittees within the LLAR WMG are required to conduct monitoring required under the Los Angeles County NPDES MS4 permit and comply with any monitoring requirements associated with six separate TMDLs (Table 3-2). TMDL monitoring sites were selected by reviewing requirements of each TMDL applicable to the LLAR and monitoring sites previously selected or recommended in two previous TMDL compliance plans:

- *Los Angeles River Metals TMDL Coordinated Monitoring Plan* (Metals CMP) – March 25, 2008
- *Coordinated Monitoring Plan for Los Angeles River Watershed Bacteria TMDL – Compliance Monitoring – Draft* (Bacteria CMP). - March 23, 2013

The Metals CMP included monitoring of five sites within the LLAR but, based upon the results of initial monitoring and the minimal distances between sites (about 2 miles), monitoring at one site (referred to as the Del Amo site) will be discontinued. Monitoring will continue as per the initial Metals CMP at the remaining three sites within the LLAR watershed.

The Bacteria CMP was not implemented due to the fact the CIMP was anticipated to address monitoring of ambient bacteria within each WMG. Nevertheless, this document provided a comprehensive approach that addressed ambient bacteria monitoring throughout the watershed and monitoring approaches for ambient monitoring at 16 sites. The CMP provides the framework for bacteria monitoring at the four sites located within the LLAR.

Additional TMDL monitoring is required for the Long Beach City Beaches and Los Angeles River Estuary TMDLs for Indicator Bacteria (Estuary Bacteria TMDL). The LAR Estuary is the only

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portion of this TMDL addressed by this CIMP. The Long Beach City Beaches will be addressed as part of a separate WMP and IMP being developed to address portions of the City of Long Beach not addressed by the three plans being developed the Lower Los Angeles River, the freshwater portion of the Los Cerritos Channel and the Lower San Gabriel River watersheds.

Protection of the recreational beneficial uses of the City of Long Beach open beaches includes both the open waters used by wind surfers and boaters but emphasizes the shoreline and swash-zone where bathers are directly impacted by exposure to potentially contaminated water. In the Los Angeles River Estuary, swimmers do not typically access waters directly from the shoreline and therefore concerns are more directed towards assessment of bacterial concentrations in open waters of the Estuary and the potential for bacteria in this wind-driven surface plume to impinge upon the recreational beaches of the City of Long Beach after leaving the Estuary. Interim monitoring points were selected to allow determination of whether bacteria are subject to simple dilution by mixing as the water passes through the estuary or if areas within the Estuary serve as sources or sinks for indicator bacteria.

The Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL) also requires that monitoring be conducted to quantify the loads of pollutants from the Los Angeles River. This program will require additional monitoring at the S10 site to quantify metals, DDT, PCBs, and PAHs associated with suspended particulates. This program will complement monitoring within the Harbor waters and the Los Angeles River Estuary that is already funded by members of the LLAR group that are included in the Greater Harbor Waters Regional Monitoring Coalition. In accordance with Table C of Attachment E of the Permit, this CIMP fulfills the requirement for the submission of a Monitoring and Reporting Plan and Quality Assurance Project Plan.

3.2 Stormwater Outfall Monitoring

Stormwater outfall monitoring is the one element of the program that will be phased in over the course of three years. Stormwater outfall sampling will be initiated at two sites during the first year of the program. An additional site will be added in each of the following two years to bring the total number of stormwater outfall monitoring sites up to four. A detailed implementation schedule is provided in the following Section 4.

The stormwater outfall monitoring program was designed to ensure that selected monitoring locations provided representative data by:

- Monitoring at least one major outfall per subwatershed (HUC 12) drainage area, and
- The drainage area of the selected outfalls shall be representative of the land uses within the Permitee's jurisdiction, and
- Selected outfalls must be configured to facilitate accurate flow measurements and safety of monitoring personnel.

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The four outfall sites are:

Stormwater Outfall Monitoring Sites	Jurisdiction Area								Land Use				HUC Equivalent		
	Long Beach	Signal Hill	Lakewood	Paramount	Lynwood	Downey	South Gate	Pico Rivera	Residential	Industrial	Commercial	Other	Cmpt Crk/LAR	C R/ LAR	Alhm/RioHondo
LLAR1 - Cerritos Pump Station	x	x							x				x		By others
LLAR2 - Dominguez Gap	x		x						x				x		
LLAR3 - Lynwood				x	x		x		x	x			x		
LLAR4 - Firestone						x		x	x	x	x			x	

There are three HUC 12 equivalents within the LLAR. The Compton Creek-Los Angeles River is by far the large of the three HUC units. Three of the proposed outfalls monitoring sites are within this HUC. The second largest HUC within the LLAR is the Alhambra Wash-Rio Hondo. One outfall monitoring site will be established within that HUC. The third HUC is the Chavez Ravine-Los Angeles River HUC of which the LLAR only occupies a minimal portion. It is the LLAR's understanding that the adjoining WMP group, the LA River Reach 2 Group, will be placing a monitoring station within that area, therefore the LLAR will not duplicate that effort.

3.3 Non-Stormwater Outfall Monitoring

NSW outfall based monitoring will be conducted for outfalls discharging to receiving waters of the LLAR Watershed. Initially, all pipes exceeding 12 inches and discharging directly into the LLAR receiving waters will be identified. During the first cycle of the permit, the database will be refined to determine which of the 12-inch to 36-inch pipes include discharges from areas with industrial land uses. Discharge pipes determined not to incorporate runoff from industrial land use areas will be excluded from further surveys. A screening program will be implemented to initially document sites with persistent and significant non-stormwater flows. The screening program will utilize a combination of field tests and may incorporate limited laboratory testing to assist in determining whether flows are the result of illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows or unknown.

3.4 New Development/ReDevelopment Effectiveness Tracking

Participating agencies have developed mechanisms for tracking information related to new and redevelopment projects that are subject to post-construction best management practice requirements in Part VI.D.7 of the MS4 Permit.

The MRP requires that Permittees develop a New Development/Re-Development Effectiveness tracking program. Participating agencies have developed mechanisms for tracking information

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related to new and redevelopment projects that are subject to post-construction best management practice requirements in Part VI.D.7 of the MS4 Permit.

3.5 Regional Studies

On behalf of the participating agencies, the LACFCD will continue to provide financial and/or monitoring resources to the Southern California Stormwater Monitoring Coalition Regional Watershed Monitoring Program, also known as the Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program (Bioassessment Program). The Bioassessment Program was initiated in 2009 and is structured to occur in cycles of five years. Sampling under the first cycle concluded in 2013. The next five-year cycle is scheduled to begin in 2015, with additional special study monitoring scheduled to occur in 2014.

Permittee representatives will also participate in the Southern California Stormwater Monitoring Coalition (SMC) meetings and assist in development and implementation of selected and appropriate regional studies designed to improve stormwater characterization and impact assessment.

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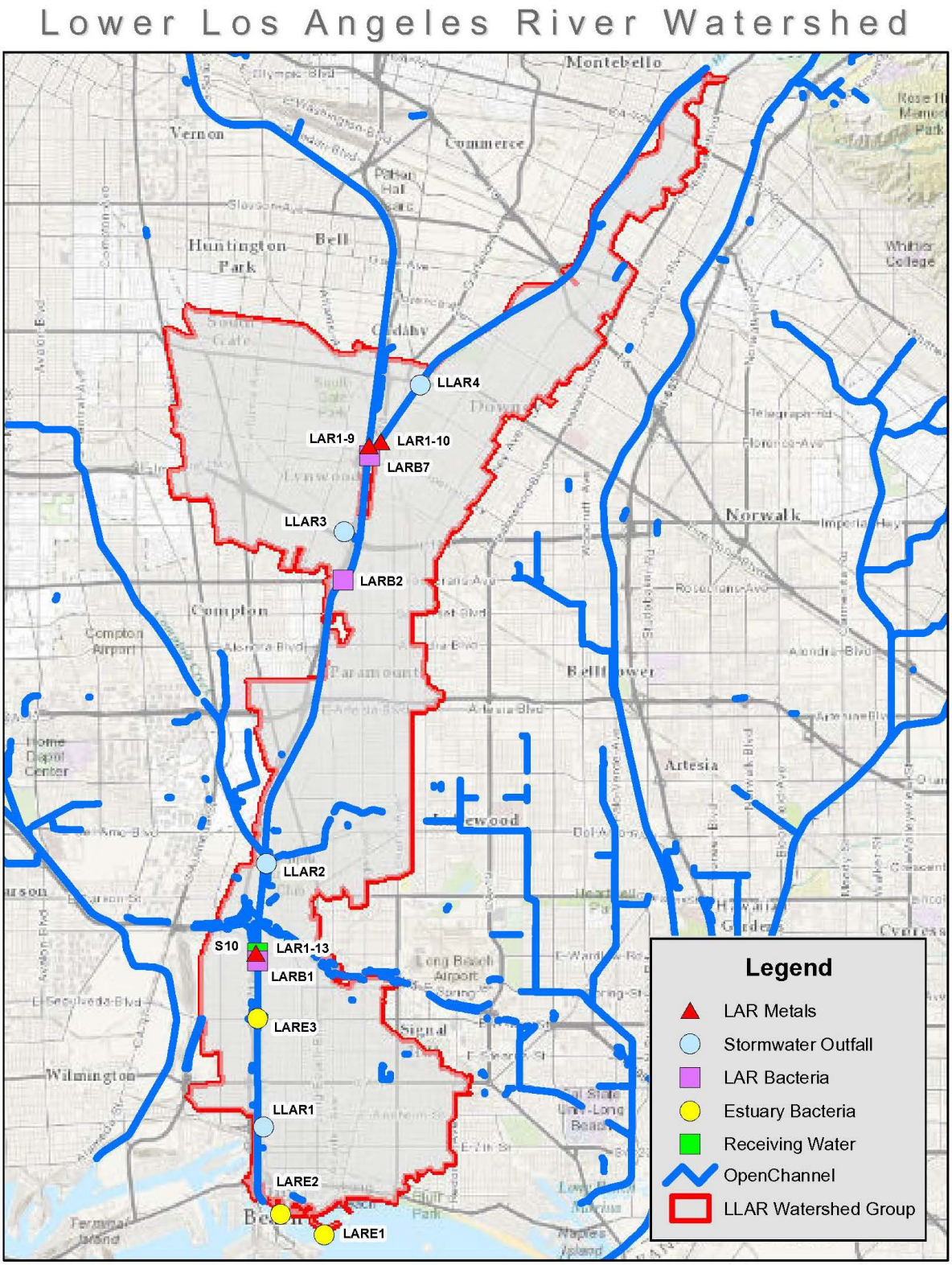


Figure 3-1. Monitoring Locations in the Lower Los Angeles River Watershed

Table 3-1. Consolidated List of Monitoring Sites in the Lower Los Angeles River WMG.

SITE CODE	SITE TYPE/PURPOSE	NAME	PRIMARY SAMPLING[2]	LATITUDE[3] (°N)	LONGITUDE (°W)
S10[1]	Receiving Water/TMDL	Wardlow Street	Auto	33.81900	118.20556
LLAR1	Stormwater Outfall	Cerritos Pump Station	Auto	33.77951	118.20380
LLAR2	Stormwater Outfall	Dominguez Gap Pump Station	Auto	33.83945	118.20320
LLAR3	Stormwater Outfall	Lynwood	Auto	33.91469	118.18214
LLAR4	Stormwater Outfall	Firestone	Auto	33.94812	118.16146
LARB1[1]	LAR Bacteria TMDL	Segment A (Wardlow)	Grab	33.81735	118.20551
LARB2	LAR Bacteria TMDL	Segment B (Rosecrans)	Grab	33.90374	118.18240
LARB7	LAR Bacteria TMDL	Rio Hondo	Grab	33.93202	118.17523
LARE1	Estuary Bacteria TMDL	LARE Mouth of Estuary	Grab	33.75506	118.18727
LARE2	Estuary Bacteria TMDL	LARE Queensway	Grab	33.75976	118.19910
LARE3	Estuary Bacteria TMDL	LARE Willow	Grab	33.80416	118.20547
LAR1-13[1]	LAR Metals TMDL	Wardlow - Main Channel	Auto/Grab	33.81900	118.20556
LAR1-10	LAR Metals TMDL	Rio Hondo - Trib	Grab	33.93510	118.17218
LAR1-9	LAR Metals TMDL	I710 - Main Channel	Grab	33.93421	118.17548

1. S10, LARB1, and LAR1-13 are all located at the same location in the Los Angeles River near Wardlow Ave. This site is the final compliance location for the Metals TMDL
2. Auto=Primarily sampled with automated stormwater monitoring equipment, Grab= Samples primarily taken as grab samples.
3. All site locations are based upon the NAD 83 datum.

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Table 3-2. Summary of TMDLs applicable to the Lower Los Angeles River Watershed (LLAR) Management Group.

TMDL	REGIONAL BOARD RESOLUTION #	REGIONAL BOARD APPROVAL DATE
Nitrogen Compounds and Related Effects TMDL (Nutrient TMDL)	2003-009 2012-010	Has not been approved.
Los Angeles River and Tributaries Metals TMDL (Metals TMDL)	2007-014 2010-003	October 29, 2008 November 3, 2011
Los Angeles River Watershed Bacteria TMDL (LAR Bacteria TMDL)	2010-007 Monitoring Plan: March 23, 2013.	October 29, 2008
Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL)	2011-008 Monitoring Plan: November 23, 2013 or the CIMP.	March 23, 2012
Los Angeles River Watershed Trash TMDL (Trash TMDL)	2007-012 Monitoring Plan not required.	September 23, 2008
Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL (Beaches/Estuary TMDL)	USEPA Established TMDL	March 26, 2012

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Table 3-3. Monitoring Site Designation and Monitoring Function.

Site Name	Site Description	Datum NAD83		Type of Site					
		Latitude (N)	Longitude (W)	Receiving Water	Stormwater Outfall	Harbor Toxics TMDL	Metals TMDL	Bacteria TMDL	
								River	Estuary
S10	Wardlow Street	33.81900	118.20556	**X**		**X**			
LLAR1	Cerritos Pump Station	33.77951	118.20380		**X**				
LLAR2	Dominguez Gap Pump Station	33.83945	118.20320		**X**				
LLAR3	Lynwood	33.91469	118.18214		**X**				
LLAR4	Firestone	33.94812	118.16146		**X**				
LARB1	Segment A (Wardlow)	33.81900	118.20556					**X**	
LARB2	Segment B (Rosecrans)	33.90374	118.18240					**X**	
LARB7	Rio Hondo	33.93202	118.17523					**X**	
LARE1	LARE Mouth of Estuary	33.75506	118.18727						**X**
LARE2	LARE Queensway	33.75976	118.19910						**X**
LARE3	LARE Willow	33.80416	118.20547						**X**
LAR1-13	Wardlow - Main Channel	33.81900	118.20556				**X**		
LAR1-10	Rio Hondo - Trib	33.93510	118.17218				**X**		
LAR1-9	I710 - Main Channel	33.93421	118.17548				**X**		

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4 Summary of Sampling Frequencies for each CIMP Element

It is anticipated that the CIMP will be implemented in a phased process (Table 4-1). The Receiving Water Quality Monitoring program will start at S10 (Wardlow) during the 2015 dry season. This site will continue to be monitored by the LACFD. This site will be sampled during two dry weather events and three stormwater events each year. During two surveys, water quality testing will incorporate the comprehensive list of water quality parameters listed in Table E-2 of the Attachment E of Regional Board Orders No. R4-2012-0175 (NPDES NO. CAS004001) and R-4-2014-0024 (NPDES No. CAS004003). This full set of analytes will be analyzed in water collected during the first major storm event of the year and during a critical, low flow dry season survey. July is considered to have the lowest historical flows based upon long-term flow monitoring. If these parameters are not detected at the specified Method Detection Limit (MDL) for their respective test method or if the result is below the lowest applicable water quality objective, and is not otherwise identified as being 303(d)-listed or part of an ongoing TMDL, the analyte will not be further analyzed. Parameters exceeding the lowest applicable water quality objective (Appendix G) will continue to be analyzed for the remainder of the Order during at the receiving water monitoring station where it was detected. Acceleration of the Receiving Water Quality Monitoring Program will also include the Aquatic Toxicity Monitoring.

Two Stormwater Outfall Monitoring sites will also start sampling during the 2015/16 wet season. These will include LLAR2 (Dominguez Gap) and a new station, LLAR3 (Lynwood). A new Stormwater Outfall Monitoring site will be installed in each subsequent year. LLAR4 (Firestone) will be installed and operable for the 2016/17 season and LLAR1 (Cerritos Pump Station) will installed and operable for the 2017/18 wet season. Once the Stormwater Outfall Monitoring sites are installed they will each be monitoring during three storm events each year. If running average concentrations of pollutants exceed the Municipal Action Limits (MALs – Attachment G of the MRP) by more than 20%, expanded monitoring will be required to identify the sources of the increased loads.

Monitoring in the main stem of the Los Angeles River and the Rio Hondo tributary for the Los Angeles River Bacteria TMDL, Los Angeles River Metals TMDL and the Los Angeles River Estuary Bacteria TMDL all start in the summer of 2015. Sampling for these three programs is based upon collection of grab samples.

Monitoring of non-stormwater discharges to the receiving waters of the Lower Los Angeles River started in the summer of 2014 in order to meet the first target of completion of 25% of the source investigations by December 2015.

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Table 4-1. Schedule for Implementation of Monitoring Activities in the Lower Los Angeles River Watershed.

Task	Dry 2014	Wet 2014-15	Dry 2015	Wet 2015-16	Dry 2016	Wet 2016-17	Dry 2017	Wet 2017-18	Dry 2018
Receiving Water/TMDL									
S10 –Wardlow									
Harbor Toxics			1	2	1	2	1	2	1
Chemistry[1]			2	3	2	3	2	3	2
Aquatic Toxicity			1	2	1	2	1	2	1
Outfall Monitoring Site									
LLAR1 (Cerritos Pump)								3	
LLAR2 (Dominguez Gap)				3		3		3	
LLAR3 (Lynwood)				3		3		3	
LLAR4 (Firestone)						3		3	
Los Angeles River Metals									
LAR1-13 (Wardlow)			4	3	4	3	4	3	4
LAR1-10 (Rio Hondo)			4		4		4		4
LAR1-9 (I710-LA River)			4		4		4		4
Los Angeles River Bacteria									
Pre-LRS – all Segment A outfalls			6						
LARB1 (Wardlow)			4		4		4		4
LARB2 (Rosecrans)			4		4		4		4
LARB7 (Rio Hondo)			4		4		4		4
Los Angeles River Estuary									
LARE1 (Mouth of Estuary)			4		4		4		4
LARE2 (Queensway Br.)			4		4		4		4
LARE3 (Willow)			4		4		4		4
Non-Stormwater Outfall									
Inventory & Screen[2]	3								
Source ID[3]		Ongoing	Ongoing		Ongoing		Ongoing		Ongoing
Monitoring[4]					2		2		2

1. Table E-2 chemical analyses will be performed once during the first wet weather event and once during the first critical dry weather monitoring event. Constituents that exceed MDLs and available water quality objectives will continue to be monitored along with all constituents with TMDLs or 303(d) listing. Wet and dry weather chemical constituents will be separately assessed for purposes of continued monitoring.
2. Initial Inventory and Screening will be completed in three surveys before the end of 2014. One re-assessment of the Non-Stormwater Outfall Monitoring Program will be conducted prior to December 2017.
3. Investigations designed to track and classify discharges will start during the 2015 dry season. Source tracking and classification work depend upon the number of sites categorized as Suspect outfalls with evidence of significant flow.
4. Monitoring will be implemented if significant dry weather flows are identified at discharge points that are cannot be identified, are non-essential exempt flows, or identified as illicit flows that are not yet controlled. These sites will be initially monitored twice a year in conjunction with dry weather monitoring of the receiving water site.

5 Chemical/Physical Parameters

This section provides a summary of chemical parameters required to be analyzed at the receiving water mass emission monitoring station a minimum of two times during the first year of the monitoring program and once during the critical dry weather period. Results of this screening process will be used to initially determine constituents that will continue to be analyzed at the mass emission site and those that will be further considered for inclusion as part of ongoing monitoring at stormwater outfall sites (Table 5-1). The full set of analytical requirements discussed below is based upon Table E-2 of the Monitoring and Reporting Program and summarized in Table 5-2 through Table 5-8 below.

Analytical requirements for the program are broken out by analytical test requirements since many are associated with an analytical test suite. This is most evident with the semivolatile organic compounds analyzed by EPA Method 625. Although this section identifies recommended methods for each analyte, many of the target constituents can be addressed by alternative methods. Selection of analytical methods is intended to be performance-based to allow laboratories flexibility to utilize methods that meet or exceed MLs listed in the MRP.

The lists of Table E-2 constituents only show minimum levels required for each analyte under the monitoring program since Method Detection Limits (MDLs) will vary among laboratories. Reporting limits are required to meet the established MLs unless matrix or other interferences are encountered that cannot be eliminated by additional cleanup procedures.

The critical dry weather event is defined as the period when historical in-stream flow records are lowest or during the historically driest month. The Reasonable Assurance Analysis (RAA)[1] conducted an assessment of long-term rainfall records and found that the least amount of rainfall occurs in August yet very little difference exists between May and September.

Initial monitoring of Table E-2 constituents during one wet and one dry weather event is intended to serve as a cross-check and/or verification that these pollutants have not become an issue in the receiving waters since the last time they were measured. This screening process is intended to be conducted one time at the receiving water mass emission site during each five-year permit cycle. If a parameter is not detected at the Method Detection Limit (MDL) for its respective test method or the result is below the lowest applicable water quality objective, and is not otherwise identified as a basic monitoring requirement, a TMDL analyte or a 303(d) listing, it is not required to be analyzed again during the current five-year permit cycle. If, during either the wet or dry weather screening, a parameter is detected exceeding the lowest applicable water quality objective then the parameter is to be analyzed for the remainder of the five-year cycle at the receiving water monitoring station where it was detected during the respective conditions (wet or dry).

[1] Draft Reasonable Assurance Analysis for Lower Los Angeles River, Los Cerritos Channel, and Lower San Gabriel River. May 2014.

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In addition, any additional constituents found to commonly exceed receiving water limitations at the ME site will also be incorporated into stormwater outfall monitoring program in order to help identify watershed sources of the pollutants.

Justification for adding and deleting constituents from the stormwater outfall monitoring program will follow the process established in the Los Angeles River Metals CMP. Any Table E-2 constituents incorporated into ongoing monitoring program at the ME receiving water monitoring site will be added to the stormwater outfall monitoring requirements after two consecutive exceedances of wet weather receiving water quality limitations. Similarly, it is not intended that constituents continue to be monitored at stormwater outfall sites if they are not detected on a regular basis and/or are not found at concentrations that would contribute to exceedances of water quality criteria in the receiving waters. Constituents will be removed from the list if they are not detected at levels of concern for two consecutive stormwater monitoring events.

Comprehensive monitoring of priority pollutants in the receiving waters at the ME site is intended to assure that all constituents with potential to impact water quality are incorporated into the monitoring program. In addition, any Table E-2 constituents incorporated into the ongoing monitoring program at the ME receiving water monitoring site, will also be added to the stormwater outfall monitoring requirements if they exceed RWLs at the ME site after two consecutive wet weather monitoring events.

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Table 5-1. Summary of Constituents to be Monitored on a Regular Basis at the S10 Mass Emission Monitoring Site.

CLASS OF MEASUREMENTS	MASS EMISSION SITE (S10)	
	Wet	**Dry**
Flow	3	2
Field Measurements Dissolved oxygen, pH, temperature, and specific conductivity	3	2
MRP Table E-2 Constituents[1] (other than those specifically listed below)	1	1
Aquatic Toxicity	2	1
General and Conventional Pollutants (Table 5-2) All <u>except</u> total phenols, turbidity, BOD_5, MTBE, and perchlorate, and fluoride.	3	2
Microbiological Constituents (Table 5-3) *E. coli*	3	2
Nutrients (Table 5-4) Nitrogen compounds only	3	2
Metals (Table 5-6**)** Al**,** Cd, Cu, Pb, Ni, Sb, Zn, Total Se & Hg	3	2
Organophosphate Pesticides (Table 5-7) Diazinon	3	2
Semivolatile Organic Compounds (Table 5-8) Bis(2-ethlyhexylyphthalate	3	2

1. All Table E-2 constituents will be measured during the first major storm event of the season and the critical, low flow dry weather event during the first year of the CIMP. The Los Angeles County Flood Control District owns and operates S10. Upon concurrence of the Executive Office of the Regional Board, the Flood Control District may reduce testing for pollutants listed on E2 if past monitoring has shown a history of non-detects or detection well below applicable WQO.

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5.1 General and Conventional Pollutants

Many of the general and conventional pollutants listed in Table 5-2 will continue to be analyzed as part of the base monitoring requirements. Total phenols, turbidity, BOD_5, fluoride, perchlorate, and MTBE will not be part of the base monitoring requirements unless these constituents are identified as constituents of concern during the first monitored storm event of the season and/or in association with monitoring conducted during the critical low flow event.

Table 5-2. Conventional constituents, analytical methods and quantitation limits.

CONSTITUENTS CONVENTIONAL POLLUTANTS	METHOD	Target Reporting Limits mg/L
Oil and Grease	EPA1664	5
Total Petroleum Hydrocarbon	EPA 418.1	5
Total Phenols	EPA 420.1	0.1
Cyanide	EPA 335.2,SM 4500-CNE	0.003
Turbidity	EPA 180.1, SM2130B	1
Total Suspended Solids	EPA 160.2, SM2540D	1
Total Dissolved Solids	EPA 160.1, SM2540C	1
Volatile Suspended Solids	EPA 160.4, SM2540E	1
Total Organic Carbon	EPA 415.1, SM 5310B	1
Biochemical Oxygen Demand	EPA 405.1, SM 5210B	3
Chemical Oxygen Demand	EPA 410.1, SM5220D	4
Alkalinity	EPA 310.1, SM2320B	5
Specific Conductance	EPA 120.1, SM2510 B	1
Total Hardness	EPA 130.2, SM2340C	1
MBAS	EPA 425.1, SM5540-C	0.02
Chloride	EPA300.0, SM4110B	2
Fluoride	EPA300.0, SM4110B	0.1
Perchlorate	EPA314.0	4 ug/L
Volatile Organics	**METHOD**	**mg/L**
Methyl tertiary butyl ether (MTBE)	EPA624	1
Field Measurements[1]	**METHOD**	**mg/L**
pH-field instrumentation	*In-situ*, EPA 150.1	0 – 14
Temperature-field	*In-situ*	N/A
Dissolved Oxygen- field [1]	*In-situ*, SM4500 (OG)	Sensitivity to 5 mg/L

[1]Field measurements will be taken *In-situ* during dry weather surveys and in grab samples during wet weather monitoring.

[2]Dissolved Oxygen will only be measured during dry weather surveys.

5.2 Microbiological Constituents

All four microbiological constituents used as fecal indicator bacteria (FIB) will continue to be monitored at the S10 (Wardlow) Receiving Water monitoring site. Bacteria used as fecal indicators

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in marine waters will continue to be analyzed during wet and dry weather surveys due to being situated just above the Los Angeles River Estuary.

All four FIBs will also be analyzed during stormwater outfall monitoring at the only site (LAR1) that discharges to the Estuary. Only *E. coli* will be monitored at the remaining three stormwater outfall sites (LAR2, LAR3, and LAR4) since each located in freshwater portion of the watershed.

Escherichia coli will also be analyzed at the three Bacteria TMDL monitoring sites in the LLAR WG and will be measured as part of the bacteria load assessment required for in all dry discharges to Segment A of the Los Angeles River. Table 5-3 provides both upper and lower quantification limits for each FIB established to assure that quantifiable results are obtained. Upper quantification limits are only identified to assure that measurements result in quantitative values.

Table 5-3. Microbiological Constituents, Analytical Methods and Quantitation Limits.

BACTERIA[1]	Method	Lower Limits MPN/100ml	Upper Limits MPN/100ml
Total coliform (marine waters)	SM 9221B	<20	>2,400,000
Fecal coliform (marine waters)	SM 9221B	<20	>2,400,000
Enterococcus (marine waters)	SM 9230C	<20	>2,400,000
E. coli (fresh waters)	SM 9223 COLt	<10	>2,400,000

[1]Microbiological constituents will vary based upon sampling point. Total and fecal coliform and enterococcus will be measured only in marine waters or at locations where either the discharge point or receiving water body will impact marine waters. These includes the mass emission site, S10, and LLAR1, the only stormwater outfall site discharging to the Estuary. *E. coli* will be analyzed at sites within the freshwater portion of the watershed.

5.3 Nutrients

Nitrogen compounds (Table 5-1 and Table 5-4) are required as part of the base requirements for both the ME (S10) and stormwater outfall monitoring sites (LAR1 through LAR4). Analysis of nitrogen compounds is required due to the Nitrogen TMDL. Phosphorus compounds have not been identified as constituents of concern in the watershed and will therefore only be analyzed during the two events where all Table E-2 constituents are analyzed.

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Table 5-4. Nutrients, analytical methods, and quantitation limits

CONSTITUENT	METHOD	REPORTING LIMIT (mg/L)
Total Kjeldahl Nitrogen (TKN)[1]	EPA 351.1	0.50
Nitrate as Nitrogen (NO3-N)[1,2]	EPA 300.0	0.10
Nitrite as Nitrogen (NO2-N)[1,2]	EPA 300.0	0.05
Total Nitrogen[1]	calculation	NA
Ammonia as Nitrogen (NH3-N)	EPA 350.1	0.10
Total Phosphorus	SM 4500-P E or F	0.1
Dissolved Phosphorus	SM 4500-P E or F	0.1

1. Total Nitrogen is the sum of TKN, nitrate, and nitrite.
2. Nitrate –N and Nitrite-N may be analyzed together using EPA 300

5.4 Organochlorine Pesticides and PCBs

Organochlorine pesticides (OC pesticides) and PCBs have been analyzed in both stormwater and dry weather water samples collected at S10 between 2006 and 2013. None of these compounds were detected in any samples taken during this time period. In recognition of this issue, the Harbor Toxics TMDL required testing to be conducted by analyzing these compounds on suspended sediment transported during storm events. A special monitoring program has been proposed to allow better assessment of these compounds while also providing data to support the Harbor Toxics TMDL. Monitoring for these constituents will be conducted at S10 using the same frequency as sampling being conducted in the Harbor waters and in the Los Angeles River Estuary.

The Harbor Toxics TMDL requires monitoring during two storm events and one dry weather event. Monitoring during the two storm events will use methods detailed in Section 8.5. Monitoring during dry weather will utilize conventional methods (Table 5-5) being used in the Harbor receiving waters and the estuary. During dry weather flows, suspended sediment concentrations will be too low to allow for direct assessment of chlorinated pesticides and PCBs in the suspended particulate fraction. Sampling will be coordinated with the "*Coordinated Compliance Monitoring, and Reporting Plan Incorporating Quality Assurance Project Plan Components: Greater Los Angeles and Long Beach Harbor Waters*", (Anchor QEA, 2013).

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Table 5-5. Chlorinated Pesticides and PCB analytical methods, and quantitation limits

CHLORINATED PESTICIDES	METHOD	Reporting Limit ug/*L*
Aldrin	EPA 608	0.005
alpha-BHC	EPA 608	0.01
beta-BHC	EPA 608	0.005
delta-BHC	EPA 608	0.005
gamma-BHC (lindane)	EPA 608	0.02
alpha-chlordane	EPA 608	0.1
gamma-chlordane	EPA 608	0.1
4,4'-DDD	EPA 608	0.05
4,4'-DDE	EPA 608	0.05
4,4'-DDT	EPA 608	0.01
Dieldrin	EPA 608	0.01
alpha-Endosulfan	EPA 608	0.02
beta-Endosulfan	EPA 608	0.01
Endosulfan sulfate	EPA 608	0.05
Endrin	EPA 608	0.01
Endrin aldehyde	EPA 608	0.01
Heptachlor	EPA 608	0.01
Heptachlor Epoxide	EPA 608	0.01
Toxaphene	EPA 608	0.5
POLYCHLORINATED BIPHENYLS[1]		
Aroclor-1016	EPA 608	0.5
Aroclor-1221	EPA 608	0.5
Aroclor-1232	EPA 608	0.5
Aroclor-1242	EPA 608	0.5
Aroclor-1248	EPA 608	0.5
Aroclor-1254	EPA 608	0.5
Aroclor-1260	EPA 608	0.5

1. Alternatively analyze 54 PCB congeners: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209. These include all 41 congeners analyzed in the SCCWRP Bight Program and dominant congeners used to identify the aroclors.

5.5 Total and Dissolved Trace Metals

A total of 16 trace metals are listed in Table E-2 of the MRP. Analytical methods and reporting limits for these elements are summarized in Table 5-6. Most metals will be analyzed by EPA Method 200.8 using ICP-MS to provide appropriate detection limits. Hexavalent chromium and mercury both require alternative methods. Hexavalent chromium has been analyzed at TMDL compliance monitoring sites in both the Los Angeles River (S10) and the San Gabriel River (S14) for the past eight to ten years. Analytical methods and detection limits used for the monitoring have been consistent with those required in Table E-2 of the MRP. Hexavalent chromium will be analyzed with all Table E-2 constituents but this trace metal has never been detected a levels greater than the reporting limit so it will not likely be monitored on a regular basis.

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Dissolved mercury has not been detected in any wet or dry weather sampling conducted at the Los Angeles River Mass Emission Site (S10) since 2006 and total mercury has only been detected on two occasions. Total mercury will be analyzed as part of the base program since it was detected during two wet weather events approximately 10 years ago and it remains one of the municipal action limits (MALs) included in the MRP.

Table 5-6. Metals Analytical Methods, and Quantitation Limits.

METALS (Dissolved & Total)	METHOD	Reporting Limit *ug/L*
Aluminum	EPA200.8	100
Antimony	EPA200.8	0.5
Arsenic	EPA200.8	0.5
Beryllium	EPA200.8	0.5
Cadmium	EPA200.8	0.25
Chromium (total)	EPA200.8	0.5
Chromium (Hexavalent)[1]	EPA218.6	5
Copper	EPA200.8	0.5
Iron	EPA200.8	25
Lead	EPA200.8	0.5
Mercury[1]	EPA245.1	0.2
Nickel	EPA200.8	1
Selenium	EPA200.8	1
Silver	EPA200.8	0.25
Thallium	EPA200.8	0.5
Zinc	EPA200.8	1

1. Only total hexavalent chromium and mercury will be analyzed during the initial wet and dry weather screening of Table E-2 constituents.

5.6 Organophosphate Pesticides and Herbicides

Organophosphate pesticides, triamine pesticides and herbicides list in Table E-2 of the MRP are summarized in Table 5-7. Due to the fact that diazinon and chlorpyrifos are no longer available for residential use, these constituents are now rarely detected and none of the organophosphate pesticides/herbicides have been detected at the Los Angeles River Mass Emission monitoring site in the past 10 years.

Two compounds in this list, atrazine and simazine, are not organophosphate pesticides, they can be analyzed by EPA Method 8141a. Both are triazine herbicides which are used for control of broadleaf weeds. Based upon historical data, herbicides such as these and the three additional separately listed compounds are unlikely to require continued analysis after completion of initial screening of Table E-2 constituents. Alternative analytical methods may be used as long as the established reporting limits can be met.

Diazinon remains on the 303(d) list but has detected at much lower frequencies and concentrations. Although this analyte remains on the list to be analyzed at the ME station, we

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recommend reevaluation after the first year of monitoring. If concentrations remain below the updated California Department of Fish and Game criteria, this analyte should be removed from the list for the ME site.

Table 5-7. Organophosphate pesticides and herbicides analytical methods, and quantitation limits

ORGANOPHOSPHATE PESTICIDES	METHOD	Reporting Limit ug/L
Atrazine	EPA507,8141A	1
Chlorpyrifos	EPA8141A	0.05
Cyanazine	EPA8141A	1
Diazinon	EPA8141A	0.01
Malathion	EPA8141A	1
Prometryn	EPA8141A	1
Simazine	EPA8141A	1
HERBICIDES		
Glyphosate	EPA547	5
2,4-D	EPA515.3	0.02
2,4,5-TP-SILVEX	EPA515.3	0.2

5.7 Semivolatile Organic Compounds (Acid, Base/Neutral)

Semivolatile organic compounds from Table E-2 of the MRP are listed in Table 5-8 below. Acids consist mostly of phenolic compounds which are uncommon in stormwater samples. Base/neutrals include polynuclear aromatic hydrocarbons (PAHs) which are the only semivolatile organic compounds considered to be constituents of concern. PAHs are included as part of the Harbor Toxics TMDL and will be part of the base program at S10.

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Table 5-8. Semivolatile organic compounds analytical methods, and quantitation limits.

SEMIVOLATILE ORGANIC COMPOUNDS	METHOD	Reporting Limit
ACIDS		**ug/L**
2-Chlorophenol	EPA625	2
4-Chloro-3-methylphenol	EPA625	1
2,4-Dichlorophenol	EPA625	1
2,4-Dimethylphenol	EPA625	2
2,4-Dinitrophenol	EPA625	5
2-Nitrophenol	EPA625	10
4-Nitrophenol	EPA625	5
Pentachlorophenol	EPA625	2
Phenol	EPA625	1
2,4,6-Trichlorophenol	EPA625	10
BASE/NEUTRAL		**ug/L**
Acenaphthene	EPA625	1
Acenaphthylene	EPA625	2
Anthracene	EPA625	2
Benzidine	EPA625	5
1,2 Benzanthracene	EPA625	5
Benzo(a)pyrene	EPA625	2
Benzo(g,h,i)perylene	EPA625	5
3,4 Benzofluoranthene	EPA625	10
Benzo(k)fluoranthene	EPA625	2
Bis(2-Chloroethoxy) methane	EPA625	5
Bis(2-Chloroisopropyl) ether	EPA625	2
Bis(2-Chloroethyl) ether	EPA625	1
Bis(2-Ethylhexl) phthalate	EPA625	5
4-Bromophenyl phenyl ether	EPA625	5
Butyl benzyl phthalate	EPA625	10
2-Chloroethyl vinyl ether	EPA625	1
2-Chloronaphthalene	EPA625	10
4-Chlorophenyl phenyl ether	EPA625	5
Chrysene	EPA625	5
Dibenzo(a,h)anthracene	EPA625	0.1
1,3-Dichlorobenzene	EPA625	1
1,4-Dichlorobenzene	EPA625	1
1,2-Dichlorobenzene	EPA625	1
3,3-Dichlorobenzidine	EPA625	5
Diethyl phthalate	EPA625	2
Dimethyl phthalate	EPA625	2
di-n-Butyl phthalate	EPA625	10
2,4-Dinitrotoluene	EPA625	5
2,6-Dinitrotoluene	EPA625	5
4,6 Dinitro-2-methylphenol	EPA625	5
1,2-Diphenylhydrazine	EPA625	1
di-n-Octyl phthalate	EPA625	10

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SEMIVOLATILE ORGANIC COMPOUNDS	METHOD	Reporting Limit
Fluoranthene	EPA625	0.05
Fluorene	EPA625	0.1
Hexachlorobenzene	EPA625	1
Hexachlorobutadiene	EPA625	1
Hexachloro-cyclopentadiene	EPA625	5
Hexachloroethane	EPA625	1
Indeno(1,2,3-cd)pyrene	EPA625	0.05
Isophorone	EPA625	1
Naphthalene	EPA625	0.2
Nitrobenzene	EPA625	1
N-Nitroso-dimethyl amine	EPA625	5
N-Nitroso-diphenyl amine	EPA625	1
N-Nitroso-di-n-propyl amine	EPA625	5
Phenanthrene	EPA625	0.05
Pyrene	EPA625	0.05
1,2,4-Trichlorobenzene	EPA625	1

6 Aquatic Toxicity Testing and Toxicity Identification Evaluations

Aquatic toxicity testing supports the identification of best management practices (BMPs) to address sources of toxicity in urban runoff. The following outlines the approach for conducting aquatic toxicity monitoring and evaluating results. Control measures and management actions to address confirmed toxicity caused by urban runoff are addressed by the WMP, either via currently identified management actions or those that are identified via adaptive management of the WMP.

The approach to conducting aquatic toxicity monitoring is presented in Figure 6-1, which describes a general evaluation process for each sample collected as part of routine sampling conducted twice per year in wet weather and once per year in dry weather. Monitoring begins in the receiving water and the information gained is used to identify constituents for monitoring at outfalls to support the identification of pollutants that need to be addressed in the WMP. The sub-sections below describe the process and its technical and logistical rationale.

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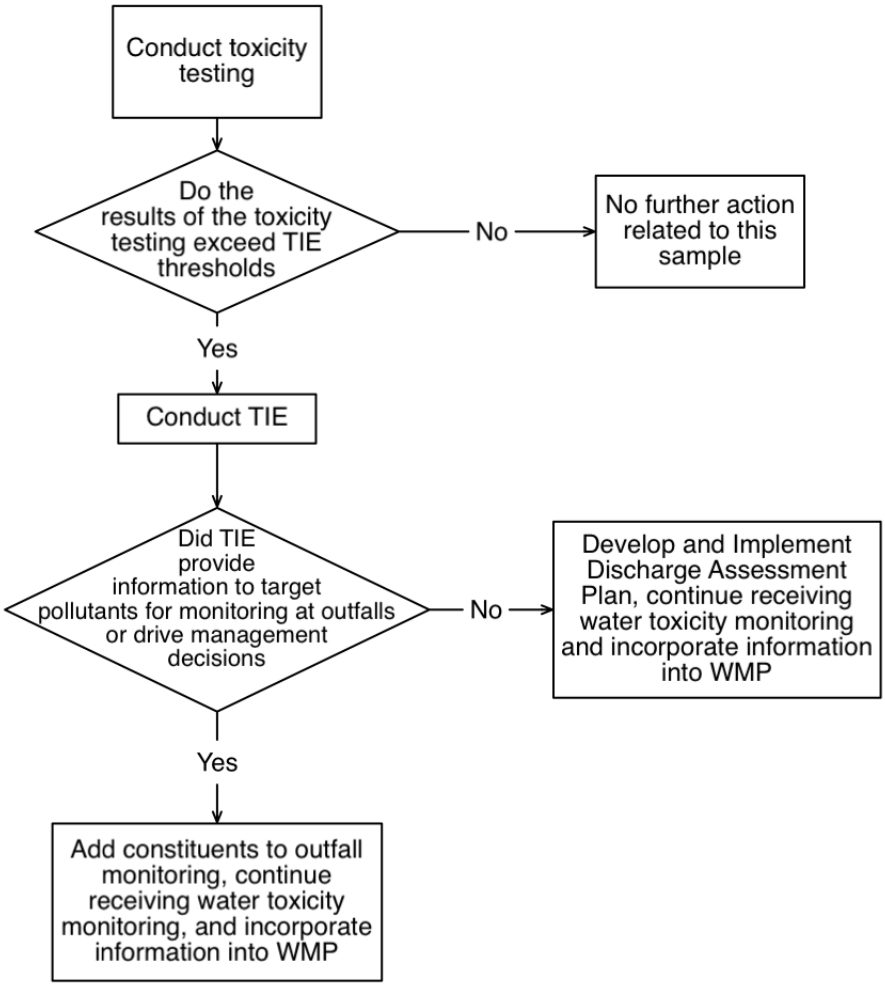


Figure 6-1. Generalized Aquatic Toxicity Assessment Process

6.1 Sensitive Species Selection

The Permit Monitoring and Reporting Program (MRP) (page E-32) states that sensitivity screening to select the most sensitive test species should be conducted unless "a sensitive test species has already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s), then monitoring shall be conducted using only that test species." Previous relevant studies conducted in the watershed should be considered. Such studies may have been completed via previous MS4 sampling, wastewater NPDES sampling, or special studies conducted within the watershed.

As described in the MRP (page E-31), if samples are collected in receiving waters with salinity less than 1 part per thousand (ppt), or from outfalls discharging to receiving waters with salinity less than 1 ppt, toxicity tests should be conducted on the most sensitive test species in accordance with species and short-term test methods in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (EPA/821/R-02/013, 2002; Table IA, 40

CFR Part 136). Salinities of both dry and wet weather discharges from the Lower Los Angeles River are considered to meet the freshwater criteria. The freshwater test species identified in the MRP are:

- A static renewal toxicity test with the fathead minnow, *Pimephales promelas* (Larval Survival and Growth Test Method 1000.04).
- A static renewal toxicity test with the daphnid, *Ceriodaphnia dubia* (Survival and Reproduction Test Method 1002.05).
- A static renewal toxicity test with the green alga, *Selenastrum capricornutum* (also named *Raphidocelis subcapitata*) (Growth Test Method 1003.0).

The three test species were evaluated to determine if either a sensitive test species had already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s). In reviewing the available data in the Los Angeles River, Los Cerritos Channel, and the San Gabriel River watersheds, organophosphate pesticides and/or metals have been identified as problematic and are generally considered the primary aquatic life toxicants of concern found in urban runoff. Pyrethroid pesticides are known to be present in urban runoff and potentially contribute to toxicity in these waters. Tests specific to pyrethroid pesticides are simply less common. Given the knowledge of the presence of these potential toxicants in the watershed, the sensitivities of each of the three species were considered to evaluate which is the most sensitive to the potential toxicants in the watersheds.

Ceriodaphnia dubia has been reported as a sensitive test species for historical and current use of pesticides and metals, and studies indicate that it is more sensitive to the toxicants of concern than *P. promelas* or *S. capricornutum*. In its aquatic life copper criteria document, the USEPA reports greater sensitivity of *C. dubia* to copper (species mean acute value of 5.93 µg/l) compared to *Pimephales promelas* (species mean acute value of 69.93 µg/l; EPA, 2007). *C. dubia's* relatively higher sensitive to metals is common across multiple metals. Researchers at the University of California, Davis also reviewed available species sensitivity values in developing pesticide criteria for the Central Valley Regional Water Quality Control Board. The UC Davis researchers reported higher sensitivity of *C. dubia* to diazinon and bifenthrin (species mean acute value of 0.34 µg/l and 0.105 µg/l) compared to *P. promelas* (species mean acute value of 7804 µg/l and 0.405 µg/l; Palumbo et al., 2010a, b). Additionally, a study of the City of Stockton urban stormwater runoff found acute and chronic toxicity to *C. dubia*, with no toxicity to *S. capricornutum* or *P. promelas* (Lee and Lee, 2001). The toxicity was attributed to organophosphate pesticides, indicating a higher sensitivity of *C. dubia* compared to *S. capricornutum* or *P. promelas*. *P. promelas* is generally less sensitive to metals and pesticides but has been found to be more sensitive to ammonia than *C. dubia*. However, as ammonia is not typically a constituent of concern for urban runoff and ammonia is not consistently observed above the toxic thresholds in the watershed, *P. promelas* is not considered a particularly sensitive species for evaluating the impacts of urban runoff in receiving waters in the watershed.

Selenastrum capricornutum is a species that is sensitive to herbicides; however, while sometimes present in urban runoff, measured concentrations are typically very low. Herbicides have not been

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identified as a potential toxicant in the watershed. *S. capricornutum* is also not considered the most sensitive species as it is not sensitive to either pyrethroids or organophosphate pesticides and is not as sensitive to metals as *C. dubia*. The *S. capricornutum* growth test can also be affected by high concentrations of suspended and dissolved solids, color and pH extremes, which can interfere with the determination of sample toxicity. As a result, it is common to manipulate the sample by centrifugation and filtration to remove solids in order to conduct the test. This process may affect the toxicity of the sample. In a study of urban highway stormwater runoff (Kayhanian et. al, 2008), the green alga response to the stormwater samples was more variable than both the *C. dubia* and the *P. promelas* and in some cases the alga growth was considered to be potentially enhanced due to the presence of stimulatory nutrients.

As *C. dubia* is identified as the most sensitive to known potential toxicant(s) typically found in receiving waters and urban runoff in the freshwater potions of the watershed and has demonstrated toxicity in programs within the watershed (CWH and ABC Laboratories, 2013), *C. dubia* is selected as the most sensitive species. The species also has the advantage of being easily maintained in in-house mass cultures. The simplicity of the test, the ease of interpreting results, and the smaller volume necessary to run the test, make the test a valuable screening tool. The ease of sample collection and higher sensitivity will support assessing the presence of ambient receiving water toxicity or long term effects of toxic stormwater over time. As such, toxicity testing will be conducted using *C. dubia*.

An alternative species of water fleas, *Daphnia magna*, may be used if the water being tested has elevated hardness. *C. dubia* test organisms are typically cultured in moderately hard waters (80-100 mg/L CaCO3) and can have increased sensitivity to elevated water hardness greater than 400 mg/L CaCO3), which is beyond their typical habitat range. Because of this, *Daphnia magna* may be substituted in instances where hardness in site waters exceeds 400 mg/L ($CaCO_3$). *Daphnia magna* is more tolerant to high hardness levels and is a suitable substitution for *C. dubia* in these instances (Cowgill and Milazzo, 1990).

6.2 Testing Period

As wet weather conditions in the region generally persist for less than the acute and chronic testing periods (typically 48 hours and 7 days, respectively), the shorter of the two testing methods, in the case of *C. dubia* acute testing measuring survival, will be used for wet weather toxicity testing. Because storm events are short duration, chronic tests performed on wet weather samples are not representative of the conditions found in the receiving water. Acute toxicity tests are consistent with the relatively shorter exposure periods of species in the watershed to potential toxicants introduced by urban runoff during storm events. Acute testing to assess survival endpoints will be conducted in accordance with *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA, 2002b).

Chronic toxicity tests will be used to assess both survival and reproductive/growth endpoints for *C. dubia* in dry weather samples. Chronic testing will be conducted on undiluted samples in

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accordance with *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (USEPA, 2002a).

6.3 Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

Acute and chronic toxicity test endpoints will be analyzed, per the MRP, using the Test of Significant Toxicity (TST) t-test approach specified by the USEPA (USEPA, 2010). The Permit specifies that the chronic in-stream waste concentration (IWC) is set at 100% receiving water for receiving water samples and 100% effluent for outfall samples. Using the TST approach, a t-value is calculated for a test result and compared with a critical t-value from USEPA's TST Implementation Document (USEPA, 2010). Follow-up triggers are generally based on the Permit specified statistical assessment as described below.

For acute *C. dubia* toxicity testing, if a statistically significant 50% difference in mortality is observed between the sample and laboratory control, a toxicity identification evaluation (TIE) will be performed. TIE procedures are discussed in detail in the following section. Experience conducting TIEs in receiving waters in the region supports using a 50% mortality trigger to provide a reasonable opportunity for a successful TIE. During TMDL monitoring in the Calleguas Creek Watershed (CCW) in 2003 and 2004, TIEs were initiated on samples exceeding the 50% threshold (the majority of which displayed 100% mortality). In that study, toxicity degraded in approximately 40% of the samples on which TIE procedures were conducted making the TIE unsuccessful (and effectively useless in pinpointing specific toxicants). Similar degradation of toxicity has been noted in tests conducted on stormwater samples from the nearby Los Cerritos Channel. The Los Angeles Regional Water Quality Control Board approved monitoring program for the CCW Toxicity TMDL utilizes a 50% threshold for TIE initiation. Additionally, a 50% mortality threshold is utilized in the Ventura County MS4 Permit.

For chronic *C. dubia* toxicity testing, a TIE will be performed if a statistically significant 50% difference in mortality is observed between the sample and laboratory control. If a statistically significant 50% difference is observed in a sub-lethal endpoint between the sample and laboratory control, a confirmatory sample will be collected from the receiving water within two weeks of obtaining the results of the initial sample. If a statistically significant 50% difference in mortality or sub-lethal endpoint is again observed between the sample and laboratory control on the confirmatory sample, a TIE will be performed.

TIE procedures will be initiated as soon as possible after the toxicity trigger threshold is observed to reduce the potential for loss of toxicity due to extended sample storage. If the cause of toxicity is readily apparent or is caused by pathogen related mortality or epibiont interference with the test, the result will be rejected, if necessary, a modified testing procedure will be developed for future testing.

In cases where significant endpoint toxicity effects in excess of 50% are observed in the original sample, but the follow-up TIE positive control "signal" is found to not be statistically significant, the

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cause of toxicity will be considered non-persistent. No immediate follow-up testing is required on the sample. However, future test results will be evaluated to determine if implementation of concurrent TIE treatments are needed to provide an opportunity to identify the cause of toxicity.

6.4 Toxicity Identification Evaluation Approach

The results of toxicity testing will be used to trigger further investigations to determine the cause of observed laboratory toxicity. The primary purpose of conducting TIEs is to support the identification of management actions that will result in the removal of pollutants causing toxicity in receiving waters. Successful TIEs will direct monitoring at outfall sampling sites to inform management actions. As such, the goal of conducting TIEs is to identify pollutant(s) that should be sampled during outfall monitoring so that management actions can be identified to address the pollutant(s).

The TIE approach as described in USEPA's 1991 Methods for Aquatic Toxicity Identification is divided into three phases although some elements of the first two phases are often combined. Each of the three phases is briefly summarized below:

- Phase I utilizes methods to characterize the physical/chemical nature of the constituents which cause toxicity. Such characteristics as solubility, volatility and filterability are determined without specifically identifying the toxicants. Phase I results are intended as a first step in specifically identifying the toxicants but the data generated can also be used to develop treatment methods to remove toxicity without specific identification of the toxicants.
- Phase II utilizes methods to specifically identify toxicants.
- Phase III utilizes methods to confirm the suspected toxicants.

A Phase I TIE will be conducted on samples that exceed a TIE trigger described in Section6.4. Water quality data will be reviewed to future support evaluation of potential toxicants. A range of sample manipulations may be conducted as part of the TIE process. The most common manipulations are described in Table 6-1. Information from previous chemical testing and/or TIE efforts will be used to determine which of these (or other) sample manipulations are most likely to provide useful information for identification of primary toxicants. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b).

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Table 6-1. Phase I and II Toxicity Identification Evaluation Sample Manipulations

TIE Sample Manipulation	Expected Response
pH Adjustment (pH 7 and 8.5)	Alters toxicity in pH sensitive compounds (i.e., ammonia and some trace metals)
Filtration or centrifugation	Removes particulates and associated toxicants
Ethylenediamine-Tetraacetic Acid (EDTA)	Chelates trace metals, particularly divalent cationic metals
Sodium thiosulfate (STS) addition	Reduces toxicants attributable to oxidants (i.e., chlorine) and some trace metals
Piperonyl Butoxide (PBO)	Reduces toxicity from organophosphate pesticides such as diazinon, chlorpyrifos and malathion, and enhances pyrethroid toxicity
Carboxylesterase addition(1)	Hydrolyzes pyrethroids
Temperature adjustments(2)	Pyrethroids become more toxic when test temperatures are decreased
Solid Phase Extraction (SPE) with C18 column	Removes non-polar organics (including pesticides) and some relatively non-polar metal chelates
Sequential Solvent Extraction of C18 column	Further resolution of SPE-extracted compounds for chemical analyses
No Manipulation	Baseline test for comparing the relative effectiveness of other manipulations

1 Carboxylesterase addition has been used in recent studies to help identify pyrethroid-associated toxicity (Wheelock et al., 2004; Weston and Amweg, 2007). However, this treatment is experimental in nature and should be used along with other pyrethroid-targeted TIE treatments (e.g., PBO addition).

2 Temperature adjustments are another recent manipulation used to evaluate pyrethroid-associated toxicity. Lower temperatures increase the lethality of pyrethroid pesticides. (Harwood, You and Lydy, 2009)

The Watershed Group will identify the cause(s) of toxicity using a selection of treatments in Table 6-1 and, if possible, using the results of water column chemistry analyses. After any initial assessments of the cause of toxicity, the information may be used during future events to modify the targeted treatments to more closely target the expected toxicant or class of toxicants. Moreover, if the toxicant or toxicant class is not initially identified, toxicity monitoring during subsequent events will confirm if the toxicant is persistent or a short-term episodic occurrence.

As the primary goals of conducting TIEs is to identify pollutants for incorporation into outfall monitoring, narrowing the list of toxicants following Phase I TIEs via Phase II/III TIEs is not necessary if the toxicant class determined during the Phase I TIE is sufficient for 1) identifying additional pollutants for outfall monitoring and/or 2) identifying control measures. Thus, if the specific pollutant(s) or classes of pollutants (e.g., metals that are analyzed via EPA Method 200.8) are identified then sufficient information is available to incorporate the additional pollutants into outfall monitoring and to start implementation of control measures to target the additional pollutants.

Phase II TIEs may be utilized to identify specific constituents causing toxicity in a given sample if the results of Phase I TIE testing and a review of available chemistry data fails to provide information necessary to identify constituents that warrant additional monitoring activities or management actions to identify likely sources of the toxicants and lead to elimination of the sources of these contaminants. Phase III TIEs will be conducted following any Phase II TIEs.

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TIEs will be considered inconclusive if 1) the toxicity is persistent (i.e., observed in the positive control), and 2) the cause of toxicity cannot be attributed to a class of constituents (e.g., insecticides, metals, etc.) that can be targeted for monitoring.

The TIE is considered conclusive if:

- a combination of causes that act in a synergistic or additive manner are identified
- toxicity can be removed with a treatment or combination of the TIE treatments
- analysis of water quality data collected during the same event identifies the pollutant or analytical class of pollutants

Note that the MRP (page E-33) allows a TIE Prioritization Metric (as described in Appendix E of the Stormwater Monitoring Coalition's Model Monitoring Program) for use in ranking sites for TIEs. Information is currently not available to determine whether a prioritization metric will be warranted. If toxicity results indicate the need for development of a prioritization metric, a strategy will be developed and structured through the CIMP adaptive management process. The suggested prioritization approach will be developed through the CIMP adaptive management process described in the CIMP annual report.

6.5 Discharge Assessment

The Watershed Management Group will prepare a brief Discharge Assessment Plan if TIEs conducted on consecutive sampling events are inconclusive. The discharge assessment will be conducted after consecutive inconclusive TIEs, rather than after one, because of inherit variability associated with the toxicity and TIE testing methods.

The Discharge Assessment Plan will consider the observed potential toxicants in the receiving water and associated urban runoff discharges above known species effect levels and the relevant exposure periods compared to the duration of the observed toxicity. The Discharge Assessment Plan will reexamine the following issues:

- Is additional receiving water toxicity monitoring necessary to better evaluate the spatial extent of receiving water toxicity?
- Should different test species be considered? If a species is proposed that is different than the species utilized when receiving water toxicity was observed, justification for the substitution will be provided.
- Is the number and location of monitoring sites suitable for understanding their impacts to the observed receiving water toxicity?
- What program adjustments are necessary to facilitate a better understanding of the cause of toxicity? Examine the number of monitoring events to be conducted, a schedule for conducting the monitoring, and a process for evaluating the completion of the assessment monitoring.

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The Discharge Assessment Plan will be submitted to Los Angeles Regional Water Board for comment within 60 days of receipt of notification of the second consecutive inconclusive result. If no comments are received within 30-days, it will be assumed that the approach is appropriate for the given situation and the Plan should be implemented within 90-days of submittal.

6.6 Follow Up on Toxicity Testing Results

The MRP (page E-33) indicates the following actions should be taken when a toxicant or class of toxicants is identified through a TIE:

1. Group Members shall analyze for the toxicant(s) during the next scheduled sampling event in the discharge from the outfall(s) upstream of the receiving water location.
2. If the toxicant is present in the discharge from the outfall at levels above the applicable receiving water limitation, a toxicity reduction evaluation (TRE) will be performed for that toxicant.

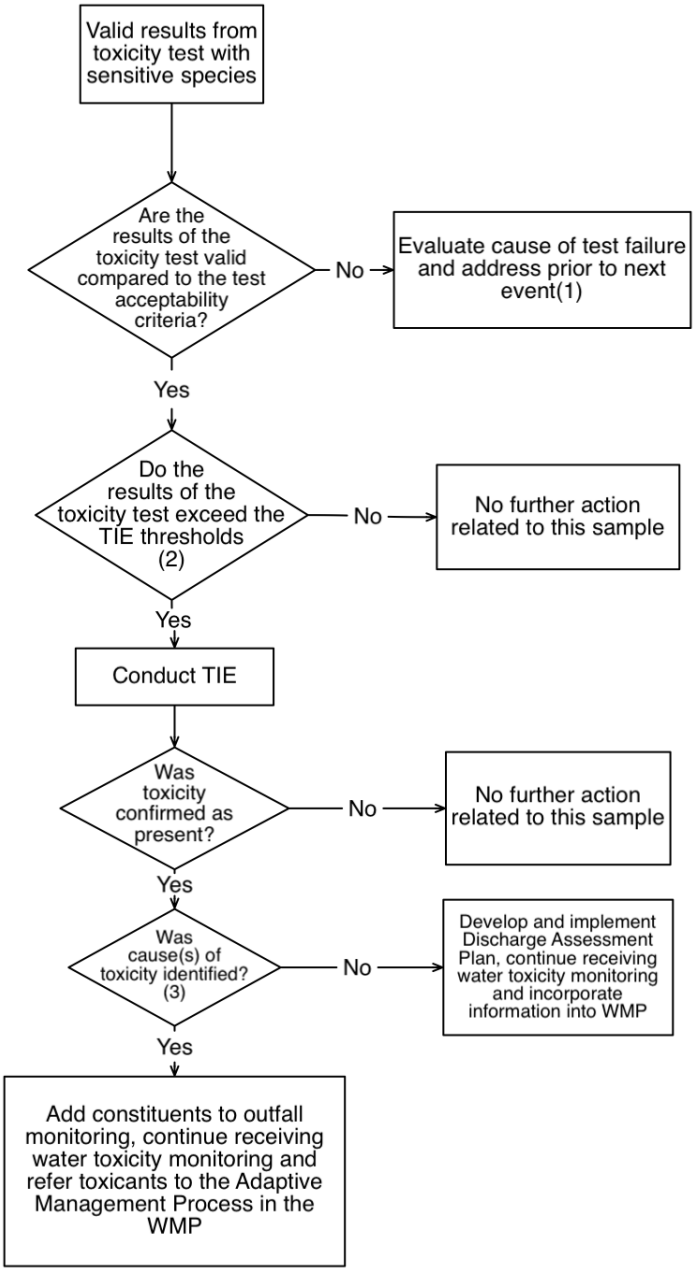
The list of constituents monitored at outfalls identified in the CIMP will be modified based on the results of the TIEs. Monitoring for those constituents will occur as soon as feasible following the completion of a successful TIE (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of a successful TIE).

The requirements of the TREs will be met as part of the adaptive management process in the WMPs rather than the CIMP. The identification and implementation of control measures to address the causes of toxicity are tied to management of the stormwater program, not the CIMP. It is expected that the requirements of TREs will only be conducted for toxicants that are not already addressed by an existing Permit requirement (i.e., TMDLs) or existing or planned management actions.

6.7 Summary of Aquatic Toxicity Monitoring

The approach to conducting aquatic toxicity monitoring as described in the previous sections is summarized in detail in Figure 6-2. The intent of the approach is to identify the cause of toxicity observed in receiving water to the extent possible with the toxicity testing tools available, thereby directing outfall monitoring for the pollutants causing toxicity with the ultimate goal of supporting the development and implementation of management actions.

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1. Test failure includes pathogen or epibiont interference which should be addressed prior to the next toxicity sampling event.
2. The TIE threshold is >50% mortality in an acute (wet weather) or chronic (dry weather) sample. If a >50% effect in a sub-lethal endpoint for a chronic test is observed a follow up sample will be initiated within two weeks of the completion of the initial sample collection. If the follow up sample exhibits a greater than 50% effect, a TIE will be initiated.
3. The goal of conducting the Phase I TIE is to identify the cause of toxicity so that outfall monitoring can incorporate the toxicant(s) into the list of constituents monitored during outfall monitoring. Thus, if the specific toxicant(s) or the analytical classes of toxicants (i.e., metals that are analyzed via EPA Method 200.8) are identified, sufficient information is available to inform the addition of pollutants to the list of pollutants monitoring during outfall monitoring.

Figure 6-2. Detailed Aquatic Toxicity Assessment Process

7 Receiving Water Monitoring Mass Emission Monitoring

All receiving water quality monitoring at the Los Angeles River mass emission monitoring site, S10 (Figure 7-1), will continue to be conducted by the Los Angeles County Flood Control District (LACFCD). Flow-weighted composite samples will be collected during each monitoring event and will be analyzed for analytes in Table 5-1.

7.1 Sampling Frequency and Mobilization Requirements

Monitoring of receiving water quality at S10 will be performed three times a year during the wet season and two times a year during dry weather conditions. Screening for Table E-2 constituents listed in the MRP will be conducted during the first significant storm of the year and during a critically dry weather period. Larger sampling volumes are required to incorporate all analytical tests and associated QA/QC needed for Table E-2 constituents, bioassay tests and to provide sufficient volumes should TIEs be required.

Wet weather conditions are defined in the MRP as when the receiving waterbody has flow that is at least 20 percent greater than its base flow or, in the case of an estuary, during a storm event of greater than or equal to 0.1 inch of precipitation.

These include:

- Wet Season defined as October 1 through April 15
- Events preceded by less than 0.1 inches of rainfall within the watershed over a three day period.
- Rainfall of at least 0.25 inches and
- Maximum flow rates greater than 500 cfs measured at the Wardlow Road gaging station associated with the S10 mass emission monitoring site.

The MRP provides defines dry weather as (for rivers, streams or creeks) as periods when flow is no more than 20% greater than base flow conditions. In the case of the Estuary, dry weather conditions are further defined by rainfall being less than 0.1 inches of rain on the day of the sampling and having experienced no less than three days of dry weather after a rain event of 0.1 inches or greater within the watershed, as measured from at least 50 percent of Los Angeles County controlled rain gauges within the watershed.

7.2 Sampling Constituents

Chemical analysis are scheduled to be conducted for all analytes listed in Table 5-2 through Table 5-8 during the first significant rainfall of the season and again during a period of critical low flow. Chemical constituents not detected in excess of their respective Method Detection Limits (MDLs) or that do not exceed available water quality standards will be considered for removal during subsequent surveys. Adjustments to the list of analytical tests will be assessed separately for wet and dry weather sampling requirements.

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Constituents to be sampled at the ME site during all other sampling events are listed in Table 5-1. Sampling requires focus on constituents that are currently part of a TMDL, are 303(d) listed or that have exceeded RWL but data are not sufficient for listing. This approach is designed to target constituents of concern in the watershed. In addition, an extensive sampling of all constituents is scheduled for two time periods during the first year of the permit when contaminants are expected to have the greatest potential for being detected. Additional constituents from the Table E-2 list that are detected at levels of concern during those two time periods will be added to the monitoring list at the ME site.

As noted in the previous section, it has been determined that adequate data exist to determine which of the three freshwater species are considered to be most sensitive during both storm events and dry weather periods. Available literature and local data indicate that the most sensitive bioassay test species is *Ceriodaphnia dubia*. The prior section on Aquatic Toxicity Testing and TIEs goes into detail as to species selection and the overall approach recommended for measuring toxicity in the receiving waters and strategies to eliminate any sources of toxicity. During wet weather conditions, bioassay tests will be performed based upon exposure to 100 percent test waters over a 48-hour time period since this time exposure is deemed to be more consistent with the duration of typical storm events. Since exposure times during the dry season are much long, dry weather testing will utilize 7-day chronic toxicity tests that assess both survival and reproductive endpoints for *C. dubia*. Chronic testing will also be conducted on 100 percent undiluted samples. Table 7-1 provides sample volumes necessary for toxicity tests (both wet and dry weather) as well as minimum volumes necessary to fulfill Phase I TIE testing if necessary. As detailed in the previous section, the sublethal endpoints will be assessed using EPA's TST procedure to determine if there is a statistically significant 50% difference between sample controls and the test waters and ultimately determine if further testing should be is necessary.

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Table 7-1. Toxicity Test Volume Requirements for Aquatic Toxicity Testing as part of the Lower Los Angeles River Coordinated Integrated Monitoring Program.

Test Organism	Toxicity Test Type	Test Concentration	Volume Required for Initial Screen (L)	Minimum Volume Required for TIE (L)[1]
Freshwater Tests for Samples with Salinity < 1.0 ppt				
Daphnid Water Flea *(Ceriodaphnia dubia*)	48-Hour Acute Survival 7-day Chronic Survival and Reproduction	100% only	1.5	10
Sample Receipt Water Quality	--	--	1.0	--
Total volume required per event for samples with salinity < 1.0 ppt;			2.5	a

[1] Minimum volumes for TIE are for Phase 1 characterization testing only. The additional volume collected for potential TIE testing can be held in refrigeration (4°C in the dark, no head space) and shipped to the laboratory at a later date if needed.

Note: The NPDES permit targets a 36-hr holding time for initiation of testing but allows a maximum holding time of 72-hr if necessary.

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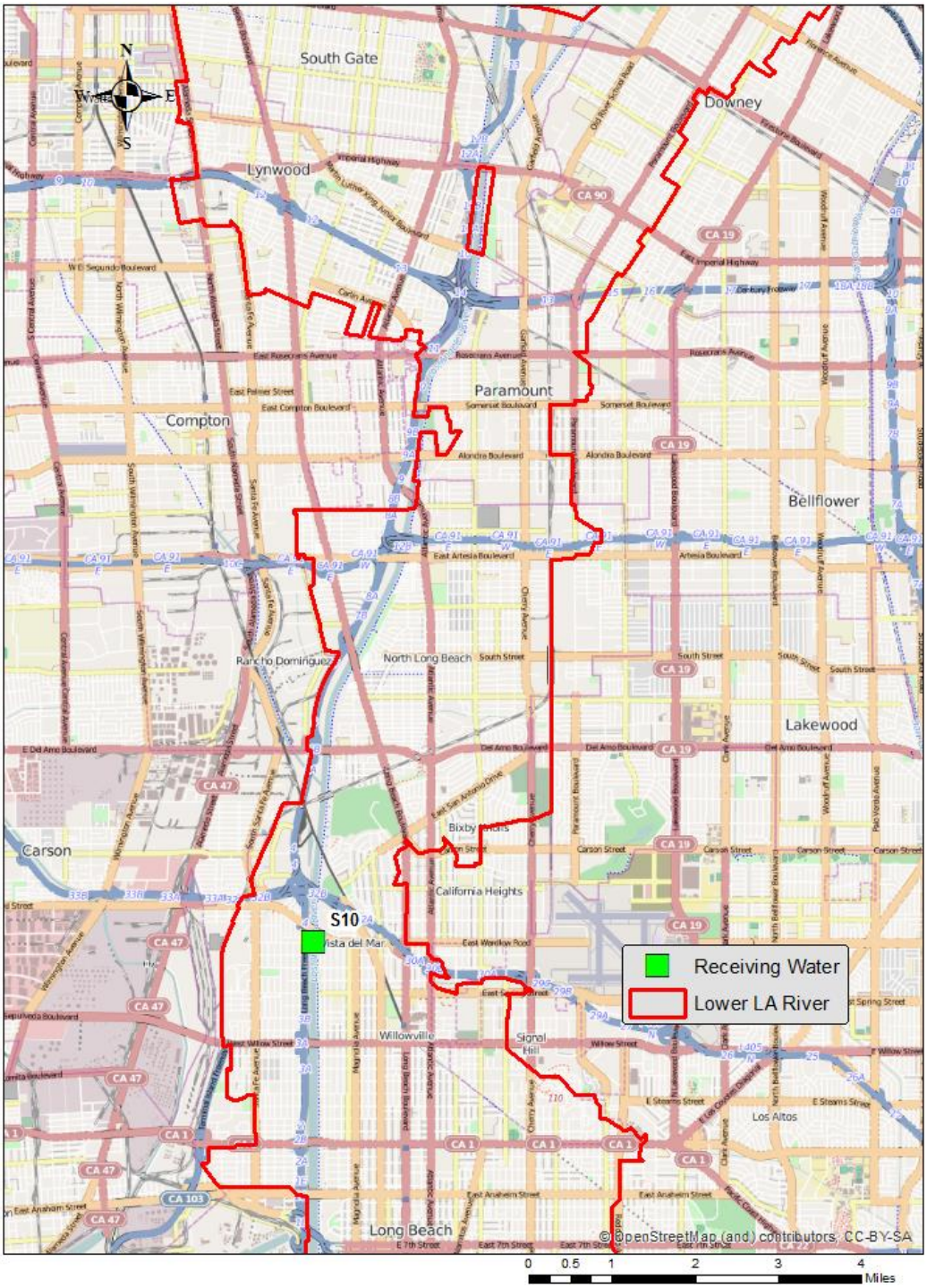


Figure 7-1. Lower Los Angeles River Receiving Water Monitoring and TMDL Compliance Site.

8 Receiving Water TMDL Monitoring

The following sections provide a summary of TMDLs applicable to the LLAR, any interim or final Waste Load Allocations applicable to each TMDL, and monitoring requirements required to evaluate compliance.

8.1 Nitrogen Compounds and Related Effects TMDL

Attachment A to Resolution No. R12-010

This TMDL identifies Water Reclamation Plants (WRP) as the major sources of nitrogen compounds to the Los Angeles River. These facilities include the Donald C. Tillman Water Reclamation Plant, the Los Angeles-Glendale WRP, and the Burbank WRP. All are located upstream of the LLAR WMG. During dry weather periods, these major POTWs contribute 84.1% of the total dry weather nitrogen load. Urban runoff, stormwater, and groundwater discharges also contribute nitrogen loads. The TMDL classifies discharges from MS4s as minor point sources of nitrogen compounds.

Waste Load Allocations (WLAs) are established for segments of the Lower LAR watershed (Table 8-1). A review of water quality measurements taken at the Wardlow (S10) Mass Emission monitoring site between 2006 and 2013 indicated that individual nitrate and nitrite-nitrogen concentrations never exceeded the 30-day WLAs. In addition, three single sample ammonia-nitrogen measurements taken in late 2006 and 2007 were found to exceed the 30-day geometric mean standard of 2.4 mg/L for ammonia-nitrogen.

Low concentrations of nitrogen compounds have been consistently reported in both wet and dry weather discharges monitored at the City of Long Beach Dominguez Gap Mass Emission Monitoring Site between 2008 and 2013 (Kinnetic Laboratories, Inc., 2013). Concentrations of ammonia-nitrogen are reported to be less than 0.7 mg/L during both dry and wet weather monitoring. Concentrations of nitrate-N in dry weather discharges have never exceeded 1.9 mg/L and all wet weather discharges have had concentrations of less than 1.4 mg/L.

Based upon the low concentrations of nitrogen reported in receiving waters of the Los Angeles River and recognition that POTWs are the major contributors of nitrogen to the River during dry weather, the existing mass emission monitoring site located at Wardlow Road (S10) will be used to assess compliance with the Nitrogen Compounds and Related Effects TMDL for the LLAR WMG. Monitoring of nitrogen compounds will be included with each of the three wet weather events and for two dry weather events.

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Table 8-1. Summary of 30-day WLAs for Nitrogen Compounds in the Lower Los Angeles River Watershed Management Group.

Segment	Ammonia-N (mg/L)	Nitrate-N (mg/L)	Nitrite-N (mg/L)	Nitrate+Nitrite-N (mg/L)
Los Angeles River Reach 1	2.4	8.0	1.0	8.0
Los Angeles River Reach 2	2.4	8.0	1.0	8.0
Los Angeles River Tributaries excluding the Whittier Narrows	2.3	8.0	1.0	8.0

In addition, the highest four-day average within the 30-day period shall not exceed 2.5 times the 30-day average waste load allocation.

8.2 Los Angeles River and Tributaries Metals TMDL

Attachment A to Resolution No. R2007-014

The Los Angeles River Metals TMDL became effective on October 29, 2008. In order to address compliance with this TMDL (Table 8-2), a Coordinated Monitoring Plan (CMP) was developed and implemented jointly by the responsible Los Angeles River Watershed MS4 permittees in October 2008. Wet and dry weather monitoring began at 13 locations in the LA River and major tributaries. Four of the monitoring sites were located within the LLAR WMG area. Grab sampling was conducted at all four monitoring sites on a monthly basis during dry weather conditions. Two sites were equipped with autosamplers which were used to collect stormwater runoff samples. A summary of the results of this monitoring effort is presented in Section 2 of the WMP.

Automated sampling equipment was used at LAR 1-13[2] near Wardlow Rd. and at LAR 1-11 located just north of Del Amo Blvd. The LAR 1-13 site is located at the same site as the Los Angeles River mass emission monitoring site S10. Both are associated with at Los Angeles County gaging station F319-R. This location has been used as the final compliance point for the Metals TMDL and is also effectively the lower end of Reach 1 of the Los Angeles River. LAR 1-11 is located just 3300 meters (just over two miles) to the north. This site is also north of the location where Compton Creek discharges to the Los Angeles River and marks the lower end of Reach 2. Monitoring results from these two closely spaced sites were typically difficult to differentiate. As a result, continued monitoring at LAR1-11 was redundant and not providing useful information for wet and dry weather monitoring. Thus three sites (Figure 8-1) will continue to be monitored for the LAR metals TMDL.

[2] LAR1-13 is located at the same site as S-10.

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The LAR1-13 monitoring site will continue to be used for collection of flow-weighted stormwater composite samples since this site also serves as the final compliance point for the metals TMDL. Three storm events will be monitored at this location to be consistent with receiving water quality monitoring requirements at this site.

Dry weather monitoring data from the Los Angeles River Metals CMP has shown metals to be in compliance during dry weather. As a result of the high level of compliance, dry weather monitoring at each of the three sites (Figure 8-1) is scheduled be conducted on a quarterly basis. No dry weather sampling will be conducted during months when a storm event is sampled at LAR1-13. Scheduling of monitoring activities will be coordinated with the Upper Los Angeles River Watershed Management Group (ULARWMG).

Table 8-2. Numeric Targets for Trace Metal in the Lower Los Angeles River WG.

TMDL Target	Waterbody	Metal (µg/L)			
		Cadmium	Copper [3,5,6]	Lead [3,5,6]	Zinc [4,5]
Dry Weather Total Recoverable Metals Targets[1,2]	Reach 1	-	23	12	-
	Tributary - Compton Cr.		19	8.9	
	Reach 2	-	22	11	-
	Arroyo Seco	-	22	11	-
	Tributary - Rio Hondo Reach 1	-	13	5	131
Wet Weather Total Recoverable Metals Target [7,8]	Reach 1 and 2, Compton Creek, Arroyo Seco, Rio Hondo Reach 1	3.1	17	62	159

Notes:

1. Dry weather targets apply to days when maximum daily flow in the river is less than 500 cfs at Wardlow gage.
2. Dry weather conversion factors used to convert total recoverable to dissolved fraction: copper = 0.96; lead = 0.79; zinc = 0.61
3. Dry weather targets for copper and lead are based on chronic California Toxic Rule (CTR) criteria.
4. Dry weather targets for zinc are based on acute CTR criteria using the 10 percentile hardness value..
5. Copper, lead and zinc targets dependent on water hardness.
6. Copper and lead targets based on 50th percentile hardness values.
7. CF Wet weather conversion factors for copper, lead, and zinc to convert total recoverable to dissolved based on regression of data collected at Wardlow gage: copper = 0.65; lead = 0.82; zinc = 0.61. Conversion factor for cadmium taken from CTR = 0.94.
8. Wet weather targets for cadmium, copper, lead and zinc based on acute CTR criteria and the 50th percentile hardness values for stormwater collected at Wardlow gage station.

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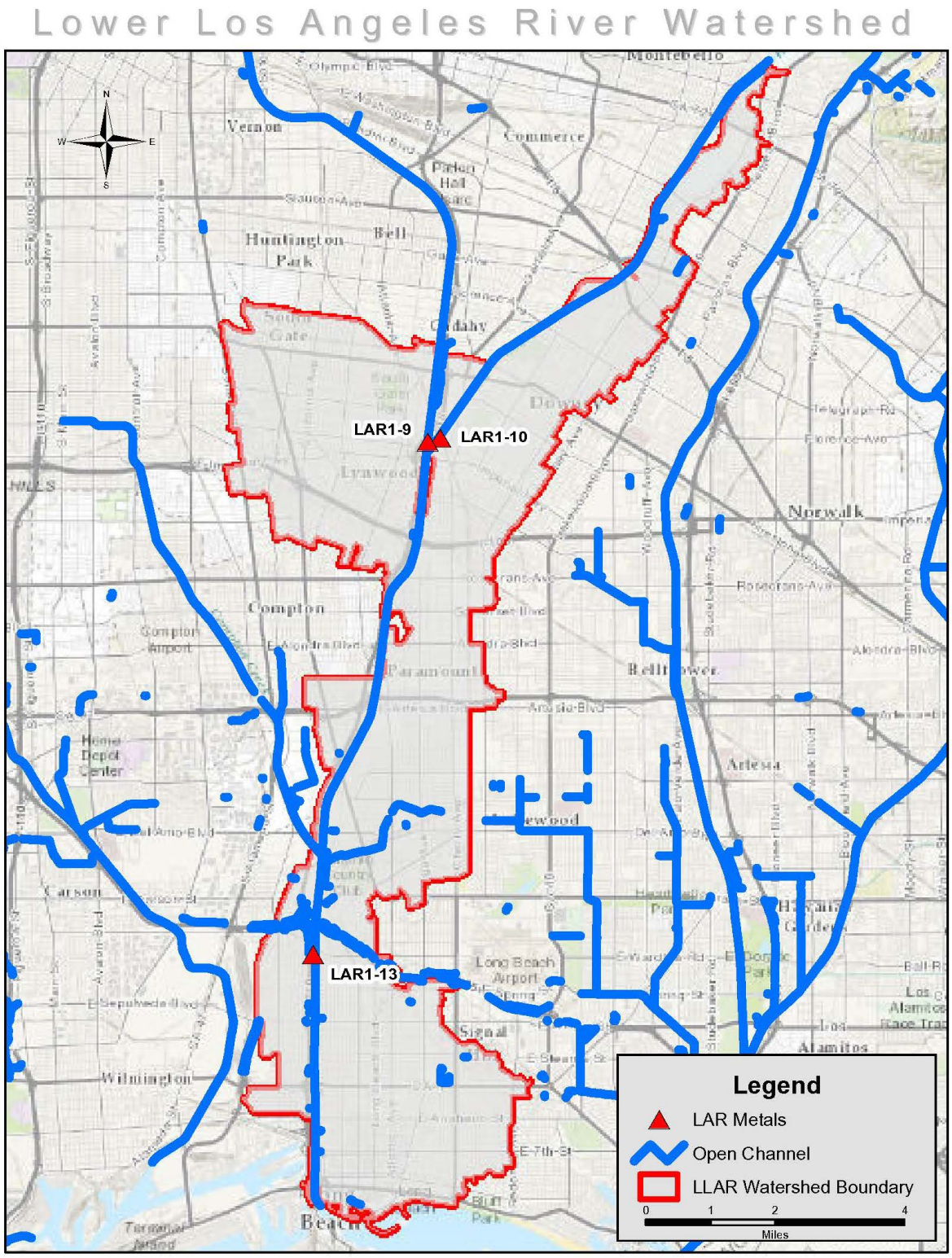


Figure 8-1. Monitoring Sites for the Los Angeles River Metals TMDL

8.3 Los Angeles River Watershed Bacteria TMDL

Attachment A to Resolution No. R10-007

The Basin Plan Amendment (Resolution No. R10-007) describes three categories of compliance monitoring:

> 1) ***Ambient (River) Monitoring*** is to occur on a monthly basis in each river segment and tributary addressed under the TMDL, until the subject river segment or tributary is at the end of the execution part of its first implementation phase, at which time, it will transition to weekly monitoring.
>
> 2) ***Load Reduction Strategy*** (LRS) Monitoring is required for parties pursing an LRS, in which intensive outfall monitoring will be conducted before and after implementation of the LRS. Pre-LRS monitoring will be used to estimate bacteria loading from MS4 Outfalls and to identify appropriate implementation actions to meet Waste Load Allocation (WLAs). Post-LRS monitoring will be used to evaluate compliance with interim WLAs and to plan for additional implementation actions to meet final WLAs during a second implementation phase, if necessary.
>
> 3) Wet Weather monitoring is to be addressed by Wet Weather Implementation Plans due in 2022.

This Coordinated Integrated Monitoring Plan (CIMP) is limited to 1) quarterly surveys necessary for the Ambient Monitoring program and 2) LRS surveys needed to first develop LRS Plans and later evaluate effectiveness of BMP implementation actions in meeting WLAs within defined reaches and tributaries within the LLAR WMG. Weekly Ambient Monitoring of receiving waters is not scheduled to occur until 7 years after a given reach or tributary has begun the first implementation phase. Given that timeline, it is expected that weekly ambient monitoring will be addressed by a future addendum to the CIMP.

River monitoring will be conducted quarterly at each of the three monitoring sites located within the LLAR WMG (Figure 8-2). Monitoring will be conducted during dry weather conditions and will consist of collection of water samples for analysis of *E. coli* and concurrent flow measurements to allow for calculation of loads. The timing of each survey will be coordinated with the upper Los Angeles River WMGs. Sampling methods are detailed in Appendix C.

LRS Monitoring will be conducted to support development of the Phase 1 LRS Plans and evaluate compliance with interim dry weather WLAs (Table 8-3). LRS monitoring for the first phase will require six synoptic surveys of all MS4 storm drains within a targeted River Segment or Tributary. Water samples will be collected from all flowing storm drains and analyzed for *Escherichia coli* (*E. coli*). Concurrent flow measurements will be necessary to allow for load calculations. The LLAR WMG includes all of Los Angeles River Segment A but only portions of River Segment B, Compton Creek and Rio Hondo. In cases where a segment or defined tributary is not fully encompassed within the LLAR WMG, the group plans to work cooperatively with adjoining WMGs to develop both

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the initial bacterial loading data and to later evaluate compliance with interim dry weather WLAs after implementation. LRS monitoring will not be conducted for the initial LRS planning effort for Segment B since data were previously collected as part of the CREST program. The first LRS surveys will be conducted for River Segment A and Rio Hondo Reach 1 since the LRS plan is due by September 30, 2016 and March 23, 2016 (Table 8-5).

The LRS process is outlined in Figure 8-3. LRS monitoring is required as part of **Step 1** to provide the data necessary to develop the LRS plan and again in **Step 6** when it is necessary to evaluate effectiveness of the strategy.

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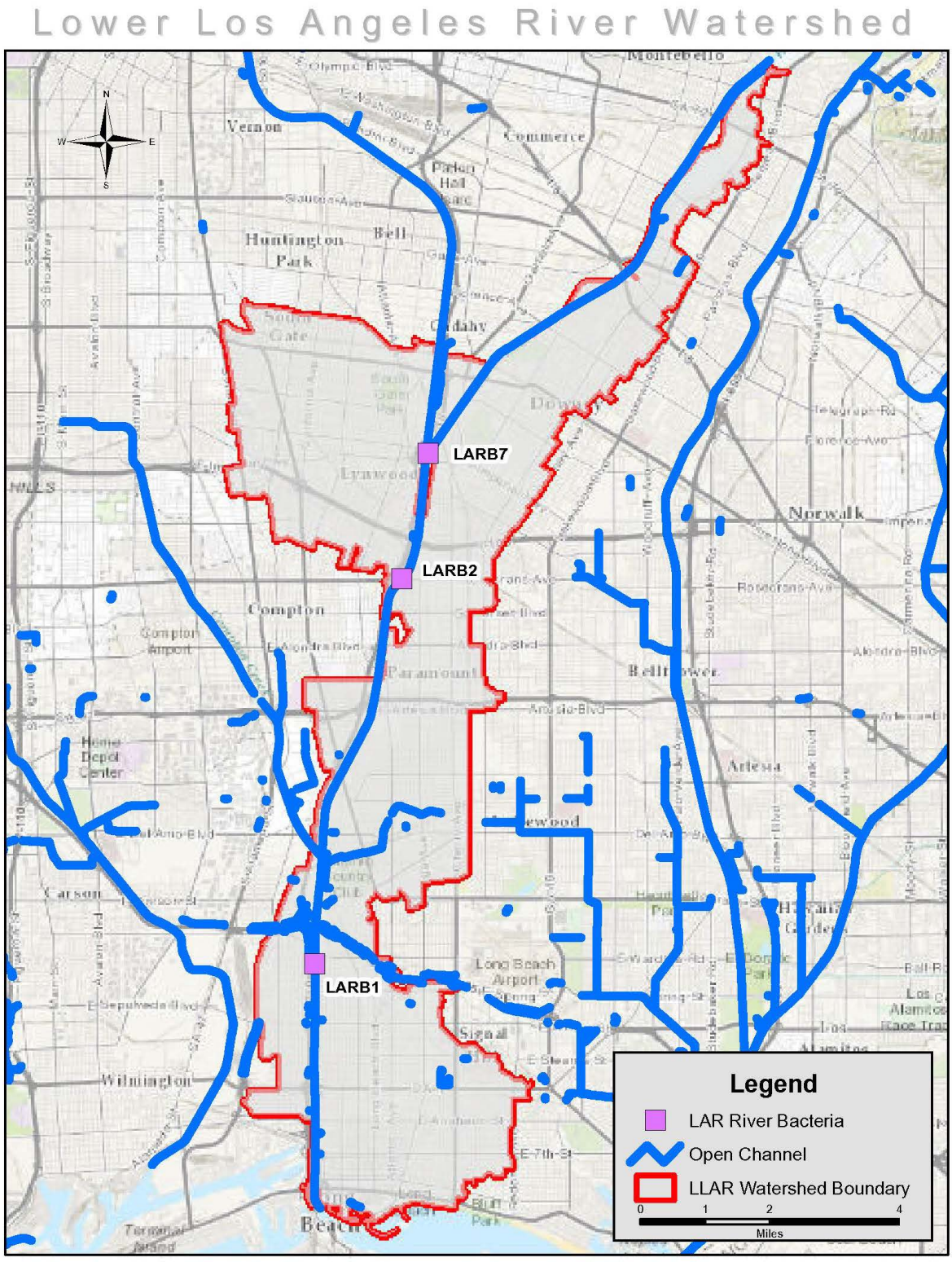
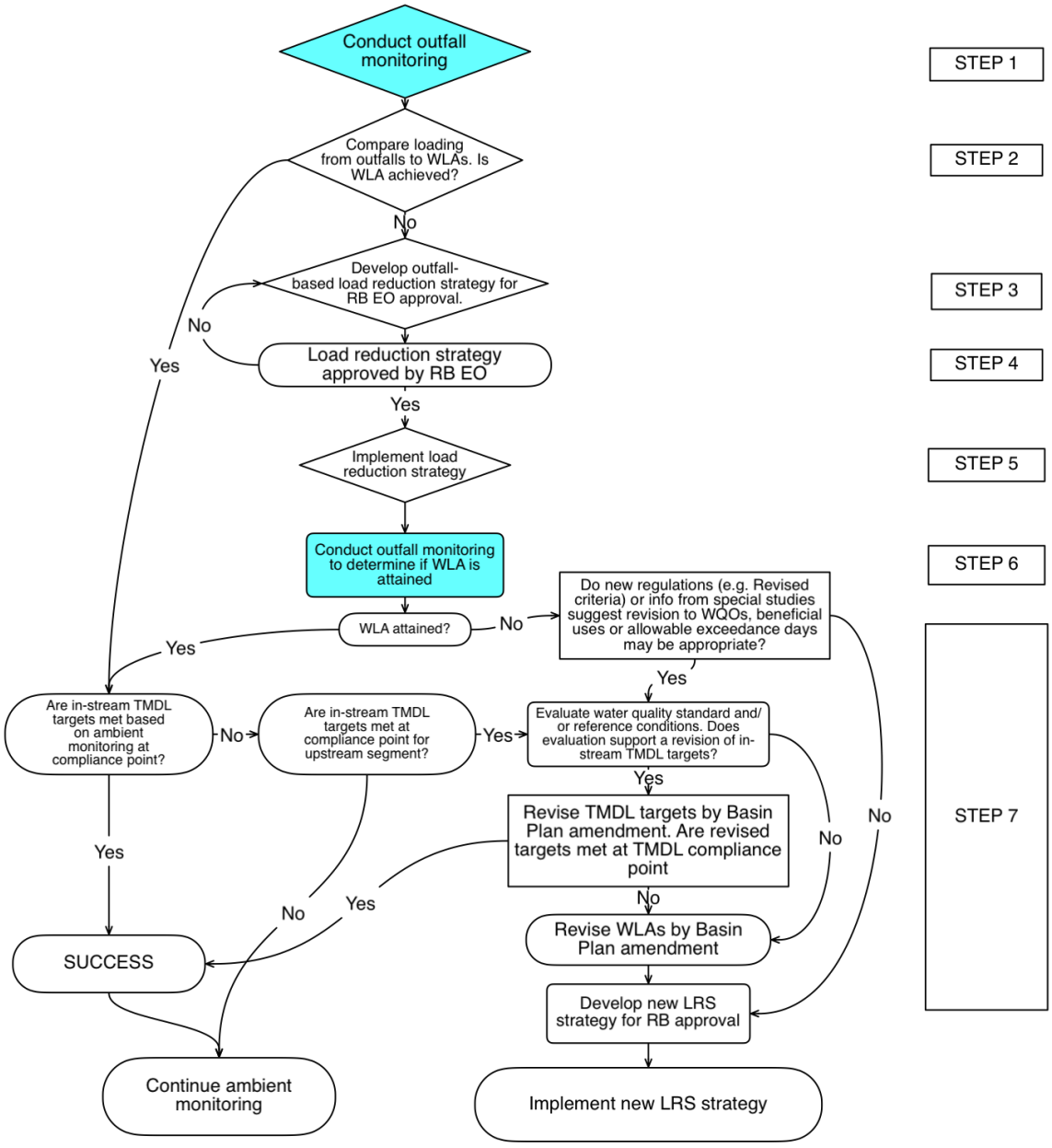


Figure 8-2. River Monitoring Sites for the Los Angeles River Bacteria TMDL.



Based Upon the Los Angeles River Bacteria TMDL Staff Report.

Figure 8-3. Outline of LRS Sampling and Assessment Process

8.3.1 Interim Dry Weather Limits for Bacteria

The Basin Plan Amendment (Resolution No. R10-007) established Interim Dry Weather WLAs for all segments of the Los Angeles River and the major tributaries. Table 8-3 summarizes WLAs for segments and tributaries located within the LLAR WMG.

Table 8-3. Interim Dry Weather Waste Load Allocations for LLAR Segments and Tributaries (Expressed as Load, 10^9 MPN/day).

River Segment or Tributary	*E. coli* Load (10^9 MPN/day)
Los Angeles River Segment A	301
Los Angeles River Segment B	518
Compton Creek	7
Rio Hondo	2

Source: Resolution No. R10-007, Amendment to the *Water Quality Control Plan for the Los Angeles* Region

8.3.2 Final In-stream Targets and Allowable Exceedances

The final in-stream numeric targets for this TMDL are as follows:

- Geometric Mean Target: *E. coli* density shall not exceed 126 MPN/100 mL.
- Single Sample Target: *E. coli* density shall not exceed 235 MPN/100 mL.

It is important to note that these Final In-stream Targets *do not* apply to monthly ambient monitoring results. They are included here for reference only. These targets only apply to weekly monitoring results, which will be initiated after a given river segment or tributary has completed the first phase of implementation of its Load Reduction Strategy. The single sample targets are assigned an allowable number of exceedance days for dry weather and wet weather. If the Regional Board adopts new bacterial standards, the CIMP, including any monitoring reports, shall be updated to incorporate the changes.

8.3.3 High Flow Suspension

Certain reaches and tributaries of the Los Angeles River are subject to a High Flow Suspension (HFS) of the recreational beneficial uses. All segments and tributaries located within the LLAR WMG would be subject to suspension of recreational beneficial uses for time periods when rainfall is greater than or equal to 0.5 inches over a 24-hour time period and a 24-hour time period following the event (Board Resolution No. 2003-010). Since this CIMP only includes sampling scheduled to be conducted during dry weather, HFS days are not likely to apply to the results obtained through this monitoring program and are included here for reference purposes only. Table 8-4 shows the final dry and wet weather allowable exceedances based on daily and weekly sampling.

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Table 8-4. Allowable Number of Exceedances of Final In-stream Numeric Targets in Dry and Wet Weather Conditions.

Allowable Number of Exceedance Days	Daily Sampling	Weekly Sampling
Dry Weather	5	1
Wet Weather(Non-HFS[1] Water bodies)	15	2
Wet Weather (HFS Water bodies)	10 (not including HFS days)	2 (not including HFS days)

1. HFS= High Flow Suspension

The River Bacteria sampling program will be based upon the March 2013 *Coordinated Monitoring Plan for Los Angeles River Watershed Bacteria TMDL – Compliance Monitoring* developed by the LA River Watershed Bacteria TMDL Technical Committee with the exception that monitoring will be conducted quarterly rather than monthly. This plan established 16 sites throughout the Los Angeles River Watershed to characterize ambient water quality conditions. Four of these sites are located in the LLAR WMG. Quarterly water samples will be collected at each site for analysis of the fecal indicator, *Escherichia coli (E. coli).* Quarterly monitoring is considered to initially be sufficient to determine a segment or tributary is in compliance with interim WLAs. Since interim WLAs are expressed as a load, flow measurements will be taken at or near the time of each sample collection so that the *E. coli* MPN/day can be calculated. Quarterly monitoring will only be conducted during dry weather conditions. Sampling must be preceded by a minimum of 72 hours without rainfall within the watershed.

LRS sampling is initially required to evaluate bacterial loads associated with each defined River Segment or Tributary in the LAR Bacteria TMDL. Sampling conducted to support development of bacteria reduction plan requires six sampling events where water samples and flow measurements are taken in all outfalls discharging to the defined area. Effectiveness monitoring is scheduled to be conducted after all actions have been taken to control bacterial loads to levels below established Waste Load Allocations (WLAs). Effectiveness monitoring is expected to require three additional synoptic surveys of the target segment. If this monitoring does not demonstrate that WLAs are being met, a second phase of testing is required to evaluate further actions necessary to meet the dry weather WLAs. Initial LRS monitoring was completed for Segment B of the Los Angeles River as part of the CREST studies (CREST 2010a, b). Appendix 1 of the CREST report provided example calculations and recommendations for reducing dry weather loads. A final LRS plan is required to be submitted by September 30, 2014. This plan may utilize recommendations provided in the CREST report or recommend alternative strategies for reducing bacterial loads.

Table 8-5 provides a schedule for the first two cycles of the Permit for development of initial LRS plans and completing effectiveness monitoring River Segments A and B and tributaries that discharge to these River Segments. It is currently intended that an LRS plan be completed for

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outfalls discharging to the Los Angeles Estuary (LAR). In order to provide consistency with the Los Angeles River Bacteria TMDL, an LRS plan for the LAR is scheduled to be completed by September 2021 when LRS plans are due for River Segments C and D.

Table 8-5. Schedule for Completion of LRS Outfall Monitoring for Bacterial Loads under the Los Angeles River Bacterial TMDL.

	Segment B	**Segment A**	**Segment B Tributaries Rio Hondo**	**Segment A Tributaries Compton Creek**
First Phase				
Monitoring for Development of LRS – 6 outfall surveys	***Sept 23, 2014***, 2.5 years after effective date of the TMDL	***Sept 23, 2016,*** 4.5 years after effective date of the TMDL	***March 23, 2016,*** , 4 years after effective date of the TMDL	***March 23, 2018***, 6 years after effective date of the TMDL
Monitoring for Effectiveness of LRS – 3 outfall surveys	***March 23, 2022***, 10 years after effective date of the TMDL	***March 23, 2024***, 12 years after effective date of the TMDL	***September 23, 2023***, 11.5 years after effective date of the TMDL	***Sept 23, 2025,*** 13.5 years after effective date of the TMDL
Second Phase				
Submit a new LRS -6 new outfall surveys	***March 23, 2023***, 11 years after effective date of the TMDL	***March 23, 2025***, 13 years after effective date of the TMDL	***March 23, 2024***, 12.5 years after effective date of the TMDL	***September 23, 2026,***, 14.5 years after effective date of the TMDL

1. This schedule is limited to activities during the first two permit cycles (10 years) that require data collection efforts.

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Table 8-6. Ambient Monitoring Sites within the LLAR WMG for the Los Angeles River Watershed Bacterial TMDL.

Site ID	Site Name	Water Body	GPS Coordinates		Description
			Latitude (N)	Longitude (W)	
LARB1	Segment A (Wardlow)	Los Angeles River(Reach 1)	33.81735	118.20551	Located at Wardlow Rd Mass Emission station (S10)
LARB2	Segment B (Rosecrans)	Los Angeles River (Reach 2)	33.90374	118.18240	Located at Rosecrans Ave
LARB7	Rio Hondo	Tributary: Rio Hondo	33.93202	118.17523	Located above with Confluence with the LA River

8.4 Long Beach City Beaches and Los Angeles River Estuary TMDLs for Indicator Bacteria

The Lower LAR Watershed Group includes drainages to the Los Angeles River Estuary, but not Long Beach City Beaches. A robust monitoring program was to be developed for the LAR Estuary. Existing data includes bi-weekly monitoring from May through September of 2009, and 2010. Monitoring was to be expanded to include year round monitoring requirements, and at least three monitoring locations within the Estuary. It was recognized that adequate data to establish a reference estuary approach was not available at the time when TMDLs were developed for indicator bacteria along the City beaches and in the Los Angeles River Estuary. It was also recognized that, as adequate data from reference estuary studies becomes available, it may be appropriate to consider a reference estuary approach to evaluate compliance with these TMDLs.

The Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL was developed by USEPA and therefore did not incorporate an Implementation Plan. The Regional Board developed a separate TMDL for bacteria in the Los Angeles River that has been incorporated into the Basin Plan Amendment with a schedule to meet compliance in 25 years (Resolution Number R10-007, approved by the State Board on November 1, 2011). The USEPA recognized that waste load allocations and load allocations (expressed as allowable exceedance days) were appropriate to implement in a timeline consistent with the lower segments of the Los Angeles River Bacteria TMDL, and that the Regional Board should consider options that provide time to comply, absent a state-adopted implementation schedule, and consistent with the State Water Board's compliance schedule policy. Interim milestones were recommended to be linked to localized efforts to reduce bacteria loading in the direct drainage areas included in these TMDLs, and should consider the influence of upstream bacteria sources to the LAR Estuary and the LBC Beaches.

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The LLAR WMG only includes the LAR Estuary portion of this TMDL but the salinities can be expected to range from a freshwater to a marine environment. Receiving water quality objectives for the LAR Estuary for REC-1[3] beneficial uses are summarized in Table 8-7. The TMDL estimated direct loads to the Estuary during dry weather solely on the basis of *E. coli.* While they recognized that the different indicator bacteria were not directly comparable, it was assumed that sources were similar for indicator bacteria applicable to the marine environment. Due to the transition from a freshwater to a marine environment, all four indicator bacteria will be considered.

Table 8-7. Marine and Freshwater Receiving Water Quality Objectives applicable to the Los Angeles River Estuary.

Water Quality Objectives	Marine REC-1	Freshwater REC-1
SINGLE SAMPLE		
E. coli	NA	235 CFU/100 mL
Fecal coliform	400 CFU/100 mL	
Enterococcus	104 CFU/100 mL	
Total Coliform[1]	10,000 CFU/100 mL	
30-DAY GEOMETRIC MEAN		
E. coli	NA	126 CFU/100 mL
Fecal coliform	200 CFU/100 mL	
Enterococcus	35 CFU/100 mL	
Total Coliform	1,000 CFU/100 mL	

1. Total coliform shall not exceed 1,000/100 mL, if the ratio of fecal to total coliform exceeds 0.1 (this is an additional single sample limit for REC-1 marine waters; presented in the Basin Plan).

The purpose of conducting a monitoring program in the Los Angeles River Estuary is to:

- develop an understanding of bacterial loading rates to the estuary and
- determine if bacteria undergo simple dilution as the freshwater passes through the estuary mixing with marine waters or if areas of the estuary serve as either sources or sinks for bacteria that can ultimately be transported to Long Beach City Beaches.

Three monitoring sites (Figure 8-4) will be monitored within the estuary. Sampling locations are located at the upstream and downstream limits of the estuary, and near the Queensway Bridge. During each survey, samples will be taken for each of the marine and freshwater bacteria indicators in Table 8-6 due to the range of conditions within the estuary. In addition, *in-situ* measurements will be taken for salinity, temperature and turbidity using field instrumentation. Sampling points will be selected at the center of the brackish surface plume (lowest salinity) resulting from

[3] uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing or use of natural hot springs.

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freshwater flows from the Los Angeles River. This will assure that conditions reflect the center of surface flows passing through the estuary. Sampling is intended to be completed in the morning within a 2-hour interval in order to assure that sampling represents a synoptic view of conditions within the estuary that is unimpacted by differential exposure to sunlight.

Based upon a simple estuarine mixing model, a linear change in bacteria concentrations in response to changes in salinity would indicate that the Los Angeles River is either the only bacterial source or at least the dominant source of bacteria to the Estuary. Increasing concentrations of bacteria relative to a linear dilution line will be indicative of a source along the Estuary. If measured concentrations of bacteria decrease faster than expected based upon simple dilution of the River water would indicate that the estuary serves as a sink. The latter case would occur if estuarine mixing creates conditions where bacteria would tend to be removed by coagulation and settling of particulate matter.

This monitoring is expected to provide information to assess the major sources of bacteria to the estuary and assist in determining where efforts would be best directed to reduce bacteria within recreational waters of the Los Angeles River Estuary and at beaches impacted by the freshwater plume as it leaves the mouth of the Estuary.

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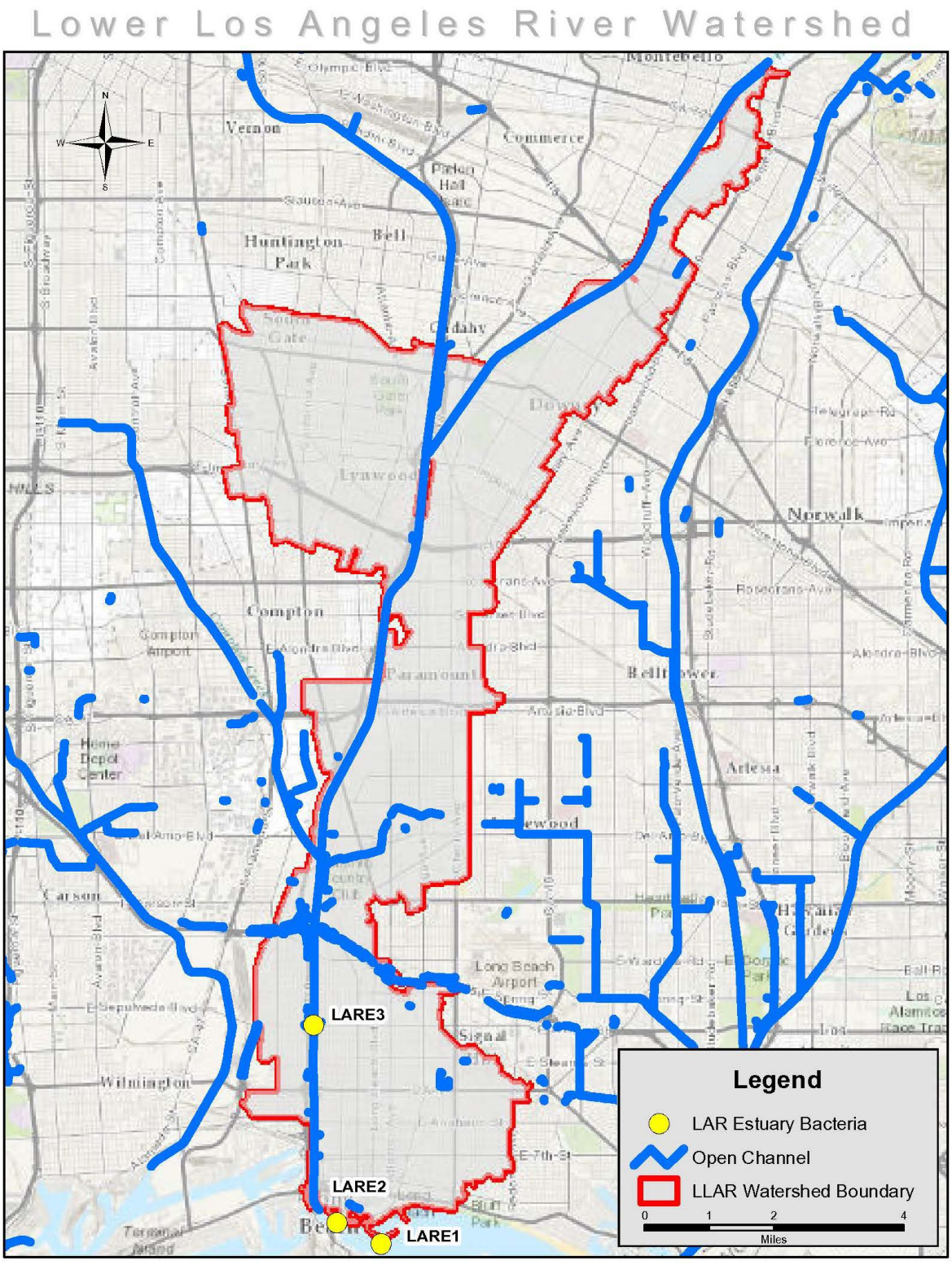


Figure 8-4. Monitoring Sites for Bacteria in the Los Angeles River Estuary.

8.5 Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL)

Attachment A to Resolution No. R11-008

The Basin Plan Amendment (Resolution No. R11-008) indicates that responsible parties identified in the existing metals TMDLs for Los Angeles River Watershed are responsible for conducting water and sediment monitoring above the Los Angeles River Estuary to determine the Rivers' contribution to the impairments in the Greater Harbor waters.

- **Water Column Monitoring**

The Basin Plan Amendment indicates that water samples and total suspended solids samples are to be collected from at least one site during two wet weather events and one dry weather event each year. The first large storm event of the season is to be included as one of the wet weather monitoring events. Water samples and total suspended solid samples are to be analyzed for metals, DDT, PCBs, and PAHs. Sampling is intended to collect sufficient volumes of water to allow for filtration of suspended solids for analysis of the listed pollutants in the bulk sediment. General water chemistry (temperature, dissolved oxygen, pH, and electrical conductivity) and a flow measurement is also be required at each sampling event. General chemistry measurements may be taken in the laboratory immediately following sample collection if auto samplers are used for sample collection or if weather conditions are unsuitable for field measurements.

- **Sediment Monitoring**

The Basin Plan Amendment also requires collection of sediment samples from at least one site every two years for analysis of general sediment quality constituents and the full chemical suite as specified in SQO Part 1. Sediment monitoring has been incorporated into the Coordinated Compliance, Monitoring, and Reporting Plan for the Greater Los Angeles and Long Beach Harbor Waters (Anchor QEA, 2013) and therefore will not be addressed in this CIMP.

The Harbor Toxics Monitoring Program includes two monitoring sites within the Queensway Bay portion of the Los Angeles River Estuary that will be monitored every two years for both general sediment quality and all chemical constituents specified for SQO Part 1 testing. Permittees located in the nearshore areas as defined by the Harbor Toxics TMDL are contributing to Harbor Toxics monitoring performed in both receiving waters and sediments of the Los Angeles River Estuary, San Pedro Bay and the Port of Long Beach.

8.5.1 Sampling Approach

A number of different approaches have been attempted to enable collection of stormwater samples based upon flow-weighted composites and then extract the suspended sediments for analysis. The various approaches have met with varied level of success and typically require extensive labor to extract the sediment for analysis. Regardless of the approach used, none are based upon standard methods.

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We are recommending an alternative approach for assessing the loads of toxic contaminants being discharged to the Harbor environment that will substantially reduce the amount of sample handling and potential for introduction of error. This approach will utilize High Resolution Mass Spectrometry (HRMS) to analyze for organochlorine pesticides (EPA1699), PCBs (EPA 1668) and PAHs (CARB429m). Test methods for these organic toxic compounds target the required analytes, but also enable assessment of each compound included in the Part 1 Sediment Quality Objectives (SQOs). These compounds include chlordane which is 303(d) listed in both the Los Angeles River Estuary sediments and in San Pedro Bay sediments.

The frequency of monitoring for the Harbor Toxics TMDL (Table 8-8) will be consistent dry and wet weather monitoring requirements specified in the TMDL however, the HRMS method will be used for the two wet weather monitoring events and conventional analytical methods will be used for the dry weather monitoring event.

During the first three years of Harbor Toxics monitoring, analyses will be conducted on whole water samples. These test methods provide detection limits that are roughly 100 times more sensitive than conventional low resolution tests. In addition, these extremely low detection limits can be achieved with as little as 3-6 liters of stormwater from each monitoring location.

Use of this approach is expected to greatly enhance the ability to consistently obtain appropriate samples for measuring and comparing loads of toxic pollutants associated with each major stormwater discharge. This will assure that all key toxics can be quantified at levels suitable for estimation of mass loads to the Harbor waters. For purposes of load calculations, it would be assumed that 100% of these toxics were associated with suspended solids. Separate analyses of TSS/SSC would be used to normalize the data. After three years (six storm events) the data will be reevaluated to assess whether direct analysis of the filtered suspended sediments are necessary to improve load assessments. If deemed necessary, a modified approach will be evaluated based upon use of HRMS methods for analysis of filtered suspended sediments. Use of HRMS for analysis of the filtered sediment will reduce sediment mass requirements down to one gram per analytical method, but this still requires collection and transport of large volumes of water for laboratory filtration. It is currently not clear whether the process of filtering large samples and direct analyzing target toxics in suspended sediments will result in any significant improvements in our ability to assess loads of the toxics being addressed in the Harbor TMDL. In fact, collecting, transporting and processing the high volumes of stormwater necessary for this approach may result in a decrease in our ability to obtain useful data and will likely result in a decrease in our ability to assess pollutant loads from all watersheds.

Similar approaches have been used by the San Francisco Estuary Institute (SFEI) staff (Gilbreath, Pearce and McKee, 2012) to measure the performance of a rain garden. Autosamplers were used to collect stormwater influent and treated effluent to assess removal efficiency for pesticides, PCBs, mercury, and copper subject to TMDLs. HRMS was used to quantify PCB removal. HRMS methods are also being used in Virginia to assist in identification of sources of PCBs in MS4 and industrial stormwater discharges (Gilinsky, 2009).

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Table 8-8. Summary of Constituents to be Monitored at the S10 Mass Emission for the Harbor Toxics Monitoring Program.

CLASS OF MEASUREMENTS	MASS EMISSION SITE (S10)	
	Wet	Dry
Flow	3	2
Field Measurements Dissolved oxygen, pH, temperature, and specific conductivity	3	2
Organochlorine Pesticides and PCBs (Table 5-5) Chlordane[1], DDTs[2], PCBs[3]	2	1
Metals (Table 5-6**)** Al**,** Cd, Cu, Pb, Ni, Sb, Zn, Total Se & Hg	2	1
Semivolatile Organic Compounds (Table 5-8) PAHs[4]	2	1

1. Chlordane components are based upon sum of chlordane-alpha, chlordane-gamma, nonachlor-alpha, nonachlor-gamma, and oxychlordane consistent with the Harbor Toxics TMDL.
2. DDT compounds include: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT. Only the 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT are included in routine monitor as part of Table E-2 constituents.
3. PCBs includes the seven aroclors listed in Table 5-5 or the following 54 PCB congeners: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209.
4. PAHs include the 18 compounds used to evaluate sediment quality ERLs and ERMs: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene. PAHs will be quantified as part of the Harbor Toxics Monitoring requirements –two wet season and one dry season event. Methods in the referenced table will only be used for dry weather testing.

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8.5.2 Sampling and Analytical Procedures-Wet Weather

Stormwater samples for the Harbor Toxics Monitoring Program will be collected using automated stormwater sampling methods specified in Appendix B. A separate autosampler and intake hose will be installed at each site. Existing flow metering equipment at each site will be used to pace the sampler to obtain a flow-weighted composite sample.

Based on TSS measurements at four mass emission sites in LA County (Table 8-9), use of a TSS concentration of 100 mg/L is expected to provide a conservative basis for estimating reporting limits for OC pesticides, PCBs, and PAHs in suspended sediments based upon 2-liter samples. However, an additional liter of stormwater will be provided for each organic analytical suite for a total of nine liters. An accurate measure of suspended sediments is critical to this sampling approach. TSS will be analyzed; however, SSC will be used as the standard for calculating the concentrations of target constituents in suspended sediments and total contaminant loads associated with those sediments. Each of the measures of suspended solids will require 1-liter samples. Any additional water (up to another six liters) will be provided to the laboratory in 2.5-L amber glass bottles.

This approach requires a maximum of 17 liters of stormwater for analysis of organic constituents and sediment tests required for the Harbor Toxics TMDL. Analyses could be performed on a minimum of eight liters of water but field duplicates would need to be provided from another site. The following configuration of sample containers and sample volumes will provide the laboratory with the maximum degree of flexibility to assure that detection limits are met and suitable water volumes are available to complete analysis of field duplicates for each analytical suite.

- Six 2.5-L amber glass containers (filled to two liters)
- Three 1-L amber glass containers
- Two 1-L HDPE containers for suspended sediment

Since detection limits will depend upon the concentration of suspended sediment in the sample, the laboratory analyzing the suspended sediment concentrations will be asked to provide a rush analysis to provide information that can be used to direct processing of the samples for the organic compounds. Processing of sample waters provided to the laboratory will depend upon the results of the SSC analysis.

- If Suspended Sediment Concentrations (SSC) are less than 150 mg/L, an additional liter of water will be extracted for each subsequent HRMS analysis. If TSS concentrations are between 150 and 200 mg/L, one of the additional liter samples may be used to increase the volume of sample water for just PAHs or the two additional liters may be used as a field duplicate for one of the analyses.

- If SSC concentrations are greater than 200 mg/L, two of the three additional liters may be used as a field duplicate for one analysis. If available, the additional water provided in 2.5 L containers will also be considered for use as field replicates.

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- If the initial SSC sample indicates that sediment content is less than 50 mg/L, additional measures will be taken to improve PAH reporting limits with respect to suspended sediment loads. This would include use of extra sample water to bring up the total sample volume (up to a maximum of 4 liters) or reduction the final extract volume.

- Given adequate sample volumes and normal levels of suspended sediment, a field duplicate will be analyzed for each analysis. Field duplicates for the three HRMS analyses may come from different monitoring sites in the Los Angeles and San Gabriel River watersheds depending on available volumes. Parties conducting the testing at each site will coordinate testing to enhance the opportunity to incorporate at least one field duplicate sample for each test.

Target reporting limits (Table 8-11 and Table 8-12) were established based upon bed sediment reporting limits listed in the *Coordinated Compliance and Reporting Plan for the Greater Los Angeles and Long Beach Harbor Waters* (Anchor QEA, 2013). Table 8-11 and Table 8-12 provide a summary of the detection limits attainable in water samples using HRMS analytical methods. Estimated detection limits are provided for concentrations of the target constituents in suspended sediments given the assumption that 2-liter sample volumes will be used for each test, suspended sediment content is 100 mg/L and that 100 percent of the target constituents are associated with the suspended sediment. This provides a conservative assumption with respect to evaluating the potential impacts of concentrations of OC pesticides, PCBs, and PAHs in suspended sediment on concentrations in bed sediment. Additionally, Table 8-11 and Table 8-12 present relevant TMDL targets and reporting limits suggested in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009). The following is a comparison between the estimated detection limits for OC pesticides, PCBs, and PAHs in the suspended sediments. The approach used to assess concentrations of trace metals in suspended sediments is based upon use of the routine monitoring information. Table 8-13 examines the possible limitations of this approach if trace metal concentrations are extremely low, approaching detection limits.

- For OC pesticides (Table 8-11), estimated detection limits in the suspended sediment are comparable or lower than Harbor Toxics TMDL targets limits for bed sediments

- For PCBs (Table 8-11), estimated detection limits in the suspended sediment are below TMDL targets limits for bed sediments. Additionally, estimated detection limits in the suspended sediment are at or below target bed sediment reporting limits for the Harbor Toxics sediment monitoring program and below target reporting limits presented in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009).

- Most PAH compounds (Table 8-12), are expected to be detectable in the suspended sediment at concentrations similar to target bed sediment reporting limits for the Harbor Toxics monitoring program, target reporting limits presented in the SWAMP QAPP (SWRCB, 2008), and maximum reporting limits cited in the SQO technical Support Manual (SCCWRP, 2009). Only two compounds, naphthalene and phenanthrene, are expected to have

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detection limits roughly three times the target bed sediment reporting limits for the Harbor Toxics TMDL. Both of these analytes are light weight PAHs that are not considered to be major analytes of concern in stormwater.

- Table 8-13 summarizes the reporting limits applicable to total recoverable metals. Estimated equivalent concentrations in suspended solids are very conservatively estimated based upon 100 percent of the metals being associated with suspended particulates as measured values approach project detection limits. In reality, this is not a likely condition. When concentrations of total recoverable metals approach the very low detection limits used in this program, sediment loads will also be extremely low and the concentrations of metals in the dissolved phase will become a more significant fraction of the total metals concentrations. If concentrations of total cadmium and mercury are extremely low, comparison with TMDL targets in bed sediments could be limited

Initial monitoring results will be compared against interim sediment Waste Load Allocations (WLAs) established for the respective receiving waters (Table 8-14). For the Los Angeles River, interim WLAs for the Los Angeles River Estuary would apply and for the San Gabriel River watershed, interim allocations for the Nearshore Waters of San Pedro Bay will apply.

8.5.3 Sampling and Analytical Procedures-Dry Weather

Suspended sediment concentrations during periods of dry weather are extremely low and not suitable for use of methods intended to quantify the concentrations of toxics associated with particulates. Dry weather samples will be collected as surface grab samples. Each sample will be collected directly into the laboratory sample containers using clean sampling techniques outlined in the section of grab sampling. Dry weather sampling will be scheduled to be conducted during a time period when flows are historically at the minimum levels.

Water samples will be collected and submitted for the following parameters:

- Total Suspended Solids (TSS) and Suspended Sediment Concentrations (SSC)
- Dissolved and total metals
- Organochlorine pesticides (including DDT and its derivatives, chlordane compounds, dieldrin, and toxaphene)
- Polychlorinated biphenyl (PCB) congeners

Analytical methods for each of these constituents will be consistent with methods listed in Section 5 for Table E-2 constituents. Analytical methods will also be consistent with methods used in the Harbor waters with the exception of metals which require chelation/extraction methods in saline waters.

In situ measurements will include temperature, dissolved oxygen, pH and salinity. *In situ* measurements will be taken with a calibrated water quality sonde (Hach Quanta or equivalent).

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8.5.4 Quality Control Measures

Quality control measures for all HRMS analyses will include field equipment blanks to assess background contamination due to the field equipment and sample handling. One field equipment blank will be analyzed from one set of field equipment prior each monitoring event during the first year. Data will be evaluated at the end of the year to determine if field equipment blanks should be reduced to one per season. For the field blank, two liters of HPLC grade water provided by the laboratory will be pumped through the entire autosampler and intake hose for each analytical test (OC pesticides, PCBs and PAHs). The blank water will be pumped into precleaned sample containers and refrigerated until the stormwater sampling is completed. If the storm does not occur immediately after blanking, the equipment blank will be transmitted under Chain of Custody to the laboratory in order the meet the requirement for extraction of aqueous samples within 7 days of collection. Extracts will be held until stormwater samples are received unless storm does not develop within a period of 30 days after extraction (samples are required to be analyzed within 40 days of extraction). If a successful storm event is monitored immediately after the equipment blank is taken, the equipment blank and stormwater samples will be submitted to the laboratory together. Given adequate sample volumes, field duplicates will also be analyzed to assess variability associated with the sampling and subsampling processes.

Laboratory quality control measures will include analysis of method blanks, initial calibrations, analysis of Ongoing Precision and Recovery (OPR) samples and use of labeled compounds to assess recoveries and matrix interferences. Method blanks will be based upon processing of laboratory water volumes identical to those used for the field samples. Initial calibrations are run periodically but daily calibration checks are conducted to verify stability of the calibration. OPR tests will be conducted with each batch of samples. OPR samples are blanks spiked with labelled isotopes that are used to monitoring continued performance of the test. Labelled isotopes are added to each field sample and analyzed to measure recovery in the sample matrix. Estimated Detection Limits (EDLs) will be calculated for each analyte associated with each field sample. For each analyte 'x', the EDL is calculated by the following formula:

$$EDL_x = 2.5 * \frac{(Na)*(Qis)*(Rah)}{(Ais)*(RRF)*(wv)}$$

Where:
- Na = Analyte peak to peak noise height.
- Qis = Concentration of internal standard.
- Rah = Area of Height Ratio
- Ais = Area of internal standard
- RRF = initial calibration average relative response factor for the congener of interest.
- wv = sample weight/volume.
- 2.5 = Minimum signal to noise ratio.

Quality control measures for water samples taken during dry weather periods will be consistent with all measures applied for sampling suspended sediment, trace metals, organochlorine pesticides and PCBs as part of the Receiving Water Monitoring Program.

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8.5.5 Summary

In summary, target reporting limits for all but one of the organic compounds of interest are below or comparable to relevant TMDL targets and the overwhelming majority are below bed sediment reporting limits identified in the Harbor Toxics Monitoring Program (Anchor, 2013), the SWAMP QAPP (SWRCB, 2008), the SQO Technical Support Manual (SCCWRP, 2009) and available Effects Range Low (ERL) values used to assess direct effects on Harbor sediments. In the case of metals, some limitations may exist for two elements, cadmium and mercury, in extreme conditions. However, neither sediments in both eastern San Pedro Bay nor the Los Angeles River Estuary are cited as being impaired by these two metals.

The sampling approach is based upon collection and analysis of whole water samples to estimate concentrations of target pollutants associated with suspended sediments in flow-rated composite samples of stormwater. Use of this approach is expected to result in very low detection limits that will allow for quantification of total contaminant loads for each constituent of concern. It will also allow for reasonable estimates of the concentrations of target compounds in the suspended sediment and provide for direct comparisons with targets established in the receiving waters for bed sediments. This approach meets the overall objectives of the program while also enhancing the chances of successfully monitoring multiple storm events in the targeted watersheds and providing data necessary to evaluate relative loads from each watershed during multiple storms each year. The proposed methods are also expected to allow incorporation of quality control measures necessary to evaluate potential sources of contamination and evaluate variability associated with both field sampling and analytical processes.

Sampling of dry weather discharges from the Los Angeles River and at the mouth of the Lower San Gabriel River Estuary will be based upon surface grab samples. Samples will be analyzed for suspended sediment, trace metals, organochlorine pesticides and PCBs as part of the Receiving Water Monitoring Program

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Table 8-9. Measurements of Suspended Sediments for Calculation of Harbor Toxics Pollutant Loads.

SAMPLE MEDIUM	CONSTITUENT	METHOD	TARGET REPORTING LIMIT
Water	Total Suspended Solids (TSS)	SM 2540D	1.0 mg/L
	Suspended Sediment Concentration (SSC)	ASTMD 3977, Method B	1.0 mg/L

Table 8-10. Summary of TSS Measurements (mg/L) at Four Mass Emission Monitoring Sites in Los Angeles County.

Site	Site ID	2nd Quartile	Median	3rd Quartile
Los Angeles River - Wardlow	S10	65	143	291
Coyote Creek	S14	33	55	117
Ballona Creek	S01	NA	158	NA
Los Cerritos Channel	LCC1	96	155	260

NA = not available

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Table 8-11. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Organochlorine Pesticides and Total PCBs

Constituent and Analytical Method	Water Detection Limit [1]	Equivalent Suspended Sediment Detection Limit [2]	Harbor Toxics Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009) Reporting Limit	Harbors Toxics TMDL Sediment Target (Indirect Effects)	Harbors Toxics TMDL Sediment Target (Direct Effects)
	pg/L	ng/g – dry wt					
Chlordane Compounds (EPA 1699)							
alpha-Chlordane	40	0.2	2	1	0.5	1.3 (Total Chlordane)	0.5 (Total Chlordane)
gamma-Chlordane	40	0.2	2	1	0.54		
Oxychlordane	40	0.2	1	1	NA		
trans-Nonachlor	40	0.2	2	1	4.6		
cis-Nonachlor	40	0.2	1	2	NA		
Other OC Pesticides (EPA 1699)							
2,4'-DDD	40	0.2	2	2	0.5	1.3 (Total DDT)	1.58 Total DDT)
2,4'-DDE	80	0.4	2	2	0.5		
2,4'-DDT	80	0.4	3	3	0.5		
4,4'-DDD	40	0.2	2	2	0.5		
4,4'-DDE	80	0.4	2	2	0.5		
4,4'-DDT	80	0.4	5	5	0.5		
Total DDT	80	0.4	---	---	0.5		
Total PCBs (EPA 1668)	5-20	0.025-0.1	0.2[3]	0.2	3.0	3.2	22.7

1. Water EDLs based upon 2 liters of water.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.
3. Harbor Toxics high resolution analytical methods include a target of 0.2 ng/g for all congeners except PCB-189 which has a target of 10 ng/g.

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Table 8-12. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for PAHs

Constituent	Water Detection Limit [1]	Equivalent Suspended Sediment Detection Limit [2]	Harbor Toxics Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009)Reporting Limit	Harbors Toxics TMDL Sediment Target (Direct Effects)
	pg/L	ng/g – dry wt				
Low Molecular Weight PAHs						
1-Methylnaphthalene	5	25	20	20	20	
1-Methylphenanthrene	5	25	20	20	20	
2-Methylnaphthalene	5	25	20	20	20	201
2,6-Dimethylnaphthalene	5	25	20	20	20	
Acenaphthene	5	25	20	20	20	
Anthracene	5	25	20	20	20	
Biphenyl	5	25	20	20	20	
Fluorene	5	25	20	20	20	
Phenanthrene	12.5	62.5	20	20	20	240
Naphthalene	12.5	62.5	20	20	20	
					LOW MOLECULAR WT PAHS	**552**
High Molecular Weight PAHs						
Benzo(a)anthracene	5	25	20	20	80	261
Benzo(a)pyrene	5	25	20	20	80	430
Benzo(e)pyrene	5	25	20	20	NA	
Chrysene	5	25	20	20	80	384
Dibenz(a,h)anthracene	5	25	20	20	80	260
Fluoranthene	5	25	20	20	80	
Perylene	5	25	20	20	80	
Pyrene	5	25	20	20	80	665
					HIGH MOLECULAR WT PAHS	**1700**
					TOTAL PAHs	**4700**

1. Water EDLs based upon 2 liter of water and CARB 429m. Detection limits are based upon a final extract of 500 µL. If the SSC is low, either an additional liter of water can be extracted to decrease the detection limit by 1/3 or the final extract volume can be reduced. Depending on sample characteristics, the extract volume can be reduced to as little as 50-100 µL which would drop EDLs by a factor of 0.1 to 0.2 times the listed EDLs.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.

Table 8-13. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Metals.

Constituent and Analytical Method	Water Detection Limit (ML)	Equivalent Suspended Sediment Detection Limit [1]	Harbor Toxics Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009) Reporting Limit	Harbors Toxics TMDL Sediment Target (Direct Effects)
	ug/L	µg/g – dry wt				
Total Metals						
Cadmium	0.25	2.5	0.01	0.01	0.09	1.2
Copper	0.50	5.0	0.01	0.01	52.8	34
Lead	0.50	5.0	0.01	0.01	25.0	46.7
Mercury	0.20	2.0	0.03	0.03	0.09	0.15
Zinc	1	10	0.1	0.1	60	150

1. Suspended Sediment EDLs based upon estimate of 100 mg/L suspended solids.

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Table 8-14. Interim Concentration-Based Sediment Waste Load Allocations

Waterbody	Pollutant (µg/g – dry wt)					
	Copper	Lead	Zinc	DDT	PAHs	PCBs
Los Angeles River Estuary	53.0	**46.7**	183.5	0.254	4.36	0.683
San Pedro Bay Near/Off Shore Zones	76.9	66.6	263.1	0.057	**4.022**	0.193

BOLDED values indicate cases where the interim allocations are equal to the final allocations

9 Stormwater Outfall Monitoring

Four outfall monitoring sites (Figure 9-1) have been assessed and selected for monitoring within the LLAR Watershed Management Group in order to meet the requirements of the Order for stormwater outfall monitoring. Appendix A provides a summary of the selected sites and two alternative monitoring sites. These sites were selected to provide good spatial representation of the watershed in terms of HUC12 boundaries, jurisdictional boundaries and land uses within the WMG. The Dominguez Gap Pump Station (LLAR2) and the Lynwood (LLAR3) stormwater outfall monitoring sites will be the first sites to be monitored. These will be followed by the Firestone (LLAR4) outfall and the Cerritos Pump Station (LLAR1) outfalls that will be installed in each subsequent year (Table 4-1). Detailed information on the monitoring equipment, field sampling procedures, protocol for cleaning all materials that come into contact with the water samples, and quality assurance/quality control procedures are provided in Appendices B through E.

Constituents monitored at each stormwater outfall monitoring site are outlined in Table 9-1 and include water body/pollutant priorities under Categories 1, 2 and 3. These include all constituents with established TMDLs, that are 303(d) listed or that have been found to exceed receiving water limitations on at least one occasion. Constituents monitored at each stormwater outfall monitoring site will include analytes measured at S10 with the exception of Aquatic Toxicity. Any constituents detected at levels of concern from Table E-2 will be considered for addition to monitoring requirements for the stormwater outfall sites after being detected twice during storm events monitored at S10.

Monitoring data will be reviewed annually to determine if adjustments to the water body/pollutant categories. Category 3 constituents will be considered for removal from the monitoring program if no exceedances are identified over a period of two consecutive years. Constituents currently classified as category 2 priorities will be considered for removal from the monitoring requirements when sufficient data are available to support delisting under the State's listing/delisting policy. Any adjustments to the monitoring requirements will be implemented during the subsequent monitoring year.

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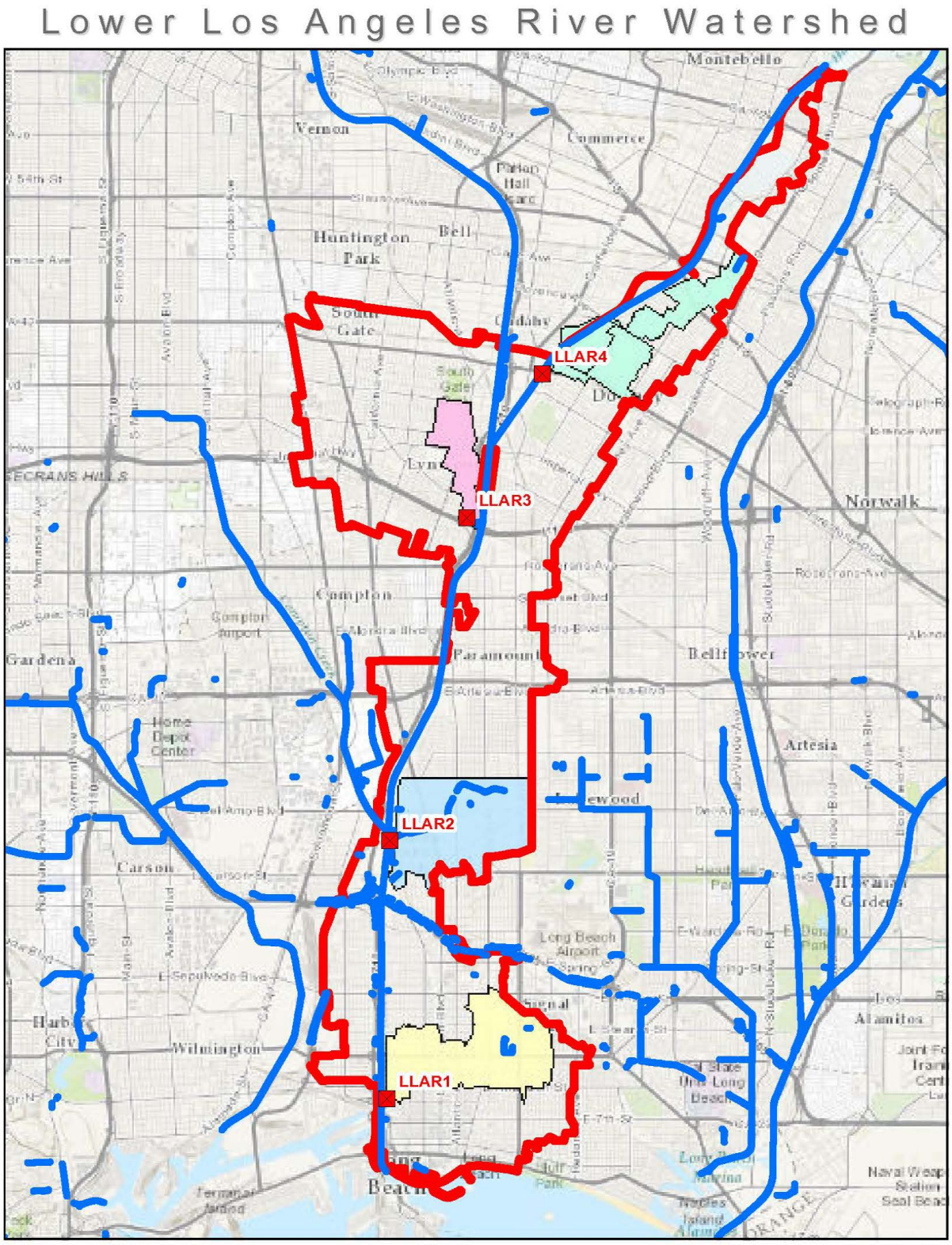


Figure 9-1. Locations of the Four Stormwater Outfall Monitoring Sites in the LLAR WMG.

Table 9-1. Summary of Constituents to be Monitored on a Regular Basis at Stormwater Outfall Monitoring Sites.

CLASS OF MEASUREMENTS	STORMWATER OUTFALL SITES Wet Only			
	LAR1	LAR2	LAR3	LAR4
Flow	3	3	3	3
Field Measurements Dissolved oxygen, pH, temperature, and specific conductivity	3	3	3	3
General and Conventional Pollutants (Table 5-2) All except total phenols, turbidity, BOD_5, MTBE, and perchlorate, and fluoride.	3	3	3	3
Microbiological Constituents (Table 5-3) *E. coli,* Total & Fecal Coliform, enterococcus *E. coli*	3[1] 3	3	3	3
Nutrients (Table 5-4) Nitrogen compounds only	3	3	3	3
Metals (Table 5-6**)** Al**,** Cd, Cu, Pb, Ni, Sb, Zn, Total Se & Hg	3	3	3	3
Semivolatile Organic Compounds (Table 5-8) Bis(2-ethlyhexylyphthalate	3	3	3	3

1. Analysis of all FIBs will only be included for LLAR1 that discharges directly to the Los Angeles River Estuary.

9.1 Sampling Frequency and Mobilization Requirements

The sampling frequency and mobilization requirements for Stormwater Outfall Monitoring sites will be consistent with monitoring conducted at the S10 (Wardlow) Receiving Water Monitoring Site. A total of three events will be monitored at each outfall site once they are installed. Monitoring will be concurrent with S10 monitoring in order to allow for comparison of pollutant loading rates associated with each segment relative to ultimate pollutant loads measured at the S10 site.

Stormwater monitoring at the Stormwater Outfall Monitoring Sites will be conducted by LLAR staff while monitoring at S10 will be performed by LACFCD staff. Monitoring will require coordination among both groups to increase the likelihood of sampling being conducted concurrently at both the ME site in receiving waters and at the stormwater outfalls. Although this may not always be possible due to equipment failures or other factors, concurrent sampling will enhance the ability to interpret the data.

Monitoring at the outfalls will therefore be restricted to the same wet weather definitions as used for the S10 mass emission station. These include:

- Wet Season defined as October 1 through April 15
- Events preceded by less than 0.1 inches of rainfall within the watershed over a three day period.
- Rainfall of at least 0.25 inches and
- Maximum flow rates greater than 500 cfs measured at the Wardlow Road gaging station associated with the S10 mass emission monitoring site.

Because a significant storm event is based on predicted rainfall, it is recognized that this monitoring may be triggered without 0.25 inches of rainfall actually occurring. In this case, the monitoring event will still qualify as meeting this requirement provided that sufficient sample volume is collected to perform all required analyses. Documentation will be provided showing data used to determine that a storm event was expected to yield sufficient rain to be considered a significant storm event that justified mobilizing field crews and preparation of autosamplers for collection of water samples.

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10 Non-Stormwater (NSW) Outfall Monitoring

Ultimately, the NSW program is intended to establish a process for identifying outfalls that serve as potential sources of contaminants. Sites where initial screening indicates the potential for discharges of a magnitude considered to have the potential to cause or contribute to exceedances of receiving water limitations will require further efforts to classify the discharges and determine appropriate actions, if any.

Detailed objectives of the screening and monitoring process (Section IX.A, page E-23 of the MRP) include the following:

1. Develop criteria or other means to ensure that all outfalls with significant non-stormwater discharges are identified and assessed during the term of this Order.
2. For outfalls determined to have significant non-stormwater flow, determine whether flows are the result of illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows, or from unknown sources.
3. Refer information related to identified IC/IDs to the IC/ID Elimination Program (Part VI.D.10 of the Order) for appropriate action.
4. Based on existing screening or monitoring data or other institutional knowledge, assess the impact of non-stormwater discharges (other than identified IC/IDs) on the receiving water.
5. Prioritize monitoring of outfalls considering the potential threat to the receiving water and applicable TMDL compliance schedules.
6. Conduct monitoring or assess existing monitoring data to determine the impact of non-stormwater discharges on the receiving water.
7. Conduct monitoring or other investigations to identify the source of pollutants in non-stormwater discharges.
8. Use results of the screening process to evaluate the conditionally exempt non-stormwater discharges identified in Parts III.A.2 and III.A.3 of the Order and take appropriate actions pursuant to Part III.A.4.d of the Order for those discharges that have been found to be a source of pollutants. Any future reclassification will occur per the conditions in Parts III.A.2 or III.A.6 of the Order.
9. Maximize the use of Permittee resources by integrating the screening and monitoring process into existing or planned CIMP efforts.

In cases where flow is determined to be significant, the program will take further action to determine if the flows are illicit, exempt, conditionally exempt, conditionally exempt but non-essential, or if the source(s) of the discharge cannot be identified (unknown). Illicit discharges require immediate action and, if they cannot be eliminated, monitoring will be implemented until such time that the illicit discharge can be eliminated. Discharges classified as conditionally exempt but non-essential or unknown also require ongoing monitoring.

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The following sections summarize the elements of the program and processes to ultimately eliminate major sources of non-stormwater discharges.

10.1 Non-Stormwater Outfall Screening and Monitoring Program

The NSW Outfall Screening and Monitoring Program will begin with three screening surveys starting in the summer of 2014 to identify outfalls or other discharges that are considered to be significant and persistent sources of non-stormwater flow to either the open channels or receiving waters.

The initial survey will focus on completing an inventory of all outfalls to receiving waters. Outfalls greater than 12-inches in diameter (or equivalent) will be photographed and documented. All minor outfalls[4] (outfalls less than 36-inches in diameter or equivalent) without evidence of the presence of industrial activities will be maintained in the database but will be considered as not requiring any further action.

Information from all three screening surveys will be consolidated to assist in the identification and ranking of outfalls considered to have significant NSW discharges. Multiple lines of evidence will be considered when assessing the significance of a discharge. The relative magnitude of the discharges, persistence of the flow, visual and physical characteristics recorded at each site, and land uses associated with the drainage will be primary consideration for determination of significant flows.

A combination of field observations, flow measurements and field water quality measurements will be used to classify outfalls into one of the following three categories that will determine further actions (Figure 10-1):

1. **Suspect Discharge** – Outfalls with persistent high flows during at least two out of three visits and with high severity on one or more physical indicators (odors, oil deposits, etc.). Outfalls in this category require prioritization and further investigation.

2. **Potential Discharge** - Flowing or non-flowing outfalls with presence of two or more physical indicators. Outfalls in this category are considered to be low priority but will be continue to be monitored periodically to determine if the sites are subject to less frequent,

[4] Minor municipal separate storm sewer outfall (or ''minor outfall'') means a municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of less than 36 inches or its equivalent (discharge from a single conveyance other than circular pipe which is associated with a drainage area of less than 50 acres); or for MS4s that receive stormwater from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of less than 12 inches or from its equivalent (discharge from other than a circular pipe associated with a drainage area of 2 acres or less)

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discharges or determine if actions can be taken to reduce or eliminate the factors that lead to the site being considered a potential source of contaminants.

3**. Unlikely Discharge** - Non-flowing outfalls with no physical indicators of an illicit discharge. Outfalls within this classification would be not be subject to any further screening.

Subsequent source investigations conducted for discharges with significant flow may utilize field water quality instrumentation and/or simple field test kits to assist in further classifying discharges. Collection of water samples for limited laboratory testing may be incorporated into the program as requirements for more complex, accurate and scientifically supportable data become necessary to characterize non-stormwater discharges and provide scientifically supportable data to track the source of these discharges. The Center for Watershed Protection and Pitt (2004) provide an evaluation of twelve analytes for assistance in determining the source of NSW discharges (Table 10-2). Three of the analytes can be measured with *in-situ* instrumentation. Others can be analyzed relatively inexpensively by use of field test kits or can be analyzed in an ELAP-certified laboratory. In addition, three to five of the listed tests are often considered sufficient to screen for illicit discharges. Ammonia, MBAS, fluoride (assuming tap water is fluorinated), and potassium are considered to confidently differentiate between sewage, wash water, tap water and industrial wastes. Incorporation of *in-situ* measurement of temperature, pH, TDS/salinity, turbidity and dissolved oxygen can further assist in characterizing and tracking the source(s) of an NSW discharge.

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Table 10-1. Outline of the NSW Outfall Screening and Monitoring Program.

Element	Description	Timing of Completion
1. Outfall Screening	The Permittees will implement a screening process to determine which outfalls exhibit significant NSW discharges and those that do not require further investigation. Data will be recorded on Outfall Reconnaissance Investigation (ORI) forms and in the associated database (Appendix F).	Commencing in the summer of 2014 and completing by 2015.
2. Identification of outfalls with significant NSW discharge (Part IX.C of the MRP)	Data from the Outfall Screening process will be used to categorize MS4 outfalls on the basis of discharge flow rates, field water quality and physical observations.	Concurrent with Outfall Screening December 28, 2014 with Annual CIMP Report
3. Inventory of Outfalls with NSW discharge (Part IX.D of the MRP)	Develop an inventory of all major MS4 outfalls, identify outfalls with known NSW discharges and identify outfalls with no flow requiring no further assessment.	Concurrent with Outfall Screening December 28, 2014 with Annual CIMP Report
4. Prioritized source investigation (Part IX.E of the MRP)	Use the data collected during the Outfall Screening process to further prioritize outfalls for source investigations.	Prioritization for Source Investigation will be occur after completion of Outfall Screening
5. Identify sources of significant NSW discharges (Part IX.F of the MRP)	For outfalls exhibiting significant NSW discharges, Permittees will perform source investigations per the established prioritization.	Complete source investigations for 25% of the outfalls with significant NSW discharges by December 28, 2015 and 100% by December 28, 2017..
6. Monitoring NSW discharges exceeding criteria (Part IX.G of the MRP)	Monitor outfalls determined to convey significant NSW discharges comprised of either unknown or conditionally exempt non-essential discharges, or illicit discharges that cannot be abated.	Monitoring will commence within 90 days of completing the source investigations or after the Executive Officer approves this CIMP, whichever is later

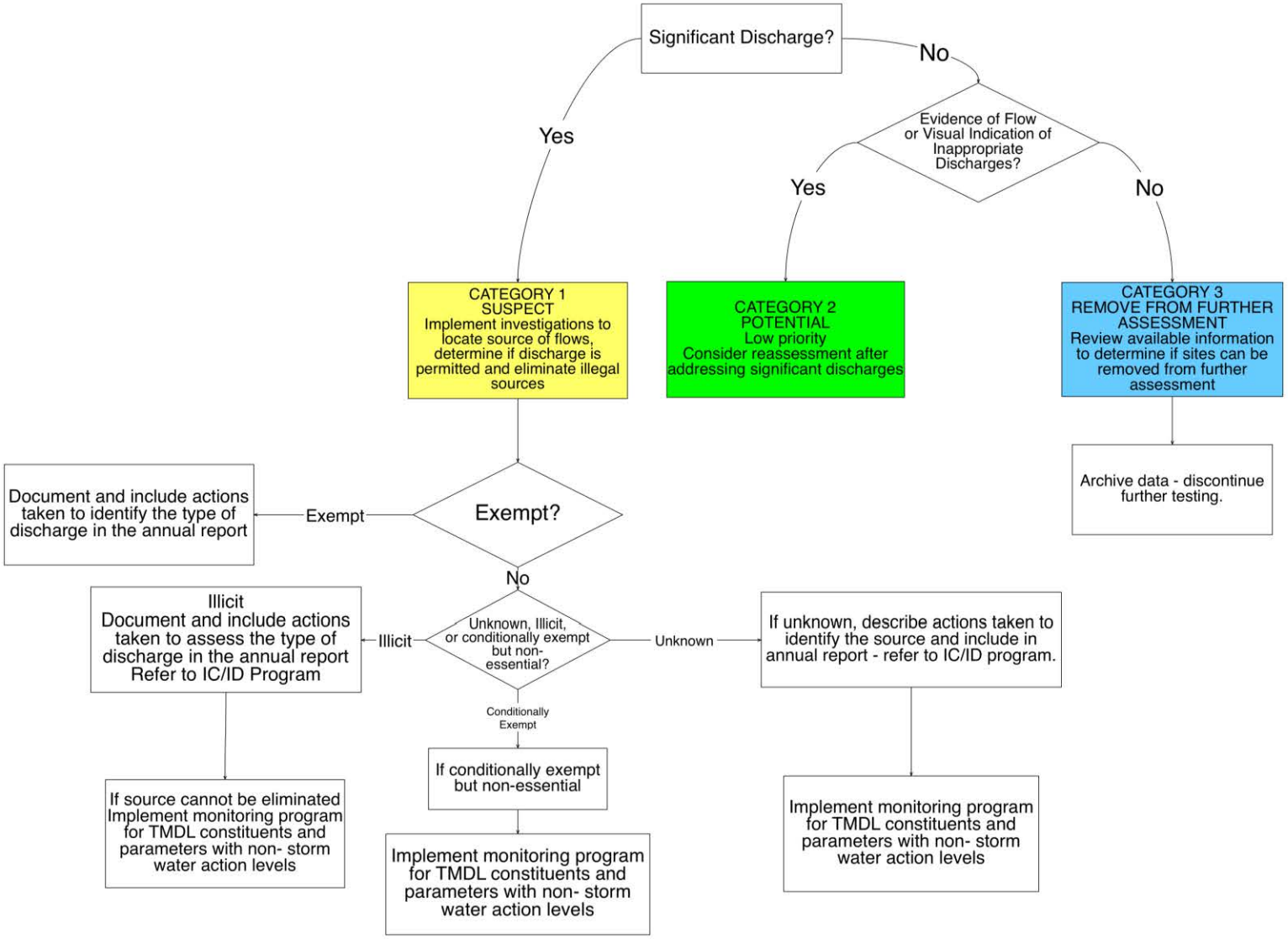


Figure 10-1. Flow Diagram of NSW Outfall Program after Classifying Outfalls during Initial Screening.

Table 10-2. Potential Indicator Parameters for Identification of Sources of NSW Discharges.

Indicator Parameters	
Ammonia	*E. coli*
Boron	Fluoride
Chlorine	Hardness
Color	pH - Field
Conductivity-Field	Potassium
Detergents – Surfactants (MBAS or fluorescence)	Turbidity

Based upon CWP and Pitt 2004. *Illicit Discharge Detection and Elimination A Guidance Manual for Program Development and Technical Assessments*

10.2 Identification of Outfalls with Significant Non-Stormwater Discharges

The screening program is necessary to collect information necessary to identify outfalls with potentially significant NSW discharges. The outfall screening includes collection of information necessary to provide an accurate inventory of the major outfalls, assess flow from each outfall and in the receiving waters, determine the general characteristics of the receiving waters (e.g. is flow present, does the flow from the outfall represent a large proportion of the flow, is it an earthen or lined channel), and record general observations indicative of possible illicit discharges. The initial screening survey(s) will also be used to refine the inventory information required in Section 10.3

The outfall screening process has already been initiated in order to meet the established schedule for completion of 25% of the source identification work. Once the screening process is completed Permittees are required to identify MS4 outfalls with "significant" NSW discharges. The MRP (Section IX.C.1) indicates that significant NSW discharges may be determined based upon one or more of the following characteristics:

a. Discharges from major outfalls subject to dry weather TMDLs.

b. Discharges for which existing monitoring data exceeds Non-Stormwater Action Levels (NALs) identified in Attachment G of the Order.

c. Non-stormwater discharges that have caused or have the potential to cause overtopping of downstream diversions.

d. Discharges exceeding a proposed threshold discharge rate as determined by the Permittee.

The relative magnitude of the discharges, persistence of the flow, visual and physical characteristics recorded at each site, and land uses associated with the drainage will be the primary factors used to determine if flows are significant. Characteristics of the receiving waters (flow, channel characteristics –hard or soft-bottom, etc.) at the discharge location will also be considered when determining the relative significance of NSW discharges. The most important consideration is whether the discharge has the potential to cause or contribute to exceedance of receiving water quality limitations. Factors that provide the best insight with respect to these impacts will receive the greatest weight when establishing the list of "significant" NSW discharges.

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10.3 Inventory of MS4 Outfalls with Non-Stormwater Discharges

Part VII.A of the MRP requires that the CIMP plan(s) include a map(s) and/or database of the MS4 that includes the elements listed in Table 10-3. Most required elements are complete and being submitted with this CIMP. Elements requiring further development include the Effective Impervious Area, information on the length of open channels and underground pipes equal to or greater than 18 inches, and the drainage areas associated with each outfall. Subbasins used for the WMMS model are currently associated with each outfall within that subbasin. If an outfall is identified as a significant source of NSW discharges, drainage areas for each targeted outfall will be refined and updated in the database. Additional information such as documenting presence of significant NSW discharges, links to a database documenting water quality measurements at sites with significant NSW discharges will be updated annually and submitted with the CIMP annual report. Maps of existing stormwater outfalls are attached as Appendix H.

Table 10-3. Basic Database and Mapping Information for the Watershed.

Database Element	Status	
	Complete	Schedule
1. Surface water bodies within the Permittee(s) jurisdiction	**X**	
2. Sub-watershed (HUC 12) boundaries	**X**	
3. Land use overlay	**X**	
4. Effective Impervious Area (EIA) overlay (if available)		Will provide if available
5. Jurisdictional boundaries	**X**	
6. The location and length of all open channel and underground pipes 18 inches in diameter or greater (with the exception of catch basin connector pipes)	**X**[1]	
7. The location of all dry weather diversions	**X**	
8. The location of all major MS4 outfalls within the Permittee's jurisdictional boundary. Each major outfall shall be assigned an alphanumeric identifier, which must be noted on the map	**X**[2]	
9. Notation of outfalls with significant non-stormwater discharges (to be updated annually)	**X**	ongoing
10. Storm drain outfall catchment areas for each major outfall within the Permittee(s) jurisdiction	**X**[3]	ongoing
11. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:[4]		
a. Ownership	**X**	
b. Coordinates	**X**	
c. Physical description	**X**	
d. Photographs of the outfall, where possible to provide baseline information to track operation and maintenance needs over time	**X**	
e. Determination of whether the outfall conveys significant non-stormwater discharges		ongoing
f. Stormwater and non-stormwater monitoring data		ongoing

1. Locations are identified but the length of all open channel and underground pipes are not fully documented.
2. Attributes in the shapefile contain a Unique ID for all outfalls greater than 12" in diameter.
3. Catchments for each outfall are included as the area of the subbasins associated with each outfall. Several outfalls may drain these subbasins. Data will be developed as needed to resolve the drainage areas specific to each outfall.
4. Efforts are ongoing to define ownership and maintenance responsibility. As data become available, information regarding the conveyance of NSW and associated water quality data will be added to the database. Information will be updated based upon the three screening surveys.

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As a component of the inventory and screening process, Permittees are required to document the physical attributes of MS4 outfalls determined to have significant non-stormwater discharges. Table 10-4 summarizes the minimum physical attributes required to be recorded and linked to the outfall database. These data will be maintained using the Outfall Reconnaissance Inventory (ORI) field form and associated database (Appendix F) developed by CWP and Pitt (2004). Data entry can be accomplished by completing the ORI form while conducting the screening survey. Current forms are shown in the Appendix F but may be modified as the parameters and database are modified to provide different information more relevant to the NSW program. Maps of existing stormwater outfalls are attached in Appendix H.

Table 10-4. Minimum Physical Attributes Recorded during the Outfall Screening Process.

Database Element	
a.	Date and time of last visual observation or inspection
b.	Outfall alpha-numeric identifier
c.	Description of outfall structure including size (e.g., diameter and shape)
d.	Description of receiving water at the point of discharge (e.g., natural, soft-bottom with armored sides, trapezoidal, concrete channel)
e.	Latitude/longitude coordinates
f.	Nearest street address
g.	Parking, access, and safety considerations
h.	Photographs of outfall condition
i.	Photographs of significant non-stormwater discharge (or indicators of discharge) unless safety considerations preclude obtaining photographs
j.	Estimation of discharge rate
k.	All diversions either upstream or downstream of the outfall
l.	Observations regarding discharge characteristics such as turbidity, odor, color, presence of debris, floatables, or characteristics that could aid in pollutant source identification
m.	Observations regarding the receiving water such as flow, channel type, hard/soft bottom. (added minimum attribute.

10.4 Prioritized Source Identification

After completion of the initial reconnaissance survey and the two additional screening surveys, sites will be ranked based upon both initial flow observations from the reconnaissance inventory and the classifications assigned during each of the screening surveys. Source investigations will be scheduled to be conducted at sites categorized as Potential Illicit discharges.

The MRP (IX.E.1) states that prioritization of source investigations should be based upon the following items in order of importance.

a. Outfalls discharging directly to receiving waters with WQBELs or receiving water limitations in the TMDL provisions for which final compliance deadlines have passed.

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b. All major outfalls and other outfalls that discharge to a receiving water subject to a TMDL shall be prioritized according to TMDL compliance schedules.

c. Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the Action Levels identified in Attachment G of this Order.

d. All other major outfalls identified to have significant non-stormwater discharges.

Additional information from the screening process will be used to refine priorities. Sites with evidence of higher, more frequent flow, presence of odors or stains will be assigned higher priorities for source investigations.

10.5 Identify Source(s) of Significant Non-Stormwater Discharges

The screening and source identification component of the program is intended to identify the source or sources of contaminants contributing to an NSW discharge. The prioritized list of major outfalls with significant NSW discharges will be used to direct investigations starting with outfalls deemed to present the greatest risk to the receiving water body.

The Order requires the WMG to develop a source identification schedule based on the prioritized list of outfalls exhibiting significant NSW discharges. Source investigations will be conducted for no less than 25% of the outfalls in the inventory by December 2015 and 100% of the outfalls in the inventory by December 2017.

Part IX.A.2 of the MRP requires Permittees to classify the source investigation results into one of four endpoints: illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows, or from unknown sources. If source investigations indicate the source is illicit or unknown, the Permittee will document actions to eliminate the discharge and implement monitoring if the discharge cannot be eliminated.

If the source of a discharge is found to be attributable to natural flows or authorized conditionally exempt NSW discharge, the Permittee must identify the basis for the determination (natural flows) and identify the NPDES permitted discharger. If the source is found to be a conditionally exempt but non-essential discharge, monitoring is required to determine whether the discharge should remain conditionally exempt or be prohibited.

Source investigations will be conducted using a variety of different approaches depending upon the initial screening results, land use within the area drained by the discharge point, and the availability of drainage maps. Any additional water quality sampling may be conducted as necessary.

- Tracking of dry weather flows from the location where they are first observed in an upstream direction along the conveyance system.
- Collection of additional water samples for analysis of NWS indicators for assistance in differentiating major categories of discharges such as tap water, groundwater, wash waters and industrial wastewaters.
- Compiling and reviewing available resources including past monitoring and investigation data, land use/MS4 maps, aerial photography, existing NPDES discharge permits and property ownership information.

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If source tracking efforts indicate that the discharge originates from a jurisdiction upstream of the boundaries of the LCC WMP, the appropriate jurisdiction and the Regional Board will be notified in writing of the discharge within 30 days of the determination. All existing information regarding documentation and characterization of the data, contribution determination efforts, and efforts taken to identify its source will be included.

Investigations will be concluded if authorized, natural, or essential conditionally exempt flows are found to be the source of the discharge. If the discharge is determined to be due to non-essential conditionally exempt, illicit, or unknown discharges, further investigations will be considered to assess whether the discharge can be eliminated. Alternatively, if the discharges are either non-essential conditionally exempt or of an unknown source, additional investigations may be conducted to demonstrate that it is not causing or contributing to receiving water impairments.

10.6 Monitor Non-Stormwater Discharges Exceeding Criteria

As required in the MRP (Part II.3.3), outfalls with significant NSW discharges that remain unaddressed after source identification will be monitored. The objectives of the non-stormwater outfall based monitoring program include the following:

a. Determine whether a Permittee's discharge is in compliance with applicable NSW WQBELs derived from TMDL WLAs,

b. Determine whether a Permittee's discharge exceeds NSW action levels, as described in Attachment G of the Order,

c. Determine whether a Permittee's discharge contributes to or causes an exceedance of receiving water limitations

d. Assist a Permittee in identifying illicit discharges as described in Part VI.D.10 of the Order.

After completion of source investigations, outfalls found to convey NSW discharges that could not be abated and were identified as illicit, conditionally exempt, but non-essential or unknown will be monitored. Monitoring will be initiated within 90 days of completing the source investigations or as soon as the first scheduled dry weather survey. Conducting NSW monitoring at the same time as receiving water dry weather monitoring will be more cost effective and allow evaluation of whether the NSW discharges are causing or contributing to any observed exceedances of water quality objectives in the receiving water.

Monitoring of NSW discharges is expected to undergo substantial changes from year to year as the result of ongoing actions taken to control or eliminate these discharges. As NSW discharges are addressed, monitoring of the discharges will no longer be required. In addition, if monitoring demonstrates that discharges do not exceed any WQBELs, non-stormwater action levels, or water quality standards for pollutants identified on the 303(d) list after the first year, monitoring of the pollutants meeting all receiving water limitations will be no longer be necessary. Due to potential frequent adjustments in the number and location of outfalls requiring monitoring and pollutants requiring monitoring, the annual CIMP report is expected to communicate adjustments in the

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number and locations of monitored discharges, pollutants being monitored and justifications for any adjustments.

10.7 Monitoring Parameters and Frequency

The MRP (Section IX.G.1) specifies the minimum parameters for monitoring of NSW discharges. Determination of monitoring parameters at each site requires consideration of a number of factors applicable to each site. Monitoring parameters will include:

a. Flow,

b. Pollutants assigned a WQBEL or receiving water limitation to implement TMDL Provisions for the respective receiving water, as identified in Attachments L - R of the Order,

c. Other pollutants identified on the CWA section 303(d) List for the receiving water or downstream receiving waters,

d. Pollutants identified in a TIE conducted in response to observed aquatic toxicity during dry weather at the nearest downstream receiving water monitoring station (LCC1) during the last sample event or, where the TIE conducted on the receiving water sample was inconclusive, aquatic toxicity. If the discharge exhibits aquatic toxicity, then a TIE shall be conducted.

e. Other parameters in Table E-2 identified as exceeding the lowest applicable water quality objective at LCC1 (the nearest downstream receiving water station) per Part VI.D.1.d.

The MRP (Part IX.G.2-4) specifies the following monitoring frequency for NSW outfall monitoring:

- For outfalls subject to a dry weather TMDL, the monitoring frequency shall be per the approved TMDL monitoring plan or as otherwise specified in the TMDL or as specified in an approved CIMP.
- For outfalls not subject to dry weather TMDLs, approximately quarterly for first year.
- Monitoring can be eliminated or reduced to twice per year, beginning in the second year of monitoring if pollutant concentrations measured during the first year do not exceed WQBELs, NALs or water quality standards for pollutants identified on the 303(d) List.

While a monitoring frequency of four times per year is specified in the Permit, it is inconsistent with the dry weather receiving water monitoring requirements. The receiving water monitoring requires two dry weather monitoring events per year. Additionally, during the term of the current Permit, outfalls are required to be screened at least once and those with significant NSW discharges will be subject to a source investigation. As a result, the LCC WMG recommends that NSW outfall monitoring events be conducted twice per year. The NSW outfall monitoring events will be coordinated with the dry weather receiving water monitoring events to provide better opportunities to determine if the NSW discharges are causing or contributing to any observed exceedances of water quality objectives in the receiving water.

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Any monitoring required will be performed using grab samples (refer to Appendix A for field sampling procedures) rather than automated samplers. Bacteria, which are expected to be the limiting factor at many sites during dry weather, require collection by grab methods and delivery to the laboratory within 6 hours. Based upon the much reduced variability experienced in measurements of dry weather flows associated with ongoing monitoring programs, measured concentrations of other analytes are not expected to vary significantly over a 24-hour period.

11 New Development/Re-Development Effectiveness Tracking

Each permittee will maintain an electronic database to track qualifying new development and redevelopment projects which are subject to the Planning and Land Development Program of the Permit (Section VI.D.7.d.iv). The electronic database contains the information listed in Table 11-1, which includes details about the project and the design of onsite and offsite best management practices (BMPs). Table 11-1 also provides a description of the required information.

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Table 11-1. Information Required in the New Development/Redevelopment Tracking Database.

	Required Information	Description
General Site Information	Project Name and Developer Name	Brief name of project and developer information (e.g. name, address, and phone number).
	Project Location and Map	Coordinates and map of the project location. The map should be linked to the GIS storm-drain map required in part VII.A of the Permit.
	Documentation of issuance of requirements to the developer	Date that the project developer was issued the Permit requirements for the project (e.g. conditions of approval).
	Date of Certificate of Occupancy	Date that the Certificate of Occupancy was issued.
On-site BMP Sizing Information	85th percentile storm event (inches per 24 hours)	85th percentile storm depth for the project location calculated using the *Analysis of 85th Percentile 24-hour Rainfall Depths Within the County of Los Angeles.*
	95th percentile storm event (inches per 24 hours)	95th percentile storm depth for the project location calculated using the *Analysis of 85th Percentile 24-hour Rainfall Depths Within the County of Los Angeles*. Only applies if the project drains directly to a natural drainage system[5] and is subject to hydromodification control measures.
	Project design storm (inches per 24 hours)	The design storm for each BMP as calculated using the *Analysis of 85th Percentile 24-hour Rainfall Depths Within the County of Los Angeles*.
	Projects design volume (gallons or MGD)	The design storm volume (design storm multiplied by tributary area and runoff coefficient) for each BMP.
	Percent of design storm volume to be retained on site	The percentage of the design volume which on-site BMPs will retain.
	Other design criteria required to meet hydromodification requirements for projects that directly drain to natural water bodies	Information relevant to determine if the project meets hydromodification requirements as described in the Permit e.g., peak flow and velocity in natural water body, peak flow from project area in mitigated and unmitigated condition, etc.). Only applies if the project drains directly to a natural drainage system.
	One -year, one-hour storm intensity as depicted on the most recently issued isohyetal map published by the Los Angeles County Hydrologist for flow-through BMPs	If flow-through BMPs (e.g., sand filters, media filters) for water quality are used at the project, provide the one-year, one-hour storm intensity at the project site from the most recent isohyetal map issued by LA County.
Off-site BMP Information	Location and maps of off-site mitigation, groundwater replenishment, or retrofit sites	If any off-site mitigation is used, provide locations and maps linked to the GIS storm-drain map required in part VII.A of the Permit.
	Design volume for water quality mitigation treatment BMPs	The calculated design volume, If water quality mitigation is required.
	Percent of design storm volume to be infiltrated at an off-site mitigation or groundwater replenishment project site	The percentage of the design volume which off-site mitigation or groundwater replenishment will retain.
	Percent of design storm volume to be retained or treated with biofiltration at an off-site retrofit project	The percentage of the design volume which off-site biofiltration will retain or treat.

[5] A natural drainage system is defined as a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

12 Reporting

Reporting will normally consist of Annual CIMP Reports and semi-annual data reports. Discharge Assessment Plans will be only submitted if TIEs are found to produce inconsistent results during two consecutive tests. These include the following reports:

Annual CIMP Reports

Annual CIMP monitoring reports are required to be submitted to the Regional Water Board Executive Officer by December 15th of each year in the form of three compact disks (CD) The annual reporting process is intended to meet the following objectives.

Summary information allowing the Regional Board to assess:

a. Each Permittee's participation in one or more Watershed Management Programs.
b. The impact of each Permittee(s) stormwater and non-stormwater discharges on the receiving water.
c. Each Permittee's compliance with receiving water limitations, numeric water quality-based effluent limitations, and non-stormwater action levels.
d. The effectiveness of each Permittee(s) control measures in reducing discharges of pollutants from the MS4 to receiving waters.
e. Whether the quality of MS4 discharges and the health of receiving waters is improving, staying the same, or declining as a result watershed management program efforts, and/or TMDL implementation measures, or other Minimum Control Measures.
f. Whether changes in water quality can be attributed to pollutant controls imposed on new development, re-development, or retrofit projects.

Data Submittals – CEDEN Files

Analytical data reports are required to be submitted on a semi-annual basis in formats consistent with CEDEN. These reports are required to be subject to verification and validation prior to submittal. They are to cover monitoring periods of July 1 through December 30 for the mid-year report and July 1- June 30 for the end of year report. These data reports should include verification of having be submitted and accepted through the SCWRPP Regional Data Center. These data reports should summarize:

- Exceedances of applicable WQBELs, receiving water limitations, or any available interim action levels or other aquatic toxicity thresholds.
- Basic information regarding sampling dates, locations, or other pertinent documentation.

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Discharge Assessment Plan

A Discharge Assessment Plan is applicable only if TIEs are conducted during two consecutive events and the results are inclusive for each. A Discharge Assessment Plan will be submitted to Los Angeles Regional Water Board for comment within 60 days of receipt of notification of the second consecutive inconclusive TIE result. If no comments are received within 30-days, it will be assumed that the approach is appropriate for the given situation and the Plan should be implemented within 90-days of submittal.

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APPENDIX A

SITE SELECTION
STORMWATER OUTFALL MONITORING SITES
AND ALTERNATIVES

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1 Stormwater Outfall Monitoring Sites

Four outfall monitoring sites (**Error! Reference source not found.**) have been assessed and selected for monitoring within the LLAR Watershed Management Group in order to meet the requirements of the Order for stormwater outfall monitoring.

1.1 Cerritos Pump Station (LLAR1)

The Cerritos Pump Plant (Figure 1) discharges into the Los Angeles River Estuary south of Anaheim Street at 980 N. DeForest Avenue in Long Beach. This site has a large concrete forebay that receives all the water from a single 72-inch gravity storm drain. The pump station contains four pumps which discharge into the river through four culverts equipped with tide gates.



Figure 1. Concrete Forebay of Cerritos Pump Station

Instrumentation would be done by installing a monitoring station within the confines of the pump plant boundaries, with the flow measuring sensors and sample intake inserted approximately 25 feet up inside the main storm drain as it enters the forebay. Flow monitoring would be conducted using a Doppler flow sensor to measure water velocity and a water level sensor to monitor water levels within the pipe. A FEP (Fluorinated Ethylene Propylene) intake hose fitted with a stainless steel/Teflon strain would be fastened along the side of the inlet pipe so as not to interfere with flow into the station forebay. A small instrument enclosure would be placed within the confines of the station fence at street level above the storm drain discharge. This would contain the autosampler, datalogger and communications equipment. The monitoring station would powered by deep cycle batteries with a solar panel to maintain the battery power. A rain gauge will also be installed at the site in order to measure local rainfall. The monitoring equipment will be connected by use of an IP modem to allow monitoring and control of the site by the internet. This monitoring approach would not require access to the interior of the pump plant building.

Alternatively, instrumentation could be installed inside the pump station with access to AC power and hardwire telephone lines. This would require a pressure sensor to monitor water levels within the sump and head differentials for the pumps. Each pump would need to be fitted with optical tachometers to monitor pump revolutions per minute (RPM) and enable estimation of flow rates based upon pump discharge curves. Although this would provide better security, typical storm water discharges would be more accurately estimated from the recommended installation at the head of the forebay

1.2 Dominguez Gap Pump Station (LLAR2)

The Dominguez Gap Pump Station (Figure 2 and Figure 3) is located on the east bank of the Los Angeles River just south of Del Amo Blvd. The City of Long Beach first established a monitoring site at the Dominguez Gap Pump Station during the 2000/2001 wet season. This site was originally collected runoff from 3,374 acres of land that comprised the City's Drainage Basin 14. As part of the Dominguez Gap/DeForest Wetland Project, this drainage basin was modified so that runoff from north of Market Street would be directed the Market Street Pump Station and DeForest Wetlands. Runoff from the portion of Basin 14 located south of Market Street continued to drain to the Dominguez Gap Pump Station and Wetlands. The two areas were further separated by elimination of a previous connection between the two infiltration basins at Del Amo. The former detention/infiltration basin at this site underwent major modifications to establish a wetland system that now serves as a treatment system for waters diverted from the Los Angeles River and stormwater the remaining 2,082 acre urban watershed comprised of 70% residential, 12% commercial, 17% open space and 1% mixed urban land use. Much of the open space is a golf course that borders the infiltration basin.



Figure 2. Dominguez Gap Pump Station



Figure 3. Dominguez Pump Station discharge to the Los Angeles River.

The Dominguez Gap Pump Station and adjacent infiltration/detention basin started undergoing major renovations during the summer of 2006 and work extended through most of the 2007/2008 wet season. During that time period, land disturbances associated with development of the wetland system resulted in elevated levels of sediment. By late 2009 the wetland vegetation had become well established and the water quality changes observed during the construction phase were no longer evident.

Because of this infiltration basin, the actual pumped discharge to the Los Angeles River is measured and sampled from the sump within the pump station. The discharge volume is determined by use

of optical tachometers that monitor pump shaft rotation. The tachometers monitor reflective tape placed on the pump shaft to measure RPM. Discharge rates are estimated by monitoring head differentials between the sump and the discharge point and the pump curves associated with each pump. This estimate of discharge rates are used to pace the autosampler to enable collection of a flow-rated composite sample of stormwater discharges. This site has AC power but still requires use of cellular phone connections for communications. A rain gauge installed on the roof of the pump station provides a continuous record of rainfall at this site.

1.2.1 BI 0551 Line E –Lynwood at Intersection of I105 and I710 (LLAR3)

This site is located on the north side of Highway I105 at the end of Louise St.(Figure 4). The storm drain accesses a rectangular box culvert measuring 6 feet in height and 12 feet in width. This storm drain crosses under the I710 where it opens up into a 250 feet channel before entering a 54-inch RCP that runs under the I105 and discharges by gravity to the Los Angeles River. High flows are able to overflow the open channel into spreading grounds that also receive localized runoff from Caltrans drainages. This spreading ground exists on both the north and south side of the I105 freeway. A small pump station on the south side of the I105 allows overflows to be discharged to the Los Angeles River.

The monitoring site appears to be located on property owned by Caltrans and will require access through a gate located off of Wright Street. Easements will be required to install and monitor stormwater discharges at this location. Flow monitoring will be conducted using a Doppler flow sensor to measure water velocity and a water level sensor to monitor water levels within the box culvert. A small security enclosure will be placed next to the manhole to house the monitoring equipment. Equipment will include an autosampler, flow meter, datalogger and communications equipment. The monitoring station will be powered by deep cycle batteries with a solar panel to maintain the battery power. A rain gauge will also be installed at the site in order to measure local rainfall. The monitoring equipment will be connected by use of an IP modem to allow monitoring and control of the site by the internet.

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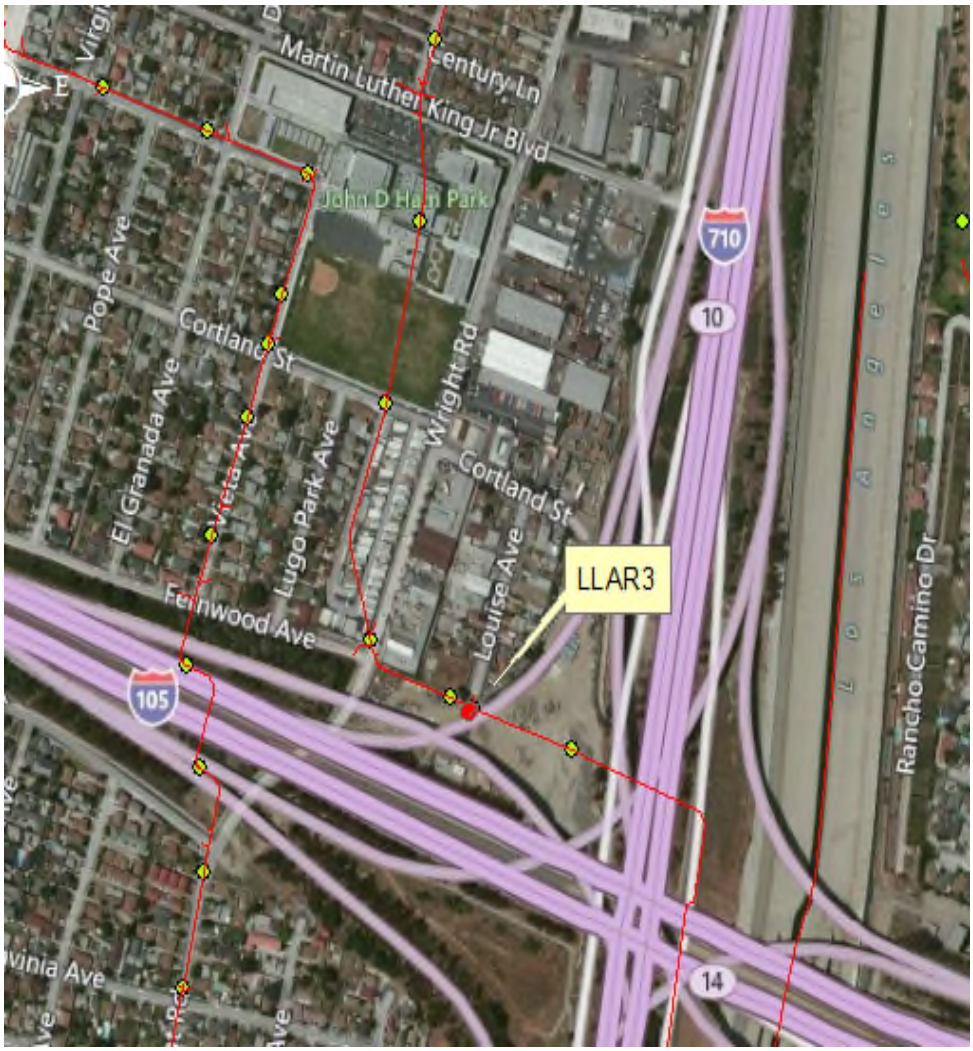


Figure 4. Location of outfall monitoring site LLAR3 at the end of Louise St. near the I710 and I105 Freeways.

1.2.2 BI 0018 Firestone - Firestone Boulevard Gravity Discharge to Rio Honda River (LLAR4)

A large gravity outfall into the Rio Honda River is located at Firestone Boulevard just downstream of the bridge that crosses the Rio Honda. Access is off of Firestone Boulevard westbound immediately after crossing the bridge via a small turnout and gate.

The outfall is a larger box culvert separated into two channels at the mouth as it passes under the levee but becomes one larger box culvert immediately upstream. This culvert discharges above the elevation of the Rio Honda Channel as it has a 5 foot ramp up to the invert of the box culvert (Figure 5).

Access for installation of instrumentation is through a small auxiliary drain located immediately above the box culvert but on the landward side of the levee road. This small local drain provides direct access to the box culvert below. Instrumentation would be housed in a small security enclosure placed at the side of the levee road. The installation would be similar to the other outfall monitoring sites. An area velocity (Doppler) flow meter would be used to monitor and record flow. The monitoring site would have a rain gauge to provide local rainfall information, a solar panel to maintain deep cycle marine batteries to power the equipment and cellular communications to allow for remote operation and monitoring of conditions at the site. The flow data will be used to pace sampling by an autosampler to enable collection of a flow-rated composite sample of stormwater discharges.







Small Drain is visible up on levee side that drops into the large stormwater channel.

Figure 5. Gravity Outfall to Rio Honda River at Firestone Boulevard

1.3 Alternative Outfall Monitoring Sites

Four alternative monitoring sites were reviewed as potential outfall monitoring locations in the case that unknown problems are encountered at one or more of the preferred locations. Of the four alternative sites, two are considered to best meet the objectives of the monitoring program if one or more of the primary sites become unsuitable. These include the Market Street and Paramount Pump Stations. The Market Street Pump Station would likely provide the most useful information due to the large drainage area, land use characteristics and the potential to provide both infiltration and settling prior to discharging stormwater to the Los Angeles River. The stormwater treatment potential for this site is addressed by other stormwater outfalls. The Paramount Pump Station is also a preferred alternative. Although this pump station collects water from a relatively small catchment, industrial land uses represent a significant portion of this area. The relative abundance of industrial land use in this catchment is higher than encountered at most other potential outfall monitoring sites.

1.1.1 Market Street Pump Station

The Market Street Pump Station is located on the east bank of the Los Angeles River at 229 Market Street in Long Beach. A large infiltration basin (DeForest Basin) extends along the inside of the levee from near Artesia Blvd to Del Amo Blvd. where it was once connected to the Dominguez Gap infiltration basin. This connection was eliminated when the wetland system was constructed in the Dominguez Gap infiltration/settling basin. Improvements to the DeForest Basin were initially planned as a second stage to work completed in the Dominguez Gap basin.

The DeForest Basin receives stormwater and dry weather discharges from several major storm drains. A 15 foot wide by 10.5 foot tall box culvert discharges from Market Street directly across from the pump station. Four additional gravity stormwater outfalls discharge to the northern end of the infiltration basin in the region of 59th Street. Low flows follow a channel towards the Market Street Pump Station. (

Installation of monitoring equipment at this site could only be installed within the Market Street Pump Station using the same approach as used at the Dominguez Gap Pump Station. Water sampling would be from the sump inside the plant, and discharge volumes to the river would be measured by optical tachometers fitted on each pump shaft to monitor the RPMs. Estimates of discharge rates would be calculated by the published pump discharge rating curve and the measured head differential between water levels in the sump and at the discharge point to the Los Angeles River. Stormwater discharge rates estimated in this manner would be used to pace autosamplers to obtain flow-rated composite sample.

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Figure 6. Market Street Pump Station and Forebay.

1.1.2 LA County Flood Control District, Paramount Pump Station

The Paramount Pump Station is located at the end of East 72nd Street just south of E. Alondra Boulevard and discharges into the Los Angeles River. This pump station has no forebay.

A manhole located near the back corner of the pump station concrete apron provides access to the stormdrain that is the inlet to the pump station. Depth in this manhole to the top of the stormdrain inlet pipe is 8 feet and it is 16 feet down to the bottom of this inlet.

Flow instrumentation and sampling could be accomplished at this inlet manhole site. A Doppler velocity sensor, a water depth sensor, and a sampling tube would be fastened to the invert of this channel in a manner that could not impede flow. A small instrument enclosure could be placed near the wall of the plant site or near the wall of the building near the manhole as vehicles cannot drive through this area.

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Figure 7. **Paramount Pump Station showing access point to storm drain.**

APPENDIX B

AUTOMATED STORMWATER MONITORING EQUIPMENT

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1 Automated Stormwater Monitoring Equipment

Monitoring of stormwater runoff at the stormwater outfall monitoring sites will require use of automated stormwater sampling equipment. This section addresses the equipment and sampling procedures that will be used for collection of composite sample of stormwater runoff.

Flow-weighted composite samples will be collected at most sites however, time-weighted sampling may be conducted at some locations where equipment is deployed on a short-term basis and sampling is conducted to screen for contaminants. Similar equipment will be necessary regardless of the selected sampling approach. Time-weighted composite samples simply allow for more mobile installations that do not require flow meters, rain gauges, solar panels, or communication equipment. In lieu of communications equipment, such sites require added field personnel to monitor and track performance of the equipment along with added sensors to trigger the equipment to initiate the sampling.

For purposes of this CIMP, it is assumed that all sites requiring collection of flow-weighted composite samples will be established as "permanent" or "long-term" sites with appropriate security to protect the equipment and intake structures from debris coming down the stream or vandalism. As noted, collection of time-weighted samples will be utilize the same types of autosamplers and composite containers but will not include flow meters, rain gauges and telecommunication packages. Monitoring stations designed to take time-weighted composite samples will require sensors to detect initial flows and trigger the sampler. This will allow for use of smaller security enclosures that can temporally be secured at a site or, if necessary, equipment can be deployed in a manhole.

Fixed monitoring sites will utilize automated stormwater sampling stations that incorporate an autosampler (American Sigma or Isco), a datalogger/flow module to monitor flow and pace the autosampler, a rain gauge to monitor and record local rainfall, and telecommunications to allow for remote monitoring and control of each site. Sites without access to AC power will be powered by deep-cycle marine batteries. Sites without direct access to AC power will utilize solar panels to provide the energy needed to maintain the charge on two deep cycle batteries used to power the autosampler, flow meter and datalogger. Providing reliable telecommunications for real-time access to data and to provide command and control functionality has greatly improved efficiency and contributed to improved stormwater data.

Both types of automated stormwater monitoring systems considered for this monitoring program use peristaltic pumping systems. When appropriate measures are taken, it has been demonstrated that these types of systems are capable of collecting blanks that are uncontaminated and high quality, reproducible data using detection limits appropriate to water quality criteria. In order to accomplish this, extreme care must be taken to avoid introduction of contaminants.

Requirements include:

- Assuring that all materials coming into contact with the samples are intrinsically low in trace metals and do not adsorb/absorb metals or other target.
- Materials coming into contact with the sample water are subjected to intensive cleaning using standardized protocol and subjected to systematic blanking to demonstrate and document that blanking standards are met.
- All cleaned sampling equipment and bottles are appropriately tracked so that blanking data can be associated with all component deployed in the field.
- Samples are collected, processed and transported taking care to avoid contamination from field personnel or their gear, and
- Laboratory analysis is conducted in a filtered air environment using ultrapure reagents.

Table 2-1 of the USGS National Field Manual (http://pubs.water.usgs.gov/twri9A/) provides a summary of acceptable materials for use sampling organic and inorganic constituents. The stormwater monitoring stations will primarily utilize 20-L borosilicate glass media bottles for the composite samples, FEP tubing for the sample hose and either 316 SS or Teflon-coated intake strainers. Ten (10) liter borosilicate glass media bottles will be considered for sites where required sample volumes are low and lower sample volumes are acceptable. The peristaltic hose is a silicone-base material that is necessary for operation of the autosamplers. The peristaltic hose can be as source of silica which is not a target compound.

Although the technical limitations of autosamplers are often cited, they still provide the most practical method for collecting representative samples of stormwater runoff for characterization of water quality and have been heavily utilized for this purpose for the past 20 years. The alternative, manual sampling, is generally not practical for collection of flow-weighted composite samples from a large number of sites or for sampling events that occur over an extended period of time. Despite the known drawbacks, autosamplers combined with accurate flow metering remain the most common and appropriate tool for monitoring stormwater runoff.

1.1 Sampler Intake Strainer, Intake Tubing and Flexible Pump Tubing

Intake strainers will be used to prevent small rocks and debris from being drawn into the intake tubing and causing blockages or damage to the pump and peristaltic pump tubing. Strainers will be constructed of a combination of Teflon and 316 stainless or simply stainless steel. The low profile version is typically preferred to provide greater ability to sample shallow flows. Although high grade stainless steel intake strainers are not likely to impact trace metal measurements, it is preferable to use strainers coated with a fluoropolymer coating. If the stainless steel intake is not coated, the strainer will not be subjected to cleaning with acids. Cleaning will be limited to warm tap water, laboratory detergents and MilliQ water rinses.

Tubing comprised of 100% FEP (Fluorinated Ethylene Propylene) will be used for the intake tubing. Several alternative fluoropolymer products are available but 3/8" ID solid FEP tubing has the chemical characteristics suitable for sampling metals and organics at low levels and appropriate physical characteristics. The rigidity of FEP tubing provides resistance to collapse at high head differentials but still is manageable for tight configurations.

The peristaltic hose used in autosamplers is a medical-grade silicon product. The specifications for the peristaltic pump hoses used in these samplers are unique to the samplers. It is very important that hose specified and provided by the manufacturers of the autosamplers be used. Minor differences in the peristaltic hose can cause major deterioration in performance of the samplers. Use of generic peristaltic pump hose from other sources can lead to problems with the ability to calibrate the samplers and maintain intake velocities of greater than 2.5 feet per second with higher lift requirements.

The peristaltic hose is connected to the FEP tubing and fed through the pump head leaving the minimum amount necessary to feed the peristaltic pump hose into the top of the composite bottle. The composite container will always have a lid to prevent dust from settling in the container.

1.2 Composite Containers

The composite containers used for monitoring must be demonstrated to be free of contaminants of interest at the desired levels (USEPA 1996). Containers constructed of fluoropolymers (FEP, PTFE), conventional or linear polyethylene, polycarbonate, polysulfone, polypropylene, or ultrapure quartz are considered optimal for metals but borosilicate glass has been shown to be suitable for both trace metals and organics at limits appropriate to EPA water quality criteria. High capacity borosilicate media bottles (20-liters or ~5-gallons) are preferred for storm monitoring since they can be cleaned and suitably blanked for analysis of both metals and organic compounds. The transparency of the bottles is also a useful feature when subsampling and cleaning the containers for reuse.



Figure 1. Composite Bottle with Label and installed Tubing inside Brute® Container.

These large media bottles are designed for stoppers and thus do not come with lids. Suitable closure mechanisms must be fabricated for use during sampling, transport and storage of clean bottles. The preferred closure mechanism is a Teflon® stopper fitted with a Viton® O-ring (2 3/8" - I.D. x 23/4"- O.D.) that seals the lid against the media bottle. A polypropylene clamp (Figure 2) is used to seal the Teflon® stopper and O-ring to the rim of the composite sample bottle. Two polypropylene bolts with wing-nuts are used to maintain pressure on the seal or to assist in removal of the lid.

Every composite bottle requires one solid lid for use in protecting the bottle during storage and transport. A minimum of one Teflon® stopper should be available for each monitoring site during storm events. Each field sampling crew should have additional stoppers with holes ("sampling stopper") that would be available if a sampling stopper is accidentally contaminated during bottle changes or original installations.



Figure 2. Composite bottle showing bottle bag used for transport and lifting.

The holes in the sampling stoppers should be minimally larger than the external diameter of the peristaltic hose. If a tight fit exists, the pressure created when water is pumped into the bottle will cause the hose to be ejected and the sampling event will to be abandoned.

Transporting composite bottles is best accomplished by use of 10-gallon Brute® containers to both protect them from breakage and simplify handling. They also provide additional capacity for ice while transporting full bottles to the laboratory or subsampling site.

Bottle bags (Figure 2) are also useful in allowing full bottles to be handled easier and reduce the need to contact the bottles near the neck. They are important for both minimizing the need to handle the neck of the bottle and are also an important Health and Safety issue. The empty bottles weigh 15 pounds and they hold another 40 pounds of water when full. These can be very slippery and difficult to handle when removing them from the autosamplers. Bags can be easily fabricated out of square-mesh nylon netting with nylon straps for handles. Use of bottle bags allows two people to lift a full bottle out of the ice in the autosampler and place it in a Brute® container. Whether empty or full, suitable restraints should be provided whenever the 20-L composite bottles and Brute® containers are being transported.

1.3 Flow Monitoring

Retrieval of flow-weighted stormwater samplers requires the ability to accurately measure flow over the full range of conditions that occur at the monitoring site. The ability to accurately measure flow at an outfall site should be carefully considered during the initial site selection process. Hydraulic characteristics necessary to allow for accurate flow measurement include a relatively straight and uniform length of pipe or channel without major confluences or other features that would disrupt establishment of uniform flow conditions. The actual measurement site should be located sufficiently downstream from inflows to the drainage system to achieve well-mixed conditions across the channel. Ideally, the flow sensor and sample collection inlet should be placed a minimum of five pipe diameters upstream and ten pipe diameters downstream of any confluence to minimize turbulence and ensure well-mixed flow. The latest edition of the *Isco Open Channel Flow Measurement Handbook* (Walkowiak 2008) is an invaluable resource to assist in selection of the most appropriate approach for flow measurements and information on the constraints of each method.

The existing mass emission site has an established flow rating curve (Stage-Flow relationships) that only requires measurement of water level to estimate flow. Additional sites requiring flow monitoring are expected to utilize area-velocity sensors that use Doppler-based sensors to measure

the velocity of water in the conveyance, a pressure sensor to measure water depth, and information regarding channel dimensions to allow for real-time flow measurements to pace the autosamplers.

1.4 Rainfall Gauges

Electronic tipping bucket rain gauges will be installed at each fixed monitoring location to provide improved assessment of rainfall in the smaller drainages. Use of a localized rain gauge provides better representation of conditions at the site. A variety of quality instruments are available but all require substantial maintenance to ensure maintenance of high data quality.

Tipping bucket rain gauges with standard 8-inch diameter cones will be used at each site. These provide 1 tip per 0.01" of rain and have an accuracy of ± 2% up to 2"/hr. The accuracy of tipping bucket rain gauges can be impacted by very intense rainfall events but errors are more commonly due to poor installation.

Continuous data records will be maintained throughout the wet season with data being output and recorded for each tip of the bucket. The rainfall data is downloaded at the same rate as the flow and stormwater monitoring events.

1.5 Power

Stormwater monitoring equipment can generally be powered by battery or standard 120VAC. If 120VAC power is unavailable, external, sealed deep-cycle marine batteries will be used to power the monitoring site. Even systems with access to 120VAC will be equipped with batteries that can provide backup power in case of power outages during an event. All batteries will be placed in plastic marine battery cases to isolate the terminals and wiring. A second battery will be provided at each site to support the telecommunication packages. Sites relying on battery power will also be equipped with a solar panel to assure that a full charge is available when needed for a storm event.

1.6 Telecommunication for System Command/Control and Data Access

The ability to remotely communicate with the monitoring equipment has been shown to provide efficient and representative sampling of stormwater runoff. Remote communication facilitates preparation of stations for storm events and making last minute adjustments to sampling criteria based upon the most recent forecasts. Communication with the sites also reduces the number of field visits by monitoring personnel. Remote two-way communication with monitoring sites allows the project manager (storm control) to make informed decisions during the storm as to the best allocations of human resources among sampling sites. By remotely monitoring the status of each monitoring site, the manager can more accurately estimate when composite bottles will fill and direct field crews to the site to avoid disruptions in the sampling. Real time access to flow, sampling and rainfall data also provides important information for determining when sampling should be terminated and crews directed to collect and process the samples. Increases in both efficiency and sample quality make two-way communication with monitoring stations a necessity for most monitoring programs.

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APPENDIX C

GENERAL FIELD SAMPLING PROCEDURES FOR COMPOSITE AND GRAB SAMPLES

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APPENDIX D

CLEANING AND BLANKING PROTOCOL

FOR

EQUIPMENT AND SUPPLIES USED IN COLLECTION OF FLOW OR TIME-WEIGHTED COMPOSITES

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CLEANING PROTOCOL FOR:

20-L Borosilicate Glass Composite Bottles (Media Bottles) and Closures

1.0 SCOPE

This Standard Operating Procedure (SOP) describes the procedures for the cleaning of 20-liter composite sample bottles and the related equipment necessary to complete the task. The purpose of these procedures is to ensure that the sample bottles are contaminant-free and to ensure the safety of the personnel performing this procedure.

2.0 APPLICATION

This SOP applies to all laboratory activities that comprise the cleaning of 20-liter composite sample bottles and stoppers.

3.0 HEALTH AND SAFETY CONSIDERATIONS

The cleaning of 20-liter composite-sample bottles and associated equipment involves hazardous materials. Skin contact with all materials and solutions should be minimized by wearing appropriate personal protective equipment (PPE) including: chemical-resistant gloves, laboratory coats, chemical-resistant aprons, and goggles. To ensure that you are aware of the hazards involved, the material safety data sheets (MSDSs) for nitric acid and laboratory detergents should be reviewed before beginning any of these procedures.

Note: Preparations should be made to contain and neutralize any spillage of acid. Be aware of the location of absorbent, neutralizing, and containment materials in the bottle cleaning area.

4.0 DEFINITIONS

4.1 **Composite sample bottle** - 20 liter borosilicate glass bottle that is used with autosamplers to collect a stormwater composite sample.

4.2 **Stopper** - a Teflon® cap used to seal the composite sample bottle (either solid, or drilled with holes for the silicon inlet tubing).

4.3 **O-Ring** - Viton O-ring 23/8"- I.D. x 23/4"- O.D. that is located around the base of stopper.

4.4 **Clamp** - Polypropylene clamp, 2 bolts, and wing nuts specifically designed to fasten the stopper and the O-ring to the rim of the composite sample bottle.

4.5 **De-ionized (DI) water** - commercial de-ionized water (12-13 Megohm/cm)

4.6 **Laboratory Detergent** - 2% solution of Contrad 70® or Micro-90® detergent

5.0 EQUIPMENT

5.1 Instrumentation:

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1) Peristaltic pump with a protocol-cleaned sub-sampling hose setup

5.2 Reagents:

1) ACS Reagent Grade nitric acid in a 2 Normal solution (2N HNO_3)

2) Contrad 70® non-phosphate laboratory detergent

3) Contrad 70® anti-foaming agent

4) Micro-90® non-phosphate laboratory detergent

5) Baking soda or equivalent to neutralize acid

6) pH paper

5.3 Apparatus:

1) Bottle Rolling Rack

2) DI Rinse Rack

3) Yellow Neutralization Drip Bucket

4) Neutralization Tank

5.4 Documentation:

The status of each composite sample bottle must be tracked. Bottles should be washed in batches of 10, 20, or 30 and the status of each batch must be made apparent to all personnel by posting a large status label (including the start date) with each batch. This will ensure that all required soak times have been attained and that each bottle was subjected to the proper cleaning procedures. Information on each batch of bottles cleaned (including bottle number, QA batch, date cleaning started, date finished, date blanked, and cleaning technicians) should be entered in the **Bottle Cleaning Log Sheet**.

6.0 CLEANING PROCEDURES

Care must be taken to ensure that no contaminants are introduced at any point during this procedure. If the wash is not performed with this in mind, the possibility for the introduction of contaminants (i.e., from dust, dirty sub-sampling tubing tips, dirty fingers/gloves, automobile emissions, etc.) is increased significantly.

6.1 Teflon® Bottle Stoppers with Holes and Field Extras:

To be performed whenever required for field use.

1) Wash with laboratory detergent using a clean all-plastic brush.

2) Rinse thoroughly (minimum of three times) with tap water.

3) Rinse thoroughly (minimum of three times) with DI water.

4) Wash three times with 2N nitric acid squirt bottle.

5) Rinse thoroughly (minimum of three times) with DI water.

6) Allow to dry in a dust-free environment.

7) Store in two sealed clean Ziploc® bags.

6.2 NPS 20 liter composite sample bottle Cleaning:

6.2.1 Preliminary Bottle Cleaning:

Bottles should undergo a preliminary rinse with tap water as soon as possible after they are available. This includes dumping any remaining stormwater into a sanitary drain and rinsing the bottles and stoppers. This prevents material from adhering to the interior surface of the bottle.

6.2.2 **48 Hour Soak:** Place the bottle to be cleaned into a secondary containment bucket. Prepare a 2% solution of laboratory detergent with tap water directly in the bottle. Note: Since laboratory detergent is a foaming solution, add 3/4 of the tap water first, add the detergent, then add the rest of the water. Should excessive foam be generated, a few drops of Contrad 70® anti-foaming agent may be added. **Make sure that the bottle is filled to the rim and scrub the rim with an all-plastic scrub brush.** Scrub a Teflon® stopper with 2% solution of laboratory detergent and place stopper over the full bottle so overflowing happens. This will allow both the stopper and the bottle to soak for 48 hours. After the 48 hour soak, this solution may be may be retained for reuse (i.e., siphoned into other dirty bottles) or it can be poured off into a sanitary drain.

6.2.3 Teflon® Bottle Stopper and O-ring Cleaning:

This procedure should be performed prior to the bottle washing process so that the stopper can follow the bottle through the acid wash.

1) Rinse thoroughly (minimum of three times) with tap water.

2) Rinse thoroughly (minimum of three times) with DI water.

3) Store temporarily in a similarly cleaned

6.2.4 **Tap Water Rinse:** Tap water rinses detergent better than DI water. Flush upside down bottle with tap water for 20 sec. Rinse each bottle 3 times with tap water being careful not to contaminate the clean surfaces.

6.2.5 **DI Rinse:** Rinse the top and neck of the bottles with DI water using a squirt bottle and then rinse upside down for three minutes on the DI rinse rack for bottles. Make sure to tip bottles from side to side for a more thorough rinsing. Allow 1-2 minutes for the bottles

to drain as much as possible. Rinse each stopper with DI water squirt bottle 3 times (being careful not to touch the clean surfaces).

6.2.6 **Acid Wash:** Note that it is important to Wash the bottle with 2N nitric acid according to the following procedure:

1) Place the empty bottle near the 2N nitric acid carboy and peristaltic pump. The location should be able to safely contain a spill if the 20L bottle breaks.

2) Pump acid into the bottle using the peristaltic pump fitted with a protocol-cleaned sub-sampling hose setup

3) Fill the bottle slightly more than half full.

4) Place a protocol-cleaned solid Teflon® stopper (with a properly seated O-ring) (Refer to Section 6.2.3 above) on the bottle and clamp it securely.

5) **Carefully** lift and place the bottle on the roller rack and check for leakage from the stopper. Neutralize any spillage. Often small leaks can be corrected by a slight tightening of the clamp. Roll the bottles for twenty minutes.

6) Pump the acid into another bottle for rolling or back into the 2N nitric acid carboy.

6.2.7 **DI Rinse for Sub-sampling Hose**: After use, the sub-sampling hose setup should be rinsed by pumping 1-2 gallons of DI water through the hoses and into a neutralization tank. Carefully rinse the outside of the hose to remove any acid that may be on the exterior of the hose. pH paper should be used to insure that the fluid in and on the hose is 6.8 or higher. Continue rinsing until your reach neutral pH. Store hose in a clean, large plastic bag between uses. Dispose of rinsate in accordance with all federal, state, and local regulations

6.2.8 **DI Rinse for Bottles**: Allow the bottles to drain into a yellow neutralization bucket for at least 1 minute. Place four bottles at a time on the DI rinse rack and rinse for 5 minutes. Move bottles around to ensure complete and thorough rinsing. Rinse the outside of the bottle with tap water. Allow bottles to drain for 2 minutes.

6.2.9 **DI Rinse for Stoppers**: Rinse caps thoroughly 3 times over neutralization tank. Place on a clean surface where the clean side of the stopper will not be contaminated.

6.3 **Storage:** Clamp a stopper (one that went through the entire cleaning procedure) on the bottle. Properly label the bottle as to the date cleaned and by whom and place on the bottle storage rack or in a secondary containment bucket in a safe area. Also, fill out the **Bottle Cleaning Log Sheet**.

7.0 QUALITY ASSURANCE REQUIREMENTS

7.1 The NPS 20 liter sample bottles must be evaluated ("blanked") for contaminants after they have completed the decontamination procedure. The analytical laboratory performing

the evaluation should supply Milli-Q® water that is used as a blanking rinsate, and sample bottles for the appropriate constituents of concern. This evaluation will be accomplished by randomly blanking 10% of the washed bottles, or 1 bottle per batch (whichever is greater) and having the blanking rinsate analyzed by the laboratory for the appropriate constituents.

7.2 If any of the bottles fail the analyses (concentration of any analytes are at or above the limit of detection), all of the bottles from that batch must be decontaminated. Again, 10% of these bottles must be subjected to the blanking process as described-above.

7.3 If results of the evaluation process show that the bottles are not contaminant-free, the cleaning procedure must be re-evaluated. Consult with the Quality Assurance/Quality Control Officer to determine the source of contamination.

CLEANING PROTOCOL FOR:

Miscellaneous Laboratory Equipment used for Cleaning and Blanking

1.0 SCOPE

This Standard Operating Procedure describes the procedures for cleaning the miscellaneous items necessary to complete the tasks of cleaning 20- liter composite sample bottles and hoses. The purpose of these procedures is to ensure that the items are contaminant-free and to ensure the safety of the personnel performing this procedure.

2.0 APPLICATION

This SOP applies to all laboratory activities that comprise the cleaning of ancillary items necessary to complete the tasks of cleaning 20 liter composite sample bottles and NPS hoses.

3.0 HEALTH AND SAFETY CONSIDERATIONS

The cleaning of the following items may involve contact with hazardous materials. Skin contact with all materials and solutions should be minimized by wearing appropriate personal protective equipment (PPE) including: chemically-resistant protective gloves, laboratory coats, chemically-resistant aprons, and goggles. In addition, to ensure that you are aware of the hazards involved and of any new revisions to the procedure, the material safety data sheets (MSDSs) for nitric acid and the laboratory detergent should be reviewed before beginning any of these procedures.

4.0 DEFINITIONS

4.1 Polyethylene Squirt Bottles - ½ and 1 liter squirt bottles for washing and/or rinsing with DI water or nitric acid.

4.2 Polycarbonate and Polyethylene De-ionized Water Jugs - For holding DI water.

4.3 Polyethylene Bucket - For holding tap water, DI water or detergent solutions during hose washing procedures.

4.4 Four-inch Teflon® Connector - For connecting two lengths of silicon peristaltic tubing together.

4.5 Four-inch Silicon Connector - For connecting two lengths of Teflon® hose together.

4.6 Orange Polypropylene Hose Caps - For placing over the ends of clean Teflon® hose to prevent contamination.

4.7 De-ionized (DI) water - Commercial de-ionized water

4.8 Laboratory Detergent - 2% solution of Contrad 70® or Micro-90® detergent.

5.0 EQUIPMENT

5.1 Instrumentation: Not applicable.

5.2 Reagents:

1) ACS Reagent Grade nitric acid as a 2 Normal solution (2N HNO_3)

2) Micro-90® non-phosphate laboratory detergent

3) Contrad 70® non-phosphate laboratory detergent

4) Contrad 70® anti-foaming agent.

5) pH paper or pH meter

6) Baking soda ($NaHCO_3$) or equivalent to neutralize acid

5.3 Apparatus:

1) Clean polyethylene squirt bottles.

2) Clean polyethylene trays or 2000 ml glass beakers.

3) Neutralization Tank

5.4 Documentation:

Label each squirt bottle, DI jug, storage container holding clean items, etc. as to the date each was cleaned and the initials of the cleaning technician.

6.0 CLEANING PROCEDURES

Care must be taken to ensure that no contaminants are introduced at any point during these procedures. If the wash is not performed with this in mind, the possibility for the introduction of contaminants (i.e., from dirty sinks, dirty counter tops, dirty fingers/gloves, dirty hose ends, etc.) is increased significantly.

Rinsing properly is essential to ensure proper cleaning. This is done by squirting the liquid over the item to be cleaned in a top-down fashion, letting the water flow off completely **before** applying the next rinse. Rinse the item in this fashion **a minimum** of three times. **Numerous rinses of relatively small volumes are much better than one or two rinses of higher volume.** Be aware of handling: use clean gloves (it is best if they have gone through the same prior wash as the item to be rinsed) and rinse off the fingers prior to grasping the item to be cleaned. Try to grasp the item in a slightly different place between rinses so ones fingers do not cover a portion of the item throughout the rinses.

6.1 Polyethylene Squirt Bottles:

1) Soak in a 2% solution of laboratory detergent in a protocol-cleaned bucket for 48 hours.

2) Rinse thoroughly (minimum of three times) with tap water.

3) Rinse thoroughly (minimum of three times) with DI water.

4) Wash three times with 2N (10%) nitric acid.

5) Rinse thoroughly (minimum of three times) with DI water. Neutralize and dispose of rinsate in accordance with all federal, state, and local regulations.

6.2 Polycarbonate and Polyethylene DI Water Jugs:

1) Fill to the rim with a 2% solution of laboratory detergent, cap the jug, and let soak for 48 hours. Wash cap with an all-plastic scrub brush after soak.

2) Rinse thoroughly (minimum of three times) with tap water.

3) Rinse thoroughly (minimum of three times) with DI water.

4) Wash three times with 2N (10%) nitric acid.

5) Rinse thoroughly (minimum of three times) with DI water. Neutralize and dispose of rinsate in accordance with all federal, state, and local regulations.

6.3 Polyethylene Bucket:

1) Fill to the rim with a 2% solution of laboratory detergent and let soak for 48 hours.

2) Rinse thoroughly (minimum of three times) with tap water.

3) Rinse thoroughly (minimum of three times) with DI water.

4) Wash three times with 2N (10%) nitric acid squirt bottle.

5) Rinse thoroughly (minimum of three times) with DI water. Neutralize and dispose of rinsate in accordance with all federal, state, and local regulations. **Label as to the date cleaned and initial**.

6.4 Four-inch Teflon® and Silicon Hose Connectors and Orange Polypropylene Hose Caps. The purpose of the four-inch sections of Teflon® and silicon hose is to connect longer lengths of each type of hose together during the hose cleaning procedures. The orange polypropylene hose caps are for the ends of cleaned FEP hoses to prevent contamination prior to use in the field or laboratory.

1) Using a 2% solution of laboratory detergent, soak the four-inch sections of FEP hose, silicon tubing, and orange caps for 48 hours.

2) Rinse thoroughly with tap water (minimum of three rinses).

3) Rinse thoroughly with DI water (minimum of three rinses).

4) Using a squirt bottle filled with 2N (10%) HNO_3, thoroughly rinse the interior and exterior of the connectors and caps thoroughly OR, roll/agitate them in a shallow layer of 2N (10%) HNO_3

in a laboratory detergent cleaned glass beaker or other appropriate, clean container for a more thorough washing.

5) Thoroughly rinse connectors and caps with DI water (minimum of three rinses). Neutralize and dispose of rinsate in accordance with all federal, state, and local regulations. Keep clean connectors and caps in a similarly cleaned (or certified clean) widemouth glass jar or detergent-cleaned resealable bag and **label as clean, date cleaned, and initial**.

NPS 20-Liter Bottle Subsampling Procedure

1.0 Scope

This Standard Operating Procedure (SOP) describes the procedures for the compositing and sub-sampling of non-point source (NPS) 20 liter sample bottles. The purpose of these procedures is to ensure that the sub-samples taken are representative of the entire water sample in the 20-L bottle (or bottles). In order to prevent confusion, it should be noted that in other KLI SOPs relating to 20-L bottles they are referred to as "composite" bottles because they are a composite of many small samples taken over the course of a storm; in this SOP the use of "compositing" generally refers to the calculated combining of more than one of these 20-L "composite" bottles.

2.0 Application

This SOP applies to all laboratory activities that comprise the compositing and sub-sampling of NPS 20 liter sample bottles.

3.0 Health and Safety Considerations

The compositing and sub-sampling of NPS 20 liter sample bottles may involve contact with contaminated water. Skin contact with sampled water should be minimized by wearing appropriate protective gloves, clothing, and safety glasses. Avoid hand-face contact during the compositing and sub-sampling procedures. Wash hands with soap and warm water after work is completed.

4.0 Definitions

4.1 **20 liter sample bottle:** 20 liter borosilicate glass bottle that is used to collect multiple samples over the course of a storm (a composite sample).

4.2 **Large-capacity stirrer**: Electric motorized "plate" that supports a 20 liter bottle and facilitates the mixing of sample water within the bottle by means of spinning a pre-cleaned magnetic stir-bar which is introduced into the bottle.

4.3 **Stir-bar**: Teflon-coated magnetic "bar" approximately 2-3 inches in length which is introduced into a 20 liter bottle and is spun by the stirrer, thereby creating a vortex in the bottle and mixing the sample. Pre-cleaned using cleaning protocols provided in KLI SOP for *Cleaning Procedures for Miscellaneous Items Related to NPS Sampling*.

4.4 **Sub-sampling hose**: Two ~3-foot lengths of Teflon tubing connected by a ~2-foot length of silicon tubing. Pre-cleaned using cleaning protocols provided in SOP for *Teflon Sample Hose and Silicon Peristaltic Tubing Cleaning Procedures*. Used with a peristaltic pump to transfer sample water from the 20-L sample bottle to sample analyte containers.

4.6 **Volume-to-Sample Ratio (VSR):** A number that represents the volume of water that will flow past the flow-meter before a sample is taken (usually in liters but can also be in kilo-cubic feet for river deployments). For example, if the VSR is 1000 it means that every time 1000 liters passes

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the flow-meter the sampler collects a sample (1000 liters of flow per 1 sample taken). Note: The VSR indicates when a sample should be taken and is NOT an indication of the sample size.

5.0 EQUIPMENT

5.1 Instrumentation: Not applicable

5.2 Reagents: Not applicable.

5.3 Apparatus

1) Large capacity stirrer.

2) Stir bar.

3) Sub-sampling hose.

4) Peristaltic pump.

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APPENDIX E

QUALITY ASSURANCE/QUALITY CONTROL

1. Quality Assurance/Quality Control

Elements of a Quality Assurance and Quality Control (QA/QC) Plan have been incorporated into the CIMP in order to detail critical activities conducted to assure that both chemical and physical measurements meet the standard of quality needed to evaluate measurements at levels relevant to applicable water quality criteria. With many different monitoring programs being implemented within the region, comparability should remain of the primary goals of the QA/QC monitoring program. The Intergovernmental Task Force on Monitoring Water Quality (ITFM, 1995) defines comparability as the "characteristics that allow information from many sources to be of definable or equivalent quality so that it can be used to address program objectives not necessarily related to those for which the data were collected."

One important aspect of comparability is the use of analytical laboratories that are accredited under a program such as the National Environmental Laboratory Accreditation Program (NELAP), California's Environmental Laboratory Accreditation Program (ELAP) or a well-qualified research laboratory. In addition, the laboratory should be a participant in a laboratory proficiency and intercalibration program. Laboratories have not been selected for this program but participation in the Stormwater Monitoring Coalition's (SMC) intercalibration program will be a primary consideration. Unfortunately, the SMC has not fully completed implementation of a program the full range of analyses included in the MRP Table E-2 list.

Evaluation of data quality will be based upon protocols provided in the *National Functional Guidelines for Inorganic Superfund Data Review (USEPA540-R-10-011)* (USEPA 2010), *National Functional Guidelines for Superfund Organic Methods Data Review (EPA540/R-08-01),* and the *Guidance on the Documentation and Evaluation of Trace Metals Data Collected for Clean Water Act Compliance Monitoring (EPA/821/B/95/002)* (USEPA 1996).

The sections that follow address activities associated with both field sampling and laboratory analyses. Quality assurance activities start with procedures designed to assure that errors introduced in the field sampling and subsampling processes are minimized. Field QA/QC samples are collected and used to evaluate potential contamination and sampling error introduced into a sample prior to its submittal to the analytical laboratory. Laboratory QA/QC activities are used to provide information needed to assess potential laboratory contamination, analytical precision and accuracy, and representativeness.

1.1.1 Sample Handling, Containers and Holding Times.

Table **1** provides a summary of the types of sample volumes, container types, preservation and holding times for each analytical method. Analytical methods requiring the same preservation and container types may be transferred to the laboratory in one container in order to minimize handling prior to transfer to the laboratory.

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Table 1. Constituents, Sample Container, Preservation and Holding Times.

Analyte	EPA Method Number	Holding Time	Container Size	Container Type	Preservation	Minimum Level/ Resolution	Units
Conventionals							
pH	150.1	15 minutes		glass or PE	none	+/- 0.1	std. units
Oil and Grease	1664A	28 days	1 L	Glass	HCl	5	mg/L
TPH	418.1	28 days	1 L	Glass	HCl	5	mg/L
Total Phenols	420.1	28 days	500mL-1 L	Glass	H_sSO_4	5	mg/L
Cyanide	SM4500-CN-E	14 days	500 mL	HDPE	NaOH	0.003	mg/L
Turbidity	SM2130B	48 hours	100-250mL	Glass	4-6°C	1	NTU
TSS	160.2	7 days	1 L	HDPE	4-6°C	4	mg/L
SSC[1]	ASTMD3977B	7 days	1 L	HDPE	4-6°C	4	mg/L
TDS	160.1	7 days	1 L	HDPE	4-6°C	1	mg/L
VSS	160.4	7 days	1 L	HDPE	4-6°C	1	mg/L
TOC; DOC	415.1	28 days	250 mL	glass	4°C and HCl or H_2SO_4 to pH<2	1	mg/L
BOD_5	SM5210B	48 hours	600mL-1L	HDPE	4-6°C	3	mg/L
COD	410.1	28 days	20-250 mL	Glass	H_sSO_4	4	mg/L
Alkalinity	SM 2320B	Filter ASAP, 14 days	100-250 mL	HDPE	4-6°C	1	mg/L
Conductivity	SM 2510	28 days	100-250 mL	HDPE	4°C; filter if hold time >24 hours	1	µmho/cm
Hardness	130.2	6 months	100-250 mL	HDPE	and HNO_3 or H_2SO_4 to pH<2	1	mg/L
MBAS	425.1	48 hours	250-500 mL	HDPE	4-6°C	0.02	mg/L
Chloride	300	28 days	250-500 mL	HDPE	4-6°C	2	mg/L
Fluoride	300	28 days	250-500 mL	HDPE	4-6°C	0.1	mg/L
Perchlorate	314.0	28 days	100-250 mL	HDPE	4-6°C	4	µg/L
Volatile Organics							
MTBE	624	14 days	3 40mL VOA	Glass	HCl	1	µg/L

Analyte	EPA Method Number	Holding Time	Container Size	Container Type	Preservation	Minimum Level/ Resolution	Units
Bacteria							
Total Coliform	SM9221B	6 hr-8 hr	100 mL	Sterile HDPE	4-6°C	20-2,400,000	MPN/100mL
Fecal Coliform	SM9221B	6 hr-8 hr	100 mL	Sterile HDPE	4-6°C	20-2,400,000	MPN/100mL
Enterococcus	SM9230B or C	6 hr-8 hr	100 mL	Sterile HDPE	4-6°C	20-2,400,000	MPN/100mL
E. coli	SM 9223 COLt	6 hr-8 hr	100 mL	Sterile HDPE	4-6°C	20-2,400,000	MPN/100mL
Nutrients							
TKN	351.1	28 days	500mL-1L	Amber glass	H_sSO_4	0.5	mg/L
Nitrate-N	300	48 hours	50-125mL	HDPE	4-6°C	0.1	mg/L
Nitrite-N	300	48 hours	50-125mL	HDPE	4-6°C	0.05	mg/L
Total Nitrogen	Calculation					NA	mg/L
Ammonia-N	350.1	28 days	500mL-1L	Amber glass	H_sSO_4	0.1	mg/L
Total Phosphorus	SM4500-P,EorF	28 days	100-250 mL	glass	H_sSO_4	0.1	mg/L
Dissolved Phosphorus	SM4500-P,EorF	28 days	100-250 mL	glass	4-6°C	0.1	mg/L
Organic Compounds (pesticides and herbicides)							
Organochlorine Pesticides & PCBs	608	7days:40days	1L	Amber glass	4-6°C	0.005-0.5	µg/L
Organophosphate Pesticides	507	14days	1L	Amber glass	$Na_sS_2O_3$ 4-6°C	0.01-1	µg/L
Glyphosate	547	14days	250mL	Amber glass	$Na_sS_2O_3$ 4-6°C	5	µg/L
Chlorinated Acids	515.3	14days	250mL	Amber glass	$Na_sS_2O_3$ 4-6°C		
2,4-D						0.02	µg/L
2,4,5-TP-Silvex						0.2	µg/L
Semivolatile Organic Compounds	625;8270D	7days;40days	1L	Amber glass	4-6°C	0.05-10	µg/L

Metals (Total and Dissolved)

Analyte	EPA Method Number	Holding Time	Container Size	Container Type	Preservation	Minimum Level/ Resolution	Units
Aluminum	200.8	If practical, filter immediately after subsampling. Otherwise filter in laboratory for dissolved fraction and preserve not more than 24 hours after subsampling; 6 months to analysis	250 to500 mL	HDPE	4°C and HNO_3 to pH<2	100	µg/L
Antimony	200.8					0.5	µg/L
Arsenic	200.8					0.5	µg/L
Beryllium	200.8					0.5	µg/L
Cadmium	200.8					0.25	µg/L
Chromium (Total)	200.8					0.5	µg/L
Copper	200.8					0.5	µg/L
Iron	200.8					25	µg/L
Lead	200.8					0.5	µg/L
Nickel	200.8					1	µg/L
Selenium	200.8					1	µg/L
Silver	200.8					0.25	µg/L
Thallium	200.8					0.5	µg/L
Zinc	200.8					1	µg/L
Chromium (Hexavalent)	218.6	Filter as above 24 hours	250 ml	HDPE	4°C	5	µg/L
Mercury	245.1	Filter as above 28 days	250 ml	Glass or Teflon	4°C and HNO_3 to pH<2	0.2	µg/L

Abbreviations

TSS=Total Suspended Solids
SSC=Suspended Sediment Concentration
TDS=Total Dissolved Solids
TPH=Total Petroleum Hydrocarbons
VSS=Volatile Suspended Solids
TOC=Total Organic Carbon
BOD_5=Five-day Biochemical Oxygen Demand
COD=Chemical Oxygen Demand
MBAS=Methylene Blue Active Substances
MTBE= Methyl Tertiary Butyl Ether
TKN=Total Kjeldahl Nitrogen
PCBs=Polychlorinated Biphenyls

1.1.2 Precision, Bias, Accuracy, Representativeness, Completeness, and Comparability

The overall quality of analytical measurements is assessed through evaluation of precision, accuracy/bias, representativeness, comparability and completeness. Precision and accuracy/bias are measured quantitatively. Representativeness and comparability are both assessed qualitatively. Completeness is assessed in both quantitative and qualitative terms. The following sections examine how these measures are typically applied.

1.1.2.1 Precision

Precision provides an assessment of mutual agreement between repeated measurements. These measurements apply to field duplicates, laboratory duplicates, matrix spike duplicates, and laboratory control sample duplicates. Monitoring of precision through the process allows for the evaluation of the consistency of field sampling and laboratory analyses.

The Relative Percent Difference (RPD) will be used to evaluate precision based upon duplicate samples. The RPD is calculated for each pair of data is calculated as:

$$RPD=[(x_1-x_2)*100]/[(x_1+x_2)/2)$$

Where:

x_1=concentration or value of sample 1 of the pair

x_2=concentration or value of sample 2 of the pair

In the case of matrix spike/spike duplicate, RPDs are compared with measurement quality objectives (MQOs) established for the program. MQOs will be established to be consistent with the most current SWAMP objectives in the SWAMP Quality Assurance Project Plan (2008) including the most recent updates as well as consultations with the laboratories performing the analyses. In the case of laboratory or field duplicates, values can often be near or below the established reporting limits. The most current SWAMP guidelines rely upon matrix spike/spike duplicate analyses for organic compounds instead of using laboratory duplicates since one or both values are often below detection limits or are near the detection limits. In such cases, RPDs do not provide useful information.

1.1.2.2 Bias

Bias is the systematic inherent in a method or caused by some artifact or idiosyncrasy of the measurement system. Bias may be either positive or negative and can emanate from a number of different points in the process. Although both positive and negative biases may exist concurrently in the same sample, the net bias is all that can be reasonably addressed in this project. Bias is preferably measured through analysis of spiked samples so that matrix effects are incorporated.

1.1.2.3 Accuracy

Accuracy is a measure of the closeness of a measurement or the average of a number of measurements to the true value. Accuracy includes of a combination of random error as measured by precision and systematic error as measured by bias. An assessment of the accuracy of measurements is based on determining the percent difference between measured values and known or "true" values applied to surrogates, Matrix Spikes (MS), Laboratory Control Samples (LCS) and Standard Reference Materials (SRM). Surrogates and matrix spikes evaluate matrix interferences on analytical performance, while laboratory control samples, standard reference materials and blank spikes (BS) evaluate analytical performance in the absence of matrix effects.

Assessment of the accuracy of measurements is based upon determining the difference between measured values and the true value. This is assessed primarily through analysis of spike recoveries or certified value ranges for SRMs. Spike recoveries are calculated as Percent Recovery according to the following formula:

$$\text{Percent Recovery} = [(t-x)/\alpha]*100\%$$

Where:

t=total concentration found in the spiked sample

x=original concentration in sample prior to spiking, and

α=actual spike concentration added to the sample

1.1.2.4 Representativeness, Comparability and Completeness

Representativeness is the degree to which data accurately and precisely represents the natural environment. For stormwater runoff, representativeness is first evaluated based upon the automated flow-composite sample and the associated hydrograph. To be considered as representative, the autosampler must have effectively triggered to capture initial runoff from the pavement and the composite sample should:

- be comprised of a minimum number of aliquots over the course of the storm event,
- effectively represent the period of peak flow,
- contain flow-weighted aliquots from over 80% of the total runoff volume, and
- demonstrate little or no evidence of "stacking".

Stacking occurs when the sampling volume is set too low and commands back up in the memory of an autosampler causing it to continuously cycle until it catches up with the accumulation of total flow measured by the stormwater monitoring station.

Representativeness is also assessed through the process of splitting or subsampling 20 L composite bottles into individual sample containers being sent to the laboratory. The first subsamples removed from the composite bottle should have the same composition as the last. Subsampling should be conducted in accordance with guidance in the subsampling SOP. This SOP is based upon use of large laboratory magnetic stir plate, an autosampler, and precleaned subsampling hoses to

minimize variability. Sample splitting can introduce a substantial amount of error especially if significant quantities of coarse sediments (greater than 250 µm) represent as significant fraction of the suspended sediments. Use of a USGS Teflon churns or Decaport cone splitter may also be used but would require development of a separate SOP.

Comparability is the measure of confidence with which one dataset can be compared to another. The use of standardized methods of chemical analysis and field sampling and processing are ways of insuring comparability. Application of consistent sampling and processing procedures is necessary for assuring comparability among data sets. Thorough documentation of these procedures, quality assurance activities and a written assessment of data validation and quality are necessary to provide others with the basic elements to evaluate comparability.

Completeness is a measure of the percentage of the data judged valid after comparison with specific validation criteria. This includes data lost through accidental breakage of sample containers or other activities that result in irreparable loss of samples. Implementation of standardized Chain-of-Custody procedures which track samples as they are transferred between custodians is one method of maintaining a high level of completeness.

A high level of completeness is essential to all phases of this study due to the limited number of samples. Of course, the overall goal is to obtain completeness of 100%, however, a realistic data quality indicator of 95% insures an adequate level of data return.

1.1.3 Laboratory Quality Assurance/Quality Control

The quality of analytical data is dependent on the ways in which samples are collected, handled and analyzed. Data Quality Objectives provide the standards against which the data are compared to determine if they meet the quality necessary to be used to address program objectives. Data will be subjected to a thorough verification and validation process designed to evaluate project data quality and determine whether data require qualification.

The three major categories of QA/QC checks are accuracy, precision, and contamination were discussed in the previous section. As a minimum, the laboratory will incorporate analysis of method blanks, and matrix spike/spike duplicates with each analytical batch. Laboratory duplicates will be analyzed for analytical tests where matrix spike/spike duplicate are not analyzed. Use of Certified Reference Materials (CRM) or Standard Reference Materials (SRM) is also recommended as these allow assessment of long term performance of the analytical methods so that representativeness can be assessed. Laboratories often use an internal CRM that is analyzed with each batch to evaluate any potential long-term shift in performance of the analytical procedures. Recommended minimum quality control samples will be based upon SWAMP QAPP (2008) and the associated 2013 Quality Control and Sample Handling Tables for water (http://www.swrcb.ca.gov/water_issues/programs/swamp/mqo.shtml).

1.1.4 Field QA/QC

1.1.4.1 Blanks

A thorough system of blanking is an essential element of monitoring. Much of the blanking processes are performed well in advance of the actual monitoring in order to demonstrate that all equipment expected to contact water is free of contaminants at the detection limits established for the program. Equipment components are cleaned in batches. Subsamples from each cleaning batch are rinsed with Type 1 laboratory blank water and submitted to the laboratory for analysis. If hits are encountered in any cleaning batch, the entire batch is put back through the cleaning and blanking process until satisfactory results are obtained. If contaminants are measured in the blanks, it is often prudent to reexamine the cleaning processes and equipment or materials used in the cleaning process. Equipment requiring blanks and the frequency of blanks is summarized below and in Table 2.

Table 2. Summary of Blanking Requirements for Field Equipment.

System Component	Blanking Frequency
Intake Hose	One per batch
Peristaltic Pump Hose	One per batch[1] or 10% for batches greater than 10
Composite Bottles	One per batch or 10% for batches greater than 10
Subsampling Pump Hose	One per batch or 10% for batches greater than 10
Laboratory Sample Containers	2% of the lot[2] or batch, minimum of one
Capsule Filter Blank[3]	One per batch or 10% for batches greater than 10
Churn/Cone Splitter[4]	When field cleaning is performed, process one blank per session

[1] A batch is a group of samples that are cleaned at the same time and in the same manner.

[2] If decontaminated bottles are sent directly from the manufacturer, the batch would be the lot designated by the manufacturer in their testing of the bottles.

[3] If filtration is performed in the laboratory, the capsule filter blanks would be considered part of laboratory QA/QC.

[4] This is applicable to use of a churn or cone splitter to subsample flow-weighted composite samples into individual containers. Splitting may be performed by the sampling team in a protected, clean area or by the laboratory.

1.1.4.2 Field Duplicates

Composite subsampling duplicates associated with flow-weighted composite samples are often referred to as field duplicates but, in fact, they are subsampling replicates. These replicates help assess combined variability associated with subsampling from the composite container and variability associated with the analytical process. They are evaluated against the same criteria as used for laboratory duplicates.

1.1.5 Equipment Cleaning, Blanking and Tracking

Sample collection, handling, and processing materials can contribute and/or sorb trace elements within the time scales typical for collection, processing and analysis of runoff samples. Sampling artifacts are especially important when measured concentrations that are at or near analytical detection limits (Horowitz 1997). Therefore, great care is required to collect and process samples in a manner that will minimize potential contamination and variability in the sampling process (Breault and Granato 2000).

Sampling conducted to measure dissolved metals and other trace contaminants at levels relevant to EPA water quality criteria requires documentation that all sampling equipment is free of contamination and that the processes used to obtain and handle samples do not introduce contamination. This requires documentation that methods used to collect, process and analyze the samples do not introduce contamination. Documentation for the CIMP includes written procedures provided in Appendix B for cleaning all components of the sampling system, blanking processes necessary to verify that system components and sample handling are not introducing contamination, and a system of tracking deployment of protocol-cleaned equipment in the field as described in this section.

All composite containers and equipment used for sample collection in the field and/or sample storage in the laboratory will be decontaminated and cleaned prior to use. These include the FEP tubing, Teflon® lids, strainers and hoses/fittings that are used in the subsampling process (USGS 1993). Personnel assigned to clean and handle the equipment are thoroughly trained and familiar with the cleaning, blanking, and tracking procedures. In addition, all field sampling staff will be trained to be familiar with these processes so that they have a better understanding of the importance of using clean sampling procedures and the effort required to eliminate sources of contamination.

Sample contamination has long been considered one of the most significant problems associated with measurement of dissolved metals and may be accentuated with use of High Resolution Mass Spectroscopy (HRMS) methods for trace levels of organic constituents at levels three orders of magnitude lower than conventional GCMS methods. One of the major elements of QA/QC documentation is establishing that clean sampling procedures are used throughout the process and that all equipment used to collect and process the water samples are free of contamination.

Cleaning protocols are consistent with ASTM (2008) standard D5088 – 02 that covers cleaning of sampling equipment and sample bottles. The generalized cleaning process is based upon a series of washings that typically start with tap water with a phosphate-free detergent, a tap water rinse, soaking in a 10% solution of reagent grade nitric acid, and a final series of rinses with ASTM Type 1 water. Detailed procedures for decontamination of sampling equipment are provided in Appendix A. In addition, Appendix G of the most recent Caltrans Stormwater Monitoring Guidance Manual (Caltrans, 2013) provides alternative cleaning procedure that incorporate use of methylene chloride to remove potential organic contaminants. Experience indicates that this step can be eliminated and still result in blanking data suitable for most target organic contaminants. Addition of this cleaning step or a comparable step to address organic contaminants may be necessary if satisfactory equipment blanks cannot be attained. Significant issues exist with respect to use of

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methylene chloride. This chemical is highly toxic, must be handled and disposed as a hazardous waste and is difficult to fully remove from the 20-L media bottles used as composite containers.

In order to account for any contamination introduced by sampling containers, blanks must be collected for composite bottles and laboratory bottles used for sample storage for trace contaminants. A sampling container blank is prepared by filling a clean container with blank water and measuring the concentrations of selected constituents (typically metals and other trace contaminants for composite bottles and metals analysis only for metals storage bottles). Blanking of the 20-L composite bottles will be performed by using the minimum amount of blank water necessary for the selected analytical tests. This is typically requires one to two liters. The bottle is capped and then manipulated to assure that all surfaces up to the neck of the bottle are rinsed. The water is then be allowed to sit for a minimum of one hour before decanting the rinse water into sample containers. In order to provide adequate control, media bottles are labelled and tracked. All media bottles cleaned and blanked in one batch are tracked to allow for recall if laboratory analyses reveal any contamination. Further tracking is required in the field to document where bottles from each cleaning batch are used and to assist in tracking of any contamination that might be detected after bottles have been deployed since laboratory turnaround in the middle of the storm season may require use of decontaminated bottles prior to receiving the results of the blank analyses.

Selected constituents for blanking will be dependent upon the list of contaminants with reasonable potential to be present at levels that could impact sample results. Minimum parameters used for blank analyses will include total recoverable trace metals, TDS, TOC and nutrients. Analysis of total metals will allow for detection of any residual metal contamination which will be of concern for all sampling. Nutrients, particularly nitrogen compounds, will assure that residual nitrogen from acid cleaning has been fully removed. TDS and TOC are useful for accessing presence of any residual contaminants. Additional blanking may be added when sampling other constituents with ultra-low analytical methods. These blanks may be submitted "blind" to the laboratory by field personnel or prepared internally by the laboratory.

Certified pre-cleaned QC-grade laboratory containers can be used. These bottles are cleaned using acceptable protocol for the intended analysis and tracked by lots. They come with standard certification forms that document the concentration to which the bottles are considered "contaminant-free" but these concentrations are not typically suitable for program reporting limits required for measurement of dissolved metals. Manufacturers may provide an option of certification to specific limits required by a project but it is preferable to purchase the QC bottles that are tracked by lot and conduct internal blanking studies. Lots not meeting project requirements should be returned to the manufacturer and exchanged for containers from another lot. At least 2% of the bottles in any "lot" or "batch" should be blanked at the program detection limits with a minimum frequency of one bottle per batch. A batch is considered to be a group of samples that are cleaned at the same time and in the same manner; or, if decontaminated bottles are sent directly from the manufacturer, the batch would be the lot designated by the manufacturer in their testing of the bottles. Cleaned bottles are stored in a clean area with lids properly secured.

Subsampling hoses consist of a length of peristaltic hose with short lengths of FEP tubing attached to each end. These are required to be cleaned inside and out since the FEP tubing is immersed in the composite bottle during the subsampling process. Once cleaned, the ends of the subsampling hoses are bagged. All hoses associated with the batch are then stored in large zip-lock containers labeled to identify the cleaning batch. Blanking of subsampling hoses is conducted as part of the composite bottle blanking process. A clean subsampling hose is used to decant blank water from the 20-L composite bottles into clean laboratory containers. Detection of any contaminants in the bottle blanks therefore requires that the subsampling hoses also are subjected another decontamination process. After cleaning, the subsampling hoses should only be handled while wearing clean, powder-free nitrile gloves.

APPENDIX F

NON-STORMWATER IC/ID AND OUTFALL TRACKING

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Operation Procedures	
Illicit Discharge Detection & Elimination: Initial Outfall Screening	
Purpose:	This provides a basic checklist for field crews conducting initial survey of storm drainage system outfalls for use in identification of illicit discharges

Reference: Brown et al., *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments,* Center for Watershed Protection, Ellicott City, 2004.

Planning Considerations:

- ❑ Employees should have reviewed and understand the information presented in Chapter 11 of the reference manual
- ❑ Inspections are to occur during dry weather (no runoff producing precipitation in last 72 hours)
- ❑ Conduct inspections with at least two staff per crew
- ❑ Conduct inspections during low groundwater (if appropriate).
- ❑ Complete ***Site Info section on Outfall Reconnaissance Inventory Form*** before leaving the office. Additional forms should be available for undocumented outfalls

Field Methods:

- ❑ Ensure outfall is accessible.
- ❑ Inspect outfall only if safe to do so.
- ❑ Characterize the outfall by recording information on the ***LCC Outfall Reconnaissance Inventory Form.***
- ❑ Photograph the outfall with a digital camera (use dry erase board to identify outfall).
- ❑ Enter flow information on form if dry weather flow is present and ***easily*** obtained. If not, provide rough estimate of flow.
- ❑ Document clean, dry outfalls for potential elimination during future screening programs.
- ❑ Water samples will not be collected during the initial survey. In-situ measurements of temperature, conductivity, and pH should be taken if significant flow is present.
- ❑ Do not enter private property without permission.
- ❑ Photograph each site with the site identification written on the dry erase board.

Equipment List:

1. System map
2. Outfall Reconnaissance Inventory Forms
3. City identification or business cards
4. Digital camera (spare batteries)
5. Cell phone
6. GPS unit
7. Clip board and pencils
8. Dry erase board and pens
9. Hand Mirror
10. Flashlight (spare batteries)
11. Disposable gloves
12. Folding wood ruler or comparable
13. Temperature, Conductivity probe
14. pH probe/strips
15. ***Ammonia test strips***
16. ***Ten1-liter (polyethylene) sample bottles***
17. Watch with second hand
18. Calculator
19. Hand sanitizer
20. Safety vests
21. First aid kit
22. ***Cooler***
23. Permanent marker

Bolded, italicized items will only be needed for later surveys. No water quality samples will be taken for laboratory analysis during the first survey.

LOWER LA RIVER OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

Section 1: Background Data

Subbasin:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours: Last 48 hours:		
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

☐ Industrial	☐ Open Space
☐ Ultra-Urban Residential	☐ Institutional
☐ Suburban Residential	Other: _____
☐ Commercial	Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ **Closed Pipe**	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**	**(applicable when collecting samples)**				
Flow Present?	☐ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	_____' _____"	Ft, In	Tape measure
	Measured length	_____' _____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°F	Meter
pH			pH Units	Meter
Ammonia			mg/L	Test strip

Lower LA River Outfall Reconnaissance Inventory Field Sheet

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization

☐ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a severity of 3) ☐ Obvious

Section 7: Data Collection

1.	Sample for the lab?	☐ Yes	☐ No	
2.	If yes, collected from:	☐ Flow	☐ Pool	
3.	Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type: ☐ OBM ☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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APPENDIX G

MINIMUM CRITERIA FOR EVALUATION OF WATER QUALITY CONSTITUENTS IN TABLE E-2 OF THE MRP

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Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Oil and Grease	5	mg/L	Basin Plan	Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.	N/A		
Total Phenols	100	µg/L	None	None	N/A		
Cyanide (Total)	5	µg/L	CTR Freshwater (1 hr avg.)	22	µg/L		
			CTR Freshwater (4 day avg.)	5.2			
pH	0 - 14	N/A	MS4 MAL[1]	7.7	N/A		
			Basin Plan	The pH of inland surface waters shall not be depressed below 6. 5 or raised above 8. 5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0. 5 units from natural conditions as a result of waste discharge.			
				The pH of bays or estuaries shall not be depressed below 6. 5 or raised above 8. 5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0. 2 units from natural conditions as a result of waste discharge.			
Temperature	None	°F	Basin Plan	The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. Alterations that are allowed must meet the requirements below.	°F		
				For waters designated WARM, water temperature shall not be altered by more than 5 °F above the natural temperature. At no time shall these WARM designated waters be raised above 80 °F as a result of waste discharges.			
				For waters designated COLD, water temperature shall not be altered by more than 5 °F above the natural temperature.			
Dissolved Oxygen	Sensitivity to 5 mg/L	mg/L	Basin Plan	At a minimum (see specifics below), the mean annual dissolved oxygen concentration of all waters shall be greater than 7 mg/L, and no single determination shall be less than 5.0 mg/L, except when natural conditions cause lesser concentrations.	mg/L		
				The dissolved oxygen content of all surface waters designated as WARM shall not be depressed below 5 mg/L as a result of waste discharges.			
				The dissolved oxygen content of all surface waters designated as COLD shall not be depressed below 6 mg/L as a result of waste discharges.			
				The dissolved oxygen content of all surface waters designated as both COLD and SPWN shall not be depressed below 7 mg/L as a result of waste discharges.			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Fecal coliform (fresh waters)	20	MPN/100 ml	Basin Plan (REC-1, log mean, >= 4 samples for any 30-day period)	200	MPN/100 ml	Daily Maximum	
			Basin Plan (REC-1, <10% samples during any 30-day period)	400			
			LAR Estuary Bacteria TMDL	Total Coliform: 10,000/100 mL			
				Fecal Coliform: 400/100 mL			
				Enterococcus: 104/100 mL			
E. coli (fresh waters)	1	MPN/100 ml	LAR Bacteria TMDL	235/100 ML	MPN/100 ml	Daily Maximum	
Dissolved Phosphorus	0.05	mg/L	Basin Plan	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.	mg/L		
Total Phosphorus	0.05	mg/L	MS4 MAL	0.8	mg/L		
Turbidity	0.1	NTU	Basin Plan	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in natural turbidity attributable to controllable water quality factors shall not exceed the following limits: (1) Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20%; (2) Where natural turbidity is greater than 50 NTU, increases shall not exceed 10%; (3) Allowable zones of dilution within which higher concentrations may be tolerated may be defined for each discharge in specific Waste Discharge Requirements.	NTU		
Total Suspended Solids (TSS)	2	mg/L	Basin Plan	Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.			
			MS4 MAL	264.1	mg/L		
Suspended Sediment Concentration (SSC)	0.5	mg/L	Basin Plan	Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.	mg/L		
Total Dissolved Solids (TDS)	2	mg/L	USEPA Secondary MCL	500	mg/L		
			CA Dept. Public Health Recommended Upper Level	1,000			
			CA Dept. Public Health Recommended Short-term Level	1,500			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Volatile Suspended Solids (VSS)	2	mg/L	Basin Plan	Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.	mg/L		
Total Organic Carbon (TOC)	1	mg/L	None	None	N/A		
Total Petroleum Hydrocarbons (extractable fraction, i.e., diesel and motor oil range hydrocarbons)	5	mg/L	None	None	none		
Biochemical Oxygen Demand	2	mg/L	Basin Plan	Waters shall be free of substances that result in increases in the BOD which adversely affect beneficial uses.			
Chemical Oxygen Demand	20-900	mg/L	MAL	247.5	mg/L		
Total Ammonia-Nitrogen (NH_3-N)	0.1	mg/L	LAR Nitrogen Compounds TMDL	1 hour Average: Los Angeles River below Los Angeles-Glendale WRP 8.7	mg/L		
				30 Day Average: Los Angeles River below Los Angeles-Glendale WRP 2.4			
				1 Hour Average: Los Angeles Tributaries 10.1			
				30 Day Average: Los Angeles Tributaries 2.3			
			Basin Plan	Varies based on pH and temperature for Cold waters and Warm Waters (Table 3-1 to 3-4 of Basin Plan)			
Total Kjeldahl Nitrogen (TKN)	0.1	mg/L	MS4 MAL	4.59	mg/L		
Nitrate+Nitrite (NO_2+NO_3 as N)	0.1	mg/L	LAR Nitrogen Compounds TMDL	30 Day Average: All 8.0	mg/L		
			MS4 MAL	1.85			
			Basin Plan	10 as NO3-N + NO2-N			
Alkalinity	2	mg/L	USEPA National Recommended Water Quality Criteria (Freshwater)	20,000	ug/L		
Specific Conductance	1	umho/cm	CA Dept. Public Health Secondary MCL	900	µmhos/cm		
Total Hardness (as CaCO3)	2	mg/L	None	None	N/A		
Methylene Blue Active Substances (MBAS)	500	µg/L	CA Dept. Public Health Secondary MCL	500	µg/L		
			Basin Plan Federal MCL	500			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Chloride	2	mg/L	Basin Plan	150	mg/L		
Fluoride	100	µg/L	CA Dept. Public Health MCL (drinking water)	2,000	µg/L		
Methyl tertiary butyl ether (MTBE)	1000	µg/L	USEPA National Recommended Water Quality Criteria 4-day average (freshwater)	51,000	µg/L		
			USEPA National Recommended Water Quality Criteria 1-hour average (freshwater)	151,000	µg/L		
Perchlorate	4	µg/L	CA Dept. Public Health MCL (drinking water)	6	µg/L		
Aluminum	100	µg/L	USEPA National Recommended Water Quality Criteria 4-day average (freshwater)	87	µg/L	-	
			USEPA National Recommended Water Quality Criteria 1-hour average (freshwater)	750		-	
Antimony	0.5	ug/L	USEPA National Recommended Water Quality Criteria Freshwater (acute)	9000	µg/L		
			USEPA National Recommended Water Quality Criteria Freshwater (chronic)	1600			
Arsenic	1	µg/L	CTR Freshwater (1 hr avg.) dissolved	340	µg/L		
			CTR Freshwater (4 day avg.) dissolved	150	µg/L		
Beryllium	0.5	µg/L	USEPA National Recommended Water Quality Criteria Freshwater (acute)	130	µg/L		
			USEPA National Recommended Water Quality Criteria Freshwater (chronic)	5.3			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Cadmium	0.25	µg/L	LAR Metals TMDL	Wet Weather: All WER x 2.8 x 10-9 x daily volume (L) – 1.8	kg/day	Mass based WQBEL	WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.
			MS4 MAL	2.52	µg/L		
			CTR Freshwater (1 hr avg.) dissolved	1.6	µg/L		
			CTR Freshwater (4-day avg.) dissolved	1.1			
Chromium	0.5	µg/L	MS4 MAL	20.2	µg/L		
			National Toxics Rule Freshwater (4-day avg.) dissolved	84			
			National Toxics Rule Freshwater (1-hour avg.) dissolved	260			
Chromium (Hexavalent)	5	µg/L	CTR Freshwater (1 hr avg.) dissolved	16	ug/L		
			CTR Freshwater (4 day avg.) dissolved	11			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Copper	0.5	µg/L	LAR Metals TMDL	Dry Weather: LA River Reach 1 WER x 23 Dry Weather: LAR Reach 2 and Arroyo Seco: WER x 22 Dry Weather: Compton Creek WER x 19 Dry Weather: Rio Hondo Reach 1 WER x 13	ug/L	Concentration based WQBELs	WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.
				Dry Weather: LA River Reach 1 WER x 0.14 Dry Weather: LA River Reach 2 WER x 0.13 Dry Weather: Arroyo Seco WER x 0.01 Dry Weather: Compton Creek WER x 0.04 Dry Weather: Rio Hondo Reach 1 WER x 0.01	kg/day	Mass based WQBELs	
				Wet Weather: All WER[1] x 1.5 x 10-8 x daily volume (L) – 9.5			
			Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 35.3	kg/yr	Annual mass based loading in sediment deposited to LAR Estuary	
			CTR Freshwater (1 hr avg.) dissolved	5.7	ug/L		
			CTR Freshwater (4 day avg.) dissolved	4.1			
Iron	100	µg/L	USEPA National Recommended Water Quality Criteria 4-day average (freshwater)	1,000	ug/L		
Lead	0.5	µg/L	LAR Metals TMDL	Dry Weather: LA River Reach 1 WER x 12 Dry Weather: LA River Reach 2 and Arroyo Seco WER x 11 Dry Weather: Compton Creek WER x 8.9 Dry Weather: Rio Hondo Reach 1 WER x 5.0	ug/L	Concentration based WQBELs	WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.
				Dry Weather: LA River Reach 1 WER x 0.07 Dry Weather: LA River Reach 2 WER x 0.07 Dry Weather: Arroyo Seco WER x 0.01 Dry Weather: Compton Creek WER x 0.02 Dry Weather: Rio Hondo Reach 1 WER x 0.006	kg/day	Mass based WQBELs	
				Wet Weather: All WER[1] x 5.6 x 10-8 x daily volume (L) – 3.85			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 65.7	kg/yr	Annual mass based loading in sediment deposited to LAR Estuary	
			CTR Freshwater (1 hr avg.) dissolved	24	ug/L		
			CTR Freshwater (4 day avg.) dissolved	0.92			
Nickel	1	µg/L	MS4 MAL	27.43	µg/L		
			CTR Freshwater (1 hr avg.) dissolved	220			
			CTR Freshwater (4 day avg.) dissolved	24			
Selenium	1	µg/L	CTR Freshwater (1 hr avg.) dissolved	20			
			CTR Freshwater (4 day avg.) dissolved	5			
Silver	0.25	µg/L	CTR Freshwater (1 hr avg.)	0.71	ug/L		
Thallium	1	µg/L	USEPA National Recommended Water Quality Criteria chronic (freshwater)	40	ug/L		
			USEPA National Recommended Water Quality Criteria acute (freshwater)	1400			
Zinc	1	µg/L	LAR Metals TMDL	Dry Weather: Rio Hondo Reach 1 WER[1] x 131	ug/L	Concentration based WQBEL	WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.
				Dry Weather: Rio Hondo Reach 1 WER[1] x 0.16	kg/day	Mass based WQBEL	
				Wet weather: All WER[1] x 1.4 x 10-7 x daily volume (L) – 83			
			Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 2.31	kg/yr	Annual mass based loading in sediment deposited to LAR Estuary	

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			CTR Freshwater (1 hr avg.) dissolved	54	ug/L		
			CTR Freshwater (4 day avg.) dissolved	54			
Mercury	0.5	µg/L	CTR Human Health Protection (30-d avg; fish consumption only)	0.051	µg/L		
2-Chloroethylvinyl ether[4]	1	µg/L	None	None	µg/L		
2-Chlorophenol	2	µg/L	CTR Human Health Protection (Sources of Drinking water)	120	µg/L		
4-Chloro-3-methylphenol	1	µg/L	USEPA National Recommended Water Quality Criteria (Taste & Odor)	3,000	µg/L		
2,4-Dichlorophenol	1	µg/L	CTR Human Health Protection (Sources of Drinking water)	93	µg/L		
2,4-Dimethylphenol	2	µg/L	CTR Human Health Protection (Sources of Drinking water)	540	µg/L		
2,4-Dinitrophenol	5	µg/L	CTR Human Health Protection (Sources of Drinking water)	70	µg/L		
2-Nitrophenol	10	µg/L	None	None	N/A		
4-Nitrophenol	5	µg/L	None	None	N/A		
Pentachlorophenol	2	µg/L	CTR Fresh Water (4 day avg.) at pH 6.5	4	ug/L		
			CTR Freshwater (1 hr avg.) at pH 6.5	5.3			
Phenol	1	µg/L	CTR Human Health Protection (Sources of Drinking water)	21,000	µg/L		
2,4,6-Trichlorophenol	10	µg/L	CTR Human Health Protection (Sources of Drinking water)	2.1	µg/L		
Acenaphthene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	170	µg/L		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			USEPA National Recommended Water Quality Criteria toxicity to algae	520			
Acenaphthylene	2	µg/L	None	None	N/A		
Anthracene	2	µg/L	CTR Human Health Protection (other waters)	110,000	µg/L		
Benzidine	5	µg/L	CTR Human Health Protection (Sources of Drinking water)	0.00012	µg/L		
1,2 Benzanthracene	5	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Benzo(a)pyrene	2	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Benzo(g,h,i)perylene	5	µg/L	None	None	N/A		
3,4 Benzoflouranthene	10	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Benzo(k)flouranthene	2	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Bis(2-Chloroethoxy) methane	5	µg/L	None	None	N/A		
Bis(2-Chloroisopropyl) ether	2	µg/L	None	None	N/A		
Bis(2-Chloroethyl) ether	1	µg/L	None	None	N/A		
Bis(2-Ethylhexl) phthalate	5	µg/L	National Toxics Rule (other waters)	5.9	N/A		
4-Bromophenyl phenyl ether	5	µg/L	None	None	N/A		
Butyl benzyl phthalate	10	µg/L	None	None	N/A		
2-Chloronaphthalene	10	µg/L	None	None	N/A		
4-Chlorophenyl phenyl ether	5	µg/L	None	None	N/A		
Chrysene	5	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Dibenzo(a,h)anthracene	0.1	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
1,3-Dichlorobenzene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	1,120	µg/L		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			USEPA National Recommended Water Quality Criteria chronic (freshwater)	763			
1,4-Dichlorobenzene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	1,120	µg/L		
			USEPA National Recommended Water Quality Criteria chronic (freshwater)	763			
1,2-Dichlorobenzene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	1,120	µg/L		
			USEPA National Recommended Water Quality Criteria chronic (freshwater)	763			
3,3-Dichlorobenzidine	5	µg/L	None	None	N/A		
Diethyl phthalate	2	µg/L	None	None	N/A		
Dimethyl phthalate	2	µg/L	None	None	N/A		
Di-n-Butyl phthalate	10	µg/L	None	None	N/A		
2,4-Dinitrotoluene	5	µg/L	None	None	N/A		
2,6-Dinitrotoluene	5	µg/L	USEPA Toxicity LOEL	330 (acute)	µg/L		
				230 (chronic)			
4,6 Dinitro-2-methylphenol	5	µg/L	None	None	N/A		
1,2-Diphenylhydrazine	1	µg/L	None	None	N/A		
Di-n-Octyl phthalate	10	µg/L	USEPA Toxicity LOEL	940 acute	µg/L		
				3 chronic			
Fluoranthene	0.05	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	398	ug/L		
Fluorene	0.1	µg/L	CTR Human Health Protection (other waters)	14,000	ug/L		
Hexachlorobenzene	1	µg/L	None	None	N/A		
Hexachlorobutadiene	1	µg/L	None	None	N/A		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Hexachloro-cyclopentadiene	5	µg/L	None	None	N/A		
Hexachloroethane	1	µg/L	None	None	N/A		
Indeno(1,2,3-cd)pyrene	0.05	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Isophorone	1	µg/L	None	None	N/A		
Naphthalene	0.2	µg/L	USEPA National Recommended Water Quality Criteria chronic (freshwater)	620	ug/L		
			USEPA National Recommended Water Quality Criteria acute (freshwater)	2,300			
Nitrobenzene	1	µg/L	None	None	N/A		
N-Nitroso-dimethyl amine	5	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	585	ug/L		
N-Nitroso-diphenyl amine	1	µg/L	None	None	N/A		
N-Nitroso-di-n-propyl amine	5	µg/L	None	None	N/A		
Phenanthrene	0.05	µg/L	None	None	N/A		
Pyrene	0.05	µg/L	CTR Human Health Protection (other waters)	11,000	ug/L		
1,2,4-Trichlorobenzene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	250	ug/L		
			USEPA National Recommended Water Quality Criteria chronic (freshwater)	50			
Aldrin	0.005	µg/L	CTR freshwater instantaneous max.	3	ug/L		
alpha-BHC	0.01	µg/L	CTR Human Health Protection (other waters)	0.013	ug/L		
beta-BHC	0.005	µg/L	CTR Human Health Protection (other waters)	0.046	ug/L		
delta-BHC	0.005	µg/L	None	None	N/A		
gamma-BHC (lindane)	0.02	µg/L	CTR Freshwater (1 hr avg.)	0.95	ug/L		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
alpha-chlordane[1]	0.1	µg/L	None	None	N/A		
gamma-chlordane[1]	0.1	µg/L	None	None	N/A		
4,4'-DDD	0.00004	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	0.06	ug/L		
4,4'-DDE	0.00008	ug/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	105	ug/L		
4,4'-DDT	0.00008	µg/L	Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 0.100	g/yr	Annual mass based loading in sediment deposited to LAR Estuary	
			CTR Freshwater (4-day avg.)	0.001	ug/L		
			CTR freshwater instantaneous max.	1.1			
Dieldrin	0.01	µg/L	CTR Freshwater (1 hr avg.)	0.24	ug/L		
			CTR Freshwater (4-day avg.)	0.056			
alpha-Endosulfan	0.02	µg/L	CTR Freshwater (1 hr avg.)	0.22	ug/L		
			CTR Freshwater (4-day avg.)	0.056			
beta-Endosulfan	0.01	µg/L	CTR Freshwater (1 hr avg.)	0.22	ug/L		
			CTR Freshwater (4-day avg.)	0.056			
Endosulfan sulfate	0.05	µg/L	USEPA 24 hr avg	0.056	µg/L		
Endrin	0.01	µg/L	CTR Freshwater (1 hr avg.)	0.086	µg/L		
			CTR Freshwater (4-day avg.)	0.036			
Endrin aldehyde	0.01	µg/L	None	None	N/A		
Heptachlor	0.01	µg/L	National Toxics Rule Freshwater (4-day avg.)	0.0038	ug/L		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			CTR freshwater instantaneous max.	0.52			
Heptachlor epoxide	0.01	µg/L	National Toxics Rule Freshwater (4-day avg.)	0.0038	ug/L		
			CTR freshwater instantaneous max.	0.52			
Toxaphene	0.5	µg/L	CTR Freshwater (1 hr avg.)	0.73	ug/L		
			CTR Freshwater (4-day avg.)	0.0002			
Total PCBs (sum of 166 congeners)	range for all congeners: 0.000005-0.000020	µg/L	Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 0.324	g/yr	Annual mass based loading in sediment deposited to LAR Estuary	
			National Toxics Rule Freshwater (4-day avg.)	0.014	ug/L		
	Total PCBs: 0.00002		California Primary MCL	0.5			
Atrazine	2	µg/L	USEPA National Recommended Water Quality Criteria Freshwater (1-hour avg)	1,500	ug/L		
Chlorpyrifos	0.05	µg/L	California Dept. of Fish and Game Freshwater (1-hour avg)	0.02	ug/L		
			California Dept. of Fish and Game Freshwater (4-day avg)	0.014			
Cyanazine	2	µg/L	None	None	N/A		
Diazinon	0.01	µg/L	California Dept. of Fish and Game Freshwater (4-day avg)	0.05	µg/L		
			California Dept. of Fish and Game Freshwater (1-hour avg)	**0.08**			
Malathion	1	µg/L	USEPA National Recommended Water Quality Criteria for Freshwater Aquatic Life (max instant.)	0.1	µg/L		
Prometryn	2	µg/L	None	None	N/A		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Simazine	2	µg/L	USEPA National Recommended Water Quality Criteria for Freshwater Aquatic Life (max instant.)	10	µg/L		
2,4-D	10	µg/L	USEPA National Recommended Water Quality Criteria (water+fish consumption)	100	ug/L		
Glyphosate	5	µg/L	None	None	N/A		
2,4,5-TP-SILVEX	0.5	µg/L	USEPA National Recommended Water Quality Criteria (water+fish consumption)	10	ug/L		

[1] MAL = Municipal Action Level as defined by Los Angeles County Permit Order No. R4-2012-0175 Attachment G.

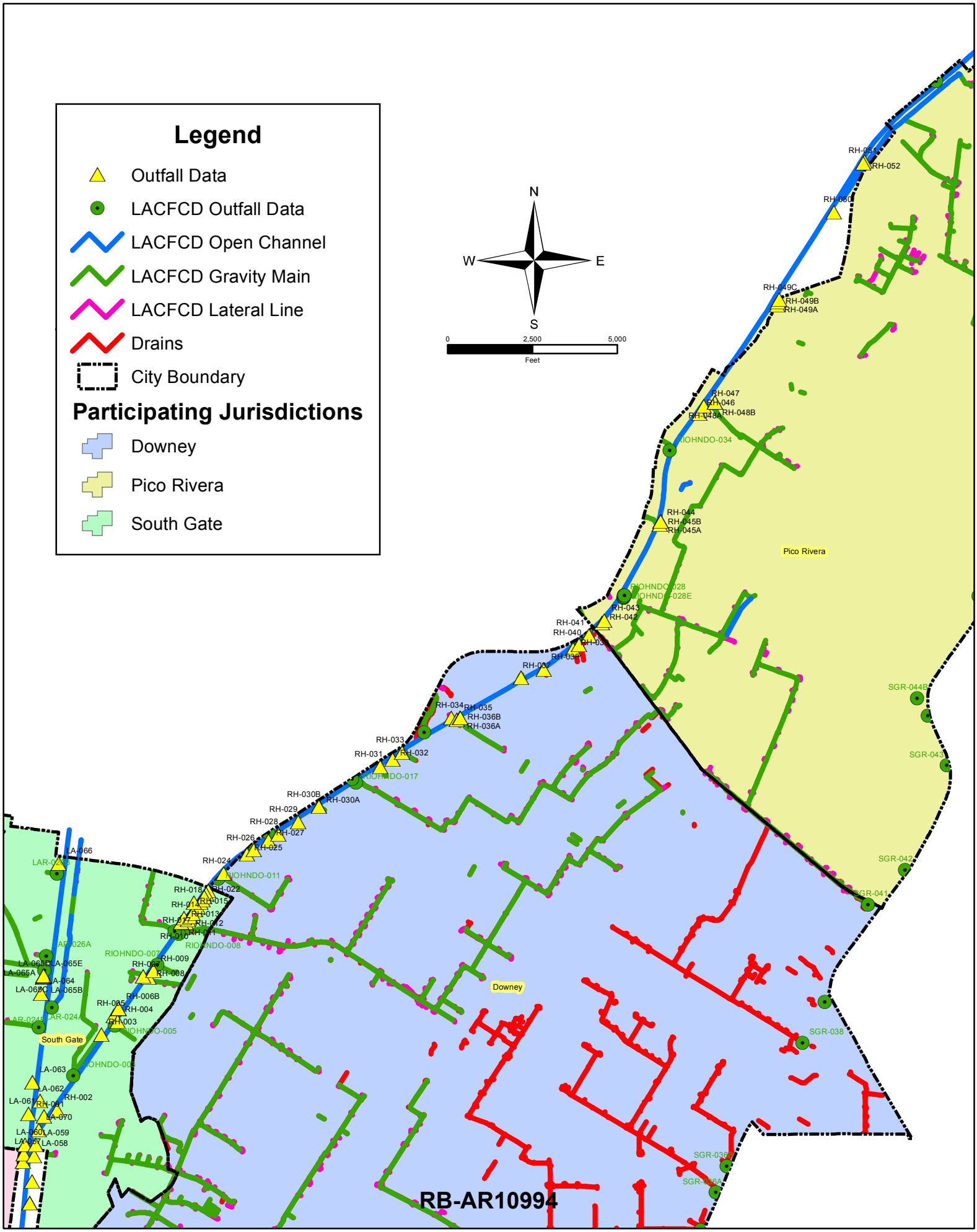
APPENDIX H

Outfall Identification

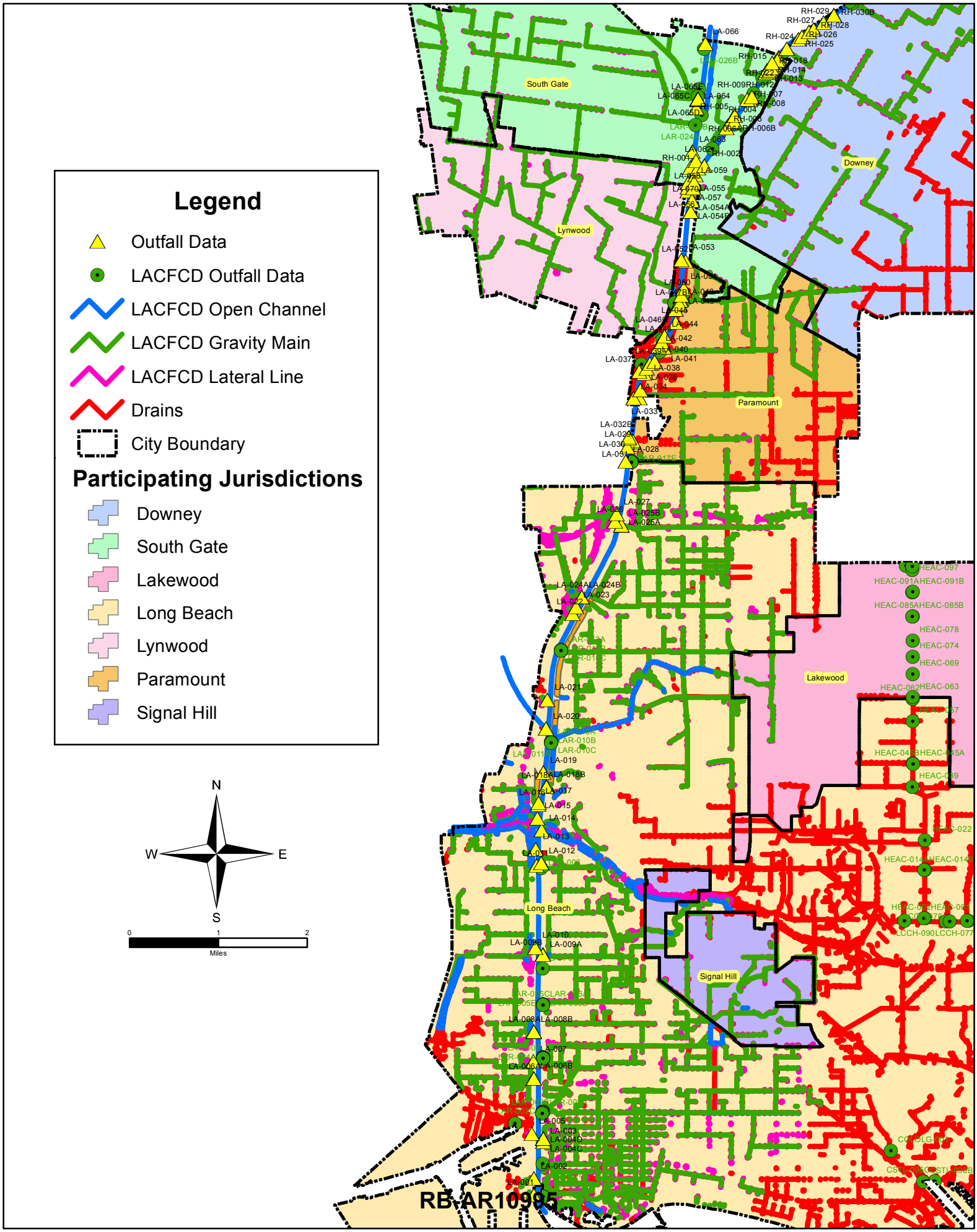
Per Section VII, Attachment E

Outfalls 12 inches and greater were surveyed. Maps showing the location of these outfalls are contained in this Appendix. Photographs collected during the survey and a database with outfall attributes is available upon request.

Rio Hondo Channel



Los Angeles River



Green Street Policy

Purpose

The City of Paramount, Department of Public Works, has established a policy on the implementation of Green Street Best Management Practices (BMPs) for transportation corridors associated with new development, and redevelopment street and roadway projects, including Capital Improvement Projects (CIPs). This policy is enacted to demonstrate compliance with the NPDES MS4 Permit for the Los Angeles Region (Order No. R4-2012-0175).

Green Streets are an amenity that provide many benefits, including water quality improvement, groundwater replenishment, creation of attractive streetscapes, creation of greenbelts, and pedestrian and bicycle accessibility. Green streets are defined as right-of-way areas that incorporate infiltration, biofiltration, and/or storage, and use BMPs to collect, retain, or detain stormwater runoff, as well as design elements that create attractive streetscapes.

Policy

A. Application. The Department of Public Works shall require new private development and/or redevelopment of streets and roadway projects and CIP projects conducted within the right-of-way of transportation corridors to incorporate green street BMPs where the BMPs will not lead to excessive maintenance or deterioration of the street improvements. Transportation corridor projects are on major arterials, as defined in the City of Paramount General Plan, which add at least 10,000 square feet of impervious surface. Routine maintenance or repair and linear utility projects are excluded from these requirements. Routine maintenance includes slurry seals, repaving, and reconstruction of the road or street where the original line and grade are maintained.

B. Amenities. The Department of Public Works shall consider opportunities to replenish groundwater, create attractive streetscapes, and provide pedestrian and bicycle accessibility through new private development and redevelopment of streets and roadway projects and CIPs.

C. Guidance. The Department of Public Works shall use the City of Los Angeles Green Streets guidance, USEPA's *Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets*[1], or equivalent guidance developed by the Department of Public Works for use in public and private developments.

D. Retrofit Scope. The Department of Public Works shall use the City's Watershed Management Program or Enhanced Watershed Management Program to identify opportunities for green street BMP retrofits. Final decisions regarding implementation will be determined by the Director of Public Works based on the availability of adequate funding and consideration of site conditions that might lead to excessive maintenance or deterioration of the proposed improvements.

E. Training. The Department of Public Works shall incorporate aspects of green streets into internal annual staff trainings.

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[1] EPA-833-F-08-009, December 2008.

18. Green Street Policy
CF 90.1

Public Works Director Cash stated that as part of the Municipal Separate Storm Sewer System (MS4) permit, the City of Paramount must adopt a Green Street Policy. He defined what green streets are and discussed the benefits of using a Green Street Policy.

It was moved by Councilmember Lemons and seconded by Councilmember Hansen to approve the Green Street Policy. There were no objections and the motion was passed.

AYES: Councilmembers Hansen, Hofmeyer, Lemons
Vice Mayor Martinez, Mayor Daniels

COMMITTEE REPORTS

Councilmember Lemons reported a few months ago about SEAACA providing grant funds to Paramount for free spaying and neutering of dogs. She provided an update, reporting that the program will not happen in Paramount as SEAACA did not receive the grant funds, and announced that the City of Compton will be holding some clinics offering free spaying and neutering and that Paramount residents would receive notice of them.

COMMENTS FROM STAFF

There were none.

COMMENTS FROM COUNCILMEMBERS

There were none.

CLOSED SESSION

Mayor Daniels recessed the meeting at 7:07 p.m. The meeting reconvened at 7:12 p.m. to discuss the following:

Conference with Legal Counsel, pursuant to Government Code Section 54956.9(c)--Initiation of Litigation
No. of Cases: 1

CERTIFICATION

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES) ss.
CITY OF PARAMOUNT)

I, Lana Chikami, City Clerk of the City of Paramount, California, DO HEREBY CERTIFY that the attached document is a true and correct copy of the City Council of the City of Paramount's **June 4, 2013** minutes approved by the City Council at its regular meeting on June 4, 2013.

Dated: July 28, 2014

Lana Chikami, City Clerk

(SEAL)

H:\CityManager\CERTIF\COPY\Copy-MinutesCC.doc

CITY OF PARAMOUNT
LOS ANGELES COUNTY, CALIFORNIA

ORDINANCE NO. 1041

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF PARAMOUNT, CALIFORNIA, AMENDING CHAPTER 48 OF THE PARAMOUNT MUNICIPAL CODE TO EXPAND THE APPLICABILITY OF THE EXISTING URBAN STORM WATER MITIGATION PLAN PROVISIONS BY IMPOSING RAINWATER LOW IMPACT DEVELOPMENT (LID) STRATEGIES ON PROJECTS THAT REQUIRE BUILDING, GRADING AND ENCROACHMENT PERMITS

WHEREAS, the City is authorized by Article XI, Section 5 and Section 7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity; and

WHEREAS, the federal Clean Water Act establishes Regional Water Quality Control Boards in order to prohibit the discharge of pollutants in stormwater runoff to waters of the United States; and

WHEREAS, the City is a permittee under the California Regional Water Quality Control Board, Los Angeles Region Order No. R4-2012-0175, issued on November 08, 2012 which establishes Waste Discharge Requirements for Municipal Separate Storm Sewer Systems (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4; and

WHEREAS, Order No. R4-2012-0175 contains requirements for municipalities to establish an LID Ordinance in order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program; and

WHEREAS, the Regional Board has adopted Total Maximum Daily Loads (TMDLs) for pollutants which are numerical limits that must be achieved effectively through LID implementation; and

WHEREAS, the City has the authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity that might degrade waters of the State; and

WHEREAS, the City is committed to a stormwater management program that protects water quality and water supply by employing watershed-based approaches that balance environmental and economic considerations; and

WHEREAS, urbanization has led to increased impervious surface areas resulting in increased water runoff and less percolation to groundwater aquifers causing the transport of pollutants to downstream receiving waters; and

WHEREAS, is it the intent of the City to expand the applicability of the existing LID requirements by providing stormwater and rainwater LID strategies for all projects for Development and Redevelopment projects as defined under "Applicability."

THE CITY COUNCIL OF THE CITY OF PARAMOUNT, CALIFORNIA, DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Section 48-1 of the Paramount Municipal Code is hereby amended in its entirety as follows:

Sec. 48-1. Definitions.
The following words, phrases and terms as used in this chapter shall have the meanings ascribed to them in Part 1.

100,000 square foot commercial or development. Any commercial development that creates at least 100,000 square feet of impervious area, including parking areas. (Ord. No. 916)

Act. The Federal Water Pollution Act, also known as the Clean Water Act, as amended, 33 U.S.C. 1251, et seq. (Ord. No. 892)

Adverse impact. A detrimental effect upon water quality or beneficial uses caused by a discharge or loading of a pollutant or pollutants. (Ord. No 892)

Area susceptible to runoff. Any surface exposed to precipitation or in the path of runoff caused by precipitation that leads directly to the street or storm drain. (Ord. No. 916)

Automotive repair shop. A facility that is categorized in any one of the following Standard Industrial Classifications (SIC); Codes 5013, 5014, 5541, 8532-7534, or 7536-7539. (Ord. No. 916)

Automotive service facility. A facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5511, 5541, 7532-7534, and 7536-7539 provided that these facilities have no outside activities or materials that may be exposed to stormwater.

Basin plan. The Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments. (Ord. No. 892)

Beneficial uses. Existing or potential uses of receiving waters as defined in a basin plan. (Ord. No. 892)

Best Management Practice (BMP). Practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters, or designed to reduce the volume of stormwater or non-stormwater discharged to the receiving water. (Ord No. 892)

Board. The City Council of the City of Paramount (Ord. No. 892)

Biofiltration. A LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an under drain and bio-swales.

Bioretention. A LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in this Ordinance, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by Order No. R4-2012-0175 as biofiltration.

Bio-swale. A LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes.

City. The City of Paramount. (Ord. No. 892)

Clean Water Act (CWA). The Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

Code of Federal Regulations (CFR). The codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government of the United States. (Ord. No. 892)

Commercial activity. Any public or private activity not defined as an industrial activity in 40 CFR 122.26(b) (14), involved in the storage, transportation, distribution, exchange or sale of goods and/or commodities or providing professional and/or non-professional services. Commercial activity does not mean a dwelling as defined in Chapter 44 of the code. (Ord. No. 892)

Commercial development. Any development on private land that is not heavy industrial or residential. The category includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities; mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes. (Ord. No. 916)

Commercial malls. Any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers.

Construction activity. Any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that results in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See "Routine Maintenance" definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan. (Ord. No. 892)

Control. To minimize, reduce or eliminate by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities.

County. The Department of Public Works of the County of Los Angeles. (Ord. No. 892)

Department. The Department of Public Works of the City of Paramount. (Ord. No. 892)

Development. Construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail, and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

Directly connected to impervious areas. The area covered by a structure, impervious pavement, and other impervious surfaces, which drains directly into the storm drain without first flowing across pervious land area (i.e. lawns). (Ord. No. 916)

Directly adjacent. Situated within 200 feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area.

Director. The Director of Public Works of the City of Paramount, or his/her authorized deputy, agent, representative, or inspector. (Ord. No. 892)

Discharge. Any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance. (Ord. No. 892)

Discharge exception. Shall mean the group activities not restricted or prohibited by this ordinance, including only:

Discharges composed entirely of storm water; discharges subject to regulation under current EPA or Regional Water Quality Control Board issued NPDES permits, State General Permits, or other waivers, permits or approvals granted by an appropriate governmental agency; discharges for which mitigation measures for construction activity have been permitted pursuant to Chapter 10 of this Code; discharges to the storm drain system from potable water line flushing, fire fighting activities, landscape irrigation systems, diverted stream flows, rising groundwater, and de minimis groundwater infiltration to the storm water drain system (from leaks in joints or connections or cracks in water drainage pipes or conveyance systems); discharges from potable water sources, passive foundation drains, air conditioning condensate and other building roof runoff; water from crawl space pumps, passive footing drains, lawn watering, non-commercial vehicle washing unless otherwise prohibited by this ordinance; flows from riparian habitats and wetlands; dechlorinated swimming pool discharges; discharges of reclaimed water generated by a lawfully permitted water treatment facility, and street wash waters when related to cleaning and maintenance by, or on behalf of, the City. (Ord. No. 892)

Discretionary project. A project that requires the exercise of judgement or deliberation when the public agency or public body decides to approve or disapprove a particular activity, as distinguished from situations where the public agency or body has to determine whether there has been conformity with applicable statutes, ordinances, or regulations. (Ord. No. 916)

Disturbed area. An area that is altered as a result of clearing, grading, and/or excavation.

Flow-through treatment BMPs. A modular, vault type "high flow biotreatment" device contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain.

Full capture system. Any single device or series of devices, certified by the Executive Officer, that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate Q resulting from a one-year, one-hour storm in the sub-drainage area.

General Construction Activities Storm Water Permit (GCASP). The general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from construction activities under certain conditions.

General Industrial Activities Storm Water Permit (GIASP). The general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from certain industrial activities under certain conditions.

Green roof. A LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain.

Good housekeeping practice. A best management practice related to the transfer, storage, use, or cleanup of materials performed in a regular manner that minimizes the discharge of pollutants to the storm drain system and/or receiving waters. (Ord. No. 892)

Hazardous material(s). Any material(s) defined as hazardous by Division 20, Chapter 6.95 of the California Health and Safety Code. (Ord. No. 892)

Hazardous waste. A hazardous material which is to be discharged, discarded, recycled, and/or reprocessed. (Ord. No. 892)

Illicit connection. Any human made conveyance that is connected to the storm drain system without a permit, excluding roof drains which convey only storm water. The term illicit connection shall not include a Legal Non-conforming Connection or connections to the storm drain system that are hereinafter authorized by the agency with jurisdiction over the system at the location at which the connection is made. (Ord. No. 892)

Illicit discharge. Any discharge to the storm drain system that is prohibited under local, state, federal statues, ordinances, codes, or regulations. Illicit discharge includes all non-storm water discharges exept discharges pursuant to a NPDES permit or discharges that are exempted or conditionally exempted by such permit. (Ord. No. 892)

Impervious surface. Any man-made or modified surface that prevents or significantly reduces the entry of water into the underlying soil, resulting in runoff from the surface in greater quantities and/or at an increased rate, when compared to natural conditions prior to development. Examples of places that commonly exhibit impervious surfaces include parking lots, driveways, roadways, storage areas, and rooftops. The imperviousness of these areas commonly results from paving, compacted gravel, compacted earth and oiled earth.

Industrial activity. Any public or private activity which is in any of the 11 categories of activities defined in 40 CFR 122.26(b) (14) and which is required to obtain an NPDES permit. (Ord. No. 892)

Industrial/Commercial facility. Any facility involved and/or used in the production, manufacture, storage, transportation, distribution, exchange or sale of goods and/or commodities, and any facility involved and/or used in providing professional and non-professional services. This category of facilities includes, but is not limited to, any facility defined by either the Standard Industrial Classifications (SIC) or the North American Industry Classification System (NAICS). Facility ownership (federal, state, municipal, private) and profit motive of the facility are not factors in this definition. (Ord. No. 892)

Industrial park. Land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry.

Infiltration. The downward entry of water into the surface of the soil. (Ord. No. 916)

Infiltration BMP. A LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement.

Legal non-conforming connection. Shall mean connections to the storm drain system existing as of the adoption of this ordinance that were in compliance with all federal, state and local rules, regulations, statutes and administrative requirements in effect at the time the connection was established. (Ord. No. 892)

Low Impact Development (LID). Consists of building and landscape features designed to retain or filter stormwater runoff.

Municipal separate storm sewer system (MS4). A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(a) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;

(b) Designed or used for collecting or conveying stormwater;

(c) Which is not a combined sanitary sewer; and

(d) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR Section 122.2.

(Ord. No. 916)
National Pollutant Discharge Elimination System (NPDES). The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA Section 307, 402, 318, and 405. The term includes an "approved program." (Ord. No. 892)

Natural drainage system. A drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

New development. Land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision.

Non-stormwater discharge. Any discharge to a municipal storm drain system that is not composed entirely of stormwater. (Ord. No. 892)

Outfall. A point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances with connect segments of the same stream or other waters of the United Sates and are used to convey waters of the United States. [40 CFR Section 122.26(b)(9)]

Parking lot. Land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces. (Ord. No. 916)

Planning priority projects. Development projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s).

Pollutant. Any "pollutant" defined in Section 502(6) of the Federal Clean Water Act or incorporated into the California Water Code Section 13373 . (Ord. No. 892)

Post construction BMP. A structural on non-structural BMP incorporated into the design of a project to control or reduce the discharge of pollutants from the site after construction is complete for the life of the project. (Ord. No. 916)

Project. All development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code Section 21065).

Rainfall harvest and use. A LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department.

Receiving water. "Water of the United States" into which waste and/or pollutants are or may be discharged. (Ord. No. 892)

Redevelopment. Land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety. (Ord. No 916)

Regional board. The California Regional Water Quality Control Board, Los Angeles Region. (Ord. No. 892)

Restaurant. A facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812). (Ord. No. 916)

Retail gasoline outlet. Any facility engaged in selling gasoline and lubricating oils (Order No. R4-2012-0175). (Ord. No. 916)

Routine maintenance. Includes, but is not limited to projects conducted to:

(a) Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.
(b) Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.
(c) Includes road shoulder work, re-grading dirt or gravel roadways and shoulders and performing ditch cleanouts.
(d) Update existing lines* and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
(e) Repair leaks.

Routine maintenance does not include construction of new** lines or facilities resulting from compliance with applicable codes, standards and regulations.

* Update existing lines includes replacing existing lines with new materials or pipes.

** New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines.

Runoff. Any storm water or non-storm water discharge from any surface and/or drainage area that reaches the storm drain system and/or receiving waters. (Ord. No. 892)

Significant Ecological Areas (SEAs). An area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs, if they possess one or more of the following criteria:

(a) The habitat of rare, endangered, and threatened plant and animal species.
(b) Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.

(c) Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.
(d) Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.
(e) Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.
(f) Areas important as game species habitat or as fisheries.
(g) Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.
(h) Special areas.

Site. Land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity.

Standard Industrial Classification (SIC). A numbering system developed by the United States Government, Office of Budget, for the classification of businesses by the type of activity in which they are engaged. (Ord. No. 916)

State Board. The State Water Resources Control Board. (Ord. No. 892)

Storm drain system. Any facility or any parts of the facility, including streets, gutters, conduits, natural or artificial drains, channels and watercourse that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the City. (Ord. No. 892)

Storm event. A rainfall event that produces more than 0.10 of an inch of precipitation and that is separated from the previous rainfall event by at least 72 hours. (Ord. No. 916)

Storm water or stormwater. Runoff and drainage related to precipitation events (pursuant to 40 CFR Section 122.26(b)(13); 55 Fed. Reg. 47990, 47995 (Nov. 16, 1990). (Ord. No. 892)

Storm Water Pollution Prevention Plan (SWPPP). A plan required by and for which the contents are specified in a NPDES permit. (Ord. No. 892)

Storm water runoff. Part of precipitation (rainfall or snowmelt) which travels across a surface to the storm drain system or receiving water. (Ord. No. 892)

Structural BMP. Any permanent facility constructed to control, treat, store, divert, neutralize, dispose of, and/or monitor runoff in order to reduce or measure pollutants. (Ord. No. 892)

Treatment. The application of engineering systems that use physical, chemical, or biological processes to remove pollutants. Such processes include, but are not limited to, filtration, gravity settling, medial absorption, biodegradation, biological uptake, chemical oxidation and UV radiation. (Ord. No. 916)

Treatment control BMP. Any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media absorption or any physical, biological or chemical process. (Ord. No. 916)

Uncontrolled discharge. Any discharge intentional or accidental, occurring in such a manner that the discharger is unable to determine or regulate the quantity, quality, or effects of the discharge. (Ord. No. 892)

Urban Storm Water Mitigation Plan (USWMP). A plan required as part of the previous Municipal NPDES permit Order No. 01-182, NPDES No. CAS004001 and required plans that designate best management practices (BMPs) that must be used in specific categories of development projects. (Ord. No. 916)

Urban runoff. Surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial or industrial activities involving the use of potable and non-potable water.

U.S. EPA. The United States Environmental Protection Agency. (Ord. No. 892)

Section 2. Section 48-4.5 through Section 48-4.5.5 of the City of Paramount Municipal Code are hereby repealed.

Section 3. Section 48-4.5 of the City of Paramount Municipal Code is hereby added as follows:

Sec. 48-4.5. Low impact development measures for new development and/or redevelopment planning and construction activities.

(a) Objective. The provisions of this Section establish requirements for construction activities and facility operations of Development and Redevelopment projects to comply with the current "Order No. R4-2012-0175," to lessen the water quality impacts of development by using smart growth practices, and integrate LID practices and standards for stormwater pollution mitigation through means of infiltration, evapotranspiration, biofiltration, and rainfall harvest and use. LID shall be inclusive of new development and/or redevelopment requirements.

(b) Scope. This Section contains requirements for stormwater pollution control measures in Development and Redevelopment projects and authorizes the City to further define and adopt stormwater pollution control measures, and to develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies, grant waivers from the LID requirements, and collect funds for projects that are granted waivers. Except as otherwise provided herein, the City shall administer, implement and enforce the provisions of this Section.

(c) Applicability. Development projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate storm water pollution, prior to completion of the project(s), are:

(1) All development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.

(2) Industrial parks 10,000 square feet or more of impervious surface area.

(3) Commercial malls 10,000 square feet or more of impervious surface area.

(4) Retail gasoline outlets with 5,000 square feet or more of impervious surface area.

(5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of impervious surface area.

(6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.

(7) Streets and roads construction of 10,000 square feet or more of impervious surface area. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects.

(8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of impervious surface area.

(9) Redevelopment projects.

a. Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site of Planning Priority Project categories.

b. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.

c. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

d. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

e. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

(d) Effective date. The Planning and Land Development requirements contained in Section 7 of Order No. R4-2012-0175 shall become effective 30 days from the adoption of the Order. This includes Planning Priority Projects that are discretionary permit projects or project phases that have not been deemed complete for processing, or discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals within 90 days of adoption of the Order. Projects that have been deemed complete within 90 days of adoption of the Order are not subject to the requirements Section 7.

(e) Specific requirements. The Site for every Planning Priority Project shall be designed to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use.

(1) Street and road construction of 10,000 square feet or more of impervious surface shall follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets (December 2008 EPA-833-F-08-009) to the maximum extent practicable.

(2) The remainder of Planning Priority Projects shall prepare a LID Plan to comply with the following:

a. Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

1. The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or

2. The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

3. $SWQDv = (2{,}722.5\ ft^3/acre)*[(A_I)(0.9)+(A_P+A_U)(C_U)]*(I_{85\%}/I_{0.75})$

i. A_I = Area of impervious coverage in acres
ii. A_P = Area of Pervious coverage in acres
iii. A_U = Area of Undeveloped area in acres
iv. C_U = Undeveloped runoff coefficient
v. $I_{85\%}$ = Intensity of the storm for the 85th Percentile 24 hour storm
vi. $I_{0.75}$ = Intensity of the storm for the 0.75 inch, 24-hour rain event

b. To demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use, and that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect. Technical infeasibility may result from conditions including the following:

1. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.

2. Locations where seasonal high groundwater is within five to ten feet of surface grade;

3. Locations within 100 feet of a groundwater well used for drinking water;

4. Brownfield development sites or other locations where pollutant mobilization is a documented concern;

5. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

c. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in Attachment H of Order No. R4-2012-0175.

1. Additional alternative compliance options such as offsite infiltration and groundwater replenishment projects may be available to the project site. The project site should contact the City of Paramount to determine eligibility.

d. The remaining SWQDv that cannot be retained or bioretained onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per Table 11 of Order No. R4-2012-0175. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

1. 0.2 inches per hour, or

2. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

(f) Content of the LID Plan. The LID plan required by this section shall be prepared by a registered Civil Engineer, Licensed Architect, Landscape Architect or any other professional knowledgeable about Storm Water Quality Issues and shall document in detail the requirements established above. The plan shall identify the treatment BMPs that are required to reduce the pollutant load from the discharges of the SWQDv that cannot be infiltrated, bio-retained or captured and used on the development and redevelopment site and the BMPs that are proposed to treat the discharge from the property above the SWQDv. The LID plan shall also identify the following:

(1) Provide storm drain system stenciling and signage. All Storm Drain inlets from a project shall be clearly labeled to indicate that "No Dumping, Drains to Ocean" Label shall be maintained at least annually as needed.

(2) Proper design of trash storage areas. Trash enclosure areas shall not be designed in the path of drainage nor shall roof drainage downspouts discharge to the trash enclosure.

(3) Vehicle/equipment wash areas. If a project is designed with a vehicle/equipment wash area the design shall include a roof to prevent rainwater from entering the area along with a berm to prevent site drainage from entering the area. The wash area shall be connected to the Sanitary Sewer.

(4) Proof of ongoing maintenance. The plan shall incorporate record keeping standards to document maintenance of structural BMPs to assure ongoing operation of the system. Records shall be kept for three (3) years. The records shall be made available for inspection upon the request of the City Engineer, the Regional Water Quality Control Board or the USEPA or their designated agent during normal business hours.

(g) Project specific issues to be addressed by the LID Plan. In addition to the items identified above the LID Plan shall also consider issues unique to the occupancy:

(1) Automotive repair shops.

a. Proper design of fueling areas. If provided at an Automotive repair shop Fueling facilities shall be designed as required for Retail Gasoline outlets below.

b. Proper design of outside material storage areas. Areas used for storage of vehicles under repair or for storage of spare parts or the storage of used oil products shall be designed to minimize the exposure of stored cars, parts or fluids to rain fall.

c. Proper design of maintenance bays. Repair/Maintenance bays shall be within a building or under a roof to eliminate the exposure of vehicles being repaired to rain fall. The bays shall also be designed to allow for the collection of all fluid spills and floor wash down runoff. Fluid spills and floor wash down runoff shall either be collected and discharged to the Sanitary sewer or shall be collected by other means and disposed of as required by State Law or USEPA regulations. Automotive fluids and greases shall not be discharged to areas exposed to rain fall.

d. Spill prevention and cleanup. Spill prevention and cleanup materials shall be maintained on site and staff shall be trained in its proper use.

(2) Industrial/commerial developments with more than 10,000 sq. ft. of impervious area.

a. Proper design of outside material storage areas. Areas used for storage of storage of raw materials, finished products or merchandise shall be designed to minimize the exposure of stored materials to rain fall.

b. Proper design of maintenance bays. Repair/Maintenance bays shall be within a building or under a roof to eliminate the maintenance of vehicles from rain fall. The bays shall also be designed to allow for the collection of all fluid spills and floor wash down runoff. Fluid spills and floor wash down runoff shall either be collected and discharged to the Sanitary sewer or shall be collected by other means and disposed of as required by State Law or USEPA regulations. Automotive fluids and greases shall not be discharged to areas exposed to rain fall.

c. Proper design of loading and unloading areas. Loading and Unloading areas shall be roof where practical to limit the exposure of materials to rain fall. Spill prevention and cleanup materials shall be maintained on site and staff shall be trained in its proper use.

(3) Restaurants.

a. Properly designed equipment/accessory wash areas. Projects in this classification shall be designed with an area for the washing of floor mats and other large equipment that is connected to the sanitary sewer system. The area shall be roofed to prevent the entranceof rainwater or shall be designed to activate a valve to transfer the discharge from the storm drain to the sanitary sewer when mats or equipment are being washed. The operator may, upon submission of substantial proof, eliminate the wash area if no floor mats or equipment will be washed outside.

b. Proper design of outside storage areas. Projects shall be designed to limit the exposure to rain fall or rainwater runoff for materials stored outside. This provision shall apply to, but not be limited to, the storage of fryer fat stored for recycling, cardboard or paper storage intended for recycling, and waste food products stored for recycling or disposal. The storage of these materials shall be under a roof whenever possible.

(4) Retail gasoline outlets.

a. Properly design fueling areas. Fueling facilities for a new Retail Gasoline outlet project shall be constructed in compliance with the Service Station Managers Association guidelines.

b. Proper design of outside material storage areas. Areas used for storage of vehicles under repair or for storage of spare parts or the storage of used oil products shall be designed to minimize the exposure of stored cars, parts or fluids to rain fall.

c. Proper design of maintenance bays. Repair/Maintenance bays shall be within a building or under a roof to eliminate the exposure of vehicles being repaired to rain fall. The bays shall also be designed to allow for the collection of all fluid spills and floor wash down runoff. Fluid spills and floor wash down runoff shall either be collected and discharged to the Sanitary sewer or shall be collected by other means and disposed of as required by State Law or USEPA regulations. Automotive fluids and greases shall not be discharged to areas exposed to rain fall.

(5) Parking lots.

a. As required above the SWQDv shall be retained on site for infiltration.

b. Sweep lot regularly to limit the accumulation of trash and debris. Also inspect the lot once per month for the accumulation of oil on the parking lot pavement. The inspection shall be documented with an inspection report and any accumulated oil or grease shall be removed to limit the exposure of oil and grease to rain fall.

(h) Review of the LID Plan by the City. The City shall review the LID Plan to assure that all elements of the plan have been addressed and that the applicant has identified the areas to be set aside for the infiltration of the SWQDv and for the BMPs necessary to protect the storm drain system. If the plan is found to comply with the provisions of this section the grading and building permits may be issued for the project. If during construction, the plan is found to be deficient by the City or any other interested party the applicant shall amend the plan to address the deficiencies.

(i) Filing of LID Plan with the County Recorder. Upon acceptance of the LID plan by the City the applicant shall file a signed original of the plan with the County Recorder. The document shall bebinding on the applicant and all successors in interest to the property. The form shall be provided by the City and shall only be amended or deleted from title with the consent of the City.

(j) Other agencies of the City of Paramount. All Paramount departments, offices, entities and agencies, shall establish administrative procedures necessary to implement the provisions of this Article on the Development and Redevelopment projects and report their activities to the Public Works Department

(k) Validity. If any provision of this Ordinance is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect remaining provisions of this Ordinance are declared to be severable.

PASSED, APPROVED, and ADOPTED by the City Council of the City of Paramount this 2nd day of July 2013.

Gene Daniels, Mayor

ATTEST:

Lana Chikami, City Clerk

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STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES) ss.
CITY OF PARAMOUNT)

I, Lana Chikami, City Clerk of the City of Paramount, California, DO HEREBY CERTIFY that the foregoing **ORDINANCE NO. 1041** was introduced at a regular meeting of the City Council held on **June 4, 2013** and adopted at a regular meeting of the City Council held on **July 2, 2013** by the following vote, to wit; and said Ordinance has been duly signed by the Mayor, attested by the City Clerk, and published pursuant to law:

AYES:	COUNCILMEMBERS:	Hansen, Hofmeyer, Lemons Mayor Daniels
NOES:	COUNCILMEMBERS:	None
ABSENT:	COUNCILMEMBERS:	Vice Mayor Martinez
ABSTAIN:	COUNCILMEMBERS:	None

Dated: July 3, 2013

Lana Chikami, City Clerk

(SEAL)

PARAMOUNT JOURNAL
Date of Publication: July 11, 2013
Three (3) Affidavits

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CERTIFICATION

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES) ss.
CITY OF PARAMOUNT)

I, Lana Chikami, City Clerk of the City of Paramount, California, DO HEREBY CERTIFY that the foregoing document is a true and correct copy of City of Paramount **Ordinance No. 1041** that was adopted by the City Council of the City of Paramount at their meeting held on July 2, 2013.

Signed and sealed this 28th day of July 2014.

Lana Chikami, City Clerk

(SEAL)

RESOLUTION NO. 6758

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PICO RIVERA, CALIFORNIA, APPROVING A GREEN STREETS POLICY

WHEREAS, on November 8, 2012, the California Regional Water Quality Control Board, Los Angeles Region (hereinafter "Regional Board") adopted Order No. R4-2012-0175, NPDES Permit No. CAS 004001, the Municipal Separate Storm Sewer Permit for Los Angeles County (hereinafter "MS4 Permit"); and

WHEREAS, among other things, the MS4 Permit requires the City of Pico Rivera (hereinafter "City") and other subject MS4 permittees to establish a "Green Streets" policy to reduce stormwater runoff discharges from municipal and private streets to receiving waters; and

WHEREAS, by this resolution, the City intends to implement a Green Streets program in accordance with USEPA and other applicable guidelines through: (1) the Planning and Land Development/Standard Urban Stormwater Mitigation Plan (SUSMP) program that will require Low Impact Development (LID) controls for private developments that call for the construction of new streets 10,000 square feet or more; and (2) its public agency program for public street projects that exceed this threshold; and

WHEREAS, Green Street LID techniques shall be incorporated into the City's Planning and Land Use Development/SUSMP program and triggered by: 1) residential, commercial, or industrial developments that include streets 10,000 square feet or more in area; or 2) street and road redevelopment resulting in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already redeveloped site; and

WHEREAS, Green Street LID techniques shall also apply to the construction of any new public street or roadway, as a capital improvement project, triggered by the 10,000 square foot threshold, and

WHEREAS, the City's selection of LID techniques shall generally include but not be limited to bio-swales, bio-retention curb extensions and sidewalk planters, and permeable unit pavers—the selection of which shall depend on project location, soil conditions, average daily traffic, and cost;

WHEREAS, green controls for streets and roadways shall be designed to infiltrate, or treat if infiltration is infeasible, reduce the volume of runoff resulting from a 85th percentile 24 hour storm event, to the maximum extent practicable.

NOW, THEREFORE, THE CITY COUNCIL OF PICO RIVERA DOES HEREBY RESOLVE THE FOLLOWING:

SECTION 1. Direct the Director of Public Works to implement Green Street for publicly owned street and road projects that add 10,000 square feet or more of impervious area following the USEPA's Wet Weather With Green Infrastructure guidance (December 2008 EPA- F-08-009) and City of Pico Rivera Green Street Manual to the maximum extent practicable.

SECTION 2. Directs the Director of Public Works to implement Green Streets for transportation corridors as described in the City of Pico Rivera's Green Streets Manual.

SECTION 3. Routine maintenance including, but not limited to, slurry seals, grind and overlay, chip seal, and reconstruction to maintain original line grade are exempt from the Green Streets Policy.

SECTION 4. The Director of Public Works is authorized to modify the City of Pico Rivera's Green Streets Manual from time to time to maintain consistency with the most current MS4 permit.

SECTION 5. The City Clerk shall certify to the passage and adoption of this resolution and hereafter the same shall be in full force and effect.

APPROVED AND ADOPTED this 22nd day of April, 2014.

Brent A. Tercero, Mayor

ATTEST:

Anna M. Jerome, City Clerk

Arnold M. Alvarez-Glasman, City Attorney

AYES: Archuleta, Armenta, Camacho
NOES: None
ABSENT: Salcido
ABSTAIN: Tercero

ORDINANCE NO. 1086

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF PICO RIVERA, CALIFORNIA, AMENDING PICO RIVERA MUNICIPAL CODE CHAPTER 16.04, STORM WATER AND URBAN RUNOFF POLLUTION PREVENTION

WHEREAS, the City is authorized by Article XI, Section 5 and Section 7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity; and

WHEREAS, the City is a permittee under the California Regional Water Quality Control Board, Los Angeles Region Order No. R4-2012-0175, issued on November 08, 2012 which establishes Waste Discharge Requirements for Municipal Separate Storm Sewer Systems (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those discharges originating from the City of Pico Rivera; and

WHEREAS, the MS4 Permit requires the adoption of an Low Impact Development (LID) ordinances; and

WHEREAS, City Staff, a technical consultant and the City attorney have reviewed the requirements and prepared the following recommended revisions to the Pico Rivera Municipal Code to bring it into conformance with the MS4 Permit

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF PICO RIVERA, CALIFORNIA, DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1. Chapter 16.04 Storm Water and Urban Runoff Pollution Prevention of Title 16 (Environment) of the Pico Rivera Municipal Code is hereby repealed and replaced in entirety with the following text:

Chapter 16.04 STORM WATER AND URBAN RUNOFF POLLUTION PREVENTION

16.04.010 Purpose and intent.

The purpose of this chapter is to protect and improve water quality of receiving waters by:

1. Reducing illicit discharges to the municipal storm water system to the maximum extent practicable;
2. Eliminating illicit connections to the municipal storm water system;
3. Eliminating spillage, dumping, and disposal of pollutant materials into the municipal storm water system; and
4. Reducing pollutant loads in storm water and urban runoff, from land uses and activities identified in the municipal NPDES permit.
5. Reducing the contribution of pollutants to the MS4 through interagency coordination.

The provisions of this chapter are adopted pursuant to the Federal Water Pollution Control Act, also known as the "Clean Water Act," codified and amended at 33 U.S.C. 1251 et seq. The intent of this chapter is to enhance and protect the water quality of the receiving waters

of the United States in a manner that is consistent with the Clean Water Act and acts amendatory thereof or supplementary thereto; applicable implementing regulations; the Municipal NPDES permit, and any amendment, revision, or re-issuance thereof. (Ord. 989 § 1 (part), 2002)

16.04.020 Definitions.

For the purpose of the provisions of this chapter concerning water quality hereinafter set forth, the following words and phrases shall be construed to have the meanings set forth, unless it is apparent from the context that a different meaning is intended:

"Automotive Service Facility" means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5511, 5541, 7532-7534, and 7536-7539 provided that these facilities have no outside activities or materials that may be exposed to storm water.

"Basin Plan" means the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments.

"Best management practices" or "BMPs" are practices, physical devices, or systems designed to prevent or reduce pollutant loading from storm water or non-storm water discharges to receiving waters, or designed to reduce the volume of storm water or non-storm water discharged to the receiving water.

"Clean Water Act" means the Federal Water Pollution Control Act as amended, 33 U.S.C. 1251, et seq.

"Commercial facility" means any development on private land that is not industrial or residential. The category includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities; mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes, restaurants, automotive service facilities, automotive dealerships, and retail gasoline station outlets or any other definition provided in the municipal NPDES permit or Storm Water Quality Management Plan.

"Discharge" means any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

"Disturbed Area" means an area that is altered as a result of clearing, grading, and/or excavation.

"Executive officer" means executive officer of the California Regional Water Quality Control Board, Los Angeles.

"Illicit connection" means any man-made conveyance that is connected to the storm drain system without a permit, excluding roof drains and other similar type connections. Examples

include channels, pipelines, conduits, inlets, or outlets that are connected directly to the storm drain system.

"Illicit discharge" means any discharge into the MS4, or from the MS4 into a receiving water, that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations. The term illicit discharge includes any non-storm water discharge, except authorized non-storm water discharges; conditionally exempt non-storm water discharges; and non-storm water discharges resulting from natural flows specifically identified in Part III.A.1.d.

"Industrial activity" means any of the ten classifications of industrial facilities specified in 40 Code of Federal Regulations § 122.26(b)(14), defined by Standard Industrial Classification (SIC) and which is required to obtain a NPDES permit, not including construction activities.

"Low Impact Development (LID)" consists of building and landscape features designed to retain or filter stormwater runoff.

"Maximum extent practicable" or "MEP" means the extent to which the City can reduce the discharge of pollutants in stormwater runoff. MEP requires selecting and implementing effective BMPs, and rejecting applicable BMPs only where: (i) other effective BMPs will serve the same purpose; (ii) the BMPs would not be technically feasible; or (iii) the cost would be prohibitive. Factors considered include, but are not limited to:

(i) Effectiveness: Whether the BMP addresses a pollutant of concern
(ii) Regulatory Compliance: Whether the BMP complies with storm water regulations, as well as other environmental regulations
(iii) Public acceptance: Whether the BMP has public support
(iv) Cost: Whether the cost of implementing the BMP has a reasonable relationship to the pollution control benefits achieved
(v) Technical Feasibility: Whether the BMP is technically feasible, considering soils, geography, and water resources

"Municipal NPDES permit" means California Regional Water Quality Control Board, Los Angeles Region, Order No. R4-2012-0175, NPDES Permit No. CAS004001 Waste Discharge Requirements For Municipal Separate Storm Sewer System (MS4) Discharge Within the Coastal Watersheds of Los Angeles County, Except Those Discharges Originating From the City of Long Beach MS4, and any amendment thereto or re-issuance thereof.

"Municipal separate storm sewer system" (referred to herein as "MS4"), means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated

and approved management agency under section 208 of the CWA that discharges to waters of the United States;

(ii) Designed or used for collecting or conveying stormwater;

(iii) Which is not a combined sewer; and

(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined in 40 CFR Section 122.2.(40 CFR Section 122.26(b)(8)).

"Non-storm water discharge" means any fluid discharge to the storm drain system and/or receiving waters that is not composed entirely of storm water but may not necessarily be an illicit discharge.

"NPDES" or "National Pollutant Discharge Elimination System" means the national permitting program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Clean Water Act (CWA) §307, 402, 318, and 405. The term includes an "approved program."

Mandated by Congress under the Clean Water Act, the NPDES Stormwater Program is a comprehensive two-phased national program for addressing the non-agricultural sources of stormwater discharges which adversely affect the quality of our nation's waters. The program uses the National Pollutant Discharge Elimination System (NPDES) permitting mechanism to require the implementation of controls designed to prevent harmful pollutants from being washed by stormwater runoff into local water bodies.

"Outfall" means a point source as defined in the Code of Federal Regulations (CFR) at 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States, and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances with connect segments of the same stream or other waters of the United Sates, and are used to convey waters of the United States (40 CFR Section 122.26(b)(9)) (Order No. R4-2012-0175).

"Owner" as applied to a building or real property, means any part owner, joint owner, tenant in common, tenant in partnership, joint tenant or tenant by the entirety of the whole or of a part of such building or real property.

"Person" means, within the context of this chapter, any natural person, firm, association, organization, partnership, business trust, corporation, or company.

"Pollutant" or "Pollutants" means those "pollutants" defined in CWA §502(6) (33.U.S.C.§1362(6)), and incorporated by reference into California Water Code §13373, and may include, but is not limited to, garbage, debris, lawn clippings, leaves, fecal waste, biological waste, sediment, sludge, manure, fertilizers, pesticides, oil, grease, gasoline, paints, solvents, cleaners, and any fluid or solid containing toxic or non-toxic chemicals, metals, including batteries.

"Public works director" means the Director of Public Works of the City of Pico Rivera.

"Receiving waters" means rivers, lakes, oceans, or other bodies of water that receive runoff.

"Redevelopment" means land-disturbing activity that results in the creation, addition, or replacement of five thousand (5000) square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint, addition or replacement of a structure, replacement of impervious surface area that is not part of a routine maintenance activity, and land disturbing activities related to structural or impervious surfaces. Redevelopment does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

"Regional Board" means the appointed members of the California Regional Water Quality Control Board, Los Angeles Region.

"Restaurant" means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812).

"Retail Gasoline Outlet" means any facility engaged in selling gasoline and lubricating oils .

"Runoff" means any runoff including storm water and dry weather flows from a drainage area that reaches a receiving water body or subsurface. During dry weather it is typically comprised of base flow either contaminated with pollutants or uncontaminated, and nuisance flows.

"State Board" means the State Water Resources Control Board of the California Environmental Protection Agency (hereinafter "SWRCB").

"Storm water runoff" means any surface water flow produced by rain or snow melt.

"Standard Urban storm water mitigation program" means the Los Angeles Countywide Storm Water Quality Management Program which includes descriptions of programs, collectively developed by the permitees in accordance with provisions of the NPDES permit, to comply with applicable federal and state law, as the same is amended from time to time. (Ord. 989 § 1 (part), 2002)

16.04.030 Illicit discharges, dumping, and non-storm water discharges.

A. No person shall cause or allow an illicit discharge to enter the municipal storm water system.

B. No person shall place, dump, dispose, litter, accumulate, maintain, discharge, or cause to enter into the MS4, any pollutant or any foreign object such as batteries, tires, waste receptacles, yard debris, refuse, rubbish, food waste, chemicals, animal waste or oil cans, which are also considered illicit discharges.

C. Any person causing an illicit discharge to the MS4 may be required to pay for the cost of clean-up and remediation.

D. Any owner of any private property from which a non-storm water discharge is observed may be required to pay for the cost of collecting and analyzing the discharge to determine if it is an illicit discharge.

E. Discharges identified in Part III.A of the 2012 NPDES MS4 permit are considered exempt or conditionally exempt illicit discharges.

16.04.040 Illicit connections.

A. No person shall maintain or intentionally use a connection that operates to convey an illicit discharge to the municipal storm water system.

B. Upon discovery of an illicit connection, the person owning or operating such connection shall either remove it or render it incapable of conveying an illicit discharge.

C. If any person fails to eliminate an illicit connection after being called upon by the city to do so, the city administrator or the Director of Public Works or his/her designee(s), shall impose appropriate measures to remove or disable the illicit connection and may recover the costs from the owner of such illicit connection. (Ord. 989 § 1 (part), 2002)

16.04.050 Reduction of pollutants in runoff.

No person shall cause, or threaten to cause, the discharge of pollutants to the MS4 by exposing such pollutants to storm water runoff. (Ord. 989 § 1 (part), 2002)

16.04.060 Control of pollutants from commercial facilities.

Subject commercial facilities shall implement BMPs prescribed by the Regional Board or its executive officer, through programs or actions made pursuant to the municipal NPDES permit, as called for more particularly in the city's storm water quality management program, or any revisions made thereto. (Ord. 989 § 1 (part), 2002)

16.04.070 Control of pollutants from industrial activities.

A. It shall be a violation of this chapter for any industry in the city that is subject to waste discharge requirements specified in the SWRCB Water Quality —Control Board's Industrial General Permit (IGP), or any revision or re-issuance thereof, to operate without a general industrial activities stormwater NPDES permit.

B. Industries that require a NPDES IGP permit shall retain on-site the following documents: (i) a copy of the notice of intent for general permit to discharge storm water associated with industrial activity; (ii) a waste discharge identification number issued by the SWRCB; and/or (iii) a storm water pollution prevention plan and monitoring program plan.; (4) any storm_water quality data; and (5) evidence of facility self-inspection.

C. Any industry in the city requiring a NPDES IGP permit shall, upon reasonable request from a duly authorized officer of the Cty, provide any of the documents described in subsection B of this section. (Ord. 989 § 1 (part), 2002)

D. Industrial facilities not subject to the NPDES Industrial General permit that are subject to pollution control requirements under the municipal NPDES permit, shall implement BMPs prescribed by the ;Regional bBoard or its executive officer, through programs or actions made pursuant to the Municipal NPDES permit.

16.04.080 Control of pollutants from other industrial facilities.

Industrial facilities not subject to the general industrial activities storm water NPDES permit but subject to pollution control requirements under the municipal NPDES permit, shall implement BMPs prescribed by the regional board or its executive officer, through programs or actions made pursuant to the municipal NPDES permit. (Ord. 989 § 1 (part), 2002)

16.04.090 Control of pollutants from state permitted construction activities.

A. No person shall commence or continue any construction activity in the city that causes the disturbance of one acre or more of soil by clearing, grading, and excavating without demonstrating to the city that such person has obtained a NPDES Construction General Permit from the SWRCB. The NPDES Construction General Permit does not apply to the following construction activity:

(1) Routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility;
(2) Disturbances to land surfaces solely related to agricultural operations such as disking, harrowing, terracing and leveling, and soil preparation;
(3) Construction activity covered by an individual NPDES Permit for storm water discharges;
(4) Landfill construction activity that is subject to the Industrial General Permit; or
(5) Construction activity that discharges to Combined Sewer Systems.

In the case of a public emergency that requires immediate construction activities, a discharger shall submit a brief description of the emergency construction activity within five days of the onset of construction, and then shall submit all PRDs within thirty days.

B. Any person engaged in a construction activity requiring a general construction activity storm water NPDES permit shall retain at the construction site the following documents: (i) a copy of the notice of intent to comply with terms of the general permit to discharge water associated with construction activity; (ii) a waste discharge identification number issued by the SWRCB; (iii) a storm water pollution prevention plan and monitoring program plan for the construction activity requiring the construction permit; and (iv) records of all inspections, compliance and non-compliance reports, evidence of self-inspection and good housekeeping practices.

C. Any person engaged in a construction activity in the city requiring an NPDES general construction storm water activity permit shall, upon reasonable request from a duly authorized officer of the city, provide any of the documents specified in subsection B of this section and shall retain said documents for at least three years after completion of construction. (Ord. 989 § 1 (part), 2002)

D. Construction activity not subject to the NPDES Industrial General permit that are subject to pollution control requirements under the Municipal NPDES Permit, shall implement BMP's prescribed by the Regional Board or its executive officer, through programs or actions made pursuant to the Municipal NPDES Permit.

16.04.100 Control of pollutants from other construction activities.

Any person engaged in a construction activity that is not subject to the general construction storm water activity NPDES permit, but is subject to the municipal NPDES permit, shall comply with all requirements specified in the storm water management quality program, including any revisions made thereto. (Ord. 989 § 1 (part), 2002)

16.04.110 Control of pollutants from new developments/redevelopment projects.

A. Standard Urban Storm Water Mitigation Program (SUSMP) - Subject new development and redevelopment projects are required to comply with SUSMP conditions assigned by the City that shall consist of: (1) low impact development ("LID") structural and non-structural best management practices ("BMPs"); (2) source control BMPs; and (3) structural and non-structural BMPs for specific types of uses. LID controls effectively reduce the amount of impervious area of a completed project site and promote the use of infiltration and other controls that reduce runoff. Source control BMPs prevent runoff contact with pollutant materials that would otherwise be discharged to the MS4. Specific structural controls are also required to address pollutant discharges from certain uses including but not limited to developments, retail gasoline outlets, automotive service facilities, restaurants, and industrial and commercial facilities where pollutant materials are disposed, stored, or handled.

B. Standard Urban Storm Water Mitigation Plan Review and Approval - An applicant for a subject new development or a redevelopment project shall incorporate into the applicant's project plans into a SUSMP plan subject to City review and approval.

C. California Environmental Quality Act ("CEQA") - Any project subject to CEQA review but is not specified in a redevelopment or development project category may be required to comply with any of the SUSMP requirements at the City's discretion.

D. Storm Water Management/Watershed Management Program - The City's stormwater management program ("SWMP") plan or watershed management program ("WMP") plan, whichever is in effect at the time of review, shall contain specific conditions and procedures for meeting Planning Land Development and SUSMP requirements. The program plans shall contain guidance documents to facilitate compliance including but not limited to an updated SUSMP guidance manual, a Low Impact Development (LID) Guidance Manual, and Green Street Manual referencing the USEPA's guidance regarding Managing Wet Weather with Green Infrastructure Manual.

E. Certificate of Occupancy - As a condition for issuing a Certificate of Occupancy for new development or redevelopment project, the authorized enforcement officer shall require facility operators and/or owners to build all the storm water pollution control Best Management Practices and structural or treatment control BMPs that are shown on the approved project plans and to submit a signed certification statement stating that the site and all structural or treatment control BMPs will be maintained in compliance with the SUSMP and other applicable regulatory requirements.

F. Transfer of Properties- The transfer or lease of a property subject to a requirement for maintenance of structural and treatment control BMPs shall include conditions requiring the transferee and its successors and assigns to either: (i) assume responsibility for maintenance of any existing structural or treatment control BMP, or (ii) to replace existing structural or treatment control BMPs with new control measures or BMPs meeting the then current standards of the City and the SUSMP. Such requirement shall be included in any sale or lease agreement or deed for such property. The condition of transfer shall include a provision that the successor property owner or lessee conduct maintenance inspections of all structural or treatment control BMPs at least once a year and retain proof of inspection.

1. For residential properties where the structural or treatment control BMPs are located within a common area which will be maintained by a homeowner's association, language regarding the responsibility for maintenance shall be included in the project's conditions, covenants and restrictions (CC&Rs). Printed educational material will be required to accompany the first deed transfer to highlight the existence of the requirement and to provide information on what storm water management facilities are present, signs that maintenance is needed, and how the necessary maintenance can be performed. The transfer of this information shall also be required with any subsequent sale of the property.

2. If structural or treatment control BMPs are located within an area proposed for dedication to a public agency, they will be the responsibility of the developer until the dedication is accepted.

16.04.120 Enforcement—Authority.

A. The Director of Public Works, the City Engineer, and duly authorized representatives thereof, are hereby authorized and directed to enforce all provisions of this chapter.

B. Nothing in this chapter precludes a local authority from using regular full-time employees to enforce this chapter. This authority shall be in addition to the authority granted to police and code enforcement officers.

C. Fees to be charged for plan checking, inspection, enforcement and any other activities carried out by the city shall be specified by resolution of the city council. (Ord. 989 § 1 (part), 2002)

16.04.130 Enforcement—Right of entry and inspection.

A. The Director of Public Works, City Engineer, or duly authorized designee thereof, may, on twenty-four hours' oral or written notice, unless exigent circumstances justify a shorter time period, enter upon and inspect any private premises for the purposes of verifying compliance with the terms of this chapter and perform any duty imposed upon the officer by this chapter, provided that:

1. If such building or premises is occupied, he or she shall first present proper credentials and request entry.

2. If such building or premises is unoccupied, he or she shall first make a reasonable effort to locate the owner or occupant of the building or premises and request entry. In the event

that a request for entry is refused, the officer is hereby empowered to seek assistance from any court of competent jurisdiction in obtaining such entry.

B. Such inspection may include, but is not limited to:

1. Identifying products produced, processes conducted, chemicals and materials used, stored or maintained on the subject premises;

2. Identifying points of discharge of all waste water, non-stormwater, processed water system and pollutants;

3. Investigating the natural slope of the premises, including drainage patterns and man-made conveyance systems;

4. Establishing location of all points of discharge from the premises, whether by surface runoff or through a storm drain system;

5. Locating any illicit connection or illicit discharge;

6. Inspecting a vehicle, truck, trailer, tank or other mobile equipment;

7. Inspecting all records of the owner or occupant of public or private property relating to chemicals or processes presently or previously stored or occurring on the property, including material and/or chemical inventories, facilities maps or schematics and diagrams, material safety data sheets, hazardous waste manifests, business plans, pollution prevention plans, pollution prevention plans, state general permits, storm water pollution prevention plans, state general permits, storm water pollution prevention plans, and any and all records relating to illicit connections, illicit discharges, or any other source of contribution or potential contribution of pollutants to the municipal storm drain system;

8. Inspecting, sampling and testing any area runoff, soils area (including groundwater testing), process discharge, materials with any waste storage area (including any container contents), and/or treatment system discharges for the purpose of determining the potential for contribution of pollutants to the municipal storm drain system;

9. Inspecting the integrity of all storm drain and sanitary sewer systems any connection to other pipelines on the property, including the use of dye and smoke tests, video surveys, photographs or videotapes, and the taking of measurements, drawings, or any other records reasonably necessary to document conditions as they exist on the premises;

10. Installing and maintaining of monitoring devices for the purpose of measuring any discharge or potential source of discharge to the municipal storm drain system; or

11. Evaluating compliance with this chapter or the Clean Water Act. (Ord. 989 § 1 (part), 2002)

16.04.140 Enforcement—Violations and penalties.

A. The Director of Public Works, City Engineer, or duly authorized representatives may serve notice of violation upon a person owning or occupying a premises, describing the violations and requiring prompt correction thereof, when:

1. Pollutants or potential pollutants are being maintained, discharged or deposited in such a manner as to create, or if allowed to continue will create, any one or more of the following conditions: (a) a public nuisance, (b) a menace to the public safety, (c) pollution of underground or surface waters, (d) damage to any public sewer, municipal storm sewer system, or public or private property.

2. The person has failed to respond or comply with a previous notice of violation within the time period specified in the notice.

B. Failure to comply with a duly served notice of violation shall constitute a willful violation of this chapter.

C. The City Manager, Director of Public Works, or duly authorized representatives may serve a cease and desist order upon a person owning or occupying a premises, requiring the person to immediately:

1. Discontinue any illicit discharge, including process water, wastewater or pollutant discharge to the MS4;

2. Block or divert any flow of water from the property, where the flow is occurring in violation of any provision of this chapter; and

3. Discontinue any other violation of this chapter.

The cease and desist order may contain terms and conditions or other provisions to ensure compliance with this chapter.

D. Any person violating any provision of this chapter is guilty of a misdemeanor, and upon conviction is punishable by fine not exceeding one thousand dollars or by imprisonment in the county jail for a period not exceeding six months, or by both such fine and imprisonment. As a part of any sentence or other penalty imposed, or the award of any damage, the court may also order that restitution be paid to the city or any injured person, or, in the case of a violator who is a minor, by the minor's parent or lawfully designated guardian or custodian. Restitution may include the amount of any reward.

E. The City Attorney is also authorized to file in a court of competent jurisdiction a civil action seeking an injunction against any violation or threatened or continuing violation of this chapter. Any temporary, preliminary or permanent injunction issued pursuant hereto may include an order for reimbursement to the city for all costs incurred in enforcing this chapter, including costs of inspection, investigation, monitoring, treatment, abatement, removal or remediation undertaken by or at the expense of the city, and may include all legal expenses and fees and any or all costs incurred relating to the restoration or remediation of the environment.

F. Each separate discharge in violation of this chapter and each day a violation described in this chapter exists, without correction, shall constitute a new and separate violation punishable as a separate criminal offense and/or civil violation.

G. Any person who violates any provision of this chapter, any provision of any permit issued pursuant to this chapter, or who discharges waste or wastewater which causes pollution, or who violates any cease and desist order, prohibition, or effluent limitation, also may be in violation of the Federal Clean Water Act and/or Porter-Cologne Act and may be subject to the sanctions of those acts, including civil and criminal penalties. In addition, the City Attorney is authorized to file a citizen's suit pursuant to the Clean Water Act, seeking penalties, damages and orders compelling compliance and appropriate relief.

H. The penalties and remedies established by this chapter shall be cumulative.

I. Any person violating the provisions of this chapter shall reimburse the city for any and all costs incurred by the city in responding to, investigating, assessing, monitoring, treating, cleaning, removing, or remediating any illicit discharge or pollutant from the municipal storm drain system; rectifying any illicit connection; or remediating any violation of this chapter. Such costs to be paid to the City include all administrative expenses and all legal expenses, including costs and attorneys' fees, in obtaining compliance, and in litigation including all costs and attorneys' fees on any appeal. The costs to be recovered pursuant to this section shall be recoverable from any and all persons violating this chapter.

J. The City shall have full power and authority to take any necessary precautions including, but not limited to, decontamination, storm drain closure, packaging, diking, and

transportation of materials, in order to protect life, protect property, or prevent an imminent hazard to the public's health, safety or welfare. In the event any violation of this chapter constitutes an imminent danger to public health, safety, or the environment, the Director of Public Works, City Engineer or any authorized agent thereof, may enter upon the premises from which the violation emanates, abate the violation and danger created to the public safety or the environment, and restore any premises affected by the alleged violation, without notice to or consent from the owner or occupant of the premises. An imminent danger shall include, but is not limited to, exigent circumstances created by the discharge of pollutants, where such discharge presents a significant and immediate threat to the public health or safety, or the environment.

K. Notwithstanding any other provisions herein, violations of this chapter may further be deemed to be a public nuisance, which may be abated by administrative or civil or criminal action in accordance with the terms and provisions of this code and state law. All costs and fees incurred by the city as a result of any violation of this chapter which constitute a nuisance, including all administrative fees and expenses and legal fees and expenses, shall become a lien against the subject premises from which the nuisance emanated and a personal obligation against the owner, in accordance with Government Code Sections 38773.1 and 38773.5. The owner of record of the premises subject to any lien shall receive notice of the lien prior to recording, as required by Government Code Section 38773.1. The City Attorney is authorized to collect nuisance abatement costs and enforce a nuisance lien in an action brought for money judgment, or by delivery to the county assessor of a special assessment against the premises in accordance with the conditions and requirements of Government Code Section 38773.5.

L. Any remedies provided to the City in this chapter are not exclusive, and the City may utilize any and all other remedies as otherwise provided by law.

M. Compliance by any person or entity with the provisions of this chapter shall not relieve any such person or entity from complying with other applicable local, state or federal statutory or regulatory requirements. (Ord. 989 § 1 (part), 2002)

SECTION 2. Any provision of the City of Pico Rivera Municipal Code or appendices thereto inconsistent with the provisions of the Ordinance, to the extent of such inconsistencies and no further, are repealed or modified to that extent necessary to affect the provisions of this Ordinance.

SECTION 3. If any section, subsection, sentence, clause, phrase, or portion of this Ordinance is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this ordinance. The City Council of the City of Pico Rivera hereby declares that it would have adopted this Ordinance and each section, subsection, sentence, clause, phrase or portion thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, phrases, or portions be declared invalid or unconstitutional.

SECTION 4. The Mayor shall sign and the City Clerk shall attest to the passage of this Ordinance. The City Clerk shall cause the same to be published once in the Ordinance official newspaper within 15 days after its adoption. This Ordinance shall become effective 30 days from its adoption.

APPROVED AND ADOPTED this 13th day of May, 2014.

Brent A. Tercero, Mayor

ATTEST:

Anna M. Jerome, City Clerk

Arnold M. Alvarez-Glasman, City Attorney

AYES: Archuleta, Armenta, Camacho, Salcido, Tercero
NOES: None
ABSENT: None
ABSTAIN: None

STATE OF CALIFORNIA
COUNTY OF LOS ANGELES
CITY OF PICO RIVERA

I, Anna M. Jerome, City Clerk of the City of Pico Rivera, California, hereby certify that Ordinance No. 1086 was introduced at a regular meeting of the City Council of the City of Pico Rivera held on the 22nd of April 2014, and thereafter was adopted by the City Council at a regular meeting held on the 13th of May, 2014, and that the same was adopted by the following roll call vote:

AYES: Archuleta, Armenta, Camacho, Salcido, Tercero
NOES: None
ABSENT: None
ABSTAIN: None

CITY CLERK

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RESOLUTION NO. 2013-06-6021

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SIGNAL HILL, CALIFORNIA, APPROVING A GREEN STREETS POLICY

WHEREAS, the City Council of the City of Signal Hill, California, hereby resolves, determines and orders as follows:

Section 1. The Municipal Separate Storm Sewer System (MS4) Permit (Order No. R-2012-0175) was adopted by the California Regional Water Quality Control Board, Los Angeles Region on November 8, 2012. Municipalities electing to prepare a (Enhanced) Watershed Management Program under this Permit are required to demonstrate that Green Streets Policies are in place that specify the use of green street strategies for transportation corridors.

Section 2: Signal Hill intends to prepare a (Enhanced) Watershed Management Program in coordination with cities of the Gateway Water Management Authority.

Section 3. Green Streets are enhancements to street and road projects to improve the quality of storm water and urban runoff through the implementation of infiltration, bio-treatment, xeriscaping parkways and tree lined streets.

Section 4. The City initiated the development of a Green Streets Policy and a corresponding Green Streets Manual (Exhibit "A") prior to February 26, 2013.

Section 5. The City Council of the City of Signal Hill, California, hereby directs the Director of Public Works to implement Green Streets for transportation corridors as described in the City of Signal Hill's Green Streets Manual.

Section 5. Routine maintenance including but not limited to: slurry seals, grind and overlay, and reconstruction to maintain original line grade are excluded from the Green Streets Policy.

Section 6. The Director of Public Works is authorized to modify the City of Signal Hill's Green Streets Manual from time to time to maintain consistency with the latest MS4 permit.

Section 7. At its regular meeting held on June 4, 2013, the City Council determined that the public interest and necessity justify the adoption of the Green Streets Policy.

PASSED, APPROVED, AND ADOPTED at a regular meeting of the City Council of the City of Signal Hill, California, on this 4th day of June 2013.

MICHAEL J. NOLL
MAYOR

ATTEST:

KATHLEEN L. PACHECO
CITY CLERK

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES) ss.
CITY OF [CITY NAME])

I, KATHLEEN L. PACHECO, City Clerk of the City of Signal Hill, California, hereby certify that Resolution No. 2013-02-6021 was adopted by the City Council of the City of Signal Hill, California, at a regular meeting held on the 4th day of June 2013, and that the same was adopted by the following vote:

AYES: MAYOR MICHAEL J. NOLL, VICE MAYOR EDWARD H.J. WILSON, COUNCIL MEMBERS LARRY FORESTER, TINA L. HANSEN, LORI Y. WOODS

NOES: NONE

ABSENT: NONE

ABSTAIN: NONE

KATHLEEN L. PACHECO
CITY CLERK
CITYOF SIGNAL HILL

RB-AR11034

Exhibit "A"

Signal Hill
Green Streets Manual









April 2013

RB-AR11035

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- Adjacent to traveled way and in frontage or furniture sidewalk zones 7
- Can be located in curb extensions, medians, traffic circles, roundabouts, and any other landscaped area 7
- Can be integrated medians, islands, circles, street ends, chicanes, and curb extensions 7
- Suitable for parking or emergency access lanes 7
- Can be located in furniture zones of sidewalks especially adjacent to tree wells 7
- Cannot be placed in areas with large traffic volume or heavy load lanes 7
- Avoid steep streets 7
- Cannot be placed within 20 feet of sub-sidewalk basements 7
- Above-grade planters should be structurally separate from adjacent sidewalks 7
- Can be located adjacent to roadways, sidewalks, or parking areas 7
- Can be integrated into traffic calming devices such as chicanes and curb extensions 7
- Can be placed in medians where the street drains to the median 7
- Can be placed alongside streets and pathways 7
- Can be located in multi-way boulevards, park edge streets, or sidewalk furniture zones 7
- Can be located in a catch basin, manhole, or vault 7
- Can be installed on an existing outlet pipe or at the bottom of an existing catch basin with an overflow 7
- Can be placed on existing curbside catch basins and flush grate openings 7
- Can be installed on the existing wall of a catch basin and on the curb side wall of a catch basin 7

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SECTION 1 – INTRODUCTION

1.1 WHAT ARE GREEN STREETS?

Roads present many opportunities for green infrastructure application. One principle of green infrastructure involves reducing and treating storm water close to its source. Urban transportation right-of-ways integrated with green techniques are often called "green streets." Green streets provide source controls for storm water runoff and pollutant loads. In addition, green infrastructure approaches complement street facility upgrades, street aesthetic improvements, and urban tree canopy efforts that also make use of the right-of-way and allow it to achieve multiple goals and benefits. Using the right-of-way for treatment of storm water runoff links green with grey infrastructure by making use of the engineered conveyance of roads and providing connections to conveyance systems when needed.

Green streets are beneficial for new road construction and retrofits. They can provide substantial economic benefits when used in transportation applications. Coordinating green infrastructure installation with broader transportation improvements can reduce the cost of storm water management by including it within larger infrastructure improvements. A large municipal concern regarding green infrastructure use is maintenance access; using roads and rights-of-way as locations for green infrastructure not only addresses a significant pollutant source, but also alleviates access and maintenance concerns by using public space. Also, right-of-way installations allow for easy public maintenance.

Green streets can incorporate a wide variety of design elements including street trees, permeable pavements, bioretention, and swales. Although the design and appearance of green streets will vary, the functional goals are the same; provide source control of storm water, limit its transport and pollutant conveyance to the collection system, restore pre-development hydrology to the maximum extent practicable, and provide environmentally enhanced roads. Successful application of green techniques will encourage soil and vegetation contact and infiltration and retention of storm water.

1.2 WHY ARE GREEN STREETS BEING REQUIRED?

This Green Streets Manual provides guidance to comply with the MS4 Permit (Order Number R4-2012-0175) which requires that jurisdictions in Los Angeles County reduce contaminants in runoff to improve water quality in waterways. These requirements stem from the National Pollutant Discharge Elimination System (NPDES) requirements of the Clean Water Act (CWA).

The MS4 Permit requires Green Streets strategies to be implemented for transportation corridors. Transportation corridors represent a large percentage of the impervious area within Los Angeles and therefore generate a substantial amount of runoff from storm events. The altered flow regime from traditional roadways, increased runoff volume, and high runoff peak flows, are damaging to the environment and a risk to property downstream.

Traditionally, street design has focused on removing water from the street as quickly as possible and transferring it to storm drains, channels, and water bodies. Storm water runoff can contain bacteria and other pollutants, and is thereby regulated at the state and local level (refer to *Table 1* for a list of pollutants typical of roads). Green Streets will help to transform the design of streets from the conventional method of moving water off-site as quickly as possible to a method of storing and treating water on-site for a cleaner discharge into the waters of the U.S.

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Street and road construction applies to major arterials, state routes, highways, or rail lines used for the movement of people or goods by means of bus services, trucks, and vehicles, and transportation corridors within larger projects. Projects which are required to follow this Green Streets Guidance Manual include the following:

1. Street and road construction of 10,000 square feet or more of impervious surface area.
2. Street and road redevelopment resulting in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.
3. Street and road improvement with a cost of $500,000 or more.

Table 1: Examples of Storm water Pollutants Typical of Roads (*Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets, 2008*).

Pollutant	Source	Effects
Trash	Littering	Physical damage to aquatic animals and fish, release of poisonous substances
Sediment/solids	Construction, unpaved areas	Increased turbidity, increased transport of soil bound pollutants, negative effects on aquatic organisms reproduction and function
Metals (Copper, Zinc, Lead, Arsenic)	Vehicle brake pads, vehicle tires, motor oil, vehicle emissions and engines, vehicle emissions, brake linings, automotive fluids	Toxic to aquatic organisms and can accumulate in sediments and fish tissues
Organics associated with petroleum (e.g., PAHs)	Vehicle emissions, automotive fluids, gas stations	Toxic to aquatic organisms
Nutrients	Vehicle emissions, atmospheric deposition	Promotes eutrophication and depleted dissolved oxygen concentrations

1.3 PLANNING AND DEVELOPMENT

Ideally, a site would be designed to capture and use or infiltrate the entire runoff volume of a storm, however site and design constraints make it difficult to achieve that goal. This Green Streets Manual is designed to provide guidance with BMP selection based on site constraints typical to street design. Streetscape geometry, topography, and climate determine the types of controls that can be implemented. The initial step in selecting a storm water tool is determining the available open space and constraints. Storm water controls should be selected using the hierarchy represented in *Figure 1*, the site guidelines represented in *Table 2*, and the location opportunities listed in *Table 3*.

1.3.1 Site Considerations

Specific elements which should be given special consideration in the site assessment process for applicable Green Streets include:

- **Ownership of land adjacent to right of ways.** The opportunity to provide storm water treatment may depend on the ownership of land adjacent to the right-of-way. Acquisition of additional right-of-way and/or access easements may be more feasible if land bordering the project is owned by relatively few land owners.

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- **Location of existing utilities.** The location of existing storm drainage utilities can influence the opportunities for Green Streets infrastructure. For example, storm water planters can be designed to overflow along the curb-line to an existing storm drain inlet, thereby avoiding the infrastructure costs associated with an additional inlet. The location of other utilities may limit the allowable placement of BMPs to only those areas where a clear pathway to the storm drain exists.
- **Grade differential between road surface and storm drain system.** Some BMPs require more head from inlet to outlet than others; therefore, allowable head drop may be an important consideration in BMP selection. Storm drain elevations may be constrained by a variety of factors in a roadway project (utility crossings, outfall elevations, etc.) that cannot be overcome and may override storm water management considerations.
- **Longitudinal slope.** The suite of BMPs which may be installed on steeper road sections is more limited. Specifically, permeable pavement and swales are more suitable for gentle grades. Other BMPs may be more readily terraced to be used on steeper slopes.
- **Soil suitability.** Infiltration BMPs require specific types of soil. The site assessment should determine the type of soils on the site and the infiltration rate of the soils if infiltration BMPs are proposed.
- **Potential access opportunities.** A significant concern with installation of BMPs in major right of ways is the ability to safely access the BMPs for maintenance considering traffic hazards. Vehicle travel lanes and specific areas potentially hazardous for maintenance crews should be identified during the site assessment. The Green Streets WQMP should provide subsequent steps to avoid placing BMPs in the identified hazardous areas.

1.3.2 Design Considerations

The drainage patterns of the project should be developed so that drainage can be routed to areas with BMP opportunities before entering storm drains. For example, if a median strip is present, a reverse crown should be considered, where allowed, so that storm water can drain to a median swale. Likewise, standard peak-flow curb inlets should be located downstream of areas with potential for storm water planters so that water can first flow into the planter, and then overflow to the downstream inlet if capacity of the planter is exceeded. It is more difficult to apply green infrastructure after water has entered the storm drain.

Green Streets projects are not required to treat off-site runoff; however treatment of comingled off-site runoff may be used to off-set the inability to treat areas within the project for which significant constraints prevent the ability to provide treatment.

Applicable Green Streets projects should apply the following site design measures to the maximum extent practicable and as specified in the local permitting agency's codes:

- Minimize street width where feasible while maintaining traffic flow and public safety.
- Add tree canopy by planting or preserving trees/shrubs.
- Use porous pavement or pavers for low traffic roadways, on-street parking, shoulders or sidewalks.
- Integrate traffic calming measures in the form of bioretention curb extensions.

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1.3.3 BMP Sizing for Applicable Green Streets Projects

An 85th percentile standard design storm should be used to determine the appropriate size, slope, and materials of each facility. After identifying the appropriate storm water facilities for a site, an integrated approach using several BMPs is encouraged. To increase water quality and functional hydrologic benefits, several storm water management BMPs can be used in succession. This is called a treatment train approach. The control measures should be designed using available topography to take advantage of gravity for conveyance to and through each facility. All Green Streets designs must be based off of a published design standard.

The following steps should be used to size BMPs for applicable Green Streets projects:

1. Delineate drainage areas tributary to BMP locations and compute imperviousness.
2. Look up the recommended sizing method for the BMP selected in each drainage area and calculate target sizing criteria.
3. Design BMPs per a published design standard.
4. Attempt to provide the calculated sizing criteria for the selected BMPs.
5. If sizing criteria cannot be achieved, document the constraints that override the application of BMPs and provide the largest portion of the sizing criteria that can be reasonably provided given constraints. If BMPs cannot be sized to provide the calculated volume for the tributary area, it is still essential to design the BMP inlet, energy dissipation, and overflow capacity for the full tributary area to ensure that flooding and scour is avoided. It is strongly recommended that BMPs which are designed to less than their target design volume be designed to bypass peak flows.

1.3.4 Alternative Compliance Options for Applicable Green Streets Projects

Alternative compliance programs should be considered for applicable Green Streets projects if on-site green infrastructure approaches cannot practicably treat the design volume. The primary alternative compliance option for applicable Green Streets projects is the completion of off-site mitigation projects. The proponent would implement a project to reduce storm water pollution for other portions of roadway or similar land uses when being reconstructed to the project in the same hydrologic unit, ideally as close to the project as possible and discharging to the same outfall.

1.3.5 Infiltration Considerations

Appropriate soils, infiltration media, and infiltration rates should be used for infiltration BMPs. If infiltration is proposed, a complete geotechnical or soils report should be undertaken to determine infiltration rates, groundwater depth, soil toxicity and stability, and other factors that will affect the ability and the desirability of infiltration. At a minimum, the infiltration capacity of the underlying soils shall be deemed suitable for infiltration (0.3 inches per hour or greater), appropriate media should be used in the BMP itself, the groundwater shall be located at a depth of ten feet or greater.

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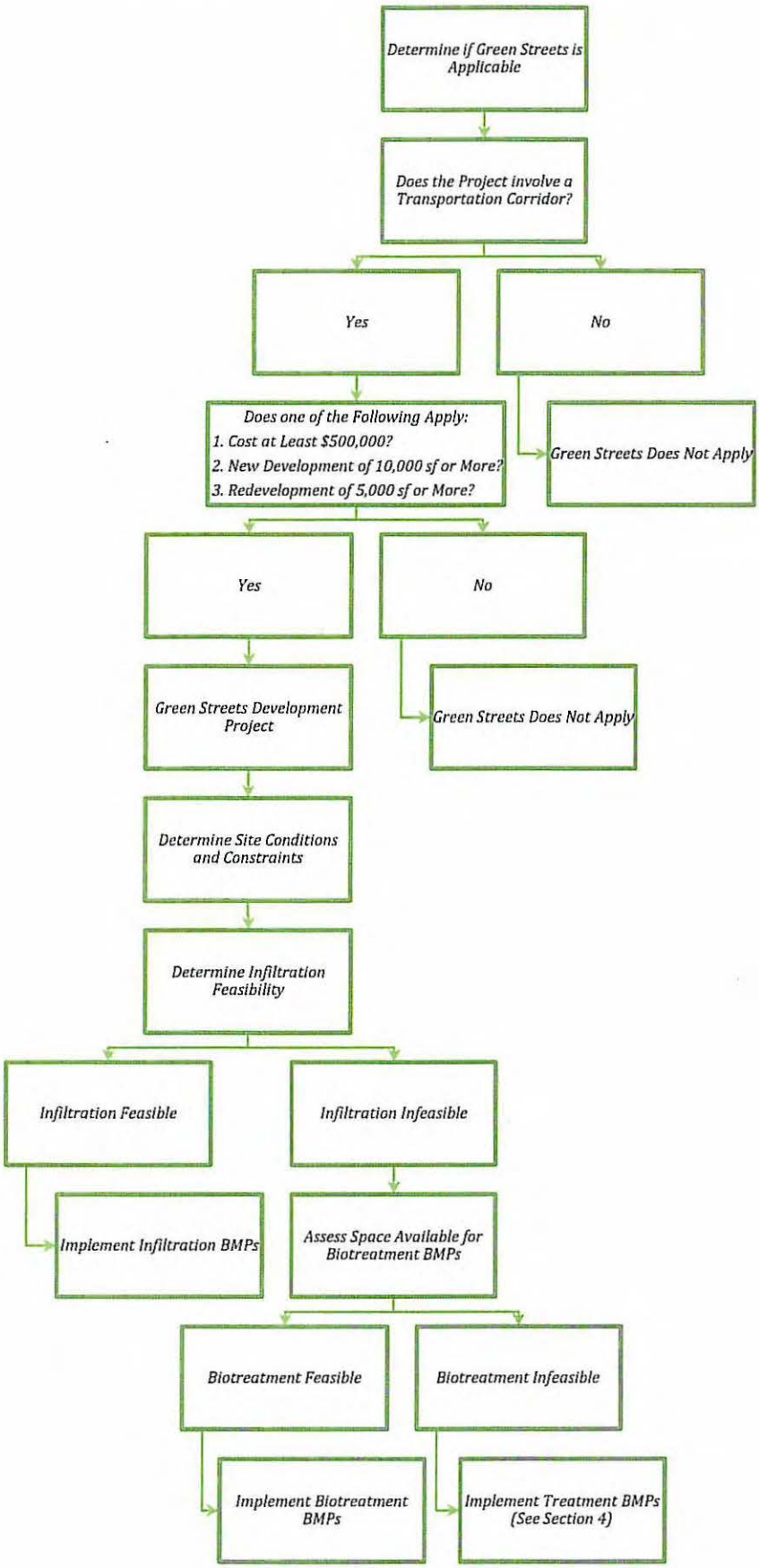


Figure 1: BMP Selection Flow Chart.

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Table 2: BMP Selection by Street Context (*Model for Living Streets Design Manual, 2011*).

	STREET CONTEXT	BIORETENTION			DETENTION		PAVING	INLET PROTECTIONS		
		Swales	Planters	Vegetated Buffer Strips	Rain Gardens	Infiltration Trenches & Dry Wells	Permeable Pavement	Storm Drain Inlet Screens	Storm Drain Filter Inserts	Pipe Filter Inserts
Commercial	Downtown Commercial		✓			✓	✓	✓	✓	✓
	Commercial Throughway		✓	✓		✓	✓	✓	✓	✓
	Neighborhood Commercial		✓	✓	✓	✓	✓	✓	✓	✓
Residential	Downtown Residential	✓	✓		✓	✓	✓	✓	✓	✓
	Residential Throughway	✓	✓		✓	✓	✓	✓	✓	✓
	Neighborhood Residential	✓	✓		✓	✓	✓	✓	✓	✓
Industrial And Mixed-Use	Industrial	✓	✓		✓	✓	✓	✓	✓	✓
	Mixed-Use		✓	✓	✓	✓	✓	✓	✓	✓
Special	Sidewalk Furniture Zone	✓	✓		✓	✓	✓	✓	✓	✓
	Park Edge	✓	✓		✓	✓	✓	✓	✓	✓
	Boulevard	✓	✓		✓	✓	✓	✓	✓	✓
	Ceremonial (Civic)						✓	✓	✓	✓
Small	Alley		✓			✓	✓	✓	✓	✓
	Shared Public Way		✓			✓	✓	✓	✓	✓
	Walk Street		✓	✓		✓	✓	✓	✓	✓

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Table 3: BMP Location Opportunity Summary.

BMP	Location Opportunity Summary
Bioretention	• Adjacent to traveled way and in frontage or furniture sidewalk zones • Can be located in curb extensions, medians, traffic circles, roundabouts, and any other landscaped area • Suitable for constrained locations
Infiltration Trench/Dry Well	• Can be located under sidewalks and in sidewalk planting strips, curb extensions, roundabouts, and medians
Rain Gardens	• Can be integrated medians, islands, circles, street ends, chicanes, and curb extensions • Can be located at the terminus of swales in the landscape
Permeable Pavement	• Suitable for parking or emergency access lanes • Can be located in furniture zones of sidewalks especially adjacent to tree wells • Cannot be placed in areas with large traffic volume or heavy load lanes • Avoid steep streets • Cannot be placed within 20 feet of sub-sidewalk basements • Cannot be within 50 feet of domestic water wells
Flow-Through Planters	• Above-grade planters should be structurally separate from adjacent sidewalks • At-grade planter systems can be installed adjacent to curbs within the frontage and/or furniture zones
Vegetated Swales	• Can be located adjacent to roadways, sidewalks, or parking areas • Can be integrated into traffic calming devices such as chicanes and curb extensions • Can be placed in medians where the street drains to the median • Can be placed alongside streets and pathways • Should be designed to work in conjunction with the street slope
Vegetated Buffer Strips	• Can be located in multi-way boulevards, park edge streets, or sidewalk furniture zones • Can serve as pre-treatment
Treatment BMPs	• Can be located in a catch basin, manhole, or vault • Can be installed on an existing outlet pipe or at the bottom of an existing catch basin with an overflow • Can be placed on existing curbside catch basins and flush grate openings • Can be installed on the existing wall of a catch basin and on the curb side wall of a catch basin • Minimum set-backs from foundations and slopes should be observed if the BMP is not lined
Street Trees	• Can be placed on sidewalks, in furniture zones, and on medians • Adequate spacing must be provided between trees and street lights, pedestrian lights, accessible parking spaces, bus shelters, awnings, canopies, balconies, and signs

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SECTION 2 – INFILTRATION

Infiltration systems utilize rock, gravel, and other highly permeable materials for on-site infiltration. In these systems, storm water runoff is directed to the system and allowed to infiltrate into the soils for on-site retention and groundwater recharge. During small storm events, infiltration systems can result in significant or even complete volume reduction of storm water runoff.

Infiltration should be used to the maximum extent practicable. Biotreatment BMPs should be considered if infiltration is found to be infeasible due to low infiltration rates, soil instability, high groundwater, or soil contamination.

Infiltration BMPs may become damaged by storm water carrying high levels of sediment, therefore pre-treatment features should be designed to treat street runoff prior to discharging to infiltration features. Media filters, filter inserts, vortex type units, bioretention devices, sumps, and sedimentation basins are several pre-treatment tools effective at removing sediment.

2.1 INFILTRATION TRENCHES AND DRY WELLS

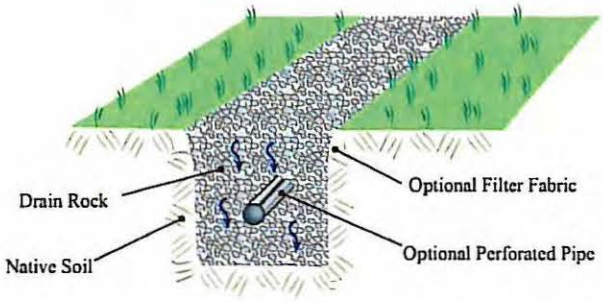


Figure 2: Infiltration Trench (*Model for Living Streets Design Manual, 2011*).

Description

Infiltration trenches are linear, rock-filled features that promote infiltration by providing a high ratio of sub-surface void space in permeable soils. They provide on-site storm water retention and may contribute to groundwater recharge. Infiltration trenches may accept storm water from sheet flow, concentrated flow from a swale or other surface feature, or piped flow from a catch basin. Because they are not flow-through BMPs, infiltration trenches do not have outlets but may have overflow outlets for large storm events.

Dry wells are typically distinguished from infiltration trenches by being deeper than they are wide. They are usually circular, resembling a well, and are backfilled with the same materials as infiltration trenches. Dry wells typically accept concentrated flow from surface features or from pipes and do not have outlets.

Infiltration trenches and dry wells are typically designed to infiltrate all flow they receive. In large storm events, partial infiltration of runoff can be achieved by providing an overflow outlet. In these systems, significant or even complete volume reduction is possible in smaller storm events. During large storm events, these systems may function as detention facilities and provide a limited amount of retention and infiltration.

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Location and placement guidelines

Infiltration trenches and dry wells typically have small surface footprints so they are potentially some of the most flexible elements of landscape design. However, because they involve sub-surface excavation, these features may interfere with surrounding structures. Care needs to be taken to ensure that surrounding building foundations, pavement bases, and utilities are not damaged by infiltration features. Once structural soundness is ensured, infiltration features may be located under sidewalks and in sidewalk planting strips, curb extensions, roundabouts, and medians. When located in medians, they are most effective when the street is graded to drain to the median. Dry wells require less surface area than trenches and may be more feasible in densely developed areas.

Infiltration features should be sited on uncompacted soils with acceptable infiltration capacity. They are best used where soil and topography allow for moderate to good infiltration rates (0.3 inches per hour or better) and the depth to groundwater is at least 10 feet. Prior to design of any retention or infiltration system, proper soil investigation and percolation testing shall be conducted to determine appropriate infiltration design rates, depth to groundwater, and if soil will exhibit instability as a result of infiltration. Any site with potential for previous underground contamination shall be investigated. Infiltration trenches and dry wells can be designed as stand-alone systems when water quality is not a concern or may be combined in series with other storm water tools.

Perforated pipes and piped inlets and outlets may be included in the design of infiltration trenches. Cleanouts should be installed at both ends of any piping and at regular intervals in long sections of piping, to allow access to the system. Access ports are recommended for both trenches and wells and can be combined with clean-outs. If included, the overflow inlet from the infiltration trench should be properly designed for anticipated flows.

2.2 RAIN GARDENS

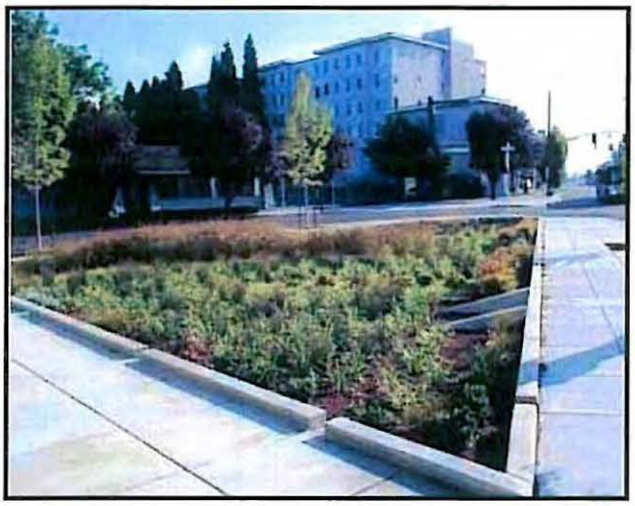


Figure 3: Rain garden (*Model for Living Streets Design Manual, 2011).*

Description

Rain gardens are vegetated depressions in the landscape. They have flat bottoms and gently sloping sides. Rain gardens can be similar in appearance to swales, but their footprints may be any shape. Rain gardens hold water on the surface, like a pond, and have overflow outlets. The detained water is infiltrated through the topsoil and subsurface drain rock unless the volume

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of water is so large that some must overflow. Rain gardens can reduce or eliminate off-site storm water discharge while increasing on-site recharge.

Location and Placement Guidelines

Rain gardens may be placed where there is sufficient area in the landscape and where soils are suitable for infiltration. Rain gardens can be integrated with traffic calming measures installed along streets, such as medians, islands, circles, street ends, chicanes, and curb extensions. Rain gardens are often used at the terminus of swales in the landscape.

2.3 PERMEABLE PAVEMENT



Figure 4: Permeable pavement during a storm event (*Model for Living Streets Design Manual, 2011).*

Description

Permeable pavement is a system with the primary purpose of slowing or eliminating direct runoff by absorbing rainfall and allowing it to infiltrate into the soil. Permeable pavement also filters and cleans pollutants such as petroleum deposits on streets, reduces water volumes for existing overtaxed pipe systems, and decreases the cost of offsite or onsite downstream infrastructure. This BMP is impaired by sediment-laden run-on which diminishes its porosity. Care should be taken to avoid flows from landscaped areas reaching permeable pavement. Permeable pavement is, in certain situations, an alternative to standard pavement. Conventional pavement is designed to move storm water off-site quickly. Permeable pavement, alternatively, accepts the water where it falls, minimizing the need for management facilities downstream.

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Location and Placement Guidelines

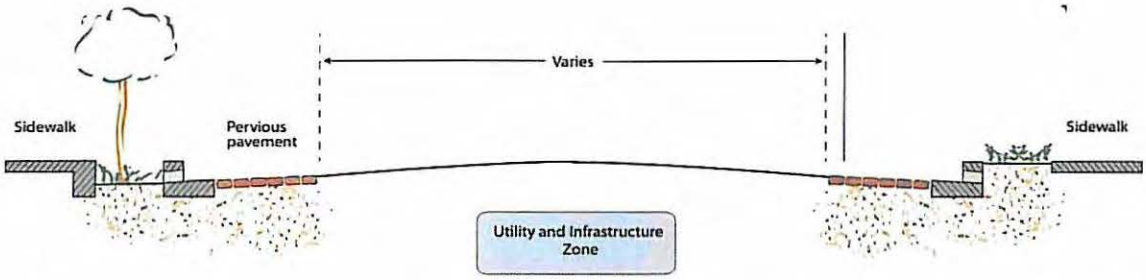


Figure 5: Possible pervious pavement design layout (*Model for Living Streets Design Manual, 2011*).

Conditions where permeable pavement should be encouraged include:

- Sites where there is limited space in the right-of-way for other BMPs;
- Parking or emergency access lanes; and
- Furniture zones of sidewalks especially adjacent to tree wells

Conditions where permeable pavement should be avoided include:

- Large traffic volume or heavy load lanes;
- Where runoff is already being harvested from an impervious surface for direct use, such as irrigation of bioretention landscape areas;
- Steep streets;
- Gas stations, car washes, auto repair, and other sites/sources of possible chemical contamination;
- Areas with shallow groundwater;
- Within 20 feet of sub-sidewalk basements; and
- Within 50 feet of domestic water wells.

Material and Design Guidelines

A soil or geotechnical report should be conducted to provide information about the permeability rate of the soil, load-bearing capacity of the soil, the depth to groundwater (10 feet or more required), and if soil will exhibit instability as a result of implementation. Infiltration rate and load capacity are key factors in the functionality of this BMP. Permeable pavement generally does not have the same load-bearing capacity as conventional pavement, so this BMP may have limited applications depending on the underlying soil strength and pavement use. Permeable pavement should not be used in general traffic lanes due to the possible variety of vehicles weights and heavy volumes of traffic.

When used as a road paving, permeable pavement that carries light traffic loads typically has a thick drain rock base material. Pavers should be concrete as opposed to brick or other light-duty materials. Other possible permeable paving materials include porous concrete and porous asphalt. These surfaces also have specific base materials that detain infiltrated water and provide structure for the road surface. Base material depths should be specified based on design load and the soils report.

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Plazas, emergency roads, and other areas of limited vehicular access can also be paved with permeable pavement. Paving materials for these areas may include open cell paver blocks filled with stones or grass and plastic cell systems. Base material specifications may vary depending on the product used, design load, and underlying soils.

When used for pedestrian paths, sidewalks, and shared-use paths, appropriate materials include those listed above as well as rubber pavers and decomposed granite or something similar (washed or pore-clogging fine material). Pedestrian paths may also use broken concrete pavers as long as ADA requirements are met. Paths should drain into adjoining landscapes and should be higher than adjoining landscapes to prevent run-on. Pavement used for sidewalks and pedestrian paths should be ADA compliant, especially smooth, and not exceed a 2 percent slope or have gaps wider than 0.25 inches. In general, tripping hazards should be avoided.

Design considerations for permeable pavement include:

- The location, slope and load-bearing capacity of the street, and the infiltration rate of the soil;
- The amount of storage capacity of the base course;
- The traffic volume and load from heavy vehicles;
- The design storm volume calculations and the quality of water; and
- Drain rock, filter fabrics, and other subsurface materials.

Maintenance Guidelines

Maintenance of permeable pavement systems is essential to their continued functionality. Regular vacuuming and street sweeping should be performed to remove sediment from the pavement surface. The bedding and base material should be selected for long life and sufficient infiltration rates.

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SECTION 3 – BIOTREATMENT

Biotreatment BMPs are landscaped, shallow depressions that capture and filter storm water runoff. These types of BMPs are an increasingly common type of storm water treatment device that are installed at curb level and filled with a bioretention type soil. They are designed as soil and plant-based filtration devices that remove pollutants through a variety of physical, biological, and chemical treatment processes. They typically consist of a ponding area, mulch layer, planting soils, and plants. Storm water is directed to the system and pollutants are treated as the storm water drains through the planting soil and either infiltrated or collected by an underdrain and directed to a collection system.

Biotreatment should only be used in cases where infiltration has been proven infeasible due to low infiltration rates, soil instability, high groundwater, or soil contamination.

3.1 BIORETENTION



Figure 6: Bioretention system (*Model for Living Streets Design Manual, 2011).*

Description

Bioretention is a storm water management process that cleans storm water by mimicking natural soil filtration processes as water flows through a bioretention BMP. It incorporates mulch, soil pores, microbes, and vegetation to reduce and remove sediment and pollutants from storm water. Bioretention is designed to slow, spread, and, to some extent, infiltrate water. Each component of the bioretention BMP is designed to assist in retaining water, evapotranspiration, and adsorption of pollutants into the soil matrix. As runoff passes through the vegetation and soil, the combined effects of filtration, absorption, adsorption, and biological uptake of plants remove pollutants.

For areas with low permeability or other soil constraints, bioretention can be designed as a flow-through system with a barrier protecting storm water from native soils. Bioretention areas can be designed with an underdrain system that directs the treated runoff to infiltration areas, cisterns, or the storm drain system, or may treat the water exclusively through surface flow. Examples of bioretention BMPs include swales, planters, and vegetated buffer strips.

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Location and Placement Guidelines

Bioretention facilities can be included in the design of all street components; adjacent to the traveled way and in the frontage or furniture sidewalk zones. They can be designed into curb extensions, medians, traffic circles, roundabouts, and any other landscaped area. Depending on the feature, maintenance and access should always be considered in locating the device. Bioretention systems are also appropriate in constrained locations where other storm water facilities requiring more extensive subsurface materials are not feasible.

If bioretention devices are designed to include infiltration, native soil should have a minimum permeability rate of 0.3 inches per hour and at least 10 feet to the groundwater table. Sites that have more than a 5 percent slope may require other storm water management approaches or special engineering.

3.2 FLOW-THROUGH PLANTERS



Figure 7: Flow-through planter (*Model for Living Streets Design Manual, 2011*).

Description

Flow-through planters are typically above-grade or at-grade with solid walls and a flow-through bottom. They are contained within an impermeable liner and use an underdrain to direct treated runoff back to the collection system. Where space permits, buildings can direct roof drains first to building-adjacent planters. Both underdrains and surface overflow drains are typically installed with building-adjacent planters.

At-grade street-adjacent planter boxes are systems designed to take street runoff and/or sidewalk runoff and incorporate bioretention processes to treat storm water. These systems may or may not include underdrains.

Location and Placement Guidelines

Above-grade planters should be structurally separate from adjacent sidewalks to allow for future maintenance and structural stability per local department of public works' standards. At-grade planter systems can be installed adjacent to curbs within the frontage and/or furniture zones.

All planters should be designed to pond water for less than 48 hours after each storm. Flow-through planters designed to detain roof runoff can be integrated into a building's foundation walls, and may be either raised or at grade.

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For at-grade planters, small localized depressions may be included in the curb opening to encourage flow into the planter. Following the inlet, a sump (depression) to capture sediment and debris may be integrated into the design to reduce sediment loadings.

3.3 VEGETATED SWALES



Figure 8: Vegetated swale (*Signal Hill, CA*).

Description

Swales are linear, vegetated depressions that capture rainfall and runoff from adjacent surfaces. The swale bottom should have a gradual slope to convey water along its length. Swales can reduce off-site storm water discharge and remove pollutants along the way. In a swale, water is slowed by traveling through vegetation on a relatively flat grade. This gives particulates time to settle out of the water while contaminants are removed by the vegetation.

Location and Placement Guidelines

Swales can easily be located adjacent to roadways, sidewalks, or parking areas. Roadway runoff can be directed into swales via flush curbs or small evenly-spaced curb cuts into a raised curb. Swale systems can be integrated into traffic calming devices such as curb extensions.

Swales can be placed in medians where the street drains to the median. Placed alongside streets and pathways, vegetated swales can be landscaped with native plants which filter sediment and pollutants and provide habitat for wildlife. Swales should be designed to work in conjunction with the street slope to maximize filtration and slowing of storm water.

Swales are designed to allow water to slowly flow through the system. Depending on the landscape and design storm, an overflow or bypass for larger storm events may be needed. Curb openings should be designed to direct flow into the swale. Following the inlet, a sump may be built to capture sediment and debris.

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3.4 VEGETATED BUFFER STRIPS

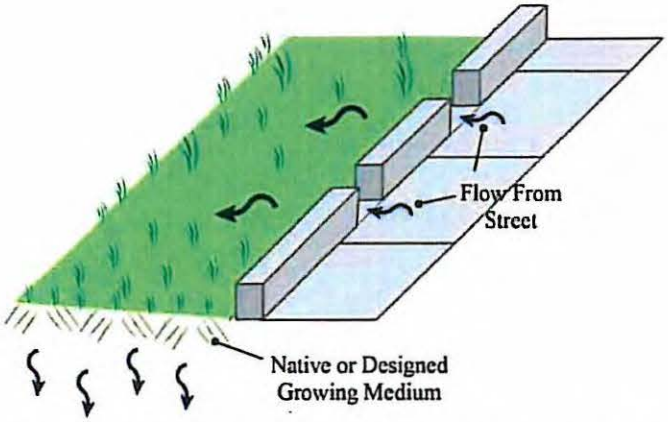


Figure 9: Vegetated buffer strip detail (*Model for Living Streets Design Manual, 2011*).

Description

Vegetated buffer strips are sloping planted areas designed to treat and absorb sheet flow from adjacent impervious surfaces. These strips are not intended to detain or retain water, only to treat it as a flow-through feature. They should not receive concentrated flow from swales or other surface features, or concentrated flow from pipes.

Location and Placement Guidelines

Vegetated buffer strips are well-suited to treating runoff from roads and highways, small parking lots, and pervious surfaces. They may be commonly used on multi-way boulevards, park edge streets, or sidewalk furniture zones with sufficient space. When selecting potential placement the need for supplemental irrigation should be considered. Vegetated buffers can also be situated so they serve as pre-treatment for another storm water management feature, such as an infiltration BMP.

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SECTION 4 – TREATMENT BMPS

4.1 SAND FILTERS & STORM DRAIN INLET PROTECTIONS

As described in Section 1 of this Green Streets Manual, it may be infeasible for specific projects to apply infiltration or biotreatment BMPs. In these cases, sand filters or filter inserts as treatment BMPs can be considered as an alternative. Sand filters and filter inserts can be designed to prevent particulates, debris, metals, and petroleum-based materials conveyed by storm water from entering the storm drain system. All treatment BMP units should have an overflow system that allows the storm drain to remain functional if the filtration system becomes clogged during rainstorms. All storm drain inlet protections must be of a style and configuration approved by the agency with ownership of the inlet.

Typical maintenance of catch basins includes scheduled trash removal if a screen or other debris capturing device is used. Street sweeping should be performed by vacuum sweepers with occasional weed and large debris removal. Maintenance should include keeping a log of the amount of sediment collected and the data of removal.

The following are examples of acceptable treatment BMPs:

- **Sand Filters:** Sand filters are designed to filter storm water through a constructed media bed and to an underdrain system. As storm water flows through the media pollutants are filtered out of the water. The filtered water is conveyed through the underdrain to a collection system. Pretreatment is necessary to eliminate significant sediment load or other large particles which would clog the system. Minimum set-backs from foundations and slopes should be observed if the facility is not lined. Filters should be designed and maintained such that ponded water should not persist for longer than 48 hours following a storm event.
- **Cartridge Media Filters:** Cartridge media filters contain multiple modular filters which contain engineered media. The filters can be located in a catch basin, manhole, or vault. The manhole or vault may be divided into multiple chambers so that the first chamber may act as a pre-settling basin for removal of coarse sediment while the next chamber may act as the filter chamber. Cartridge media filters are recommended for drainage areas with limited available surface area or where surface BMPs would restrict uses. Depending on the number of cartridges, maintenance events can have long durations. Locations should be chosen so that maintenance events will not significantly disrupt businesses or traffic. Inlet inserts should be sized to capture all debris and should therefore be selected to match the specific size and shape of each catch basin and inlet. Filter media should be selected to target pollutants of concern. A combination of media may be used to remove a variety of pollutants. Systems with lower maintenance requirements are preferred.
- **Storm Drain Inlet Screens:** Inlet screens are designed to prevent large litter and trash from entering the storm drain system while allowing smaller particles to pass through. The screens function as the first preventive measure in removing pollutants from the storm water system. The City's street sweeping department should be consulted to ensure compliance with local specifications and to schedule regular maintenance. Annual inspection of the screen is recommended to ensure functionality. Note that most LA River drainage areas are already protected using connector pipe screens through collective systems.
- **Storm Drain Pipe Filter Insert:** The storm drain outlet pipe filter is designed to be installed on an existing outlet pipe or at the bottom of an existing catch basin with an overflow. This filter removes debris, particulates, and other pollutants from storm water as it leaves the

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storm drain system. This BMP is less desirable than a protection system that prevents debris from entering the storm drain system because the system may become clogged with debris. Outlet pipe filters can be placed on existing curbside catch basins and flush grate openings. Regular maintenance is required and inspection should be performed rigorously. Because this filter is located at the outlet of a storm drain system, clogging with debris is not as apparent as with filters at street level. This BMP may be used as a supplemental filter with an inlet screen or inlet insert unit.

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SECTION 5 – STREET TREES

5.1 STREET TREES



Figure 10: Street trees (*Signal Hill, CA*).

Description

Healthy urban trees are powerful storm water management tools. Leaves and branches catch and slow rain as it falls, helping it to soak into the ground. The plants themselves take up and store large quantities of water that would otherwise contribute to surface runoff. Part of this moisture is then returned to the air through evaporation to further cool the city. As an important element along sidewalks, street trees must be provided with conditions that allow them to thrive, including adequate uncompacted soil, water, and air.

The goal of adding street trees is to increase the canopy cover of the street, the percentage of its surface either covered by or shaded by vegetation. The selection, placement, and management of all elements in the street should enhance the longevity of a city's street trees and healthy, mature plantings should be retained and protected whenever possible.

Benefits to adding street trees include:

- Creation of shade to lower temperatures in a city, reduces energy use, and makes the street a more pleasant place in which to walk and spend time
- Slowing and capture of rainwater, helping it soak into the ground to restore local hydrologic functions and aquifers
- Improving air quality by cooling air, producing oxygen, and absorbing and storing carbon in woody plant tissues

Guidelines

For guidelines on street tree design refer to the Signal Hill Street Tree Ordinance at http://www.cityofsignalhill.org/DocumentCenter/Home/View/774.

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SECTION 6 – DEFINITIONS

Best Management Practice (BMP)
Operating methods and/or structural devices used to reduce storm water volume, peak flows, and/or pollutant concentrations of storm water runoff through evapotranspiration, infiltration, detention, filtration, and/or biological and chemical treatment.

Bioretention
Soil and plant-based retention practice that captures and biologically degrades pollutants as water infiltrates through sub-surface layers containing microbes that treat pollutants. Treated runoff is then slowly infiltrated and recharges the groundwater.

Conveyance
The process of water moving from one place to another.

Design Storm
A storm whose magnitude, rate, and intensity do not exceed the design load for a storm drainage system or flood protection project.

Detention
Storm water runoff that is collected at one rate and then released at a controlled rate. The volume difference is held in temporary storage.

Filtration
A treatment process that allows for removal of solid (particulate) matter from water by means of porous media such as sand, soil, vegetation, or a man-made filter. Filtration is used to remove contaminants.

Furniture Zone
The furniture zone is the area which lies between the curb and pedestrian zones and is intended to house utilities and pedestrian amenities.

Hardscape
Impermeable surfaces, such as concrete or stone, used in the landscape environment along sidewalks or in other areas used as public space.

Infiltration
The process by which water penetrates into soil from the ground surface.

Permeability/Impermeability
The quality of a soil or material that enables water to move through it, determining its suitability for infiltration.

Retention
The reduction in total runoff that results when storm water is diverted and allowed to infiltrate into the ground through existing or engineered soil systems.

Runoff
Water from rainfall that flows over the land surface that is not absorbed into the ground.

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Sedimentation
The deposition and/or settling of particles suspended in water as a result of the slowing of the water.

Storm water
Water runoff from rain or snow resulting from a storm.

Transportation Corridor
A major arterial, state route, highway, or rail line used for the movement of people or goods by means of bus services, trucks, and vehicles.

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SECTION 7 – REFERENCES

1. Los Angeles County. *Model for Living Streets Design Manual*. 2011.
2. U.S. Environmental Protection Agency (EPA). *Managing Wet Weather With Green Infrastructure Municipal Handbook: Green Streets*. December 2008.
3. Orange County. *Technical Guidance Document*. May 2011.

RB-AR11059

ORDINANCE NO. 2013-06-1455

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF SIGNAL HILL, CALIFORNIA, AMENDING SIGNAL HILL MUNICIPAL CODE CHAPTER 12.16 ENTITLED STORM WATER/URBAN RUNOFF, TO EXPAND THE APPLICABILITY OF THE EXISTING POLLUTANT SOURCE REDUCTION REQUIREMENTS BY IMPOSING RAINWATER LOW IMPACT DEVELOPMENT (LID) STRATEGIES ON CERTAIN PROJECTS THAT REQUIRE BUILDING, GRADING AND ENCROACHMENT PERMITS

WHEREAS, the City is authorized by Article XI, Section 5 and Section 7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity; and

WHEREAS, the federal Clean Water Act establishes Regional Water Quality Control Boards in order to prohibit the discharge of pollutants in storm water runoff to waters of the United States; and

WHEREAS, the City is a permittee under the California Regional Water Quality Control Board, Los Angeles Region Order No. R4-2012-0175, issued on November 08, 2012, which establishes Waste Discharge Requirements for Municipal Separate Storm Sewer Systems (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4; and

WHEREAS, Order No. R4-2012-0175 contains requirements for municipalities to establish a LID Ordinance in order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program; and

WHEREAS, the Regional Board has adopted Total Maximum Daily Loads (TMDLs) for pollutants, which are numerical limits that must be achieved effectively through LID implementation; and

WHEREAS, the City has the authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity that might degrade waters of the State; and

WHEREAS, the City is committed to a storm water management program that protects water quality and water supply by employing watershed-based approaches that balance environmental and economic considerations; and

WHEREAS, urbanization has led to increased impervious surface areas resulting in increased water runoff and less percolation to groundwater aquifers causing the transport of pollutants to downstream receiving waters; and

WHEREAS, it is the intent of the City to expand the applicability of the existing LID requirements by providing storm water and rainwater LID strategies for all Development and Redevelopment projects, as defined herein.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SIGNAL HILL, CALIFORNIA, DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1. Section 12.16.010 of the Signal Hill Municipal Code is repealed in its entirety and shall be replaced with the following:

12.16.010. DEFINITIONS.

A. "40 CFR" means Title 40 of the Code of Federal Regulations.

B. "Automotive Service Facility" means a facility that is categorized in any one of the following Standard Industrial Classification Codes: 5013, 5014, 5541, 7532-7534 or 7536-7539.

C. "Basin Plan" means the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments.

D. "Best Management Practice (BMP)" means practices or physical devices or systems designed to prevent or reduce pollutant loading from storm water or non-storm water discharges to receiving waters, or designed to reduce the volume of storm water or non-storm water discharged to the receiving water.

E. "Biofiltration" means a LID BMP that reduces storm water pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental

infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Chapter is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales.

F. "Bioretention" means a LID BMP that reduces storm water runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in this Chapter, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by the MS4 Permit as biofiltration.

G. "Bioswale" means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect storm water runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes.

H. "Brownfield Development" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

I. "CEQA" means the California Environmental Quality Act, California Public Resource Code Sections 21000 et seq., and the regulations thereunder.

J. "City" means the City of Signal Hill.

K. "Clean Water Act" or "CWA" means the Federal Water Pollution Control Act, amended in 1977 as the Clean Water Act (Title 33 U.S.C. § 1251 et seq.), and amended in 1987 to establish new controls on industrial and municipal storm water discharges, and any and all subsequent amendments thereto.

L. "Commercial Development" means any development on private land that is not heavy industrial or residential. Commercial Development includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities; mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes.

M. "Commercial Mall" means any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along

with parking area(s). Commercial Mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers.

N. "Construction Activity" means any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that results in land disturbance. The term "Construction Activity" does not include emergency construction activities required to immediately protect public health and safety, nor does it include routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility.

O. "Control" means to minimize, reduce or eliminate, by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities.

P. "Dechlorinated/debrominated swimming pool discharges" means swimming pool discharges which have no measurable chlorine or bromine and do not contain any detergents, wastes, or additional chemicals not typically found in swimming pool water. The term "swimming pool discharges" does not include swimming pool filter back wash.

Q. "Development" means construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail, and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

R. "Directly Adjacent" means situated within 200 feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area.

S. "Director" shall refer to the city of Signal Hill's Director of Public Works or his or her designee.

T. "Discharge" means any release, spill, leak, disposal, flow, escape, leaching (including subsurface migration or deposition to groundwater), dumping or discarding of any liquid, semisolid or solid substance, or combination thereof.

U. "Disturbed Area" means an area that is altered as a result of clearing, grading, and/or excavation.

V. "Environmentally Sensitive Area" (ESA) means an area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments (California Public Resources Code § 30107.5).

Areas subject to storm water mitigation requirements are: areas designated as Significant Ecological Areas by the County of Los Angeles (Los Angeles County Significant Areas Study, Los Angeles County Department of Regional Planning (1976) and amendments); an area designated as a Significant Natural Area by the California Department of Fish and Game's Significant Natural Areas Program, provided that area has been field verified by the Department of Fish and Game; an area listed in the Basin Plan as supporting the "Rare, Threatened, or Endangered Species (RARE)" beneficial use; and an area identified by a permittee as environmentally sensitive.

W. "Flow-through treatment BMPs" means a modular, vault type "high flow biotreatment" device contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain.

X. "Full Capture System" means any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate Q resulting from a one-year, one-hour storm in the sub-drainage area.

Y. "General Construction Activities Storm Water Permit (GCASP)" means the general NPDES permit adopted by the State Board which authorizes the discharge of storm water from construction activities under certain conditions.

Z. "General Industrial Activities Storm Water Permit (GIASP)" means the general NPDES permit adopted by the State Board which authorizes the discharge of storm water from certain industrial activities under certain conditions.

AA. "Green Roof" means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain.

BB. "Hazardous Substance" means any "Hazardous Substance" as that term is defined under California Health & Safety Code Sections 25281(g), 25501(o) and 25501.7, and pursuant to Title 42, Section 9601(14) of the United States Code; any "hazardous waste" as that term is defined under Title 42 Sections 6903(5) of the United States Code, and under California Health & Safety Code Section 25550(p); any "hazardous material," as that term is defined under California Health & Safety Code Section 25501(n); any chemical which the Governor of California has identified as a chemical known to cause cancer or reproductive toxicity, pursuant to California Health & Safety Code Section 25249.8; and any crude oil or refined or unrefined petroleum product, or any fraction or derivative thereof, and any asbestos or asbestos containing material. The term "Hazardous Substance" includes any amendments to the above-referenced statutes and regulations.

CC. "Hillside Property" means property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25 percent or greater.

DD. "Illicit Connection" means any man-made conveyance that is connected to the storm drain system without a permit, excluding roof drains and other similar type connections. Examples include channels, pipelines, conduits, inlets, or outlets that are connected directly to the storm drain system.

EE. "Illicit Discharge" means any discharge to the storm drain system that is prohibited under local, state, or federal statutes, ordinances, codes or regulations. The term Illicit Discharge includes all nonstorm water discharges except discharges made pursuant to a National Pollutant Discharge Elimination System (NPDES) permit, discharges that are listed within this chapter as exempt and discharges authorized by the Regional Board Executive Officer.

FF. "Impaired Water Body" means a water body that is listed by the State Board as impaired by a particular pollutant or pollutants, pursuant to Section 303(d) of the Clean Water Act.

GG. "Impervious Surface" means any surface that prevents or significantly reduces the entry of water into the underlying soil resulting in runoff from the surface in greater quantities and/or at an increased rate when compared to natural conditions prior to development including, but not limited to: parking lots, driveways, roadways, storage areas, and rooftops. The imperviousness of these areas commonly results from the use of paving or compacted gravel.

HH. "Industrial/Commercial Facility" means any facility involved and/or used in the production, manufacture, storage, transportation, distribution, exchange or sale of goods and/or commodities, and any facility involved and/or used in providing professional and non-professional services. This category of facilities includes, but is not limited to, any facility defined by either the Standard Industrial Classifications (SIC) or the North American Industry Classification System (NAICS). Facility ownership (federal, state, municipal, private) and profit motive of the facility are not factors in this definition.

II. "Industrial Park" means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry.

JJ. "Infiltration BMP" means a LID BMP that reduces storm water runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement.

KK. "Low Impact Development (LID)" consists of building and landscape features designed to retain or filter storm water runoff.

LL. "Low Impact Development for Small Sites Technical Guidance Manual (LID Manual for Small Sites)" means such manual prepared by the Director and approved by the City Council pursuant to Section 12.16.116(A) of this Chapter.

MM. "Low Impact Development Plan (LID Plan)" means such plan prepared by the project applicant pursuant to Section 12.16.114(D) of this Chapter.

NN. "Maximum Extent Practicable" as defined in the permit means a standard for implementation of storm water management programs to reduce pollutants in storm water. CWA 402(p)(3)(B)(iii) requires that municipal permits "shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or State determines appropriate for the control of such pollutants."

OO. "Municipal NPDES Permit (MS4 Permit)" means the current, area-wide NPDES permit issued to a government agency or agencies permitting the discharge of storm water from an MS4.

PP. "Municipal Separate Storm Sewer System (MS4)" or "Municipal Storm Drain System" means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

1. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;

2. Designed or used for collecting or conveying storm water;

3. Which is not a combined sewer; and

4. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR Section 122.2.

(40 CFR Section 122.26(b)(8)) (Order No. R4-2012-0175)

QQ. "National Pollutant Discharge Elimination System (NPDES)" means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA Section 307, 402, 318, and 405.

RR. "National Pollutant Discharge Elimination System ("NPDES") Permit" means a storm water discharge permit issued by the Los Angeles Regional Water Quality Control Board or the State Water Resources Control Board, that authorizes discharges to water of the United States and requires the reduction of pollutants in such discharges.

SS. "Natural Drainage System" means a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

TT. "New Development" means land disturbing activities, structural development (including construction or installation of a building or structure), creation of impervious surfaces, and land subdivision.

UU. "Non-Storm Water Discharge" means any discharge to the Municipal Storm Drain System that is not composed entirely of storm water.

VV. "Outfall" means a point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States. Outfall does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances with connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.

WW. "Parking Lot" means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces.

XX. "Person" means any natural person, firm, association, club, organization, corporation, partnership, sole proprietorship, business trust, company or other entity which is recognized by law as the subject of rights or duties.

YY. "Pollutant" means those pollutants defined in Section 502(6) of the Federal Clean Water Act (33 USC § 1362(c)) or incorporated into California Water Code Section 13373. Examples of pollutants include, but are not limited to, the following:

1. Artificial materials, chips or pieces of man-made materials (such as floatable plastics, paper, cartons, or pieces of metal);

2. Commercial or industrial water (such as fuels, solutions, detergents, plastic pellets, hazardous substances, fertilizer, pesticides, slag, ash and sludge);

3. Household waste (such as trash, paper, plastics, lawn clippings and yard wastes; animal fecal materials; excessive pesticides, herbicides and fertilizers; used oil and fluids from vehicles, lawn mowers and other common household equipment);

4. Metals, including but not limited to cadmium, lead, zinc, copper, silver, nickel, chromium, and non-metals, such as phosphorus and arsenic;

5. Petroleum hydrocarbons (such as crude oils, fuels, lubricants, surfactants, waste oils, solvents, coolants, condensate and grease);

6. Excessive eroded soils, sediment and particulate materials in amounts which may adversely affect the beneficial use of the receiving waters, or flora or fauna of the State of California;

7. Animal wastes (such as discharge from confinement facilities, kennels, pens and recreational facilities, including, stables, show facilities, or polo fields);

8. Substances having characteristics with a pH of less than 6 or greater than 9; or unusual coloration or turbidity, or excessive levels of fecal coliform, fecal streptococcus or enterococcus;

9. Waste materials and wastewater generated on construction sites and by construction activities (such as painting and staining; use of sealants, glues, limes; excessive pesticides, fertilizers or herbicides; use of wood preservatives and solvents; disturbance of asbestos fibers, paint flakes or stucco fragments; application of oils, lubricants, hydraulic, radiator or battery fluids; construction equipment washing, concrete pouring and cleanup wash water or use of concrete detergents; steam cleaning or sand blasting residues; use of chemical degreasing or diluting agents; and super chlorinated water generated by potable water line flushing);

10. The term "Pollutant" shall not include uncontaminated storm water runoff, potable water or reclaimed water generated by a lawfully permitted water treatment facility.

ZZ. "Potable Water Sources" means flows from drinking water distribution systems, including flows from system failures, pressure releases, system maintenance,

well development, testing, fire hydrant flow testing and flushing, and dewatering of pipes, reservoirs, vaults, and wells.

AAA. "Premises" means any building, structure, fixture or improvement on land, and any lot, parcel of land, land or portion of land whether improved or unimproved.

BBB. "Project" means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code Section 21065).

CCC. "Proper Disposal" means the act of disposing of material(s) in a lawful manner which ensures protection of water quality and beneficial uses of receiving waters.

DDD. "Rainfall Harvest and Use" means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department.

EEE. "Receiving Water" means "water of the United States" into which waste and/or pollutants are or may be discharged.

FFF. "Redevelopment" means land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

GGG. "Regional Board" means the California Regional Water Quality Control Board, Los Angeles Region.

HHH. "Restaurant" means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption.

III. "Retail Gasoline Outlet" means any facility engaged in selling gasoline and lubricating oils.

JJJ. "Routine Maintenance" includes, but is not limited to projects conducted to:

1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility;

2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities;

3. Perform road shoulder work, regrade dirt or gravel roadways and shoulders and perform ditch cleanouts;

4. Update existing lines* and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity; or

5. Repair leaks.

Routine maintenance does not include construction of new lines** or facilities resulting from compliance with applicable codes, standards and regulations.

* Update existing lines includes replacing existing lines with new materials or pipes.

** New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines.

KKK. "Runoff" means any runoff, including storm water and dry weather flows, that reaches a receiving water body or subsurface. During dry weather, it is typically comprised of many base flow components that are either contaminated with pollutants, or that are uncontaminated.

LLL. "Significant Ecological Areas (SEAs)" means an area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs if they possess one or more of the following criteria:

1. The habitat of rare, endangered, and threatened plant and animal species.

2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.

3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.

4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.

5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.

6. Areas important as game species habitat or as fisheries.

7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.

8. Special areas.

MMM. "Site" means land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity.

NNN. "Small Site Low Impact Development Plan (Small Site LID Plan)" means such plan prepared by the project applicant pursuant to Section 12.16.116(B) of this Chapter.

OOO. "State Board" means the State Water Resources Control Board.

PPP. "State General Construction Permit" means the current State approved NPDES Permit and waste discharge requirements for discharges of storm water associated with construction activities, and any amendments thereto.

QQQ. "Storm Drain System" means any facility or any parts of the facility, including streets, gutters, conduits, natural or artificial drains, channels and watercourse that are used for the purpose of collecting, storing, transporting or disposing of storm water and are located within the City.

RRR. "Storm Water or Storm water" means runoff and drainage related to precipitation events (pursuant to 40 CFR Section 122.26(b)(13); 55 Fed. Reg. 47990, 47995 (Nov. 16, 1990)).

SSS. "Storm Water Pollution Prevention Plan (SWPPP)" means such plan, as developed by a Qualified SWPPP Developer, as defined by the Construction General Permit.

TTT. "Urban Runoff" means surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial or industrial activities involving the use of potable and non-potable water.

UUU. "US EPA" means the United States Environment Protection Agency.

VVV. "Water Quality Standards" means those water quality standards and/or water quality objectives adopted by either the State Board and/or US EPA for the Los Angeles Region.

SECTION 2. Section 12.16.110 of the Signal Hill Municipal Code is hereby repealed in its entirety and shall be replaced with the following:

12.16.110 POLLUTANT SOURCE REDUCTION.

A. Treatment Systems. All persons who own, operate or maintain storm water clarifiers, separators, sediment ponds, LID BMPs, and other storm water treatment systems shall at all times maintain such systems in good working order and repair. This maintenance requirement shall be understood to include any maintenance activities necessary to prevent the breeding of vectors. Such systems shall be constructed and installed in a manner so as to at all times permit easy and safe access for proper maintenance, repair and inspection.

B. Industrial Sites. Each owner, operator or person in charge of day-to-day activities at any industrial site (including construction sites) within the City shall implement those minimum BMPs as may be designated by the Director, as necessary to control Pollutants (or the potential contribution of Pollutants) that exist or may exist in Discharges in runoff from such facility into the MS4. For those industrial sites that are located within ESAs or that are tributary to Impaired Water Bodies, and those industrial sites implementing BMPs that are not adequate to achieve Water Quality Standards, the Director may impose additional BMPs or additional controls in existing BMPs may be required to be implemented as required by the Director.

C. Commercial, Residential Uses. All owners, operators, and/or persons in charge of the day-to-day activities in any commercial (including institutional) or residential facility, or any other non-industrial operation within the City, shall implement those BMPs as may be required by the Director and needed to reduce the discharge of Pollutants into the MS4, as well as such additional controls as needed to avoid causing or contributing to an exceedence of a Water Quality Standard, or to reduce Pollutants in runoff in or discharging to an ESA or such areas that are tributary to an Impaired Water Body.

SECTION 3. Section 12.16.112 of the Signal Hill Municipal Code entitled "Construction Pollutant Reduction" is hereby added to read, in its entirety, as follows:

12.16.112 CONSTRUCTION POLLUTANT REDUCTION.

A. Copies of Documents. All persons engaged in Construction Activity within the City requiring State Construction General Permit coverage shall have at least the following readily available at the construction site:

1. One (1) copy of the notice of intent for the State Construction General Permit.

2. The waste discharge identification (WDID) number issued by the State Board.

3. One (1) copy of the SWPPP and storm water monitoring plan as required by the permit.

The documents listed above must also be retained for three (3) years from the date generated or date submitted, whichever is last.

B. All persons engaged in Construction Activity within the City shall implement Best Management Practices to avoid, to the Maximum Extent Practicable, the discharge of Pollutants to the MS4, in accordance with the City's grading manual, as developed and updated by the City Engineer, and, when applicable, in accordance with a grading plan approved by the City Engineer for such project.

1. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Storm water Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan.

C. Development Construction Requirements.

1. Runoff from construction activity at all construction sites shall meet the following minimum requirements:

   a. Sediments generated on the project site shall be retained using adequate Treatment Control or Structural BMPs;

   b. Construction-related materials, wastes, spills, or residues shall be retained at the project site to avoid discharge to streets, drainage facilities, receiving waters, or adjacent properties by wind or runoff;

c. Non-storm water runoff from equipment and vehicle washing and any other activity shall be contained at the project site; and

d. Erosion from slopes and channels shall be controlled by implementing an effective combination of BMPs (as approved in Regional Board Resolution No. 99-03), such as the limiting of grading scheduled during the wet season; inspecting graded areas during rain events; planting and maintenance of vegetation on slopes; and covering erosion susceptible slopes.

2. For those construction projects which are one acre and greater, the owner, operator and person in charge of the day-to-day activities at such construction site shall meet the following minimum requirements:

a. Where coverage is required pursuant to the State Construction General Permit, to have proof of a Waste Discharger Identification Number for filing of a Notice of Intent for permit coverage under the State Construction General Permit, as well as a certification that an SWPPP has been prepared; and

b. To show proof of a Notice of Intent and a copy of the SWPPP upon the transfer of ownership of any part or portion of the subject property, while construction activities are ongoing.

D. City Review and Plan Approval.

1. Prior to the issuance of a permit for a New Development or Redevelopment Project, the City shall evaluate the proposed project using the applicable State Construction General Permit approved by the Regional Board, and erosion and grading requirements of the City Building Official or Director to determine (i) its potential to generate the flow of Pollutants into the MS4 during construction; and (ii) how well the SWPPP for the proposed project meets the goals of this Chapter. Each plan will be evaluated on its own merits according to the particular characteristics of the project and the site to be developed. Based upon the review, the City may impose conditions upon the issuance of the building permit, in addition to any required by the State Construction General Permit for the project, in order to minimize the flow of Pollutants into the MS4.

2. No grading permit for developments requiring coverage under the State Construction General Permit shall be issued unless the applicant can show that a notice of intent to comply with the State Construction General Permit has been filed and that a SWPPP has been prepared for the project.

3. Storm Water runoff containing sediment, construction waste or other Pollutants from the construction site and parking areas shall be reduced to the Maximum Extent Practicable. The following Best Management Practices shall apply to all construction projects within the City, and shall be required from the time of demolition of existing structures or commencement of construction until receipt of a certificate of occupancy:

   a. Sediment, construction waste, and other Pollutants from construction activities shall be retained on the construction site to the Maximum Extent Practicable;

   b. Structural controls such as sediment barriers, plastic sheeting, detention ponds, dikes, filter beams and similar controls shall be utilized to the Maximum Extent Practicable in order to minimize the escape of sediment and other Pollutants from the site;

   c. All excavated soil shall be located on the site in a manner that minimizes the amount of sediments running onto the street, drainage facilities or adjacent properties. Soil piles shall be covered with plastic or similar material until the soil is either used or removed from the site;

   d. No washing of construction or other vehicles is permitted adjacent to a construction site. No water from the washing of construction or other vehicles is permitted to run off the construction site, or to otherwise enter the MS4.

4. As a condition to granting a building permit or grading permit, the City may set reasonable limits on the clearing of natural vegetation from construction sites, in order to reduce the potential for soil erosion. These limits may include, but are not limited to, regulating the length of time soil is allowed to remain bare or prohibiting bare soil.

5. The Director may require, prior to the issuance of any building or grading permit, preparation of appropriate wet weather erosion control plan, SWPPP or other plans consistent with countywide

development construction guidance provisions and the goals of this chapter.

6. Full or partial waivers of compliance with the requirements of this section may be obtained where the project applicant shows by application in writing that the incorporation and design elements that address the objectives set forth in this section are impracticable, and are non-economical or otherwise physically impossible due to the site characteristics or other characteristics unique to the project. Any waiver request shall be in writing to the Director and may only be approved where permitted in accordance with the terms of the existing Construction General Permit.

SECTION 4. Section 12.16.114 of the Signal Hill Municipal Code entitled "New Development/Redevelopment Pollutant Reduction" is hereby added to read, in its entirety, as follows:

12.16.114. NEW DEVELOPMENT/REDEVELOPMENT POLLUTANT REDUCTION.

A. Objective. The provisions of this Section establish requirements for construction activities and facility operations of Development and Redevelopment Projects to comply with the MS4 Permit, to lessen the water quality impacts of development by using smart growth practices, and to integrate LID practices and standards for storm water pollution mitigation through means of infiltration, evapotranspiration, biofiltration, and rainfall harvest and use. LID shall be inclusive of new development and/or redevelopment requirements.

B. Scope. This Section contains requirements for storm water pollution control measures in Development and Redevelopment Projects, and authorizes the City to further define and adopt storm water pollution control measures, and authorizes the City to further define and adopt storm water pollution control measures and to develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies. Except as otherwise provided herein, the City shall administer, implement and enforce the provisions of this Section.

C. Applicability. This Section applies to the following Projects:

1. All Development Projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of Impervious Surface area.

2. Industrial Parks with 10,000 square feet or more of surface area.

3. Commercial Malls with 10,000 square feet or more of surface area.

4. Retail Gasoline Outlets with 5,000 square feet or more of surface area.

5. Restaurants with 5,000 square feet or more of surface area.

6. Parking Lots with 5,000 square feet or more of Impervious Surface area, or with 25 or more parking spaces.

7. Streets and roads construction with 10,000 square feet or more of Impervious Surface area. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects.

8. Automotive Service Facilities with 5,000 square feet or more of surface area.

9. Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area, where the Development will:

    a. Discharge Storm water Runoff that is likely to impact a sensitive biological species or habitat; and

    b. Create 2,500 square feet or more of Impervious Surface area

10. Single-family Hillside Properties.

11. Redevelopment Projects

    a. Construction Activity that results in the creation, addition or replacement of 5,000 square feet or more of Impervious Surface area on an already developed Site of one of the Projects identified in this Subsection.

    b. Where Redevelopment results in an alteration to more than fifty percent of Impervious Surfaces of a previously existing development, and the existing development was not subject to post-construction Storm water quality control requirements, the entire project must be mitigated.

    c. Where Redevelopment results in an alteration to less than fifty percent of Impervious Surfaces of a previously existing development, and the existing development was not subject to post-construction Storm water quality control requirements, only the alteration must be mitigated, and not the entire development.

d. Redevelopment does not include Routine Maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious Surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a Routine Maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

e. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of Impervious Surface area.

D. Requirements. The Site for every Project identified in Section 12.16.114(C) shall be designed to control Pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing Impervious Surface area and controlling Runoff from Impervious Surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use. The project applicant shall prepare a LID Plan which implements set LID standards and practices for storm water pollution mitigation and provides documentation to demonstrate compliance with the MS4 Permit on the plans and permit application submitted to the City. Such a LID Plan shall comply with the following:

1. A new single-family Hillside Property Development shall prepare a LID Plan to include mitigation measures to:

a. Conserve natural areas;

b. Protect slopes and channels;

c. Provide storm drain system stenciling and signage;

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and

e. Direct surface flow to vegetated areas before discharge, unless the diversion would result in slope instability.

2. Street and road construction of 10,000 square feet or more of Impervious Surface shall follow US EPA guidance regarding

Managing Wet Weather with the City's most current Green Streets Manual to the Maximum Extent Practicable.

3. The remainder of Projects identified in Section 12.16.114(C) shall prepare a LID Plan to comply with the following:

   a. Retain Storm water Runoff onsite for the Storm water Quality Design Volume (SWQDv) defined as the Runoff from:

      i. The 85th percentile 24-hour Runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or

      ii. The volume of Runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

   b. Minimize hydromodification impacts to natural drainage systems.

E. Technical Infeasibility.

1. Full or partial waivers of compliance with the requirements of this Section may be obtained where the project applicant shows by application in writing that the incorporation and design elements that address the objectives set forth in this Section are impracticable and are non-economical or otherwise physically impossible due to the Site characteristics or other characteristics unique to the Project. Any waiver request shall be in writing to the Director and may only be approved where permitted in accordance with the terms of the MS4 Permit.

2. To demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use, and that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect. Technical infeasibility may result from conditions including the following:

   a. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.

b. Locations where seasonal high groundwater is within five to ten feet of surface grade;

c. Locations within 100 feet of a groundwater well used for drinking water;

d. Brownfield Development sites or other locations where pollutant mobilization is a documented concern;

e. Locations with potential geotechnical hazards; and

f. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

3. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in the MS4 permit.

a. Additional alternative compliance options such as offsite infiltration and groundwater replenishment projects may be available to the project Site. The applicant should contact the Director to determine eligibility.

4. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required by the MS4 permit. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

a. 0.2 inches per hour, or

b. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

F. Exemptions from LID Requirements. The provisions of this Section do not apply to any of the following:

1. A Development involving only emergency construction activity required to immediately protect public health and safety;

2. Infrastructure projects within the public right-of-way;

3. A Development or Redevelopment involving only activity related to gas, water, cable, or electricity services on private property;

4. A Development involving only resurfacing and/or re-striping of permitted parking lots, where the original line and grade, hydraulic capacity, and original purpose of the facility is maintained;

5. A project involving only exterior movie or television production sets, or facades on an existing developed site;

6. A project not requiring a City building, grading, demolition or other permit for construction activity.

G. Any Development that is exempted from LID requirements under Subsection F of this Section has the option to voluntarily opt in and incorporate into the project the LID requirements set forth herein.

H. City Review and Approval

1. Prior to the issuance of a permit for a New Development or Redevelopment Project, the City shall evaluate the proposed project using the MS4 Permit, and erosion and grading requirements of the City Building Official or Director to determine (i) its potential to generate the flow of Pollutants into the MS4 after construction; and (ii) how well the LID Plan for the proposed project meets the goals of this Chapter. Each plan will be evaluated on its own merits according to the particular characteristics of the project and the site to be developed. Based upon the review, the City may impose conditions upon the issuance of the building permit, in addition to any required by the State Construction General Permit for the project, in order to minimize the flow of Pollutants into the MS4.

2. The Director shall approve or disapprove of the LID Plan within thirty (30) calendar days of submittal, or within thirty (30) days of approval of the development project by the Planning Commission, where Planning Commission approval is required. If the LID Plan is disapproved, the reasons for disapproval shall be given in writing to the applicant. Any LID Plan disapproved may be revised by the applicant and resubmitted for approval. A resubmitted plan will be approved or disapproved within thirty (30) days of submittal. No building or grading permit shall be issued until a LID Plan has been approved by the Director.

3. If no building permit has been issued or no construction has begun on a project within a period of one hundred eighty (180) days of

approval of a LID Plan, the LID Plan for that project shall expire. The Director may extend the time by written extension for action by the applicant for a period not to exceed one hundred eighty (180) days upon written request by the applicant showing that circumstances beyond the control of the applicant prevented the construction from commencing. In order to renew the LID Plan, the applicant shall resubmit all necessary forms and other data and pay a new LID plan check fee.

I. Transfer of Properties Subject to the Requirements of this Section.

1. The transfer or lease of a property subject to maintenance requirements for LID BMPs shall include conditions requiring the transferee and its successors and assigns to either: (a) assume responsibility for maintenance of any existing LID BMP, or (b) replace an existing LID BMP with new control measures or BMPs meeting the then current standards of the City and MS4 Permit. Such requirement shall be included in any sale or lease agreement or deed for such property. The condition of transfer shall include a provision that the successor property owner or lessee conduct maintenance inspections of all LID BMPs at least once a year and retain proof of inspection.

2. For residential properties where the LID BMPs are located within a common area which will be maintained by a homeowners' association, language regarding the responsibility for maintenance shall be included in the project's conditions, covenants and restrictions (CC&Rs). Printed educational materials will be required to accompany the first deed transfer to highlight the existence of the requirement and to provide information on what LID BMPs are present, signs that maintenance is needed, and how the necessary maintenance can be performed. The transfer of this information shall also be required with any subsequent sale of the property.

3. If LID BMPs are located within an area proposed for dedication to a public agency, they will be the responsibility of the developer until the dedication is accepted.

SECTION 5. Section 12.16.116 of the Signal Hill Municipal Code entitled "Small Site New Development/Redevelopment Pollutant Reduction" is hereby added to read, in its entirety, as follows:

12.16.116. SMALL SITE NEW DEVELOPMENT/REDEVELOPMENT POLLUTANT REDUCTION.

A. LID Manual. The LID Manual for Small Sites shall be prepared, maintained, and updated, as deemed necessary and appropriate, by the Director and approved by the City Council. It shall set LID standards and practices for Storm water pollution mitigation, including Urban and Storm water Runoff quantity and quality control development principles and technologies for achieving the LID standards for projects not otherwise required to implement LID strategies by the MS4 Permit.. The LID Manual for Small Sites shall also include technical feasibility and implementation parameters, alternative compliance for technical infeasibility, as well as other rules, requirements and procedures as the Director deems necessary.

B. Requirements. The Site for Projects not listed in Section 12.16.114(C), but resulting in the creation or addition or replacement of 500 square feet or more of Impervious Surface area shall be designed to control Pollutants, pollutant loads, and Runoff volume per the LID Manual for Small Sites. The project applicant shall prepare a Small Site LID Plan which implements set LID standards and practices, as identified in the LID Manual for Small Sites for storm water pollution mitigation, and provides documentation to demonstrate compliance with theLID Manual for Small Sites on the plans submitted to the City. Such a Small Site LID Plan shall comply with the following:

1. Storm water Runoff will be infiltrated, evapotranspired, captured and used, biofiltrated/biotreated through high removal efficiency LID BMP alternatives as identified in the LID Manual for Small Sites, onsite, through Storm water management techniques that comply with the provisions of the LID Manual for Small Sites. To the maximum extent feasible, onsite Storm water management techniques must be properly sized, at a minimum, without any Storm Water Runoff leaving the Site for at least the volume of water produced by the water quality design storm event that results from:

    a. The 85th percentile 24-hour rain event determined as the maximized capture Storm water volume for the area using a 48 to 72-hour draw down time; or

    b. The volume of Runoff produced from a 0.75 inch, 24 hour rain event.

2. Pollutants shall be prevented from leaving the Site for a water quality design storm event as defined in paragraph 1 of this Subsection, unless the Site has been treated through an approved LID strategy.

3. Any Development four or fewer units intended for residential use shall implement LID BMP alternatives identified in the LID Manual for Small Sites for the Residential LID category and provide documentation to demonstrate compliance on the plans and permit application submitted to the City.

4. Any Development of five or more units intended for residential use or any Development intended for nonresidential use shall implement LID BMP alternatives identified in the LID Manual for Small Sites for the Commercial/Industrial LID category and provide documentation to demonstrate compliance on the plans and permit application submitted to the City.

5. For any Construction Activity resulting in an alteration of at least fifty percent (50%) or more of the Impervious Surfaces on an existing developed Site, the entire Site must comply with the standards and requirements stated above and with the LID Manual for Small Sites.

6. For any Construction Activity resulting in an alteration of less than fifty percent (50%) of the Impervious Surfaces of an existing developed Site, only such incremental Development shall comply with the standards and requirements stated above and with the LID Manual for Small Sites.

C. Technical Infeasibility.

1. When, as determined by the Director, the onsite LID requirements are technically infeasible, partially or fully, the infeasibility shall be demonstrated in the submitted Small Site LID Plan, shall be consistent with other City requirements, and shall be reviewed in consultation with the Department of Building and Safety. The technical infeasibility may result from conditions that may include, but are not limited to:

   a. Locations where seasonal high groundwater is within five to ten feet of surface grade;

   b. Locations within 100 feet of a groundwater well used for drinking water;

   c. Brownfield Development sites or other locations where pollutant mobilization is a documented concern;

   d. Locations with potential geotechnical hazards;

e. Locations with impermeable soil type as indicated in applicable soils and geotechnical reports; and

f. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs.

2. If partial or complete onsite compliance of any type is technically infeasible, as determined by the Director, the project Site and LID Plan will be granted a waiver from the requirements of this Section and the LID Manual for Small Sites. If a portion of the Project Site is deemed technically infeasible, the project applicant may propose an equivalent area within the same project area for LID. The Director may permit substitutions of equivalent areas upon request by the project applicant.

D. Exemptions from LID Requirements. The provisions of this Section do not apply to any of the following:

1. A Development involving only emergency construction activity required to immediately protect public health and safety;

2. Infrastructure projects within the public right-of-way;

3. A Development or Redevelopment involving only activity related to gas, water, cable, or electricity services on private property;

4. A Development involving only resurfacing and/or re-striping of permitted parking lots, where the original line and grade, hydraulic capacity, and original purpose of the facility is maintained;

5. A project involving only exterior movie or television production sets, or facades on an existing developed site;

6. A project not requiring a City building, grading, demolition or other permit for construction activity.

E. Any Development that is exempted from LID requirements under Subsection D of this Section has the option to voluntarily opt in and incorporate into the project the LID requirements set forth herein.

F. City Review and Plan Approval.

1. Prior to the issuance of a permit for a small site, as described in Section 12.16.116(B), the City shall evaluate the proposed project

using the LID Manual for Small Sites and erosion and grading requirements of the City Building Official or Director to determine (i) its potential to generate the flow of Pollutants into the MS4 after construction; and (ii) how well the Small Site LID Plan for the proposed project meets the goals of this Chapter. Each plan will be evaluated on its own merits according to the particular characteristics of the project and the site to be developed. Based upon the review, the City may impose conditions upon the issuance of the building permit, in order to minimize the flow of Pollutants into the MS4.

2. The Director shall approve or disapprove of the Small Site LID Plan within thirty (30) calendar days of submittal, or within thirty (30) days of approval of the development project by the Planning Commission, where Planning Commission approval is required. If the plan is disapproved, the reasons for disapproval shall be given in writing to the applicant. Any plan disapproved may be revised by the applicant and resubmitted for approval. A resubmitted plan will be approved or disapproved within thirty (30) days of submittal. No building or grading permit shall be issued until a Small Site LID Plan has been approved by the Director.

3. If no building permit has been issued or no construction has begun on a project within a period of one hundred eighty (180) days of approval of a Small Site LID Plan, the Small Site LID Plan for that project shall expire. The Director may extend the time by written extension for action by the applicant for a period not to exceed one hundred eighty (180) days upon written request by the applicant showing that circumstances beyond the control of the applicant prevented the construction from commencing. In order to renew the Small Site LID Plan, the applicant shall resubmit all necessary forms and other data and pay a new plan review fee.

G. Transfer of Properties Subject to the Requirements of this Section.

1. The transfer or lease of a property subject to maintenance requirements for LID BMPs shall include conditions requiring the transferee and its successors and assigns to either: (a) assume responsibility for maintenance of any existing LID BMP, or (b) replace an existing LID BMP with new control measures or BMPs meeting the then current standards of the City and MS4 Permit. Such requirement shall be included in any sale or lease agreement or deed for such property. The condition of transfer shall include a provision that the successor property owner or lessee conduct maintenance inspections of all LID BMPs at least once a year and retain proof of inspection.

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2. For residential properties where the LID BMPs are located within a common area which will be maintained by a homeowners' association, language regarding the responsibility for maintenance shall be included in the project's conditions, covenants and restrictions (CC&Rs). Printed educational materials will be required to accompany the first deed transfer to highlight the existence of the requirement and to provide information on what LID BMPs are present, signs that maintenance is needed, and how the necessary maintenance can be performed. The transfer of this information shall also be required with any subsequent sale of the property.

3. If LID BMPs are located within an area proposed for dedication to a public agency, they will be the responsibility of the developer until the dedication is accepted.

SECTION 6. Section 12.16.118 of the Signal Hill Municipal Code entitled "Low Impact Development Plan Check Fees" is hereby added to read, in its entirety, as follows:

12.16.118. LOW IMPACT DEVELOPMENT PLAN CHECK FEES

A. Before review and approval of a set of plans and specifications, the applicant shall pay a LID plan check fee.

B. LID plan check fees will be established by resolution of the City Council.

SECTION 7. Effective Date. The City Clerk shall certify to the passage and adoption of this ordinance by the City Council of the City of Signal Hill and shall, within 15 days after its final passage, cause the same to be published once in the Signal Hill Tribune, a newspaper of general circulation which is hereby designated for that purpose. This Ordinance shall take effect 30 days after its passage.

SECTION 8. Severability. If any section, subsection, sentence, clause, phrase, or portion of this Ordinance is, for any reason, held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance. The City Council of the City of Signal Hill hereby declares that it would have adopted this Ordinance and each section, subsection, sentence, clause, phrase, or portion thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, phrases, or portions thereof may be declared invalid or unconstitutional.

SECTION 9. CEQA Findings. The City Council hereby finds that this Ordinance is an activity taken to maintain, restore, enhance, or protect the environment and therefore categorically exempt from CEQA review as a Class 8 exemption pursuant to 14 California Code of Regulations Section 15308.

PASSED, APPROVED, AND ADOPTED at a regular meeting of the City Council of the City of Signal Hill, California, on this 2nd day of July 2013.

MICHAEL J. NOLL
MAYOR

ATTEST:

KATHLEEN L. PACHECO
CITY CLERK

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES) ss.
CITY OF SIGNAL HILL)

I, KATHLEEN L. PACHECO, City Clerk of the City of Signal Hill, California, hereby certify that Ordinance No. 2013-06-1455 was introduced at a regular meeting of the City Council of the City of Signal Hill held on the 18th of June 2013, and thereafter was adopted by the City Council at a regular meeting held on the 2nd of July 2013, and that the same was adopted by the following roll call vote:

AYES: MAYOR MICHAEL J. NOLL, VICE MAYOR EDWARD H.J. WILSON, COUNCIL MEMBERS LARRY FORESTER, TINA L. HANSEN, LORI Y. WOODS

NOES: NONE

ABSENT: NONE

ABSTAIN: NONE

KATHLEEN L. PACHECO
CITY CLERK

STATE OF CALIFORNIA)
CITY OF LOS ANGELES)
CITY OF SIGNAL HILL)

I, KATHLEEN L. PACHECO, City Clerk of the City of Signal Hill, California, do hereby certify that this document is a true and correct copy of Ordinance No. 2013-06-1455, which was introduced at a regular meeting of the City Council on June 18, 2013, and adopted at a regular meeting of the City Council on July 2, 2013, and that it has been published and posted pursuant to G.C. 36933, G.C. 40806, and SHMC 1.08.010.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 2nd day of July 2013.

KATHLEEN L. PACHECO, City Clerk
City of Signal Hill, California

RESOLUTION NO. 7565

CITY OF SOUTH GATE
LOS ANGELES COUNTY, CALIFORNIA

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SOUTH GATE APPROVING THE MANAGING WET WEATHER WITH GREEN INFRASTRUCTURE MUNICIPAL HANDBOOK AS THE CITY'S GREEN STREETS POLICY

WHEREAS, the Municipal Separate Storm Sewer System (MS4) Permit (Order No. R-2012-0175) ("Permit"), adopted by the California Regional Water Quality Control Board, Los Angeles Region on November 8, 2012 and becoming effective December 28, 2012, requires all municipalities electing to prepare a Watershed Management Program or an Enhanced Watershed Management Program under the Permit to demonstrate that Green Streets policies are in place that specify the use of green street strategies for transportation corridors; and

WHEREAS, a transportation corridor is a linear pathway intended for a particular mode of transportation, such as streets, roads, highways, railroads, freeways, etc.; and

WHEREAS, "Green Streets" are defined as enhancements to street and road projects to improve the quality of storm water and urban runoff through the implementation of infiltration, bio-treatment, xeriscaping parkways and tree lined streets; and

WHEREAS, since February 26, 2013, the City in conjunction with the Gateway Water Management Authority, began development of a Green Streets Policy,

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SOUTH GATE DOES HEREBY RESOLVE AS FOLLOWS:

SECTION 1. The above recitals are all true and correct.

SECTION 2. The City Council hereby approves the Green Streets Policy and authorizes the Public Works Director to implement Green Streets Policy attached here to as Exhibit "A" and entitled as: Managing Wet Weather with Green Infrastructure Municipal Handbook (December 2008 EPA-833-F-08-009).

SECTION 3. The Director of Public Works is authorized to review each project on a case-by-case basis to determine if it meets the criteria of a transportation corridor.

SECTION 4. The Director of Public Works is authorized evaluate technical and economic feasibility of any proposed Best Management Practices ("BMPs") for any project meeting the above criteria prior to approval of any such BMPs.

SECTION 5. Routine maintenance including, but not limited to, slurry seals, grind and overlay and reconstruction to maintain original line and grade, are excluded from the Green Streets Policy.

SECTON 6. The City Clerk shall certify to the adoption of this Resolution which shall be effective upon its adoption.

PASSED, APPROVED, and **ADOPTED** this 13th day of August 2013.

CITY OF SOUTH GATE:

Gil Hurtado, Mayor

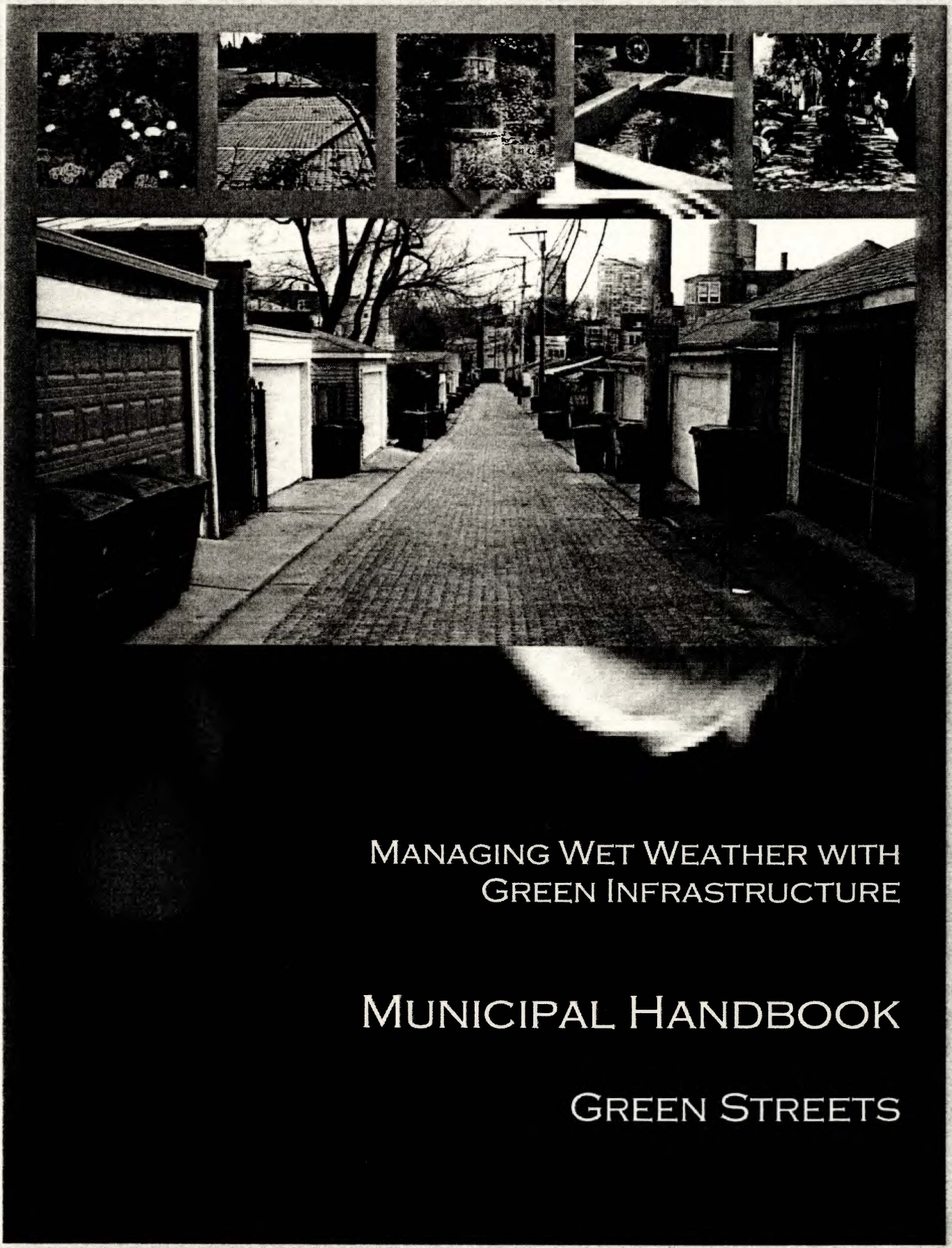
ATTEST:

Carmen Avalos, City Clerk
(SEAL)

APPROVED AS TO FORM:

Raul F. Salinas, City Attorney

EXHIBIT A



Managing Wet Weather with Green Infrastructure

Municipal Handbook

Green Streets

RB-AR11092

Managing Wet Weather with Green Infrastructure

Municipal Handbook

Green Streets

prepared by

Robb Lukes
Christopher Kloss
Low Impact Development Center

The Municipal Handbook is a series of documents
to help local officials implement green infrastructure in their communities.

December 2008

EPA-833-F-08-009

Front Cover Photos
Top: rain garden; permeable pavers; rain barrel; planter; tree boxes.
Large photo: green alley in Chicago

RB-AR11093

Green Streets

Introduction

By design and function, urban areas are covered with impervious surfaces: roofs, roads, sidewalks, and parking lots. Although all contribute to stormwater runoff, the effects and necessary mitigation of the various types of surfaces can vary significantly. Of these, roads and travel surfaces present perhaps the largest urban pollution sources and also one of the greatest opportunities for green infrastructure use.

The Federal Highway Administration (FHA) estimates that more than 20% of U.S. roads are in urban areas.[1] Urban roads, along with sidewalks and parking lots, are estimated to constitute almost two-thirds of the total impervious cover and contribute a similar ratio of runoff.[2] While a significant source of runoff, roads are also a part of the infrastructure system, conveying stormwater along gutters to inlets and the buried pipe network. Effective road drainage, translated as moving stormwater into the conveyance system quickly, has been a design priority while opportunities for enhanced environmental management have been overlooked especially in the urban environment.

Table 1. Examples of Stormwater Pollutants Typical of Roads.[3, 4]

Pollutant	Source	Effects
Trash	---	Physical damage to aquatic animals and fish, release of poisonous substances
Sediment/solids	Construction, unpaved areas	Increased turbidity, increased transport of soil bound pollutants, negative effects on aquatic organisms reproduction and function
Metals • Copper • Zinc • Lead • Arsenic	• Vehicle brake pads • Vehicle tires, motor oil • Vehicle emissions and engines • Vehicle emissions, brake linings, automotive fluids	Toxic to aquatic organisms and can accumulate in sediments and fish tissues
Organics associated with petroleum (e.g., PAHs)	Vehicle emissions, automotive fluids, gas stations	Toxic to aquatic organisms
Nutrients	Vehicle emissions, atmospheric deposition	Promotes eutrophication and depleted dissolved oxygen concentrations

The altered flow regime from traditional roadways, increased runoff volume, more frequent runoff events, and high runoff peak flows, are damaging to the environment and a risk to property downstream. These erosive flows in receiving streams will cause down cutting and channel shifting in some places and excessive sedimentation in others. The unnatural flow regime destroys stream habitat and disrupts aquatic systems.

Compounding the deliberate rapid conveyance of stormwater, roads also are prime collection sites for pollutants. Because roads are a component of the stormwater conveyance system, are impacted by atmospheric deposition, and exposed to vehicles, they collect a wide suite of pollutants and deliver them into the conveyance system and ultimately receiving streams (See Table 1). The metals, combustion by-products, and automotive fluids from vehicles can present a toxic mix that combines with the ubiquitous nutrients, trash, and suspended solids.

RB-AR11094

While other impervious surfaces can be replaced, for example using green roofs to decrease the amount of impervious roof surface, for the most part, impervious roads will, for some time to come, constitute a significant percentage of urban imperviousness because of their current widespread existence. Reducing road widths and other strategies to limit the amount of impervious surface are critical, but truly addressing road runoff requires mitigating its effects.

Green Streets achieve multiple benefits, such as improved water quality and more livable communities, through the integration of stormwater treatment techniques which use natural processes and landscaping.

Roads present many opportunities for green infrastructure application. One principle of green infrastructure involves reducing and treating stormwater close to its source. Urban transportation right-of-ways integrated with green techniques are often called "green streets". Green streets provide a source control for a main contributor of stormwater runoff and pollutant load. In addition, green infrastructure approaches complement street facility upgrades, street aesthetic improvements, and urban tree canopy efforts that also make use of the right-of-way and allow it to achieve multiple goals and benefits. Using the right-of-way for treatment also links green with gray infrastructure by making use of the engineered conveyance of roads and providing connections to conveyance systems when needed.

Green streets are beneficial for new road construction and retrofits. They can provide substantial economic benefits when used in transportation applications. Billions of dollars are spent annually on road construction and rehabilitation, with a large percentage focused on rehabilitation especially in urban areas. Coordinating green infrastructure installation with broader transportation improvements can significantly reduce the marginal cost of stormwater management by including it within larger infrastructure improvements. Also, and not unimportantly, right-of-way installations allow for easy public maintenance. A large municipal concern regarding green infrastructure use is maintenance; using roads and right-of-ways as locations for green infrastructure not only addresses a significant pollutant source, but also alleviates access and maintenance concerns by using public space.

In urban areas, roads present many opportunities for coordinated green infrastructure use. Some municipalities are capitalizing on the benefits gained by introducing green infrastructure in transportation applications. This paper will evaluate programs and policies that have been used to successfully integrate green infrastructure into roads and right-of-ways.

Green Street Designs

Green streets can incorporate a wide variety of design elements including street trees, permeable pavements, bioretention, and swales. Although the design and appearance of green streets will vary, the functional goals are the same: provide source control of stormwater, limit its transport and pollutant conveyance to the collection system, restore predevelopment hydrology to the extent possible, and provide environmentally enhanced roads. Successful application of green techniques will encourage soil and vegetation contact and infiltration and retention of stormwater.

Alternative Street Designs (Street Widths)

A green street design begins before any BMPs are considered. When building a new street or streets, the layout and street network must be planned to respect the existing hydrologic functions of the land (preserve wetlands, buffers, high-permeability soils, etc.) and to minimize the impervious area. If retrofitting or redeveloping a street, opportunities to eliminate unnecessary impervious area should be explored.

RB-AR11095

Implementation Hurdles

Many urban and suburban streets, sized to meet code requirements for emergency service vehicles and provide a free flow of traffic, are oversized for their typical everyday functions. The Uniform Fire Code requires that streets have a *minimum 20 feet of unobstructed width;* a street with parking on both sides would require a width of at least 34 feet. In addition to stormwater concerns, wide streets have many detrimental implications on neighborhood livability, traffic conditions, and pedestrian safety.[5]

Oregon State Code Granting Authority for Street Standards to Local Government

ORS 92.044 - Local governments shall *supersede and prevail over any specifications and standards for roads and streets set forth in a uniform fire code adopted by the State Fire Marshal, a municipal fire department or a county firefighting agency....* Local governments shall consider the needs of the fire department or fire-fighting agency when adopting the final specifications and standards.

The Transportation Growth and Management Program of Oregon, through a Stakeholder Design Team, developed a guide for reducing street widths titled the *Neighborhood Street Design Guidelines.*[6] The document provides a helpful framework for cities to conduct an inclusive review of street design profiles with the goal of reducing widths. Solutions for accommodating emergency vehicles while minimizing street widths are described in the document. They include alternative street parking configurations, vehicle pullout space, connected street networks, prohibiting parking near intersections, and smaller block lengths.



Figure 1. The street-side swale and adjacent porous concrete sidewalk are located in the High Point neighborhood of Seattle, WA
(Source: Abby Hall, US EPA).

In 1997, Oregon, which has adopted the *Uniform Fire Code,* specifically granted local government the authority to establish alternative street design standards but requires them to consult with fire departments before standards are adopted. Table 2 provides examples of alternative street widths allowed in U.S. jurisdictions.[7]

Swales

Swales are vegetated open channels designed to accept sheet flow runoff and convey it in broad shallow flow. The intent of swales is to reduce stormwater volume through infiltration, improve water quality through vegetative and soil filtration, and reduce flow velocity by increasing channel roughness. In the simple roadside grassed form, they have been a common historical component of road design. Additional benefit can be attained through more complex forms of swales, such as those with amended soils, bioretention soils, gravel storage areas, underdrains, weirs, and thick diverse vegetation.

Implementation Hurdles

There is a common misconception of open channel drainage being at the bottom of a street development hierarchy in which curb and gutter are at the top. Seattle's Street Edge Alternative Project and other natural drainage swale pilot projects have demonstrated that urban swales not only mitigate stormwater impacts, but they can also enhance the urban environment.[8]

RB-AR11096

Table 2. Examples of Alternative Street Widths

Jurisdiction	Street Width	Parking Condition
Phoenix, AZ	28'	parking both sides
Santa Rosa, CA	30'	parking both sides, <1000ADT
	26'-28'	parking one side
	20'	no parking
	20'	neck downs @ intersection
Orlando, FL	28'	parking both sides, res. Lots<55' wide
	22'	parking both sides, res. Lots>55' wide
Birmingham, MI	26'	parking both sides
	20'	parking one side
Howard County, MD	24'	parking unregulated
Kirkland, WA	12'	alley
	20'	parking one side
	24'	parking both sides – low density only
	28'	parking both sides
Madison, WI	27'	parking both sides, <3DU/AC
	28'	parking both sides, 3-10 DU/AC

ADT: Average Daily Traffic DU/AC: dwelling units per acre

Bioretention Curb Extensions and Sidewalk Planters

Bioretention is a versatile green street strategy. Bioretention features can be tree boxes taking runoff from the street, indistinguishable from conventional tree boxes. Bioretention features can also be attractive attention grabbing planter boxes or curb extensions. Many natural processes occur within bioretention cells: infiltration and storage reduces runoff volumes and attenuates peak flows; biological and chemical reactions occur in the mulch, soil matrix, and root zone; and stormwater is filtered through vegetation and soil.



Figure 2. This bioretention area takes runoff from the street through a trench drain in the sidewalk as well as runoff from the sidewalk through curb cuts *(Source: Abby Hall, US EPA).*

Implementation Hurdles

A few municipal DOT programs have instituted green street requirements in roadway projects, but as of yet, specifications for street bioretention have not yet been incorporated into municipal DOT specifications. Many cities do have street bioretention pilot projects; two of the well documented programs are noted in the table. Several concerns and considerations have prevented standard implementation of bioretention by DOTs.

Table 3. Municipalities with Swale Specifications and Standard Details

Municipality	Document	Section Title	Section #
City of Austin[9]	Standard Specifications and Standard Details	Grass-Lined Swale and Grass-Lined Swale with Stone Center	627S
City of Seattle[10]	2008 Standard Specifications for Municipal Construction	Natural Drainage Systems	7-21

RB-AR11097

Table 4. Municipalities with Bioretention Pilot Projects in the Right-of-Way

Municipality	Bioretention Type	Document
Maplewood, MN	Rain gardens	*Implementing Rainwater in Urban Stormwater Management* [11]
Portland, OR	• Curb extensions • Planters • Rain gardens	*2006 Stormwater Management Facility Monitoring Report* [12]

The diversity of shapes, sizes, and layouts bioretention can take is a significant obstacle to their incorporation with DOT specifications and standards. Street configurations, topography, soil conditions, and space availability are some of the factors that will influence the design of the bioretention facility. These variables make documentation of each new bioretention project all the more important. By building a menu of templates from local bioretention projects, future projects with similar conditions will be easier to implement and cost less to design. The documentation should include copies of the details and specifications for the materials used. A section on construction and operation issues, costs, lessons learned, and recommendations for similar designs should also be included in project documentation. Portland's Bureau of Environmental Services has proven adept at documenting each of its Green Streets projects and making them accessible online.[13]

Utilities are a chief constraint to implementing bioretention as a retrofit in urban areas. The Prince George's County, MD Bioretention Design Specifications and Criteria manual recommends applying the same clearance criteria recommended for storm drainage pipes.[14] Municipal design standards should specify the appropriate clearance from bioretention or allowable traversing.

Prince George's County, MD - 2.12.1.16 Utility Clearance

Utility clearances that apply to storm drainage pipe and structure placement also apply to bioretention. Standard utility clearances for storm drainage pipes have been established at 1' vertical and 5' horizontal. However, bioretention systems are shallow, non-structural IMP's consisting of mostly plant and soil components, (often) with a flexible underdrain discharge pipe. For this reason, other utilities may traverse a bioretention facility without adverse impact. Conduits and other utility lines may cross through the facility but construction and maintenance operations must include safeguard provisions. In some instances, bioretention could be utilized where utility conflicts would make structural BMP applications impractical.

Plants are another common concern of municipal staff, whether it is maintenance, salt tolerance, or plant height with regard to safety and security. Cities actively implementing LID practices in public spaces maintain lists of plants which fit the vegetated stormwater management practice niche. These are plants that flourish in the regional climate conditions, are adapted to periodic flooding, are low maintenance, and, if in cold climates, salt tolerant. Most often these plants are natives, but sometimes an approved non-native will best fit necessary criteria. A municipal plant list should be periodically updated based on maintenance experience, and vegetation health surveys.

Permeable Pavement

Permeable pavement comes in four forms: permeable concrete, permeable asphalt, permeable interlocking concrete pavers, and grid pavers. Permeable concrete and asphalt are similar to their impervious counterparts but are open graded or have reduced fines and typically have a special binder added. Methods for pouring, setting, and curing these permeable pavements also differ from the impervious versions. The concrete and grid pavers are modular systems. Concrete pavers are installed with gaps between them that allow water to pass through to the base. Grid pavers are typically a durable plastic matrix that can be filled with gravel or vegetation. All of the permeable pavement systems have an aggregate base in common which provides structural support, runoff storage, and pollutant removal through filtering and adsorption. Aside from a rougher unfinished surface, permeable concrete and asphalt look very similar to their impervious versions. Permeable concrete and asphalt and certain permeable concrete pavers are ADA compliant.

RB-AR11098

Implementation Hurdles

Of all the green streets practices, municipal DOTs have been arguably most cautious about implementing permeable pavements, though it should be noted that some DOTs have, for decades, specified open-graded asphalt for low use roadways because of lower cost; to minimize vehicle hydroplaning; and to reduce road noise. The reticence to implement on a large-scale, however, is understandable given the lack of predictability and experience behind impervious pavements. However, improved technology, new and ongoing research, and a growing number of pilot projects are dispelling common myths about permeable pavements.



Figure 3. Pervious pavers used in the roadway of a neighborhood development in Wilsonville, OR
(Source: Abby Hall, US EPA).

The greatest concern among DOT staff seems to be a perceived lack of long-term performance and maintenance data. Universities and DOTs began experimenting with permeable pavements in parking lots, maintenance yards, and pedestrian areas as early as twenty years ago in the U.S., even earlier in Europe. There is now a wealth of data on permeable pavements successfully used for these purposes in nearly every climate region of the country. In recent years, the cities of Portland, OR, Seattle, WA, and Waterford, CT and several private developments have constructed permeable pavement pilots within the roadway with positive results.

Permeable pavement concerns in the roadway often raise concerns of safety, maintenance, and durability. Municipalities can replace impervious surfaces in other non-critical areas such as sidewalks, alleys, and municipal parking lots. These types of applications help municipalities build experience and a market for the technology.

The two typical maintenance activities are periodic sweeping and vacuuming. The City of Olympia, WA has experimented with several methods of clearing debris from permeable concrete sidewalks. Each of the methods was evaluated on the ease of use, debris removal, and the performance pace. The cost analysis by Olympia, WA found that the maintenance cost for pervious pavement was still lower than the traditional pavement when the cost of stormwater management was considered.

Table 5. Municipalities with Permeable Pavement Specifications and Standard Details

Municipality	Document	Section Title	Section #
Portland	2007 Standard Construction Specifications	Unit Pavers (includes permeable pavers)	00760
Olympia	WSDOT Specification	Pervious Concrete Sidewalks	8-30

Freeze/thaw and snow plows are the major concerns for permeable pavements in cold climate communities. However, these concerns have proven to be generally unwarranted when appropriate design and maintenance practices are employed. A well designed permeable pavement structure will always drain and never freeze solid. The air voids in the pavement allow plenty of space for moisture to freeze and ice crystals to expand. Also, rapid drainage through the pavement eliminates the occurrence of freezing puddles and black ice. Cold climate municipalities will need to make adjustments to snow plowing and deicing programs for permeable pavement areas. Snow plow blades must be raised enough to prevent scraping the surface of permeable pavements, particularly paver systems. Also, sand should not be applied.

RB-AR11099

Table 6. A Study in Olympia, WA Comparison of the cost of permeable concrete sidewalks to the cost of traditional impervious sidewalks[15]

Traditional Concrete Sidewalk		Permeable Concrete Sidewalk	
Construction Cost	Maintenance Cost	Construction Cost	Maintenance Cost
$5,003,000*	$156,000	$2,615,000*	$147,000
Total = $5,159,000 $101.16 per square yard		Total = $2,762,000 $54.16 per square yard	

*The cost of stormwater management (stormwater pond) for the added impervious surface is factored into the significantly higher cost of constructing the traditional concrete sidewalk. Maintenance of the stormwater pond is also factored into the traditional concrete sidewalk maintenance cost.

Sidewalk trees and tree boxes

From reducing the urban heat island effect and reducing stormwater runoff to improving the urban aesthetic and improving air quality, much is expected of street trees. Street trees are even good for the economy. Customers spend 12% more in shops on streets lined with trees than on those without trees.[16] However, most often street trees are given very little space to grow in often inhospitable environments. The soil around street trees often becomes compacted during the construction of paved surfaces and minimized as underground utilities encroach on root space. If tree roots are surrounded by compacted soils or are deprived of air and water by impervious streets and sidewalks, their growth will be stunted, their health will decline, and their expected life span will be cut short. By providing adequate soil volume and a good soil mixture, the benefits obtained from a street tree multiply. To obtain a healthy soil volume, trees can simply be provided larger tree boxes, or structural soils, root paths, or "silva cells" can be used under sidewalks or other paved areas to expand root zones. These allow tree roots the space they need to grow to full size. This increases the health of the tree and provides the benefits of a mature sized tree, such as shade and air quality benefits, sooner than a tree with confined root space.



Figure 4. Trees planted at the same time but with different soil volumes, Washington DC
(Source: Casey Trees)

Table 7. Healthy Tree Volume and Permeable Pavement Specifications and Standard Details

Jurisdictions	Minimum Soil Volume		Section Title	Section #
Prince William County, VA	Large tree Medium tree Small tree	970 cf 750 cf 500 cf	Design Construction Manual (Sec 800)	Table 8-8
Alexandria, VA		300 cf	Landscape Guidelines	II.B. (2)

Implementation Hurdles

Providing an adequate root volume for trees comes down to a trade off between space in the right-of-way and added construction costs. The least expensive way to obtain the volume needed for roots to grow to full size is providing adequate space unhindered by utilities or other encroachments. However, it is often hard to reserve space dedicated just to street trees in an urban right-of-way with so many other uses competing for the room they need. As a result, some creative solutions, though they cost more to install, have become useful alternatives in crowded subsurface space. Structural soils, root paths, and "silva cells" leave void space for roots and still allow sidewalks to be constructed near trees.

Root Paths can be used to increase tree root volume by connecting a small tree root volume with a larger subsurface volume nearby. A tunnel-like system extends from the tree underneath a sidewalk and connects to an open space on the other side.

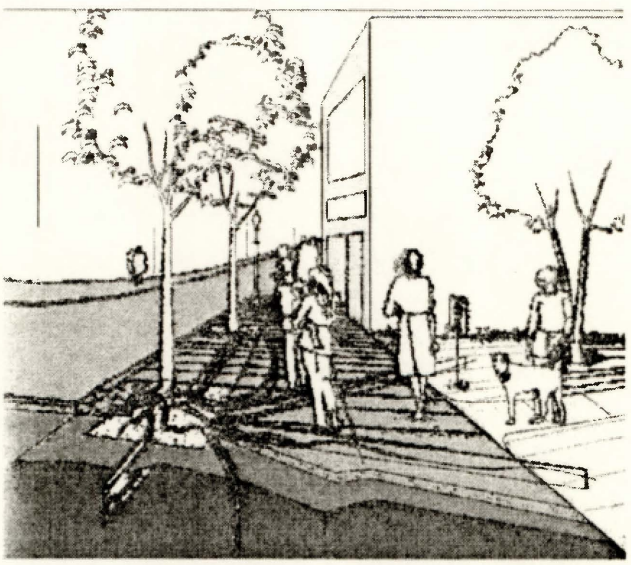


Figure 5. Root Paths direct tree roots under paving and into better soil areas for tree root growth
(Source: Arlington County, VA).

Silva Cells[17] are another option for supporting sidewalks near trees while still providing enough space for roots to grow. These plastic milk crate-like frames fit together and act as a supporting structure for a sidewalk while leaving room for uncompacted soil and roots inside the frame.

Permeable pavement sidewalks are another enhancement to the root space. They provide moisture and air to roots under sidewalks. Soils under permeable pavements can still become compacted. Structural soils[18] are a good companion tree planting practice to permeable pavement. When planting a tree in structural soils an adequate tree root volume is excavated and filled with a mix of stone and soil that still provides void space for healthy roots and allows for sidewalks, plazas or other paved surfaces to be constructed over them.

Case Studies

Portland, OR: Green Street Pilot Projects

Portland, Oregon is a national leader in developing green infrastructure. Portland's innovation in stormwater management was necessitated by the need to satisfy a Combined Sewer Overflow consent decree, Safe Drinking Water Act requirements, impending Total Maximum Daily Load limitations, Superfund cleanup measures and basement flooding. Through the 1990s, over 3 billion gallons of combined sewer overflow discharged to the Willamette River every year.[19] All of these factors plus leadership and local desires to create green solutions and industries compelled the city to implement green infrastructure as a complement to adding capacity to the sewer system with large pipe overflow interceptors. Despite gaps in long-term performance data, Portland took a proactive approach in implementing green infrastructure pilot projects.

Portland's green infrastructure pilot projects have their roots in the city's 2001 Sustainable Infrastructure Committee. The committee, consisting of representatives from Portland's three infrastructure management Bureaus, documented the city's ongoing efforts toward sustainable infrastructure, gathered research on green infrastructure projects from around the country, and identified opportunities for local pilots.[20, 21, 22]

RB-AR11101

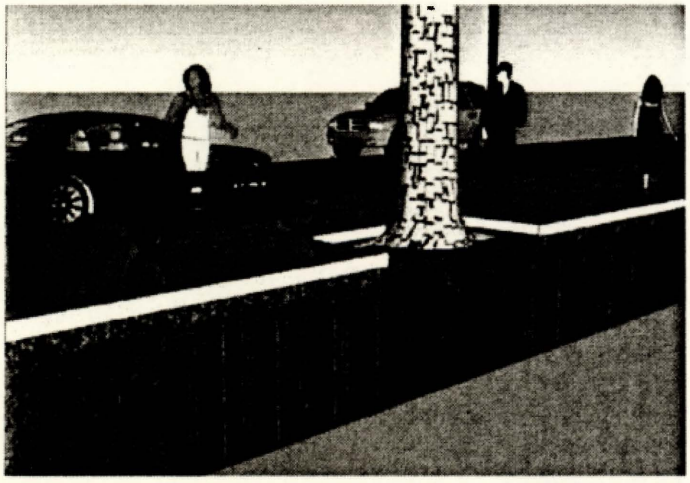


Figure 6. Silva cell structures support the sidewalk while providing root space for street trees
(Source: Deep Root Partners, LP).

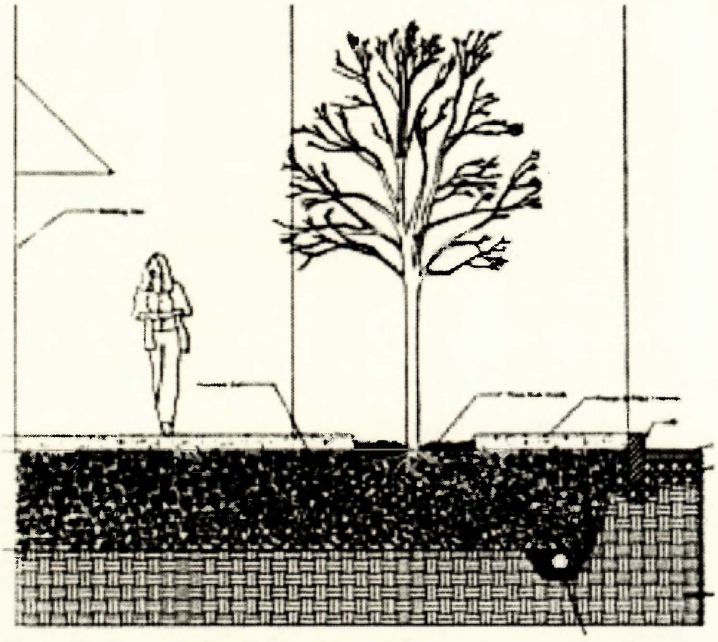


Figure 7. Structural soils provide void space for root growth and load-bearing for sidewalk
(Source: Urban Horticulture Institute, Cornell University).

One of the Bureau of Environmental Services' (BES) earliest green infrastructure retrofit projects within the right-of-way was a set of two stormwater curb extensions on NE Siskiyou Street. Portland had been retrofitting many streets with curb extensions for the purpose of pedestrian safety, but this was the first done for the purpose of treating street runoff. In a simulated 25-year storm event flow test, the curb extensions captured 85% of the runoff volume that would be discharged to the combined sewer system and reduced peak flow by 88%.[23]

Between 2003 and 2007, Portland designed and implemented a variety of Green Street pilots. Funding sources for these projects have come from BES, Portland Department of Transportation, U.S. EPA, and an Innovative Wet Weather Fund. BES combined funds with an EPA grant to create the Innovative Wet Weather Fund. In 2004, nearly $3 million from the Innovative Wet Weather Fund was budgeted for a long list of projects from city green roofs, public-private projects, and a number of pilot projects within the right-of-way.[24] Several pilots have been cost competitive with or less costly than conventional upgrades. The Bureau recognizes that costs will decrease once these projects become more routine. Many of the pilot project costs included one time costs such as the development of outreach materials and standard drawings.

RB-AR11102



Figure 8: NE Siskiyou Vegetated Curb Extensions
Source: City of Portland – Bureau of Environmental Services

Table 8. Portland, OR - Green Street Pilot Projects

Location	Design	Year Completed	Cost
NE Siskiyou b/w NE 35th Pl. and NE 36th Ave	Stormwater curb extension	2003	$20,000
3 blocks of the Westmoreland Neighborhood	Permeable Pavers in parking lanes and curb to curb	2004	$412,000
SE Ankeny b/w SE 56th and SE 57th Ave.	Stormwater curb extensions	2004	$11,946
NE Fremont b/w NE 131st and 132nd Av	Stormwater curb extension	2005	$20,400
SW 12th Ave b/w SW Montgomery and Mill	Stormwater planters	2005	$34,850
East Holladay Park	Pervious paver parking lot	2005	$165,000
4 blocks of North Gay Avenue b/w N Wygant and N Sumner	Porous concrete in curb lanes and curb to curb; porous asphalt in curb lanes and curb to curb	2005	--
SW Texas	Stormwater wetlands and swales	2007	$2.3 million
Division St. – New Seasons Market	Stormwater planters and swales	--	--
SE Tibbetts and SE 21st Ave.	Stormwater curb extension and planters	--	--

Source: Portland Bureau of Environmental Services, 2008
http://www.portlandonline.com/bes/index.cfm?c=44463&

Each of the pilot projects have been well documented by BES. A consistent format has been used to describe pilot background, features, engineering design, landscaping, project costs, maintenance, monitoring, and, most importantly, lessons learned. These case studies as well as other Green Street documentation can be found on BES's Sustainable Stormwater webpage, http://www.portlandonline.com/BES/index.cfm?c=34598. Due to physical factors (drainage, slope, soil, existing utilities, multiple uses) and development factors (retrofit, redevelopment, and new construction), there will be many variations on Green Streets. As part of the program, a continually updated Green Street Profile Notebook will catalog the successful green street projects. Users can use the Notebook for permitting guidance, to identify green streets facilities appropriate for various factors, but the document is not a technical document with standard details.

RB-AR11103

The Green Streets Team

The City of Portland, OR is widely acknowledged for long term, forward thinking, and comprehensive transportation and environmental planning. Portland recognized the fact that 66% of the City's total runoff is collected from streets and the right-of-way.[25] The city also saw the potential for transportation corridors to meet multiple objectives, including:

- Comprehensively address numerous City goals for neighborhood livability, sustainable development, increased green spaces, stormwater management, and groundwater protection;
- Integrate infrastructure functions by creating "linear parks" along streets that provide both pedestrian/bike areas and stormwater management;
- Avoid the key impacts of unmanaged stormwater whereby surface waterbodies are degraded, and water quality suffers;
- Manage stormwater with investments citizens can support, participate in, and see;
- Manage stormwater as a resource, rather than a waste;
- Protect pipe infrastructure investments (extend the life of pipe infrastructure, limit the additional demand on the combined sewer system as development occurs);
- Protect wellhead areas by managing stormwater on the surface; and
- Provide increased neighborhood amenities and value.

In a two phased process from 2005 to 2007, the Green Streets Team, a cross agency and interdisciplinary team, developed a comprehensive green streets policy and a way forward for the green streets agenda. Phase 1 identified challenges and issues and began a process for addressing them. Barriers to the public initiation of green street projects included a code and standards that would disallow or discourage green street strategies, long term performance unknowns, and maintenance responsibilities. To address these barriers, the Green Streets Team organized into subgroups focusing on outreach, technical guidance, infrastructure, maintenance, and resources.

Phase 2 of the Green Streets project synthesized the opportunities and solutions identified in Phase 1 into a citywide Green Streets Program. The first priority for this phase was the drafting of a binding citywide policy. The resolution was adopted by the Portland City Council in March 2007.

Prior to the start of the Portland effort, 90% of implemented green street projects were issued by private permits rather than city initiated projects.

Six Approaches to Implementing Green Streets	
Pathway	**Implementation**
City-initiated street improvement projects	City designs, manages, maintains
City-initiated stormwater retrofits	City designs, manages, maintains
Neighborhood-initiated LIDs	
Developer-initiated subdivisions with public streets	Developer designs and builds via City permit and review process, then turns over new right of way to the City after warranty period
Developer-initiated subdivisions with private streets	Developer designs and builds via City permit and review process, and turns over to home-owner association
Developer-related initiated frontage improvements on existing public streets	Developer designs and builds new sidewalks and curbs via City permit and review process, usually because the City required it via a building permit or via a land division

Source: Portland Green Streets, Phase 1

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Portland City Council Approved Green Streets Policy

Goal: City of Portland will promote and incorporate the use of green street facilities in public and private development.

City elected officials and staff will:

1. Infrastructure Projects in the Right of Way:
   a. Incorporate green street facilities into all City of Portland funded development, redevelopment or enhancement projects as required by the City's September 2004 (or updated) Stormwater Management Manual. Maintain these facilities according to the May 2006 (or updated) Green Streets Maintenance Policy.

      If a green street facility (infiltrating or flow through) is not incorporated into the Infrastructure Project, or only partial management is achieved, then an off site project or off site management fee will be required.

   b. Any City of Portland funded development, redevelopment or enhancement project, that does not trigger the Stormwater Manual but requires a street opening permit or occurs in the right of way, shall pay into a "% for Green" Street fund. The amount shall be 1% of the construction costs for the project.
      Exceptions: Emergency maintenance and repair projects, repair and replacement of sidewalks and driveways, pedestrian and trail replacement, tree planting, utility pole installation, street light poles, traffic, signal poles, traffic control signs, fire hydrants, where this use of funds would violate contracted or legal restrictions.
2. Project Planning and Design:
   a. Foster communication and coordination among City Bureaus to encourage consideration of watershed health and improved water quality through use of green street facilities as part of planning and design of Bureau projects.
   b. Coordinate Bureau work programs and projects to implement Green Streets as an integrated aspect of City infrastructure.
   c. Plan for large-scale use of Green Streets as a means of better connecting neighborhoods, better use of the right of way, and enhancing neighborhood livability.
   d. Strive to develop new and innovative means to cost-effectively construct new green street facilities.
   e. Develop standards and incentives (such as financial and technical resources, or facilitated permit review) for Green Streets projects that can be permitted and implemented by the private sector. These standards and incentives should be designed to encourage incorporation of green street facilities into private development, redevelopment and enhancement projects.
3. Project and Program Funding:
   a. Seek opportunities to leverage the work and associated funding of projects in the same geographic areas across Bureaus to create Green Street opportunities.
   b. Develop a predictable and sustainable means of funding implementation and maintenance of Green Street projects.
4. Outreach:
   a. Educate citizens, businesses, and the development community/industry about Green Streets and how they can serve as urban greenways to enhance, improve, and connect neighborhoods to encourage their support, demand and funding for these projects.
   b. Establish standard maintenance techniques and monitoring protocols for green street facilities across bureaus, and across groups within bureaus.
5. Project Evaluation:
   a. Conduct ongoing monitoring of green street facilities to evaluate facility effectiveness as well as performance in meeting multiple City objectives for:
      - Gallons managed;
      - Projects distributed geographically by watershed and by neighborhood; and

The second priority for Phase 2 was developing communication and planning procedures for incorporating multi-bureaus plans into the scheduled Portland DOT Capital Improvement Program (CIP). Three timeframes for green street project planning were recommended. In the short term, the CIP Planning Group, backed by the citywide policy directive, will shift to a focus on "identifying and evaluating opportunities to partner." For example, coordinating Water Bureau and BES pipe replacement

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projects with DOT maintenance, repair, and improvement projects. The mid-term approach is more proactive and involves forecasting potential green street projects using existing bureau data and GIS tools. As for the long term, green street objectives will be incorporated into the citywide systems plan which guides city bureaus for the next 20 years.

The Green Street Team methodology propelled Portland's early green street pilot projects into a comprehensive, citywide multi-bureau program. The program built on previous efforts by the Sustainable Infrastructure Committee as well as other efforts such as the 2005 Portland Watershed Management Plan, established a City Council mandated policy, and institutionalized green street development. The outcome of this approach is multi-agency buy-in and responsibility for the effort. For instance, because of their knowledge of plant maintenance, Portland Parks and Recreation is responsible for the maintenance of some DOT installations.

Chicago, IL: Green Alleys Program

The City of Chicago, Illinois has an alley system that is perhaps the largest in the world. These 13,000 publicly owned alleys result in 1,900 miles, or 3,500 acres, of impermeable surfaces in addition to the street network. Because the alley system was not originally paved, there are no sewer connections as part of the original design. Over time the alleys were paved and flooding in garages and basements began to occur as a result of unmanaged stormwater runoff. Since the city already spends $50 million each year to clean and upgrade 4,400 miles of sewer lines and 340,000 related structures, the preferred solution to the flooded alleys is one that doesn't put more stress on an already overburdened and expensive sewer system.[26]

In 2003, the Chicago Department of Transportation (CDOT) used permeable pavers and French drain pilot applications to remedy localized flooding problems in alleys in the 48th Ward.[27] These applications proved to be successful and by 2006, CDOT launched its Green Alley Program with the release of the Chicago Green Alley Handbook (Handbook).[28]

The Chicago Green Alley Program is unique because it marries green infrastructure practices in the public right-of-way with green infrastructure efforts on private property. The user-friendly Handbook, which describes both facets of the program including the design techniques and their benefits, is an award winning document. The American Society of Landscape Architects awarded the creators of the Handbook the 2007 Communications Honor Award for the clear graphics and simple, yet effective, message.[29] The Handbook explains to the residents why green infrastructure is important, how to be good stewards of the Green Alley in their neighborhood, and what sorts of "green" practices they can implement on their property to reduce waste, save water, and help manage stormwater wisely.

While the initial impetus behind the Green Alley Program was stormwater management, Chicago decided to use this opportunity to address other environmental concerns as well as reducing the urban heat island effect, recycling, energy conservation, and light pollution.

Chicago's Green Alley Program uses the following five techniques in the public right-of-way to "green" the alley:

1. Changing the grade of the alley to drain to the street rather than pond water in the alley or drain toward garages or private property.
2. Using permeable pavement that allows water to percolate into the ground rather than pond on the surface.
3. Using light colored paving material that reflects sunlight rather than adsorbing it, reducing urban heat island effect.

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4. Incorporating recycled materials into the pavement mix to reduce the need for virgin materials and reduce the amount of waste going into the landfill.

5. Using energy efficient light fixtures that focus light downward, reducing light pollution.



Figure 9: Permeable Asphalt Installation Using Ground Tire Rubber.
Source: Chicago Department of Transportation, Sustainable Development Initiatives; Streetscape and Urban Design Program, CDOT Division of Project Development.

Four design approaches were created using these techniques. Based on the local conditions, the most appropriate approach is selected. In areas where soils are well-draining, permeable pavement is used. In areas where buildings come right up to the edge of pavement and infiltrated water could threaten foundations, impermeable pavement strips are used on the outside with a permeable pavement strip down the middle. In areas where soils do not provide much infiltration capacity, the alley is regraded to drain properly and impermeable pavement made with recycled materials is used. Another approach utilizes an infiltration trench down the middle of the alley. Light colored (high albedo) pavement, recycled materials, and energy efficient, glare reducing lights are a part of each design approach.

Green Infrastructure on Private Property

The Handbook also describes actions that property owners can take to "green" their own piece of Chicago. The Handbook describes the costs, benefits, and utility of the following practices:

- Recycling;
- Composting;
- Planting a tree;
- Using native landscape vegetation;
- Constructing a rain garden;
- Installing a rain barrel;
- Using permeable pavement for patios;
- Installing energy efficient lighting; and
- Utilizing natural detention.

By bringing this wide range of "green" practices to the attention of homeowners, the positive impacts of the Green Alley Program spread beyond the boundaries of the right-of-way, increasing awareness and providing practical resources to help community members be a part of the solution.

Chicago Green Alley Cost Considerations

When the program began in 2006, repaving the alleys with impermeable pavement ranged in cost from $120,000 to $150,000, whereas a total Green Alley reconstruction was more along the lines of $200,000 to $250,000.[30] While less expensive conventional rehabilitation options may seem more attractive, they don't provide a solution to the localized flooding issues or the combined sewer system overflow problems. Sewer system connections could be established to solve the localized flooding problem, but it would add to the already overburdened sewer system and increase the cost of the reconstruction to that of the impermeable alley option. Consequently, the higher priced Green Alley option proved to be the best investment as it has multiple benefits in addition to solving localized flooding and reducing flow into the combined sewer system. The additional benefits of the Green Alley Program include not only urban heat

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island effect reduction, material recycling, energy conservation, and light pollution reduction, but also the creation of a new market.

In 2006, when the Green Alley Program began, the city paid about $145 per cubic yard of permeable concrete. Just one year later, the cost of permeable concrete had dropped to only $45 per cubic yard. Compared with the cost of ordinary concrete, $50 per cubic yard, permeable concrete may have seemed like an infeasible option in the past to customers wanting to purchase concrete.[31] After the city's initial investment in the local permeable concrete market, the product cost has come down making permeable concrete a more affordable option for other consumers besides the city. This has resulted in an increased application of permeable concrete throughout the region.

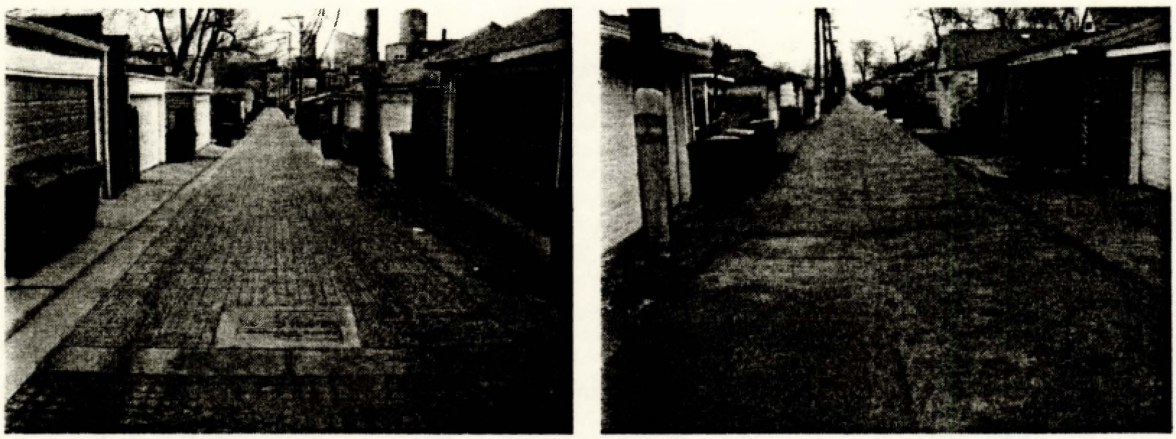


Figure 10: Permeable Pavers and Permeable Concrete Chicago Alleys
(Source: Abby Hall, US EPA)

The success of the Chicago Green Alley Program is evident. Not only are the alleys been "greened" as a result of the program, the surrounding properties and even the surrounding neighborhoods are experiencing the positive impacts of the program's implementation.

Conclusions and Recommendations

Incorporating green streets as a feature of urban stormwater management requires matching road function with environmental performance. Enhancing roads with green elements can improve their primary function as a transportation corridor while simultaneously mitigating their negative environmental impacts. In theory and practice many municipalities are not far removed from dedicated green streets programs. Street tree and other greenscaping programs are often identified and promoted along urban transportation corridors. Adapting them to become fully functional green streets requires minor design modifications and an evaluation of how to maximize the benefits of environmental systems.

Portland's green streets program demonstrates how common road and right-of-way elements (e.g., traffic calming curb extensions, tree boxes) can be modified and optimized to provide stormwater management in addition to other benefits. The curb cuts and design variations to allow runoff to enter the vegetated areas are subtle changes with a significant impact and demonstrate how stormwater can be managed successfully at the source. One of the biggest successes of the program was reassessing common design features and realizing that environmental performance can be improved by integrating stormwater management.

Where Portland used vegetation, Chicago's Green Alley Program similarly demonstrates that hardscape elements can be an integral part of a greening program. By incorporating permeable pavements that simulate natural infiltration, Chicago enhances the necessary transportation function of alleys while enhancing infrastructure and environmental management. Portland also contrasts the "soft" and "hard"

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elements of green streets by using both permeable pavements and vegetated elements. The green options available demonstrate the flexibility of green infrastructure to satisfy road function and environmental objectives and highlight why transportation corridors are well suited for green infrastructure.

Elements necessary for a successful green streets program:

- **Pilot projects are critical.** The most successful municipal green street programs to date all began with well documented and monitored pilot projects. These projects have often been at least partially grant funded and receive the participation of locally active watershed groups working with the city infrastructure programs. The pilot projects are necessary to demonstrate that green streets can work in the local environment, can be relied upon, and fit with existing infrastructure. Pilot projects will help to dispel myths and resolve concerns.
- **Leadership in sustainability from the top.** The cities with the strongest green streets programs are those with mayors and city councils that have fully bought into sustainable infrastructure. Council passed green policies and mayoral sustainability mandates or mission statements are needed to institutionalize green street approaches and bring it beyond the token green project.
- **Buy-in from all municipal infrastructure departments.** By their nature, green streets cross many municipal programs. Green street practices impact stormwater management, street design, underground utilities, public lighting, green space planning, public work maintenance, and budgeting. When developing green streets, all of the relevant agencies must be represented. Also, coordination between the agencies on project planning is important for keeping green infrastructure construction costs low. Superior green street design at less cost occurs when sewer and water line replacement projects can be done in tandem with street redevelopment. These types of coordination efforts must happen at the long-term planning stage.
- **Documentation.** Green street projects need to be documented on two levels, the design and construction level and on a citywide tracking level. Due to the different street types and siting conditions, green street designs will take on many variations. By documenting the costs, construction, and design, the costs of similar future projects can be minimized and construction or design problems can be avoided or addressed. Tracking green street practices across the city is crucial for managing maintenance and quantifying aggregate benefits.
- **Public outreach.** Traditional pollution prevention outreach goes hand in hand with green street programs. Properly disposing of litter, yard waste, and hazardous chemicals and appropriately applying yard chemicals will help prolong the life of green street practices. An information campaign should also give the public an understanding of how green infrastructure works and the benefits and trade offs. In many cases, remedial maintenance of green street practices will be performed by neighboring property owners; they need to know how to maintain the practices to keep them performing optimally.

As public spaces, roads are prime candidates for green infrastructure improvements. In addition to enabling legislation, and technical guidance, developing a green streets program requires an institutional re-evaluation of how right-of-ways are most effectively managed. This process typically includes:

- Assessing the necessary function of the road and selecting the minimum required street width to reduce impervious cover;
- Enhancing streetscaping elements to manage stormwater and exploring opportunities to integrate stormwater management into roadway design; and
- Integrating transportation and environmental planning to capitalize on economic benefits.

The use of green streets offers the capability of transforming a significant stormwater and pollutant source into an innovative treatment system. Green streets optimize the performance of public space easing maintenance concerns and allowing municipalities to coordinate the progression and implementation of stormwater control efforts. In addition, green streets optimize the performance of both the transportation and water infrastructure. Effectively incorporating green techniques into the transportation network provides significant opportunity to decrease infrastructure demands and pollutant transport.

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RESOLUTION CERTIFICATION PAGE

STATE OF CALIFORNIA)

COUNTY OF LOS ANGELES) SS

CITY OF SOUTH GATE)

I, Carmen Avalos, City Clerk of the City of South Gate, California, hereby certify that the whole number of Members of the City Council of said City is five; that Resolution No. 7565 was adopted by the City Council at their Regular Meeting held on August 13, 2013, by the following vote:

Ayes:	Council Members:	Hurtado, Gonzalez, Morales, Davila and De Witt
Noes:	Council Members:	None
Absent:	Council Members:	None
Abstain:	Council Members:	None

Witness my hand and the seal of said City on August 21, 2013.

Carmen Avalos, City Clerk
City of South Gate, California

ORDINANCE NO. 2307

CITY OF SOUTH GATE
LOS ANGELES COUNTY, CALIFORNIA

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF SOUTH GATE AMENDING SECTION 6.67.010 (GENERAL PROVISIONS) AND SUBSECTION C (NEW DEVELOPMENT AND CONSTRUCTION) OF SECTION 6.67.030 (POLLUTANT SOURCE REDUCTION) OF CHAPTER 6.67 (STORM DRAINS) OF TITLE 6 (HEALTH AND SANITATION) OF THE SOUTH GATE MUNICIPAL CODE, TO EXPAND THE APPLICABILITY OF THE EXISTING POLLUTANT SOURCE REDUCTION REQUIREMENTS, BY IMPOSING RAINWATER LOW IMPACT DEVELOPMENT (LID) STRATEGIES ON PROJECTS THAT REQUIRE BUILDING, GRADING AND ENCROACHMENT PERMITS.

WHEREAS, the City is authorized by Article XI, Section 5 and Section 7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity; and

WHEREAS, the federal Clean Water Act establishes Regional Water Quality Control Boards in order to prohibit the discharge of pollutants in stormwater runoff to waters of the United States; and

WHEREAS, the City is a permittee under the California Regional Water Quality Control Board, Los Angeles Region Order No. R4-2012-0175, issued on November 08, 2012 which establishes Waste Discharge Requirements for Municipal Separate Storm Sewer Systems (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4; and

WHEREAS, Order No. R4-2012-0175 contains requirements for municipalities to establish an LID Ordinance in order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program; and

WHEREAS, the Regional Board has adopted Total Maximum Daily Loads (TMDLs) for pollutants which are numerical limits that must be achieved effectively through LID implementation; and

WHEREAS, the City has the authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity that might degrade waters of the State; and

WHEREAS, is it the intent of the City to expand the applicability of the existing LID requirements by providing stormwater and rainwater LID strategies for all projects

for Development and Redevelopment projects as defined under Subsection D.1 of this chapter.

NOW, THEREFORE THE CITY COUNCIL OF THE CITY OF SOUTH GATE DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1. Section 6.67.010 (General Provisions) of Chapter 6.67 (Storm Drains) of Title 6 (Health and Sanitation) of the South Gate Municipal Code is hereby amended to read as follows:

A. ***Purpose and Intent.*** The purpose of this chapter is to protect the public health, welfare and safety and to reduce the quantity of pollutants being discharged to the waters of the United States. This chapter has the following objectives:

1. The elimination of non-stormwater discharges to the municipal separate storm sewer system;

2. The elimination of spillage, dumping and disposal of pollutants into the municipal separate storm sewer system;

3. The reduction of pollutants in stormwater discharges to the maximum extent practicable;

4. The protection and enhancement of the quality of the waters of the United States in a manner consistent with the provisions of the Clean Water Act.

B. ***Definitions.*** For the purpose of this chapter, unless it is plainly evident from the context that a different meaning is intended, certain terms used herein are defined as follows:

1. "Best management practice (BMP)" means methods, measures or practices designed and selected to reduce or eliminate the discharge of pollutants to surface waters from point and nonpoint source discharges including stormwater. BMPs include structural and nonstructural controls, and operation and maintenance procedures, which can be applied before, during and/or after pollution producing activities.

2. "Biofiltration" means a LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the

Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales.

3. "Bioretention" means a LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in this Ordinance, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated as biofiltration.

4. "Bioswale" means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes.

5. "Building official" shall be the current Building official of the City or his/her authorized deputy, agent, representative or inspector.

6. "City" means the City of South Gate.

7. "City Manager" means the current City Manager as appointed by the City Council to carry out its policies and ensure that the community is served in a responsive manner.

8. "CFR" means the current issue of the Code of Federal Regulations.

9. "Construction" means construction, clearing, grading, structure teardown or excavation that results in soil disturbance. It does not include projects solely involving: routine maintenance to maintain original line and grade, hydraulic capacity or original purpose of facility or emergency construction activities required to immediately protect public health and safety, or interior remodeling or mechanical, electrical and sign permit work.

10. "Construction General Permit" means the general permit for discharges of stormwater associated with construction activity issued by the State Water Resource Control Board

11. "Development" means any construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail and other non-residential projects, including public agency projects or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity or original purpose of facility, nor does it

include emergency construction activities required to immediately protect public health and safety.

12. "Director of Community Development" means the current director of the Department of Community Development of the City or his or her duty authorized deputy, agent, designee, representative or inspector.

13. "Discharge" means any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

14. "Disturbed Area" means an area that is altered as a result of clearing, grading, and/or excavation.

15. "Exempted discharge" means any discharge to the municipal separate storm sewer system that is not subject to the provisions of this chapter. Exempted discharges are listed in subsection (B) (2) of Section 6.67.020.

16. "Good housekeeping"" means any practice for the storage, use, handling or cleanup of materials in a manner that minimizes the discharge of pollutants in stormwater runoff.

17. "Green Roof" means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain.

18. "Illicit connection" means any manmade conveyance that is connected to the municipal separate storm sewer system without a permit.

19. "Illicit discharge" means any non-stormwater discharge that is neither permitted by a valid NPDES permit nor considered an exempted discharge under subsection B of Section 6.67.020.

20. "Industrial Park" means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry.

21. "Low Impact Development (LID)" consists of building and landscape features designed to retain or filter stormwater runoff.

22. "Municipal separate storm sewer system (MS4)" means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins curbs, gutters, ditches, manmade channels, or storm drains):

a. Owned or operated by a State, City, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;

b. Designed or used collecting or conveying stormwater;

c. Which is not a combined sewer; and

d. Which is not part of a Publicly Owned Treatment Works (POTW).

23. "National Pollutant Discharge Elimination System (NPDES)" means the National Pollutant Discharge Elimination System used for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA Section 307, 402, 318 and 405.

24. "Natural Drainage System" means a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

25. "New development" means land-disturbing activities; structural development, including construction or installation of a building or structure; creation of impervious surfaces and land subdivision.

26. "Non-stormwater discharge" means any discharge to the municipal separate storm sewer system that is not directly generated by and composed primarily of rainfall.

27. "Owner," when applied to a building or land, means any part owners, joint owner, community property owner, tenant in common, tenant in partnership, joint tenant or tenant by the entirety of the whole or of a part of such building or land.

28. "Person" means any natural person, firm, association, club, organization, corporation, partnership, business trust, company or other entity which is recognized by law as the subject of rights or duties.

29. "Pollutant" means any substance introduced into the environment that may directly or indirectly result in adverse effects on the beneficial uses of a resource. Pollutants may include, but are not limited to:

a. Artificial materials, chips or pieces of natural or manmade materials;

b. Household waste;

c. Commercial and industrial waste;

d. Metals such as cadmium, lead, zinc, copper, silver, nickel, chromium and nonmetals such as phosphorus and arsenic;

e. Petroleum hydrocarbons;

f. Excessive eroded soils, sediment and particulate materials;

g. Animal wastes;

h. Substances having characteristics such as pH less than six or greater than nine, unusual coloration or turbidity, excessive levels of fecal coliform, fecal streptococcus or enterococcus;

i. Waste materials and wastewater generated by construction activities;

j. Materials causing an increase in biochemical oxygen demand, chemical oxygen demand or total organic carbon;

k. Materials which contain base/neutral or acid extractable organic compounds;

l. Those pollutants defined in Section 1362(6) of the Clean Water Act;

m. Any other constituent or material that may interfere with or adversely affect the beneficial uses of the receiving waters, flora or fauna of the state.

30. "Planning priority projects" means those projects that are required to incorporate appropriate stormwater mitigation measures into the design plan for their respective project.

31. "Premises" means any building, lot, parcel of land, land or portion of whether improved or unimproved.

32. "Rainfall Harvest and Use" means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere

within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department.

33. "Redevelopment" means land-disturbing activity that results in the creation, addition or replacement of at least five thousand square feet or more of impervious surfaces on an already development site, or as established by resolution of the City council. Redevelopment includes, but is not limited to, the expansion of a building footprint or addition or replacement of a structure; replacement of impervious surface that is not part of a routine maintenance activity; and land-disturbing activities related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety. Existing single-family structures are exempt from the development requirements, unless such projects create, add, or replace 10,000 square feet of impervious surface area.

34. "Regional Board" means the California Regional Water Quality Control Board, Los Angeles Region.

35. "Significant material" includes, but is not limited to:

a. Raw materials;

b. Fuels;

c. Materials such as solvents, detergents and plastic pellets;

d. Finished materials such as metallic products;

e. Raw materials used in food processing or production;

f. Hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA);

g. Any chemical a facility is required to report pursuant to Section 313 of Title III of Superfund Amendments and Reauthorization Act (SARA);

h. Fertilizers;

i. Pesticides; and

j. Waste products such as ashes, slag and sludge that have the potential to be released with stormwater discharges.

36. "Site" means land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity.

37. "Storm Drain System" means any facility or any parts of the facility, including streets, gutters, conduits, natural or artificial drains, channels and watercourse that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the City.

38. "Storm Water or Stormwater" means runoff and drainage related to precipitation events (pursuant to 40 CFR Section 122.26(b)(13); 55 Fed. Reg. 47990, 47995 (Nov. 16, 1990)).

39. "Stormwater Quality Design Volume (SWQDv)" means the runoff from the 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or the volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

40. "Stormwater treatment system" means any physical system designed and/or used to reduce the concentrations of pollutants in stormwater runoff.

41. "Stormwater runoff" refers to a part of precipitation which travels via flow across a surface to the municipal separate storm sewer system or receiving waters.

C. ***Responsibility for Administration.*** Responsibility for the administration and implementation of this chapter is delegated to the Director of Community Development.

1. Delegation of Powers. Whenever a power is granted to or a duty is imposed upon the Director of Community Development by this chapter, that power may be exercised or the duty may be performed by a duly authorized deputy, agent, designee, representative or inspector of the Director of Community Development, unless this chapter expressly provides otherwise.

D. ***Regulatory Consistency.*** The provisions of this chapter shall take precedence over any inconsistent or conflict provisions of this code.

E. ***Time Limits.*** Any time limit provided for in the provisions of this chapter may be extended in a manner consistent with federal and state regulations, by mutual written consent of the Director of Community Development and the permittee, applicant, or other affected person, consistent with the NPDES permit.

F. ***Severability.*** If any section, subsection, subdivision, paragraph, sentence, clause or phrase in this chapter or any part thereof, is held invalid, or unconstitutional, such

decision shall not affect the validity of the chapter as a whole or the remaining section or portions of this chapter or part thereof, other than the section or portion so declared to be unconstitutional or invalid. The City Council declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase of this chapter irrespective of the fact that any one or more sections, subsections, subdivisions, paragraphs, sentences, clauses or phases may be declared invalid or unconstitutional.

G. ***Fees.*** Fees to be charged for plan checking, inspection, enforcement and any other activities carried out by the City under this chapter shall be specified by ordinance or resolution of the City council.

H. ***Taking.*** The provisions of this chapter shall not operate to deprive any landowner of substantially all of the market value of his/her property or otherwise constitute an unconstitutional taking without compensation. If application of this chapter to a specific project would create a taking, then pursuant to this chapter, the City Council may allow additional land uses, but only to the extent necessary, to avoid a taking. Such uses shall be consistent with and carry out the purposes of this chapter.

SECTION 2. Subsection C (New Development and Construction of Section 6.67.030 (Pollutant Source Reduction) of Chapter 6.67 (Storm Drains) of Title 6 (Health and Sanitation) of the South Gate Municipal Code is hereby amended, and Subsections D and E are hereby added, to read as follows:

C. Construction Pollution Reduction.

1. *Regulatory Compliance.* All persons engaged in construction activity within the City shall operate in compliance with all state and federal laws regulating or pertaining to stormwater management and runoff. Proof of compliance may be required by the Director of Community Development or Building official prior to the issuance of any grading, building or occupancy permit or any other type of permit or license issued by the City.

2. *Copies of Documents.* All persons engaged in construction activity within the City requiring a State Construction Activity Stormwater Permit shall have at the construction site available for review:

a. A copy of the notice intent for the State Construction Activities Stormwater Permit;

b. The waste discharge identification number issued by the State Water Resources Control Board; and

c. Copies of the stormwater pollution prevention plan and stormwater monitoring plan as required by the permit.

3. Construction projects equal to or greater than one acre, but less than five acres shall prepare and submit a local stormwater pollution prevention plan

consistent with the most recent Countywide Development Planning Model Program and Construction General Permit to the City Manager or duly authorized representative thereof for review and approval prior to the issuance of any site plan approval, entitled of use or grading or building permits.

4. *Notice of Intent to Comply.* No grading, building, demolition, or other permit shall be issued by the Division of Building and Safety for developments with a disturbed area of one acre of greater unless the applicant can show that a notice of intent to comply with the State Construction General Permit has been filed and that a stormwater pollution prevention plan has been prepared for the project.

5. *Standard Best Management Practices.* Stormwater runoff containing sediment, construction waste or other pollutants from the construction site and parking areas shall be reduced to the maximum extent practicable. The following best management practices shall apply to all existing structure or commencement of construction where no demolition is necessary, until receipt of a certificate of occupancy.

a. Sediment, construction waste and other pollutants from construction activities shall be retained on the construction site to the maximum extent practicable.

b. Structural controls such as sediment barriers, plastic sheeting, detention ponds, dikes and filter berms shall be utilized to the maximum extent practicable in order to minimize the escape from the site of sediment and other pollutants.

c. All excavated soil shall be located on the site in a manner that minimizes the amount of sediments running onto the street, drainage facilities or adjacent properties. Between October 1st and April 30th, such excavated soil shall be covered with waterproof material until the soil is either used or removed from the site.

d. No washing of construction or other vehicles is permitted adjacent to a construction site. No water from the washing of construction vehicles or other vehicles on the construction site is permitted to run off the construction site and enter the municipal separate storm sewer system.

e. Trash receptacles must be situated at convenient locations on construction sites and must be maintained in such a manner that trash and litter does not accumulate on the site nor migrate off site.

f. Erosion from slopes and channels must be controlled through the effective combination of best management practices.

6. *Vegetation Clearing Limits.* As a condition of granting a construction permit, the City may set reasonable limits on the clearing of natural vegetation from construction sites, in order to reduce the potential for soil erosion. These limits may include, but not be limited to, regulating the length of time soil is allowed to remain bare or prohibiting bare soil.

7. *Additional Plans.* The Building official may require, prior to the issuance of any permit, preparation of appropriate wet weather erosion control, stormwater pollution prevention or other plans consistent with the county-wide development construction guidance document and the goals of this chapter.

D. New Development/Redevelopment Pollutant Reduction

1. *Low Impact Development (LID) Plan.* An applicant shall submit an LID Plan to the Department of Community Development prior to the submittal of an application for the first planning or building approval for a new planning priority project development project. This Section contains requirements for stormwater pollution control measures in Development and Redevelopment Projects, and authorizes the City to further define and adopt stormwater pollution control measures, and authorizes the City to further define and adopt stormwater pollution control measures and to develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies. Except as otherwise provided herein, the City shall administer, implement and enforce the provisions of this Section. The following projects for new development and redevelopment, if subject to discretionary project approval in the Zoning Ordinance of the City, shall require a LID Plan that complies with the current Municipal NPDES Permit:

a. Other than those listed below, all Development Projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of Impervious Surface area.

b. Industrial Parks. Permit applications submitted after June 15, 2014 for Industrial Parks with 10,000 square feet or more of surface area.

c. Commercial Malls. Permit applications submitted after June 15, 2014 for Commercial Malls with 10,000 square feet or more of surface area.

d. Retail Gasoline Outlets with 5,000 square feet or more of surface area.

e. Restaurants with 5,000 square feet or more of surface area.

f. Parking Lots with 5,000 square feet or more of Impervious Surface area, or with 25 or more parking spaces.

g. Unless otherwise provided by Resolution of City Council through Green Street Policy, streets and roads construction with 10,000 square feet or more of Impervious Surface area. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects.

h. Automotive Service Facilities with 5,000 square feet or more of surface area.

i. Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area, where the Development will:

i. Discharge Stormwater Runoff that is likely to impact a sensitive biological species or habitat; and

ii. Create 2,500 square feet or more of Impervious Surface area

j. Single-family Hillside Properties.

k. Redevelopment Projects

i. Construction Activity that results in the creation, addition or replacement of 5,000 square feet or more of Impervious Surface area on an already developed Site of one of the Projects identified in this Subsection.

ii. Where Redevelopment results in an alteration to more than fifty percent of Impervious Surfaces of a previously existing development, and the existing development was not subject to post-construction Stormwater quality control requirements, the entire project must be mitigated.

iii. Where Redevelopment results in an alteration to less than fifty percent of Impervious Surfaces of a previously existing development, and the existing development was not subject to post-construction Stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

iv. Redevelopment does not include Routine Maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious Surface replacement, such as the reconstruction of parking lots and

roadways which does not disturb additional area and maintains the original grade and alignment, is considered a Routine Maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

v. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of Impervious Surface area.

2. *Requirements.* The Site for every Project identified in subsection D.1 of this chapter shall be designed to control Pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing Impervious Surface area and controlling Runoff from Impervious Surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use. The project applicant shall prepare a LID Plan which implements set LID standards and practices for stormwater pollution mitigation and provides documentation to demonstrate compliance with the Municipal NPDES permit on the plans and permit application submitted to the City. Such a LID Plan shall comply with the following:

a. A new single-family hillside home development or redevelopment shall include mitigation measures to:

i. Conserve natural areas;

ii. Protect slopes and channels;

iii. Provide storm drain system stenciling and signage;

iv. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and

v. Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

b. Street and road construction of 10,000 square feet or more of Impervious Surface shall follow US EPA guidance regarding Managing Wet Weather with the City's most current Green Streets Manual to the Maximum Extent Practicable.

c. The remainder of Projects identified in subsection C.1 of this chapter shall prepare a LID Plan to comply with the following:

i. Retain Stormwater Runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the Runoff from the 85th

percentile 24-hour Runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or the volume of Runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

ii. Minimize hydromodification impacts to natural drainage systems.

3. *City Review and Requirements.* No discretionary permit may be issued for any new development or redevelopment project identified in subsection (D) of this chapter until the authorized enforcement officer confirms that the project plans comply with the applicable stormwater mitigation plans and enumerated design criteria requirements. Where redevelopment results in an alteration to more than 50% of impervious surfaces of a previously existing development, and the existing development was not subject to post-development storm water quality control requirements, the entire project must be mitigated. Where redevelopment results in an alteration to less than 50% of impervious surfaces of a previously existing development, and the existing development was not subject to post-development storm water quality control requirements, only the alteration must be mitigated, and not the entire development.

4. *Issuance of Certificates of Occupancy.* As a condition for issuing a certificate of occupancy for new development or redevelopment project identified in subsection (D) of this section, the authorized enforcement officer shall require facility operators and/or owners to build all the storm water pollution control best management practices and structural or treatment control BMP's that are shown on the approved project plans and to submit a signed certification statement stating that the site and all structural or treatment control BMP's will be maintained in compliance with the municipal NPDES permit and other applicable regulatory requirements.

5. *Technical Infeasibility.* Full or partial waivers of compliance with the requirements of this Section may be obtained where the project applicant shows by application in writing that the incorporation and design elements that address the objectives set forth in this Section are impracticable and are non-economical or otherwise physically impossible due to the Site characteristics or other characteristics unique to the Project. Any waiver request shall be in writing to the Director of Community Development and may only be approved where permitted in accordance with the terms of the Municipal NPDES permit.

a. To demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use, and that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape

architect. Technical infeasibility may result from conditions including the following:

i. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite;

ii. Locations where seasonal high groundwater is within five to ten feet of surface grade;

iii. Locations within 100 feet of a groundwater well used for drinking water;

iv. Brownfield Development sites or other locations where pollutant mobilization is a documented concern;

v. Locations with potential geotechnical hazards; and

vi. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

b. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in the Municipal NPDES permit.

c. Additional alternative compliance options such as offsite infiltration and groundwater replenishment projects may be available to the project Site. The applicant should contact the Director of Community Development to determine eligibility.

d. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required by the municipal NPDES permit. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

i. 0.2 inches per hour, or

ii. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

6. Exemptions from LID Requirements. The provisions of this Subsection D do not apply to any of the following:

a. A Development involving only emergency construction activity required to immediately protect public health and safety;
b. Infrastructure projects within the public right-of-way;

c. A Development or Redevelopment involving only activity related to gas, water, sewer, cable, or electricity services on private property;

d. A Development involving only resurfacing and/or re-striping of permitted parking lots, where the original line and grade, hydraulic capacity, and original purpose of the facility is maintained;

e. A project involving only exterior movie or television production sets, or facades on an existing developed site; or

f. A project not requiring a City building, grading, demolition or other permit for construction activity.

7. Any Development that is exempted from LID requirements under Subsection 6 of this Section has the option to voluntarily opt in and incorporate into the project the LID requirements set forth herein.

8. *Plan Approval.* Prior to the issuance of a permit by the Division of Building and Safety for a New Development or Redevelopment Project, the City shall evaluate the proposed project using the MS4 Permit, and erosion and grading requirements of the City Building official or Director of Community Development to determine (i) its potential to generate the flow of Pollutants into the MS4 after construction; and (ii) how well the LID Plan for the proposed project meets the goals of this Chapter. Each plan will be evaluated on its own merits according to the particular characteristics of the project and the site to be developed. Based upon the review, the City may impose conditions upon the issuance of the building permit, in addition to any required by the State Construction General Permit for the project, in order to minimize the flow of Pollutants into the MS4. The Building official shall approve or disapprove of the LID Plan within thirty calendar days of submittal. If the plan is disapproved, the reasons for disapproval shall be given in writing to the developer. Any plan disapproved by the Building official may be revised by the developer and resubmitted for approval. A resubmitted plan will be approved or disappointed within thirty calendar days of submittal. No building permit shall be issued until an urban runoff mitigation plan has been approved by the Building official.

9. *Expiration of LID Plan.* If no building permit has been issued or no construction has begun on a project within a period of one hundred eighty days of approval of a LID Plan, the LID Plan for that project shall resubmit all necessary forms and supporting data and include payment of new plan review fees, unless extended by the Building and Safety official consistent with the requirements of the recent California Building and Residential codes.

E. Small Site New Development/Redevelopment Pollutant Reduction

1. *LID Manual for Small Sites*. The LID Manual for Small Sites shall be prepared, maintained, and updated, as deemed necessary and appropriate, by the Director of Community Development or his/her designee and adopted through resolution of the City Council. It shall set LID standards and practices for stormwater pollution mitigation, including urban and stormwater runoff quantity and quality control development principles and technologies for achieving the LID standards for projects not otherwise required to implement LID strategies by the MS4 Permit. The LID Manual for Small Sites shall also include technical feasibility and implementation parameters, alternative compliance for technical infeasibility, as well as other rules, requirements and procedures as the Director of Community Development deems necessary.

2. *Requirements*. The Site for Projects not listed in Section 6.67(D), but resulting in the creation or addition or replacement of 800 square feet or more of impervious surface area, or as established by resolution of City Council shall be designed to control Pollutants, pollutant loads, and Runoff volume per the LID Manual for Small Sites. The project applicant shall prepare a Small Site LID Plan which implements set LID standards and practices, as identified in the LID Manual for Small Sites for stormwater pollution mitigation, and provides documentation to demonstrate compliance with the LID Manual for Small Sites on the plans submitted to the City. Such a Small Site LID Plan shall comply with the following:

a. Stormwater Runoff will be infiltrated, evapotranspired, captured and used, biofiltrated/biotreated through high removal efficiency LID BMP alternatives as identified in the LID Manual for Small Sites, onsite, through stormwater management techniques that comply with the provisions of the LID Manual for Small Sites. To the maximum extent feasible, onsite stormwater management techniques must be properly sized, at a minimum, without any storm water runoff leaving the site for at least the volume of water produced by the water quality design storm event that results from:

i. The 85th percentile 24-hour rain event determined as the maximized capture Stormwater volume for the area using a 48 to 72-hour draw down time; or

ii. The volume of Runoff produced from a 0.75 inch, 24 hour rain event.

b. Pollutants shall be prevented from leaving the site for a water quality design storm event as defined above, unless the site has been treated through an approved LID strategy.

c. Any Development of four or fewer units intended for residential use shall implement LID BMP alternatives identified in the LID Manual for Small Sites for the residential LID category and provide documentation to demonstrate compliance on the plans and permit application submitted to the City.

d. Any development of five or more units intended for residential use or any development intended for nonresidential use shall implement LID BMP alternatives identified in the LID Manual for Small Sites for the Commercial/Industrial LID category and provide documentation to demonstrate compliance on the plans and permit application submitted to the City.

e. For any construction activity resulting in an alteration of at least fifty percent (50%) or more of the Impervious Surfaces on an existing developed Site, the entire Site must comply with the standards and requirements stated above and with the LID Manual for Small Sites.

f. For any construction activity resulting in an alteration of less than fifty percent (50%) of the Impervious Surfaces of an existing developed Site, only such incremental Development shall comply with the standards and requirements stated above and with the LID Manual for Small Sites.

3. *Technical Infeasibility.*

a. When, as determined by the Director of Community Development or his/her designee, the onsite LID requirements are technically infeasible, partially or fully, the infeasibility shall be demonstrated in the submitted Small Site LID Plan, shall be consistent with other City requirements, and shall be reviewed in consultation with the Department of Building and Safety. The technical infeasibility may result from conditions that may include, but are not limited to:

i. Locations where seasonal high groundwater is within five to ten feet of surface grade;

ii. Locations within 100 feet of a groundwater well used for drinking water;

iii. Brownfield Development sites or other locations where pollutant mobilization is a documented concern;

iv. Locations with potential geotechnical hazards;

v. Locations with impermeable soil type as indicated in applicable soils and geotechnical reports; and

vi. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs.

b. If partial or complete onsite compliance of any type is technically infeasible, as determined by the Director of Community Development, the project site and LID Plan will be granted a waiver from the requirements of this Section and the LID Manual for Small Sites. If a portion of the project site is deemed technically infeasible, the project applicant may propose an equivalent area within the same project area for LID. The Director of Community Development may permit substitutions of equivalent areas upon request by the project applicant.

4. *Exemptions from LID Requirements.* The provisions of this Subsection E do not apply to any of the following:

a. A Development involving only emergency construction activity required to immediately protect public health and safety;

b. Infrastructure projects within the public right-of-way;

c. A Development or Redevelopment involving only activity related to gas, water, sewer, cable, or electricity services on private property;

d. A Development involving only resurfacing and/or re-striping of permitted parking lots, where the original line and grade, hydraulic capacity, and original purpose of the facility is maintained;

e. A project involving only exterior movie or television production sets, or facades on an existing developed site;

f. A project not requiring a City building, grading, demolition or other permit for construction activity.

g. Other exemptions and/or modifications as established by resolution of City Council as it related to the LID manual for small sites.

5. Any Development that is exempted from LID requirements under Subsection D of this Section has the option to voluntarily opt in and incorporate into the project the LID requirements set forth herein.

6. *City Review and Plan Approval.*

a. Prior to the issuance of a permit for a small site, as described in this subsection E.2 of this chapter, the City shall evaluate the proposed project using the LID Manual for Small Sites and erosion and grading requirements of the City Building official or Director of Community

Development to determine (i) its potential to generate the flow of Pollutants into the MS4 after construction; and (ii) how well the Small Site LID Plan for the proposed project meets the goals of this Chapter. Each plan will be evaluated on its own merits according to the particular characteristics of the project and the site to be developed. Based upon the review, the City may impose conditions upon the issuance of the building permit, in order to minimize the flow of Pollutants into the MS4.

b. The Director of Community Development shall approve or disapprove of the Small Site LID Plan within thirty (30) calendar days of submittal, or within thirty (30) days of approval of the development project by the Planning Commission, where Planning Commission approval is required. If the plan is disapproved, the reasons for disapproval shall be given in writing to the applicant. Any plan disapproved may be revised by the applicant and resubmitted for approval. A resubmitted plan will be approved or disapproved within thirty (30) days of submittal. No building or grading permit shall be issued until a Small Site LID Plan has been approved by the Director of Community Development.

c. If no building permit has been issued or no construction has begun on a project within a period of one hundred eighty (180) days of approval of a Small Site LID Plan, the Small Site LID Plan for that project shall expire. The Director of Community Development may extend the time by written extension for action by the applicant for a period not to exceed one hundred eighty (180) days upon written request by the applicant showing that circumstances beyond the control of the applicant prevented the construction from commencing. In order to renew the Small Site LID Plan, the applicant shall resubmit all necessary forms and other data and pay a new plan review fee.

7. *Transfer of Properties Subject to the Requirements of this Section.*

a. The transfer or lease of a property subject to maintenance requirements for LID BMPs shall include conditions requiring the transferee and its successors and assigns to either: (a) assume responsibility for maintenance of any existing LID BMP, or (b) replace an existing LID BMP with new control measures or BMPs meeting the then current standards of the City and MS4 Permit. Such requirement shall be included in any sale or lease agreement or deed for such property. The condition of transfer shall include a provision that the successor property owner or lessee conduct maintenance inspections of all LID BMPs at least once a year and retain proof of inspection.

b. For residential properties where the LID BMPs are located within a common area which will be maintained by a homeowners' association, language regarding the responsibility for maintenance shall be included in the project's conditions, covenants and restrictions (CC&Rs). Printed

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educational materials will be required to accompany the first deed transfer to highlight the existence of the requirement and to provide information on what LID BMPs are present, signs that maintenance is needed, and how the necessary maintenance can be performed. The transfer of this information shall also be required with any subsequent sale of the property.

c. If LID BMPs are located within an area proposed for dedication to a public agency, they will be the responsibility of the developer until the dedication is accepted.

SECTION 3. If any provision of this Ordinance is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect remaining provisions of this Ordinance are declared to be severable.

SECTION 4. This Ordinance shall take effect and be in force on the thirty-first (31st) day after its adoption.

SECTION 5. The City Clerk shall certify to the adoption of this Ordinance and shall cause the same to be published as required by law.

PASSED, APPROVED, and **ADOPTED** this 10th day of September, 2013.

CITY OF SOUTH GATE:

Gil Hurtado, Mayor

ATTEST:

Carmen Avalos, City Clerk
(SEAL)

APPROVED AS TO FORM:

Raul F. Salinas, City Attorney

ORDINANCE CERTIFICATION PAGE

STATE OF CALIFORNIA)

COUNTY OF LOS ANGELES) SS

CITY OF SOUTH GATE)

I, Carmen Avalos, City Clerk of the City of South Gate, California, hereby certify that the whole number of Members of the City Council of said City is five; that Ordinance No. 2307 was adopted by the City Council at their Regular Meeting held on September 10, 2013, by the following vote:

Ayes:	Council Members:	Hurtado, Gonzalez, Morales, Davila and De Witt
Noes:	Council Members:	None
Absent:	Council Members:	None
Abstain:	Council Members:	None

Witness my hand and the seal of said City on September 25, 2013.

Carmen Avalos, City Clerk
City of South Gate, California

RESOLUTION NO. 14-7485

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF DOWNEY APPROVING AND ADOPTING A GREEN STREETS POLICY AND ASSOCIATED GREEN STREETS MANUAL FOR TRANSPORTATION CORRIDORS

WHEREAS, the Municipal Separate Storm Sewer System (MS4) Permit (Order No. R-2012-0175) was adopted by the California Regional Water Quality Control Board, Los Angeles Region on November 8, 2012 and requires development of Watershed Management Programs (WMPs) or Enhanced Watershed Management Programs (EWMPs) for each watershed to which an agency is tributary to among other requirements; and,

WHEREAS, the City of Downey is participating in three watershed groups, the Lower San Gabriel River, the Lower Los Angeles River, and the Los Cerritos Channel which have all elected to prepare WMPs; and,

WHEREAS, Municipalities electing to prepare a WMP or an EWMP under this Permit are required to demonstrate that Green Street policies are in place that specify the use of green street strategies for transportation corridors; and,

WHEREAS, Green Streets are enhancements to street and road projects to improve the quality of storm water and urban runoff through the implementation of infiltration measures such as bioretention and infiltration trenches and dry wells; bio-treatment/infiltration measures such flow-through planters and vegetated swales; treatment Best Management Practices (BMPs) such as catch basin filters and screens; and implementing and maintaining xeriscaped parkways and tree-lined streets; and,

WHEREAS, prior to February 26, 2013, the development of a draft Green Streets Policy and associated Green Streets Manual had been initiated by the Gateway Water Management Authority of which Downey is a participating member.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DOWNEY DOES HEREBY RESOLVE AS FOLLOWS:

SECTION 1. The City of Downey Green Streets Policy and associated Green Streets Manual for transportation corridors attached hereto are hereby approved, adopted, and ordered filed with the City Clerk.

SECTION 2. The City Council of the City of Downey, California, hereby authorizes and directs the Director of Public Works to implement the Green Streets Policy for transportation corridors as described in the City of Downey Green Streets Manual.

SECTION 3. The City Council authorizes the Director of Public Works or his/her designee to modify elements of the Green Streets Policy and associated Green Streets Manual from time to time as may be necessary to reflect changing conditions that: (1) facilitate its implementation; and (2) maintain the goal of reducing pollutants in urban runoff; and (3) are consistent with the requirements of the latest MS4 Permit; and (4) and to facilitate the use of the Manual by the City and contractors.

SECTION 4. Routine maintenance of roadways and other activities as provided in the City LID Ordinance including but not limited to: application of seal coats, slurry seals, grind and overlays, and reconstruction to maintain original line and grade, hydraulic capacity, original purpose of the facility, or emergency redevelopment activity required to protect public health and safety are exempt from the Green Streets Policy and associated Green Streets Manual.

SECTION 5. The City Clerk shall certify to the adoption of this Resolution and shall cause the same to be published or posted as required by law.

APPROVED AND ADOPTED this 22nd day of April, 2014.

FERNANDO VASQUEZ, Mayor

ATTEST:

ADRIA M. JIMENEZ, CMC
City Clerk

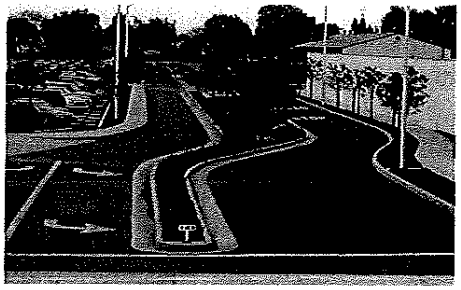
I HEREBY CERTIFY that the foregoing Resolution was adopted by the City Council of the City of Downey at a Regular Meeting held on the 22nd day of April, 2014, by the following vote, to wit:

AYES:	Council Members:	Brossmer, Guerra, Saab, Marquez, Mayor Vasquez
NOES:	Council Members:	None
ABSENT:	Council Members:	None
ABSTAIN:	Council Members:	None

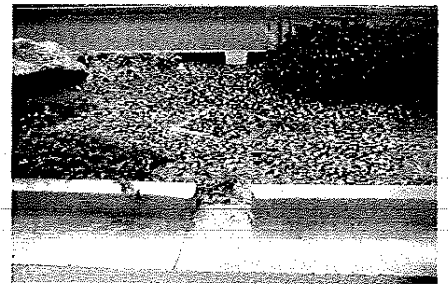
ADRIA M. JIMENEZ, CMC
City Clerk

City of DOWNEY

Green Streets Manual









April 2014

RB-AR11136

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SECTION 1 – INTRODUCTION

1.1 WHAT ARE GREEN STREETS?

Roads present many opportunities for green infrastructure application. One principle of green infrastructure involves reducing and treating stormwater and urban close to its source. Urban transportation right-of-ways integrated with green techniques are often called "green streets." Green streets provide source controls for stormwater and urban runoff and pollutant loads. In addition, green infrastructure approaches complement street facility upgrades, street aesthetic improvements, and urban tree canopy efforts that also make use of the right-of-way and allow it to achieve multiple goals and benefits. Using the right-of-way for treatment of stormwater and urban runoff links green with grey infrastructure by making use of the engineered conveyance of roads and providing connections to conveyance systems when needed.

Green streets are beneficial for new road construction and retrofits. They can provide substantial economic benefits when used in transportation applications. Coordinating green infrastructure installation with broader transportation improvements can reduce the cost of runoff management by including it within larger infrastructure improvements. A large municipal concern regarding green infrastructure use is maintenance access; using roads and right-of-ways as locations for green infrastructure not only addresses a significant pollutant source, but also alleviates access and maintenance concerns by using public space. Also, right-of-way installations allow for easy public maintenance.

Green streets can incorporate a wide variety of design elements including street trees, permeable pavements, bioretention, and swales. Although the design and appearance of green streets will vary, the functional goals are the same; provide source control of stormwater and urban runoff, limit its transport and pollutant conveyance to the collection system, restore pre-development hydrology to the maximum extent practicable, and provide environmentally enhanced roads. Successful application of green techniques will encourage soil and vegetation contact and infiltration and retention of runoff to help augment local water supplies.

1.2 WHY ARE GREEN STREETS BEING REQUIRED?

This Green Streets Manual provides guidance to comply with the MS4 Permit (Order Number R4-2012-0175) which requires that jurisdictions in Los Angeles County reduce contaminants in runoff to improve water quality in waterways. These requirements stem from the National Pollutant Discharge Elimination System (NPDES) requirements of the Clean Water Act (CWA).

The MS4 Permit requires Green Streets strategies to be implemented for transportation corridors. Transportation corridors represent a large percentage of the impervious area within Los Angeles and therefore generate a substantial amount of runoff from storm events. The altered flow regime from traditional roadways, increased runoff volume, and high runoff peak flows, are damaging to the environment and a risk to property downstream.

Traditionally, street design has focused on removing water from the street as quickly as possible and transferring it to storm drains, channels, and water bodies. Stormwater and urban runoff can contain bacteria and other pollutants, and is thereby regulated at the state and local level (refer to *Table 1* for a list of pollutants typical of roads). Green Streets will help to transform the design of streets from the

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conventional method of moving water off-site as quickly as possible to a method of storing, treating, and infiltrating water on-site for a cleaner discharge into the waters of the U.S.

Street and road construction applies to major arterials, state routes, highways, or rail lines used for the movement of people or goods by means of bus services, trucks, and vehicles, and transportation corridors within larger projects. Projects which are required to follow this Green Streets Guidance Manual include the following:

1. Street and road construction of 10,000 square feet or more of impervious surface area.
2. Street and road redevelopment resulting in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include repaving, application of seal coats, slurry seals, grind and overlays, or reconstruction of existing roads to maintain original line and grade.
3. Project is designated by the Director of Public Works as an applicable Green Streets project.

Table 1: Examples of Stormwater Pollutants Typical of Roads (*Managing Wet Weather With Green Infrastructure Municipal Handbook: Green Streets, 2008*).

Pollutant	Source	Effects
Trash	Littering	Physical damage to aquatic animals and fish, release of poisonous substances
Sediment/solids	Construction, unpaved areas	Increased turbidity, increased transport of soil bound pollutants, negative effects on aquatic organisms reproduction and function
Metals (Copper, Zinc, Lead, Arsenic)	Vehicle brake pads, vehicle tires, motor oil, vehicle emissions and engines, vehicle emissions, brake linings, automotive fluids	Toxic to aquatic organisms and can accumulate in sediments and fish tissues
Organics associated with petroleum (e.g., PAHs)	Vehicle emissions, automotive fluids, gas stations	Toxic to aquatic organisms
Nutrients	Vehicle emissions, atmospheric deposition	Promotes eutrophication and depleted dissolved oxygen concentrations

1.3 PLANNING AND DEVELOPMENT

Ideally, a site would be designed to capture and use or infiltrate the entire runoff volume of a storm, however site and design constraints make it difficult to achieve that goal. This Green Streets Manual is designed to provide guidance with BMP selection based on site constraints typical to street design. Streetscape geometry, topography, and climate determine the types of controls that can be implemented. The initial step in selecting a stormwater and urban runoff tool is determining the available open space and constraints. Stormwater and urban runoff controls should be selected using the hierarchy represented in *Figure 1*, the site guidelines represented in *Table 2*, and the location opportunities listed in *Table 3*. Note that the BMP type may be selected with the project size, complexity, and cost taken into consideration.

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1.3.1 Site Considerations

Specific elements which should be given special consideration in the site assessment process for applicable Green Streets include:

- **Ownership of land adjacent to right of ways.** The opportunity to provide stormwater and urban runoff treatment may depend on the ownership of land adjacent to the right-of-way. Acquisition of additional right-of-way and/or access easements may be more feasible if land bordering the project is owned by relatively few land owners.
- **Location of existing utilities.** The location of existing storm drainage utilities can influence the opportunities for Green Streets infrastructure. For example, stormwater planters can be designed to overflow along the curb-line to an existing storm drain inlet, thereby avoiding the infrastructure costs associated with an additional inlet. The location of other utilities may limit the allowable placement of BMPs to only those areas where a clear pathway to the storm drain exists.
- **Grade differential between road surface and storm drain system.** Some BMPs require more head from inlet to outlet than others; therefore, allowable head drop may be an important consideration in BMP selection. Storm drain elevations may be constrained by a variety of factors in a roadway project (utility crossings, outfall elevations, etc.) that cannot be overcome and may override stormwater and urban runoff management considerations.
- **Longitudinal slope.** The suite of BMPs which may be installed on steeper road sections is more limited. Specifically, permeable pavement and swales are more suitable for gentle grades. Other BMPs may be more readily terraced to be used on steeper slopes.
- **Soil suitability.** Infiltration BMPs require specific types of soil. The site assessment should determine the type of soils on the site and the infiltration rate of the soils if infiltration BMPs are proposed.
- **Potential access opportunities.** A significant concern with installation of BMPs in major right of ways is the ability to safely access the BMPs for maintenance considering traffic hazards. Vehicle travel lanes and specific areas potentially hazardous for maintenance crews should be identified during the site assessment. The Green Streets Plan should provide subsequent steps to avoid placing BMPs in the identified hazardous areas.

1.3.2 Design Considerations

The drainage patterns of the project should be developed so that drainage can be routed to areas with BMP opportunities before entering storm drains. For example, if a median strip is present, a reverse crown should be considered, where allowed, so that stormwater and urban runoff can drain to a median swale. Likewise, standard peak-flow curb inlets should be located downstream of areas with potential for stormwater planters so that water can first flow into the planter, and then overflow to the downstream inlet if capacity of the planter is exceeded. It is more difficult to apply green infrastructure after water has entered the storm drain.

Green Streets projects are not required to treat off-site runoff; however, treatment of comingled off-site runoff may be used to off-set the inability to treat areas within the project for which significant constraints prevent the ability to provide treatment.

Applicable Green Streets projects should apply the following site design measures to the maximum extent practicable and as specified in the local permitting agency's codes:

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- Minimize street width where feasible while maintaining traffic flow and public safety.
- Add tree canopy by planting or preserving trees/shrubs.
- Use porous pavement or pavers for low traffic roadways, on-street parking, shoulders or sidewalks.
- Integrate traffic calming measures in the form of bioretention curb extensions.

1.3.3 BMP Sizing for Applicable Green Streets Projects

An 85th percentile standard design storm should be used to determine the appropriate size, slope, and materials of each facility. After identifying the appropriate stormwater facilities for a site, an integrated approach using several BMPs is encouraged. To increase water quality and functional hydrologic benefits, several stormwater management BMPs can be used in succession. This is called a treatment train approach. The control measures should be designed using available topography to take advantage of gravity for conveyance to and through each facility. All Green Streets designs must be based off of a published design standard.

The following steps should be used to size BMPs for applicable Green Streets projects:

1. Delineate drainage areas tributary to BMP locations and compute imperviousness.
2. Look up the recommended sizing method for the BMP selected in each drainage area and calculate target sizing criteria.
3. Design BMPs per a published design standard.
4. Attempt to provide the calculated sizing criteria for the selected BMPs.
5. If sizing criteria cannot be achieved, document the constraints that override the application of BMPs and provide the largest portion of the sizing criteria that can be reasonably provided given constraints. If BMPs cannot be sized to provide the calculated volume for the tributary area, it is still essential to design the BMP inlet, energy dissipation, and overflow capacity for the full tributary area to ensure that flooding and scour is avoided. It is strongly recommended that BMPs which are designed to less than their target design volume be designed to bypass peak flows.

1.3.4 Alternative Compliance Options for Applicable Green Streets Projects

Alternative compliance programs should be considered for applicable Green Streets projects if on-site green infrastructure approaches cannot practicably treat the design volume. The primary alternative compliance option for applicable Green Streets projects is the completion of off-site mitigation projects. The proponent would implement a project to reduce stormwater pollution for other portions of roadway or similar land uses when being reconstructed to the project in the same hydrologic unit, ideally as close to the project as possible and discharging to the same outfall.

1.3.5 Infiltration Considerations

Appropriate soils, infiltration media, and infiltration rates should be used for infiltration BMPs. If infiltration is proposed, a complete geotechnical or soils report should be undertaken to determine infiltration rates, groundwater depth, soil toxicity and stability, and other factors that will affect the ability and the desirability of infiltration. At a minimum, the infiltration capacity of the underlying soils shall be deemed suitable for infiltration (0.3 inches per hour or greater), appropriate media should be used in the BMP itself, the groundwater shall be located at a depth of ten feet or greater.

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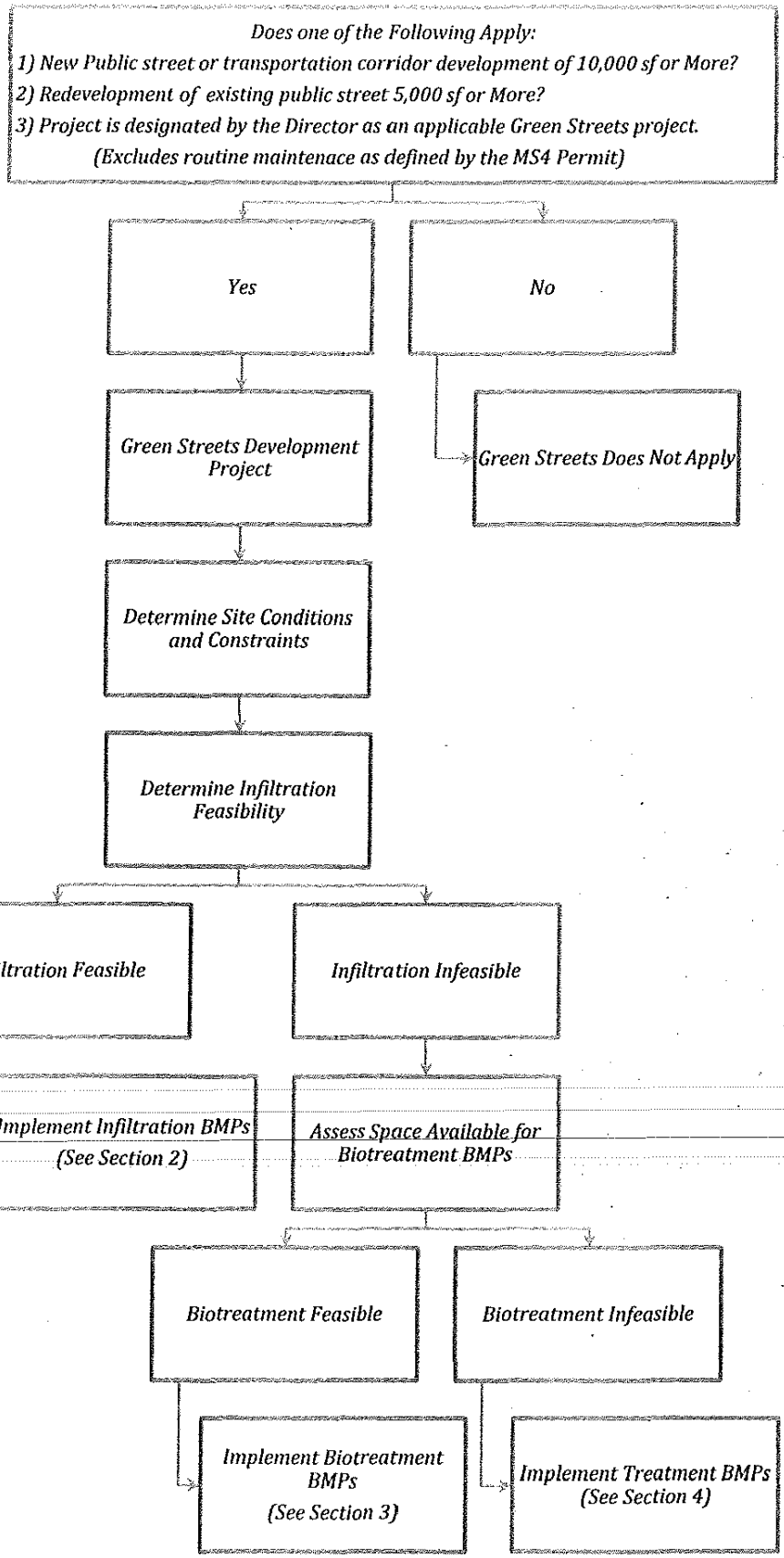


Figure 1: BMP Selection Flow Chart.

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Table 2: BMP Selection by Street Context (*Model for Living Streets Design Manual, 2011*).

	STREET CONTEXT	BIORETENTION			DETENTION		PAVING	INLET PROTECTIONS		
		Swales	Planters	Vegetated Buffer Strips	Rain Gardens	Infiltration Trenches & Dry Wells	Permeable Pavement	Storm Drain Inlet Screens	Storm Drain Filter Inserts	Pipe Filter Inserts
Commercial	Downtown Commercial		✓			✓	✓	✓	✓	✓
	Commercial Throughway		✓	✓		✓	✓	✓	✓	✓
	Neighborhood Commercial		✓	✓	✓	✓	✓	✓	✓	✓
Residential	Downtown Residential	✓	✓		✓	✓	✓	✓	✓	✓
	Residential Throughway	✓	✓		✓	✓	✓	✓	✓	✓
	Neighborhood Residential	✓	✓		✓	✓	✓	✓	✓	✓
Industrial And Mixed-Use	Industrial	✓	✓		✓	✓	✓	✓	✓	✓
	Mixed-Use		✓	✓	✓	✓	✓	✓	✓	✓
Special	Sidewalk Furniture Zone	✓	✓		✓	✓	✓	✓	✓	✓
	Park Edge	✓	✓		✓	✓	✓	✓	✓	✓
	Boulevard	✓	✓		✓	✓	✓	✓	✓	✓
	Ceremonial (Civic)						✓	✓	✓	✓
Small	Alley		✓			✓	✓	✓	✓	✓
	Shared Public Way		✓			✓	✓	✓	✓	✓
	Walk Street		✓	✓		✓	✓	✓	✓	✓

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Table 3: BMP Location Opportunity Summary.

BMP	Location Opportunity Summary
Bioretention	• Adjacent to traveled way and in frontage or furniture sidewalk zones • Can be located in curb extensions, medians, traffic circles, roundabouts, and any other landscaped area • Suitable for constrained locations
Infiltration Trench/Dry Well	• Can be located under sidewalks and in sidewalk planting strips, curb extensions, roundabouts, and medians
Rain Gardens	• Can be integrated medians, islands, circles, street ends, chicanes, and curb extensions • Can be located at the terminus of swales in the landscape
Permeable Pavement	• Suitable for parking or emergency access lanes • Can be located in furniture zones of sidewalks especially adjacent to tree wells • Cannot be placed in areas with large traffic volume or heavy load lanes • Avoid steep streets • Cannot be placed within 20 feet of sub-sidewalk basements • Cannot be within 50 feet of domestic water wells
Flow-Through Planters	• Above-grade planters should be structurally separate from adjacent sidewalks • At-grade planter systems can be installed adjacent to curbs within the frontage and/or furniture zones
Vegetated Swales	• Can be located adjacent to roadways, sidewalks, or parking areas • Can be integrated into traffic calming devices such as chicanes and curb extensions • Can be placed in medians where the street drains to the median • Can be placed alongside streets and pathways • Should be designed to work in conjunction with the street slope
Vegetated Buffer Strips	• Can be located in multi-way boulevards, park edge streets, or sidewalk furniture zones • Can serve as pre-treatment
Treatment BMPs	• Can be located in a catch basin, manhole, or vault • Can be installed on an existing outlet pipe or at the bottom of an existing catch basin with an overflow • Can be placed on existing curbside catch basins and flush grate openings • Can be installed on the existing wall of a catch basin and on the curb side wall of a catch basin • Minimum set-backs from foundations and slopes should be observed if the BMP is not lined
Street Trees	• Can be placed on sidewalks, in furniture zones, and on medians • Adequate spacing must be provided between trees and street lights, pedestrian lights, accessible parking spaces, bus shelters, awnings, canopies, balconies, and signs

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SECTION 2 – INFILTRATION

Infiltration systems utilize rock, gravel, and other highly permeable materials for on-site infiltration. In these systems, stormwater and urban runoff is directed to the system and allowed to infiltrate into the soils for on-site retention and groundwater recharge. During small storm events, infiltration systems can result in significant or even complete volume reduction of stormwater runoff.

Infiltration should be used to the maximum extent practicable. Biotreatment BMPs should be considered if infiltration is found to be infeasible due to low infiltration rates, soil instability, high groundwater, or soil contamination.

Infiltration BMPs may become damaged by stormwater carrying high levels of sediment, therefore pre-treatment features should be designed to treat street runoff prior to discharging to infiltration features. Media filters, filter inserts, vortex type units, bioretention devices, sumps, and sedimentation basins are several pre-treatment tools effective at removing sediment.

2.1 INFILTRATION TRENCHES AND DRY WELLS

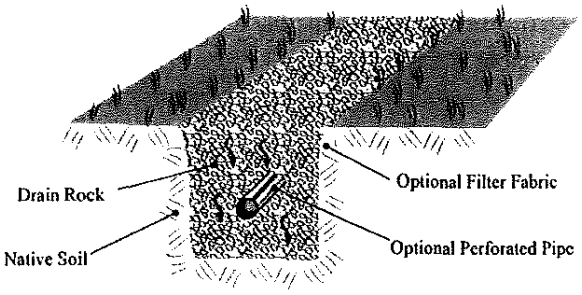


Figure 2: Infiltration Trench (*Model for Living Streets Design Manual, 2011*).

Description

Infiltration trenches are linear, rock-filled features that promote infiltration by providing a high ratio of sub-surface void space in permeable soils. They provide on-site stormwater retention and may contribute to groundwater recharge. Infiltration trenches may accept stormwater and urban runoff from sheet flow, concentrated flow from a swale or other surface feature, or piped flow from a catch basin. Because they are not flow-through BMPs, infiltration trenches do not have outlets but may have overflow outlets for large storm events.

Dry wells are typically distinguished from infiltration trenches by being deeper than they are wide. They are usually circular, resembling a well, and are backfilled with the same materials as infiltration trenches. Dry wells typically accept concentrated flow from surface features or from pipes and do not have outlets.

Infiltration trenches and dry wells are typically designed to infiltrate all flow they receive. In large storm events, partial infiltration of runoff can be achieved by providing an overflow outlet. In these systems, significant or even complete volume reduction is possible in smaller storm events. During large storm events, these systems may function as detention facilities and provide a limited amount of retention and infiltration.

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Location and placement guidelines

Infiltration trenches and dry wells typically have small surface footprints so they are potentially some of the most flexible elements of landscape design. However, because they involve sub-surface excavation, these features may interfere with surrounding structures. Care needs to be taken to ensure that surrounding building foundations, pavement bases, and utilities are not damaged by infiltration features. Once structural soundness is ensured, infiltration features may be located under sidewalks and in sidewalk planting strips, curb extensions, roundabouts, and medians. When located in medians, they are most effective when the street is graded to drain to the median. Dry wells require less surface area than trenches and may be more feasible in densely developed areas.

Infiltration features should be sited on uncompacted soils with acceptable infiltration capacity. They are best used where soil and topography allow for moderate to good infiltration rates (0.3 inches per hour or better) and the depth to groundwater is at least 10 feet. Prior to design of any retention or infiltration system, proper soil investigation and percolation testing shall be conducted to determine appropriate infiltration design rates, depth to groundwater, and if soil will exhibit instability as a result of infiltration. Any site with potential for previous underground contamination shall be investigated. Infiltration trenches and dry wells can be designed as stand-alone systems when water quality is not a concern or may be combined in series with other stormwater tools.

Perforated pipes and piped inlets and outlets may be included in the design of infiltration trenches. Cleanouts should be installed at both ends of any piping and at regular intervals in long sections of piping, to allow access to the system. Access ports are recommended for both trenches and wells and can be combined with clean-outs. If included, the overflow inlet from the infiltration trench should be properly designed for anticipated flows.

2.2 RAIN GARDENS

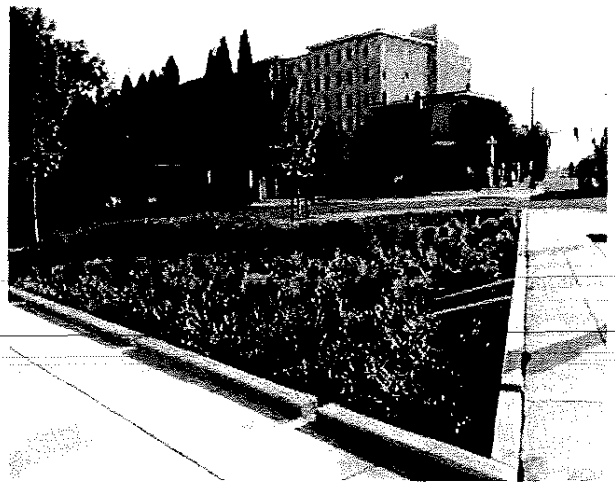


Figure 3: Rain garden (*Model for Living Streets Design Manual, 2011*).

Description

Rain gardens are vegetated depressions in the landscape. They have flat bottoms and gently sloping sides. Rain gardens can be similar in appearance to swales, but their footprints may be any shape. Rain gardens hold water on the surface, like a pond, and have overflow outlets. The detained water is infiltrated through the topsoil and subsurface drain rock unless the volume of water is so large that

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some must overflow. Rain gardens can reduce or eliminate off-site stormwater and urban runoff discharge while increasing on-site recharge.

Location and Placement Guidelines

Rain gardens may be placed where there is sufficient area in the landscape and where soils are suitable for infiltration. Rain gardens can be integrated with traffic calming measures installed along streets, such as medians, islands, circles, street ends, chicanes, and curb extensions. Rain gardens are often used at the terminus of swales in the landscape.

2.3 PERMEABLE PAVEMENT



Figure 4: Permeable pavement during a storm event (*Model for Living Streets Design Manual, 2011*).

Description

Permeable pavement is a system with the primary purpose of slowing or eliminating direct runoff by absorbing rainfall and other urban runoff and allowing it to infiltrate into the soil. Permeable pavement also filters and cleans pollutants such as petroleum deposits on streets, reduces water volumes for existing overtaxed pipe systems, and decreases the cost of offsite or onsite downstream infrastructure. This BMP is impaired by sediment-laden run-on which diminishes its porosity. Care should be taken to avoid flows from landscaped areas reaching permeable pavement. Permeable pavement is, in certain situations, an alternative to standard pavement. Conventional pavement is designed to move stormwater off-site quickly. Permeable pavement, alternatively, accepts the water where it falls, minimizing the need for management facilities downstream.

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Location and Placement Guidelines

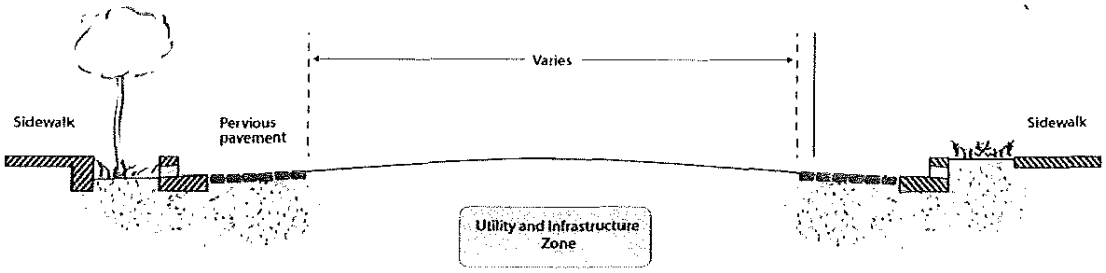


Figure 5: Possible pervious pavement design layout (*Model for Living Streets Design Manual, 2011).*

Conditions where permeable pavement should be encouraged include:

- Sites where there is limited space in the right-of-way for other BMPs;
- Parking or emergency access lanes; and
- Furniture zones of sidewalks especially adjacent to tree wells

Conditions where permeable pavement should be avoided include:

- Large traffic volume or heavy load lanes;
- Where runoff is already being harvested from an impervious surface for direct use, such as irrigation of bioretention landscape areas;
- Steep streets;
- Gas stations, car washes, auto repair, and other sites/sources of possible chemical contamination;
- Areas with shallow groundwater;
- Within 20 feet of sub-sidewalk basements; and
- Within 50 feet of domestic water wells.

Material and Design Guidelines

A soil or geotechnical report should be conducted to provide information about the permeability rate of the soil, load-bearing capacity of the soil, the depth to groundwater (10 feet or more required), and if soil will exhibit instability as a result of implementation. Infiltration rate and load capacity are key factors in the functionality of this BMP. Permeable pavement generally does not have the same load-bearing capacity as conventional pavement, so this BMP may have limited applications depending on the underlying soil strength and pavement use. Permeable pavement should not be used in general traffic lanes due to the possible variety of vehicles weights and heavy volumes of traffic.

When used as a road paving, permeable pavement that carries light traffic loads typically has a thick drain rock base material. Pavers should be concrete as opposed to brick or other light-duty materials. Other possible permeable paving materials include porous concrete and porous asphalt. These surfaces also have specific base materials that detain infiltrated water and provide structure for the road surface. Base material depths should be specified based on design load and the soils report.

Plazas, emergency roads, and other areas of limited vehicular access can also be paved with permeable pavement. Paving materials for these areas may include open cell paver blocks filled with stones or

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grass and plastic cell systems. Base material specifications may vary depending on the product used, design load, and underlying soils.

When used for pedestrian paths, sidewalks, and shared-use paths, appropriate materials include those listed above as well as rubber pavers and decomposed granite or something similar (washed or pore-clogging fine material). Pedestrian paths may also use broken concrete pavers as long as ADA requirements are met. Paths should drain into adjoining landscapes and should be higher than adjoining landscapes to prevent run-on. Pavement used for sidewalks and pedestrian paths should be ADA compliant, especially smooth, and not exceed a 2 percent slope or have gaps wider than 0.25 inches. In general, tripping hazards should be avoided.

Design considerations for permeable pavement include:

- The location, slope and load-bearing capacity of the street, and the infiltration rate of the soil;
- The amount of storage capacity of the base course;
- The traffic volume and load from heavy vehicles;
- The design storm volume calculations and the quality of water; and
- Drain rock, filter fabrics, and other subsurface materials.

Maintenance Guidelines

Maintenance of permeable pavement systems is essential to their continued functionality. Regular vacuuming and street sweeping should be performed to remove sediment from the pavement surface. The bedding and base material should be selected for long life and sufficient infiltration rates.

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SECTION 3 - BIOTREATMENT

Biotreatment BMPs are landscaped, shallow depressions that capture and filter stormwater and urban runoff. These types of BMPs are an increasingly common type of stormwater treatment device that are installed at curb level and filled with a bioretention type soil. They are designed as soil and plant-based filtration devices that remove pollutants through a variety of physical, biological, and chemical treatment processes. They typically consist of a ponding area, mulch layer, planting soils, and plants. Runoff is directed to the system and pollutants are treated as the runoff drains through the planting soil and either infiltrated or collected by an underdrain and directed to a collection system.

Biotreatment should only be used in cases where infiltration has been proven infeasible due to low infiltration rates, soil instability, high groundwater, or soil contamination.

3.1 BIORETENTION

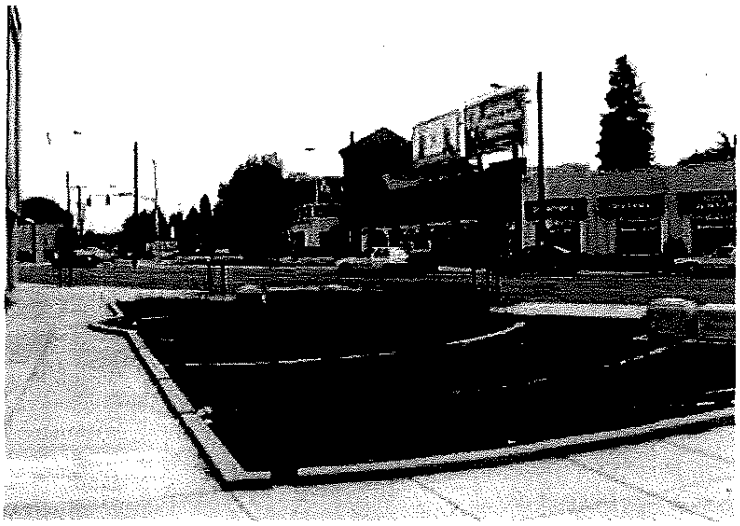


Figure 6: Bioretention system (*Model for Living Streets Design Manual, 2011*).

Description

Bioretention is a stormwater and urban runoff management process that cleans runoff by mimicking natural soil filtration processes as water flows through a bioretention BMP. It incorporates mulch, soil pores, microbes, and vegetation to reduce and remove sediment and pollutants from stormwater. Bioretention is designed to slow, spread, and, subsequently infiltrate water. Each component of the bioretention BMP is designed to assist in retaining water, evapotranspiration, and adsorption of pollutants into the soil matrix. As runoff passes through the vegetation and soil, the combined effects of filtration, absorption, adsorption, and biological uptake of plants remove pollutants.

For areas with low permeability or other soil constraints, bioretention can be designed as a flow-through system with a barrier protecting runoff from native soils. Bioretention areas can be designed with an underdrain system that directs the treated runoff to infiltration areas, cisterns, or the storm drain system, or may treat the water exclusively through surface flow. Examples of bioretention BMPs include swales, planters, and vegetated buffer strips.

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Location and Placement Guidelines

Bioretention facilities can be included in the design of all street components; adjacent to the traveled way and in the frontage or furniture sidewalk zones. They can be designed into curb extensions, medians, traffic circles, roundabouts, and any other landscaped area. Depending on the feature, maintenance and access should always be considered in locating the device. Bioretention systems are also appropriate in constrained locations where other stormwater facilities requiring more extensive subsurface materials are not feasible.

If bioretention devices are designed to include infiltration, native soil should have a minimum permeability rate of 0.3 inches per hour and at least 10 feet to the groundwater table. Sites that have more than a 5 percent slope may require other stormwater and urban runoff management approaches or special engineering.

3.2 FLOW-THROUGH PLANTERS



Figure 7: Flow-through planter (*Model for Living Streets Design Manual, 2011*).

Description

Flow-through planters are typically above-grade or at-grade with solid walls and a flow-through bottom. Often, they are contained within an impermeable liner (permeable applications are available where allowed) and use an underdrain to direct treated runoff back to the collection system. Where space permits, buildings can direct roof drains first to building-adjacent planters. Both underdrains and surface overflow drains are typically installed with building-adjacent planters.

At-grade street-adjacent planter boxes are systems designed to take street runoff and/or sidewalk runoff and incorporate bioretention processes to treat runoff. These systems may or may not include underdrains.

Location and Placement Guidelines

Above-grade planters should be structurally separate from adjacent sidewalks to allow for future maintenance and structural stability per the City Department of Public Work standards. At-grade planter systems can be installed adjacent to curbs within the frontage and/or parkway zones.

All planters should be designed to pond water for less than 48 hours after each storm. Flow-through planters designed to detain roof runoff can be integrated into a building's foundation walls, and may be either raised or at grade.

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For at-grade planters, small localized depressions may be included in the curb opening to encourage flow into the planter. Following the inlet, a sump (depression) to capture sediment and debris may be integrated into the design to reduce sediment loadings.

3.3 VEGETATED SWALES



Figure 8: Vegetated Swale (*Downey, CA*).

Description

Swales are linear, vegetated depressions that capture rainfall and runoff from adjacent surfaces. The swale bottom should have a gradual slope to convey water along its length. Swales can reduce off-site stormwater and urban runoff discharge and remove pollutants along the way. In a swale, water is slowed by traveling through vegetation on a relatively flat grade. This gives particulates time to settle out of the water while contaminants are removed by the vegetation.

Location and Placement Guidelines

Swales can easily be located adjacent to roadways, sidewalks, or parking areas. Roadway runoff can be directed into swales via flush curbs or small evenly-spaced curb cuts into a raised curb. Swale systems can be integrated into traffic calming devices such as curb extensions.

Swales can be placed in medians where the street drains to the median. Placed alongside streets and pathways, vegetated swales can be landscaped with native plants which filter sediment and pollutants and provide habitat for wildlife. Swales should be designed to work in conjunction with the street slope to maximize filtration and slowing of stormwater and urban runoff.

Swales are designed to allow water to slowly flow through the system. Depending on the landscape and design storm, an overflow or bypass for larger storm events may be needed. Curb openings should be designed to direct flow into the swale. Following the inlet, a sump may be built to capture sediment and debris.

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3.4 VEGETATED BUFFER STRIPS

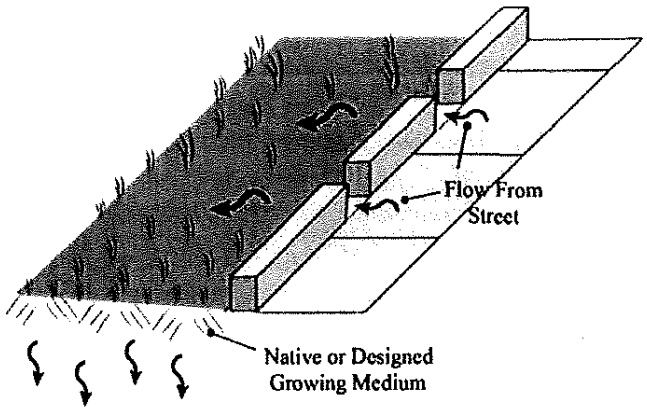


Figure 9: Vegetated buffer strip detail (*Model for Living Streets Design Manual, 2011*).

Description

Vegetated buffer strips are sloping planted areas designed to treat and absorb sheet flow from adjacent impervious surfaces. These strips are not intended to detain or retain water, only to treat it as a flow-through feature. They should not receive concentrated flow from swales or other surface features, or concentrated flow from pipes.

Location and Placement Guidelines

Vegetated buffer strips are well-suited to treating runoff from roads and highways, small parking lots, and pervious surfaces. They may be commonly used on multi-way boulevards, park edge streets, or sidewalk furniture zones with sufficient space. When selecting potential placement the need for supplemental irrigation should be considered. Vegetated buffers can also be situated so they serve as pre-treatment for another stormwater management feature, such as an infiltration BMP.

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SECTION 4 – TREATMENT BMPS

4.1 SAND FILTERS & STORM DRAIN INLET PROTECTIONS

As described in Section 1 of this Green Streets Manual, it may be infeasible for specific projects to apply infiltration or biotreatment BMPs. In these cases, sand filters or filter inserts as treatment BMPs can be considered as an alternative. Sand filters and filter inserts can be designed to prevent particulates, debris, metals, and petroleum-based materials conveyed by runoff from entering the storm drain system. All treatment BMP units should have an overflow system that allows the storm drain to remain functional if the filtration system becomes clogged during rainstorms. All storm drain inlet protections must be of a style and configuration approved by the agency with ownership of the inlet.

Typical maintenance of catch basins includes scheduled trash removal if a screen or other debris capturing device is used. Street sweeping should be performed by vacuum sweepers with occasional weed and large debris removal. Maintenance should include keeping a log of the amount of sediment collected and the data of removal.

The following are examples of acceptable treatment BMPs:

- **Sand Filters:** Sand filters are designed to filter stormwater and urban runoff through a constructed media bed and to an underdrain system. As runoff flows through the media pollutants are filtered out of the water. The filtered water is conveyed through the underdrain to a collection system. Pretreatment is necessary to eliminate significant sediment load or other large particles which would clog the system. Minimum set-backs from foundations and slopes should be observed if the facility is not lined. Filters should be designed and maintained such that ponded water should not persist for longer than 48 hours following a storm event.
- **Cartridge Media Filters:** Cartridge media filters contain multiple modular filters which contain engineered media. The filters can be located in a catch basin, manhole, or vault. The manhole or vault may be divided into multiple chambers so that the first chamber may act as a pre-settling basin for removal of coarse sediment while the next chamber may act as the filter chamber. Cartridge media filters are recommended for drainage areas with limited available surface area or where surface BMPs would restrict uses. Depending on the number of cartridges, maintenance events can have long durations. Locations should be chosen so that maintenance events will not significantly disrupt businesses or traffic. Inlet inserts should be sized to capture all debris and should therefore be selected to match the specific size and shape of each catch basin and inlet. Filter media should be selected to target pollutants of concern. A combination of media may be used to remove a variety of pollutants. Systems with lower maintenance requirements are preferred.
- **Storm Drain Inlet Screens:** Inlet screens are designed to prevent large litter and trash from entering the storm drain system while allowing smaller particles to pass through. The screens function as the first preventive measure in removing pollutants from the storm water system. The City's Public Works Department should be consulted to ensure compliance with local specifications and to schedule regular maintenance. Annual inspection of the screen is recommended to ensure functionality. Note that most LA River drainage areas are already protected using connector pipe screens through collective systems.
- **Storm Drain Pipe Filter Insert:** The storm drain outlet pipe filter is designed to be installed on an existing outlet pipe or at the bottom of an existing catch basin with an overflow. This filter removes debris, particulates, and other pollutants from runoff as it leaves the storm drain system. This BMP

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is less desirable than a protection system that prevents debris from entering the storm drain system because the system may become clogged with debris. Outlet pipe filters can be placed on existing curbside catch basins and flush grate openings. Regular maintenance is required and inspection should be performed rigorously. Because this filter is located at the outlet of a storm drain system, clogging with debris is not as apparent as with filters at street level. This BMP may be used as a supplemental filter with an inlet screen or inlet insert unit.

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SECTION 5 – STREET TREES

5.1 STREET TREES



Figure 10: Street Trees (*Downey, CA*).

Description

Healthy urban trees are powerful stormwater management tools. Leaves and branches catch and slow rain as it falls, helping it to soak into the ground. The plants themselves take up and store large quantities of water that would otherwise contribute to surface runoff. Part of this moisture is then returned to the air through evaporation to further cool the city. As an important element along sidewalks, street trees must be provided with conditions that allow them to thrive, including adequate uncompacted soil, water, and air.

The goal of adding street trees is to increase the canopy cover of the street, the percentage of its surface either covered by or shaded by vegetation. The selection, placement, and management of all elements in the street should enhance the longevity of a city's street trees and healthy, mature plantings should be retained and protected whenever possible.

Benefits to adding street trees include:

- Creation of shade to lower temperatures in a city, reduces energy use, and makes the street a more pleasant place in which to walk and spend time
- Slowing and capture of rainwater, helping it soak into the ground to restore local hydrologic functions and aquifers
- Improving air quality by cooling air, producing oxygen, and absorbing and storing carbon in woody plant tissues

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SECTION 6 – DEFINITIONS

Best Management Practice (BMP)
Operating methods and/or structural devices used to reduce stormwater volume, peak flows, and/or pollutant concentrations of stormwater runoff through evapotranspiration, infiltration, detention, filtration, and/or biological and chemical treatment.

Bioretention
Soil and plant-based retention practice that captures and biologically degrades pollutants as water infiltrates through sub-surface layers containing microbes that treat pollutants. Treated runoff is then slowly infiltrated and recharges the groundwater.

Conveyance
The process of water moving from one place to another.

Design Storm
A storm whose magnitude, rate, and intensity do not exceed the design load for a storm drainage system or flood protection project.

Detention
Stormwater runoff that is collected at one rate and then released at a controlled rate. The volume difference is held in temporary storage.

Filtration
A treatment process that allows for removal of solid (particulate) matter from water by means of porous media such as sand, soil, vegetation, or a man-made filter. Filtration is used to remove contaminants.

Hardscape
Impermeable surfaces, such as concrete or stone, used in the landscape environment along sidewalks or in other areas used as public space.

Infiltration
The process by which water penetrates into soil from the ground surface.

Parkway Zone
The parkway zone is the area which lies between the curb and City right-of-way line and is intended to house utilities and pedestrian amenities.

Permeability/Impermeability
The quality of a soil or material that enables water to move through it, determining its suitability for infiltration.

Retention
The reduction in total runoff that results when stormwater is diverted and allowed to infiltrate into the ground through existing or engineered soil systems.

Runoff
Water from rainfall that flows over the land surface that is not absorbed into the ground.

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Sedimentation
The deposition and/or settling of particles suspended in water as a result of the slowing of the water.

Stormwater
Water runoff from rain or snow resulting from a storm.

Transportation Corridor
A major arterial, state route, highway, or rail line used for the movement of people or goods by means of bus services, trucks, and vehicles.

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SECTION 7 – REFERENCES

1. Los Angeles County. *Model for Living Streets Design Manual*. 2011.
2. U.S. Environmental Protection Agency (EPA). *Managing Wet Weather With Green Infrastructure Municipal Handbook: Green Streets*. December 2008.
3. Orange County. *Technical Guidance Document*. May 2011.
4. Los Angeles Regional Water Quality Control Board. *Los Angeles County MS4 Permit (Order No. R4.2012-0175) Early Action Requirements for Permittees Pursuing an Enhanced Water Management Program or 18-Month Watershed Management Program – Low Impact Development Ordinances and Green streets Policies*. January 24, 2014.

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ORDINANCE NO. 14 -1330

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF DOWNEY AMENDING ARTICLE V, CHAPTER 7 OF THE DOWNEY MUNICIPAL CODE (DMC) AS IT RELATES TO STORM WATER AND URBAN RUNOFF POLLUTION AND CONVEYANCE CONTROLS, TO EXPAND THE APPLICABILITY OF THE EXISTING POLLUTANT SOURCE REDUCTION REQUIREMENTS, BY IMPOSING RUNOFF LOW IMPACT DEVELOPMENT (LID) STRATEGIES ON PROJECTS THAT REQUIRE BUILDING, GRADING, AND CONSTRUCTION PERMITS

WHEREAS, the City of Downey City Council has previously adopted Ordinances 1036, 1095, 1130, and 1142 in response to requirements of prior Municipal Separate Storm Sewer System (MS4 or NPDES or Stormwater) Permits and more recently Ordinance 1320 in response to the latest MS4 Permit that have been issued by the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB); and,

WHEREAS, additional changes to the Downey Municipal Code will be required to comply with the new MS4 Permit requirements (Order No. R4-2012-0175) including but not limited to, enforcement of restrictive water quality criteria, and new regulations directed at achieving receiving water beneficial use objectives, that the City must anticipate shall be more strictly enforced in the immediate future; and,

WHEREAS, the new MS4 Permit includes provisions and measures outlining significant fines and penalties for municipal non-compliance with its requirements; and,

WHEREAS, is it the intent of the City to expand the applicability of the existing Low Impact Development (LID) requirements by providing stormwater and urban runoff LID strategies for all projects for Development and Redevelopment projects as defined under "Applicability"; and,

WHEREAS, adopting this ordinance reduces potential environmental and public health and safety risks for the residential and business communities of the City of Downey; and,

WHEREAS, the specified amendments to this chapter of the Downey Municipal Code will facilitate compliance with the latest MS4 Permit by the City of Downey, its residents and businesses; and,

WHEREAS, the specified amendments to this chapter of the Downey Municipal Code will result in improved staff efficiency in anticipating and complying with these changing water quality initiatives.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DOWNEY DOES ORDAIN AS FOLLOWS:

SECTION 1. Article V, Chapter 7 of the Downey Municipal Code is hereby amended and changed in its entirety to read as follows:

"Chapter 7 – STORM WATER AND URBAN RUNOFF POLLUTION AND CONVEYANCE CONTROLS

SECTION 5700. DEFINITIONS.

Except as specifically provided herein, any term used in this Chapter shall be defined as provided in the most recent Los Angeles County National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, as this document may from time to time be amended and submitted to the Los Angeles Regional Water Quality Control Board (LARWQCB). If not defined in the current MS4 Permit, then such term shall be used as defined in the Federal Clean Water Act, as amended, or the regulations promulgated thereunder. If any definition contained in this Chapter conflicts with the same term in the current MS4 Permit, then the definition contained in the current MS4 Permit shall govern. Any term used herein may be extended to include examples or cases identified elsewhere in Chapter 7 or as directed by the LARWQCB.

"Automotive Service Facility" means a facility that is categorized with the Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539 or equivalent North American Industry Classification System (NAICS) codes.

"Authorized Enforcement Officer" shall mean the "Director" or a City Code Enforcement Officer.

"Basin Plan" means the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments.
"Best Management Practices" or "BMPs" shall mean practices or physical devices or systems designed to prevent or reduce pollutant loading from storm water or non-storm water discharges to receiving water, or designed to reduce the volume of storm water or non-storm water discharged to the receiving water.

"Biofiltration" means a LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales.

"Bioretention" means a LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in this Ordinance, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by Order No. R4-2012-0175 as biofiltration.

"Bioswale" means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes.

"Clean Water Act (CWA)" means the Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

"Commercial Development" means any development on private land that is not heavy industrial or residential. The category includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities; mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes (Order No. R4-2012-0175).

"Commercial Malls" means any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers (Order No. R4-2012-0175).

"Construction Activity" means any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that results in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See "Routine Maintenance" definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan (Order No. R4-2012-0175).

"Construction/Industrial General Permit" or "CGP/IGP" shall mean the general NPDES permits adopted by the State Board, authorizing the discharge of storm water associated with construction or industrial activities respectively under certain conditions.

"Control" means to minimize, reduce or eliminate by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities.

"Development" shall mean any construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does include it include emergency construction activities required to immediately protect public health and safety.

"Director" shall mean the Director of Public Works or his/her designee(s).

"Directly Adjacent" means situated within 200 feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area.

"Discharge" means any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

"Discharge of pollutants" shall mean any addition of "pollutant" or combination of pollutants to "waters of the United States" from any "point source" or, any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" of the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. The term discharge includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owner treatment works.

"Disturbed Area" means an area that is altered as a result of clearing, grading, and/or excavation (Order No. R4-2012-0175).

"Downey Municipal Codes" or "DMC" shall mean the official governmental record of all regulatory, penal and certain administrative ordinances of the City of Downey, California, as it may be amended.

"Flow-through treatment BMPs" means a modular, vault type "high flow biotreatment" devices contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain.

"Full Capture System" means any single device or series of devices, certified by the Executive Officer, that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate Q resulting from a one-year, one-hour storm in the sub-drainage area.

"Governmental" shall mean a municipal corporation, county, state, federal, or governmental body, agency or entity.

"Green Roof" means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain.

"Hillside" means a property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes.

"Illicit Connection" shall mean any man-made conveyance that is connected to the MS4 without a permit, excluding roof drains and other similar types of connections. Examples include channels, pipelines, conduits, inlets, or outlets that are connected directly to the storm drain system.

"Illicit Discharge" shall mean any discharge into the MS4 or from the MS4 into a receiving water that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations. The term illicit discharge includes any non-storm water discharge, except: authorized non-storm water discharges; conditionally exempt non-storm water discharges; and non-storm water discharges resulting from natural flows specifically identified in Part III.A.1.d of the MS4 Permit.

"Industrial/Commercial Facility" means any facility involved and/or used in the production, manufacture, storage, transportation, distribution, exchange or sale of goods and/or commodities, and any facility involved and/or used in providing professional and non-professional services. This category of facilities includes, but is not limited to, any facility defined by either the Standard Industrial Classifications (SIC) or the North American Industry Classification System (NAICS). Facility ownership (federal, state, municipal, private) and profit motive of the facility are not factors in this definition.

"Industrial Park" means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry.

"Infiltration BMP" means a LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement.

"California Regional Water Quality Control Board – Los Angeles Region" or "LARWQCB" shall mean the Board members, its Executive Officer, and their staff.

"Low Impact Development (LID)" consists of building and landscape features designed to retain or filter stormwater runoff.

"Maximum Extent Practicable" or "MEP" In selecting BMPs which will achieve MEP, it is important to remember that municipalities will be responsible to reduce the discharge of pollutants in storm water to the maximum extent practicable. This means choosing effective BMPs, and rejecting applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs would not be technically feasible, or the cost would be prohibitive. The following factors may be useful to consider:

(1) Effectiveness: Will the BMP address a pollutant of concern?

(2) Regulatory Compliance: Is the BMP in compliance with storm water regulations as well as other environmental regulations?

(3) Public acceptance: Does the BMP have public support?

(4) Cost: Will the cost of implementing the BMP have a reasonable relationship to the pollution control benefits to be achieved?

(5) Technical Feasibility: Is the BMP technically feasible considering soils, geography, water resources, etc.?

After selecting a menu of BMPs, it is of course the responsibility of the discharger to insure that all BMPs are implemented.

"MS4 Permit" shall mean the Waste Discharge Requirement for Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles, and the Incorporated Cities Therein, Except the City of Long Beach issued by the LARWQCB. The provisions of this Ordinance shall be interpreted to provide legal authority to support applicable sections of subsequent LARWQCB MS4 Permit Orders, as they may apply within the City of Downey. Aspects of this Ordinance were developed based on discharge requirements contained in LARWQCB Orders 90-079, 96-054, 01-182, and R4-2012-0175.

"Municipal Separate Storm Sewer System" or "MS4" shall mean a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(1) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges to waters of the United States; and

(2) Designed or used for collecting or conveying storm water; and

(3) Which is not a combined sewer; and

(4) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR § 122.26(b)(8).

"National Pollutant Discharge Elimination System" or "NPDES" shall mean the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Clean Water Act § 307, 402, 318 and 405, as amended. This term includes an "approved program".

"Natural Drainage System" means a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

"New Development" shall mean land disturbing activities, structural development, including construction or installation of a building or structure, creation of impervious surfaces, and land subdivision.

"Non-Stormwater Discharge" means any discharge to a municipal storm drain system that is not composed entirely of stormwater.

"Owner" shall mean the legal owner of a parcel of real property, except when the legal owner of the property is the holder of the mortgage, note, or other such security, in which case it is beneficiary of said real property.

"Outfall" means a point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances with connect segments of the same stream or other waters of the United Sates and are used to convey waters of the United States. (40 CFR Section 122.26(b)(9)).

"Parcel" shall mean the smallest lot, unit or plot of land having an owner, boundaries, surface area and Los Angeles County Tax Assessor Number.

"Parking Lot" means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces.

"Planning Priority Projects" shall mean those new development and redevelopment projects that are required by the MS4 Permit to incorporate appropriate storm water mitigation measures into their design plan.

"Pollutant(s)" means any "pollutant" defined in Section 502(6) of the Federal Clean Water Act or incorporated into the California Water Code Section 13373.

"Project" means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code Section 21065).

"Rainfall Harvest and Use" means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department and other necessary local, state, and federal agencies as required.

"Receiving Water" means "water of the United States" into which waste and/or pollutants are or may be discharged.

"Redevelopment" shall mean any construction activity that results in the creation, addition, or replacement of five thousand (5,000) square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of a routine maintenance activity; and land-disturbing activities related to structural or impervious surfaces. Redevelopment does not include routine maintenance activities to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency construction activities to immediately protect public health and safety.

"Regional Board" means the California Regional Water Quality Control Board, Los Angeles Region.

"Restaurant" means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812).

"Retail Gasoline Outlet" means any facility engaged in selling gasoline and lubricating oils.

"Routine Maintenance" includes, but is not limited to projects conducted to:

1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.
2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.
3. Includes road shoulder work, regrading dirt or gravel roadways and shoulders and performing ditch cleanouts.
4. Update existing lines* and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
5. Repair leaks

Routine maintenance does not include construction of new** lines or facilities resulting from compliance with applicable codes, standards and regulations.

* Update existing lines includes replacing existing lines with new materials or pipes.

** New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines.

"Runoff" shall mean any runoff including storm water and dry weather flows from a drainage area that reaches a receiving water body or subsurface. During dry weather it is typically comprised of base flow either contaminated with pollutants or uncontaminated, and nuisance flows.

"Significant Ecological Areas (SEAs)" means an area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs, if they possess one or more of the following criteria:

1. The habitat of rare, endangered, and threatened plant and animal species.
2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.
3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.
4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.
5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.

6. Areas important as game species habitat or as fisheries.
7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.
8. Special areas.

"Site" means land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity.

"Standard Industrial Classification" or "SIC" shall mean the four digit code system used to identify business types in the MS4 Permit and Clean Water Act Amendments. The six digit North American Industrial Classification System (NAICS) is supplanting the SIC. Cross-references between SIC and NAICS codes shall follow those of the Economic Classification Policy Committee of the United States Office of Management and Budget, which is distributed by the National Technical Information Service.

"Storm Drain System" means any facility or any parts of the facility, including streets, gutters, conduits, natural or artificial drains, channels and watercourse that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the City.

"Storm Water" shall mean storm water runoff, snow melt runoff, and surface runoff and drainage related to precipitation events.

"Storm Water Pollution Prevention Plan" or "SWPPP" shall mean a plan, as required by the State Construction General and Industrial General Permits identifying potential pollutant sources and describing the design, placement, and implementation of BMPs, to effectively prevent non-stormwater discharges and reduce pollutants in stormwater discharges during activities covered by these permits.

"Structural BMP" shall mean any structural facility designed and constructed to mitigate the adverse impacts of storm water and urban runoff pollution, including source control and treatment control BMPs.

"Treatment Control BMP" shall mean any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media adsorption or any other physical, biological or chemical process.

"Urban Runoff" means surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial or industrial activities involving the use of potable and non-potable water.

"Urban Runoff Mitigation Plan" shall mean an appropriate LID, SUSMP, or Site Specific Mitigation Plan.

"Watershed Management Program" shall mean the City's stormwater program to implement the requirements of the NPDES MS4 permit.

SECTION 5701. WATERSHED MANAGEMENT PROGRAM.

Notwithstanding other provisions in the Downey Municipal Codes, the MS4 Permit requires the City of Downey to implement the Watershed Management Program (WMP) as an enforceable element of the permit. Applicable program elements set forth in the WMP, and any subsequent amendments, are hereby incorporated into this Ordinance by reference.

SECTION 5702. PROHIBITED POLLUTANT(S).

(a) Pollutant(s) prohibited from discharge to the MS4 shall include:

(1) Any water constituent found at concentrations or levels that may potentially cause a beneficial use impairment in a downstream receiving water body that has been nominated or is currently on, a LARWQCB 303(d), Monitoring, Enforceable Limit, or similar list;

(2) Any sediment, settleable, or suspended solid;

(3) Any living or dead animal or their biological waste products;

(4) Any food, food processing or medical waste;

(5) Any thermal, color, conductive, oxygen demanding, growth inducing, corrosive, or radioactive waste;

(6) Any chemical waste, salt, organic compound, pesticide, or metal;

(7) Any hydrocarbon based fuel, oil, lubricant, fluid, or additive; and

(8) Any substance designated as a pollutant by the LARWQCB.

SECTION 5703. ILLICIT CONNECTION AND ILLICIT DISCHARGE PROHIBITION.

(a) No owner, responsible party, or person, shall use, allow, or suffer, an illicit connection to the MS4; and must therefore remove or terminate such illicit connection.

(b) No person or responsible party shall cause, nor contribute, to the exceedance of water quality standards, nor impair attainable beneficial use objectives in receiving waters of the State.

(c) All non-storm water discharges are prohibited unless they're identified in Part III.A of the MS4 Permit. A discharge may be exempt or conditionally exempt if:

(1) It consists entirely of storm water; or

(2) It is authorized by an NPDES permit; or

(3) It is identified in Part III.A of the MS4 Permit; or

(4) It is authorized by the Executive Officer of the LARWQCB.

(d) Illicit Discharges that are prohibited from entering the MS4 shall include, but are not limited to, the following:

(1) The discharge of wash waters to the MS4 from the cleaning of gas stations, auto repair garages, or other automotive service facilities;

(2) The discharge of runoff to the MS4 from mobile auto washing, steam cleaning, mobile carpet cleaning, and other such mobile commercial and industrial operations;

(3) The discharge of runoff to the MS4 from areas where repair of machinery and equipment, which are visibly leaking oil, fluid or antifreeze, is undertaken;

(4) The discharge of runoff or wash down to the MS4 from paved or unpaved storage areas where materials containing grease, oil, paint, toxic or other hazardous substances, and uncovered receptacles containing hazardous materials are, or have been, located;

(5) The discharge of chlorinated or brominated, swimming pool or spa water and filter backwash or diatomaceous earth to the MS4;

(6) The washing of materials or impervious surfaces that result in discharges to the MS4;

(7) The discharge of concrete or cement laden wash water from concrete trucks, pumps, tools, and equipment to the MS4; and

(8) Dumping or disposal of materials into the MS4, other than storm water, such as:

a. Solid waste as defined in California Public Resources Code, Section 40191;

b. Solid waste, including, but not limited to, trash, litter, food wastes, packaging, paper bags, newspaper, and garbage;

c. Construction or landscape debris, such as leaves, dirt, grass clippings, bark, fertilizer, bags, plant cans or bedding packs;

d. Any governmentally banned or unregistered pesticide, insecticide, fungicide, nematicide, acaricide, or herbicide;

e. Automotive, fuel and chemical wastes including batteries;

f. Animal, biological, food processing, or medical wastes; and

g. Other material that may have an adverse impact on water quality, wildlife, or receiving water habitat value.

SECTION 5704. CONTROL OF POLLUTANTS AND RUNOFF FROM SITES REQUIRING A STORMWATER ACTIVITIES PERMIT.

(a) It shall be a violation of this Chapter for any person or entity, required by governmental law to obtain a NPDES stormwater activities permit, to conduct a construction, commercial, or industrial activity in the City of Downey, without the appropriate Construction General Permit (CGP) or Industrial General Permit (IGP).

(b) Any person or entity, required to have an NPDES Stormwater activities permit for a parcel within the City of Downey, shall retain at said parcel the following evidence of compliance with the CGP or IGP and make said documents available upon request from an Authorized Enforcement Officer: (i) a copy of the submitted Notice of Intent (NOI) to comply with State Stormwater Waste Discharge Requirements or a waste discharge identification (WDID) number issued by the SWRCB; (ii) a SWPPP; and (iii) site specific storm water quality data.

(c) Any person or entity in the City of Downey requiring a CGP or IGP for facilities under their control or operation, shall characterize the adequacy of the facility SWPPP in applying source and treatment control BMPs to at least the MEP standard and comply with the requirements of the SWPPP.

(d) No person or entity shall obfuscate or otherwise attempt to conceal the nature or operation of a construction, commercial, or industrial site, or facility, in order to avoid obtaining the appropriate governmental stormwater permits.

(e) Industrial and construction facilities not subject to the IGP and CGP that are subject to pollution control requirements under the municipal NPDES permit shall implement BMPs prescribed by the regional board or its executive officer, through programs or actions made pursuant to the municipal NPDES permit.

SECTION 5705. BMP REQUIREMENTS FOR URBAN RUNOFF REDUCTION.

The owner, occupant or other person in charge of day-to-day operation or maintenance of each parcel within the City of Downey shall adhere to the following BMP requirements in order to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations:

(a) For premises exposed to storm water, the owner, occupant or other person in charge of day-to-day operations shall use appropriate BMPs, or other steps to reduce the discharge of pollutants to at least the MEP standard.

(b) No person or entity shall dump, release, spill, leak, pump, pour, emit, empty, discharge, inject, bury or dispose into the environment, any solid or liquid wastes, including any pollutant, in or upon any part of MS4, or upon any public or private premises in the City of Downey.

(c) No person or entity shall cause, suffer, or permit any solid or liquid waste or pollutant, to come to be located upon, in, on, or under any premises in the City of Downey, expect in the original manufacturers container or a governmentally authorized container, waste facility, or treatment works.

(d) No person shall dispose of any hazardous substance or material, into any litter or waste container, without the written authorization of the site or container, owner or operator.

(e) Water used for irrigation purposes shall not be allowed to run off of a site.

(f) Washing down paved areas shall be prohibited unless it conforms to the definition of sidewalk rinsing given in the MS4 Permit. If necessary for health or safety purposes, and not in violation of any other provision of this Code, then washing down paved areas is authorized when all applicable BMP measures are implemented to remove pollutants, or if the resulting wastewater is collected and discharged to a sanitary sewer.

(g) Uncovered outdoor storage of unsealed containers of building materials, lawn and automotive care products, or other substances that may contribute pollutants to the storm water conveyance system, is prohibited.

(h) Commercial tenants, multi-family building managers and industrial owners shall inspect trash receptacles and refuse storage areas on a weekly basis for loose garbage and liquid waste residue and shall not allow such garbage and residue to enter the storm drain system. Trash receptacles shall be maintained with solid unbroken closed covers to prevent the entry of rain, or exit of wind-blown or animal-strewn litter and leaking fluids.

(i) Premises with twenty-five (25) or more motor vehicle parking spaces, or five thousand (5,000) square feet of parking lot area, and upon which runoff water is conveyed, shall be vacuum swept monthly and shall employ other BMPs as may be necessary, to reduce discharges to the MEP.

(j) Premises with between ten (10) and twenty-four (24) motor vehicle parking spaces, and upon which runoff water is conveyed, shall be vacuum swept quarterly and shall employ other BMP's as may be necessary, to reduce discharges to the MEP.

(k) For premises where machinery or other equipment is repaired or maintained, the owner, occupant or other person in charge of the day-to-day operations shall use BMPs or other steps to prevent discharge of maintenance or repair related pollutants to the MS4.

(l) Materials and equipment necessary for pollutant source control activities, that are commensurate with facility operations and materials, shall be maintained and kept readily available and accessible to all employees.

(m) Any BMP, runoff reduction, discharge control structure, or activity must be designed, operated and maintained to prevent the release of odors, or entrance and proliferation of pathogens or their vectors, or other nuisance microbe, invertebrate or vertebrate organisms.

(n) If the Director determines that water quality criteria may be compromised by discharges from a parcel or development, the Director shall have the authority to require BMP implementation until the discharge of runoff or pollutants to the MS4, or receiving water, have been reduced to the MEP.

SECTION 5706. SOURCE CONTROL FOR NEW DEVELOPMENT.

(a) The following pollution source control requirements shall apply to all persons submitting applications for new development or redevelopment projects within the City of Downey.

(1) During application review for new development or redevelopment projects, the applicant shall submit an appropriate project specific Urban Runoff Mitigation Plan to the Director.
(2) Structural and design elements that typically increase infiltration, reduce pollutant conveyance, and decrease runoff include:

a. Using landscaped/vegetated areas, sand filters, swales, infiltration basins, biofilters, and planters to maximize infiltration;
b. Replacing impermeable surfaces with porous materials;
c. Directing impervious surface runoff to permeable areas;
d. Grading the site to encourage runoff to permeable areas;
e. Directing runoff to dry wells, perforated pipes, infiltration trenches, or other source reduction BMPs;
f. Designing curbs and landscaping to facilitate infiltration;
g. Using cisterns or retention basins to store precipitation; and
h. Installing treatment control BMPs to remove pollutants.

(3) All Urban Runoff Mitigation Plans must include a structural and treatment control BMP maintenance schedule, the applicant's signed statement of responsibility for continued BMP maintenance, and plan for continued maintenance responsibilities.
(4) The applicant shall retain responsibility for such maintenance until responsibility is legally transferred in accordance with this chapter.
(5) Applicant, facility operators and/or owners shall also provide, as requested by the Director, any other legally enforceable agreement that assigns responsibility for the maintenance of post-construction structural or treatment control BMPs.
(6) The Urban Runoff Mitigation Plan must indicate that subsequent property transfers, include, as a written condition and are subject to, the transferee assuming full responsibility for maintenance of any structural, treatment and/or source control BMPs.
(7) As a condition for issuing a certificate of occupancy for a new development or redevelopment project, the Director shall require the applicant, facility operators and/or owners, as appropriate, to construct all storm water pollution control BMPs and structural or treatment control BMPs shown on the approved project plans.
(8) As a condition for issuing a certificate of occupancy for a new development or redevelopment project, the Director shall require the applicant, facility operators and/or owners to submit, for review and approval, a BMP maintenance schedule and inspection plan.
(9) As a condition for issuing a certificate of occupancy for a new development or redevelopment project, the Director shall require that the applicant file a signed statement that the project site and all structural or treatment control BMPs shall be maintained in compliance with the Urban Runoff Mitigation Plan.

SECTION 5707. SOURCE CONTROLS FOR SPECIFIC DEVELOPMENT CATEGORIES.

(a) The following design elements shall be required for all new development or redevelopment projects, except single-family residences:

(1) Preparation and Director approval of the Urban Runoff Mitigation Plan, as a condition of Planning or Building Department approval.

(2) Runoff shall not be conveyed to, or through, the following areas:
a. Loading and unloading dock areas;
b. Repair and maintenance bays; and
c. Vehicle and equipment wash and fueling areas

(3) Developments which include outdoor material storage areas that may discharge MS4 pollutants, must include design elements to:
a. Place the materials within enclosures, such as cabinets, sheds, or awnings, which prevent contact with rain, runoff, or other liquids that might flow to the MS4.
b. Liquid handling areas shall use impervious spill containing floors, drains, sumps, vessels, berms, dikes, and curbs to contain materials and eliminate discharges to the MS4.

(4) Waste material bins with a capacity greater than 1/4 cubic yard (or fifty (50) gallons) must be stored in a covered area to prevent rainfall or roof drainage, from any structure, through the waste.

(5) Any project including down spouts, roof gutters or subsurface drainage shall utilize perforated pipe in approved infiltration areas, infiltration trenches, "French Drain" or similar systems, unless prohibited by the Director.

(6) Each Urban Runoff Management Plan shall be individually evaluated to ascertain whether the proposed project and site characteristics meet governmental standards.

(7) The Urban Runoff Mitigation Plan must demonstrate to the Director's satisfaction that proposed BMPs, numeric design criteria, or design elements meet the requirements of this chapter.

(8) The Director shall approve or disapprove of any proposed project plans. If the plans are disapproved, the developer may request a written explanation for the disapproval. No city grading or building permit shall be issued until the Director has approved an Urban Runoff Mitigation Plan.

(b) Development projects subject to Permittee permitting and approval for the design and implementation of post-construction controls to mitigate storm water pollution, prior to completion of the project(s), are:.

(1) All development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.
(2) Industrial parks 10,000 square feet or more of surface area.
(3) Commercial malls 10,000 square feet or more of surface area.
(4) Retail gasoline outlets with 5,000 square feet or more of surface area.
(5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of surface area.
(6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.
(7) Streets and roads construction of 10,000 square feet or more of impervious surface area. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects. Specific requirements in Subsection (c)(2).

(8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area.
(9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will:
   a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and
   b. Create 2,500 square feet or more of impervious surface area
(10) Single-family hillside homes.
(11) Redevelopment Projects
   a. Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on Planning Priority Project categories.
   b. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.
   c. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.
   d. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet or more of impervious surface area.

(c) **Specific Requirements.** The Site for every Planning Priority Project shall be designed to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use.

(1) A new single-family hillside home development shall include mitigation measures to:
   a. Conserve natural areas;
   b. Protect slopes and channels;
   c. Provide storm drain system stenciling and signage;
   d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and
   e. Direct surface flow to vegetated areas before discharge, unless the diversion would result in slope instability.
(2) Street and road construction of 10,000 square feet or more of impervious surface shall follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets (December 2008 EPA-833-F-08-009) or similar guidance manual to the maximum extent practicable.

(3) The remainder of Planning Priority Projects shall prepare a LID Plan to comply with the following:
   a. Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:
      i. The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or
      ii. The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.
   b. Minimize hydromodification impacts to natural drainage systems as defined in Order No. R4-2012-0175.
   c. To demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use, and that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect. Technical infeasibility may result from conditions including the following:
      i. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.
      ii. Locations where seasonal high groundwater is within five to ten feet of surface grade;
      iii. Locations within 100 feet of a groundwater well used for drinking water;
      iv. Brownfield development sites or other locations where pollutant mobilization is a documented concern;
      v. Locations with potential geotechnical hazards;
      vi. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.
   d. If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in Order No. R4-2012-0175.
      i. Additional alternative compliance options such as offsite infiltration and groundwater replenishment projects may be available to the project Site. The project Site should contact the Department of Public Works to determine eligibility.
   e. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per Order No. R4-2012-0175. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:
      i. 0.2 inches per hour, or
      ii. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

(d) Additional Requirements. The site for projects not classified with general applicability listed in Section 5707(b)of this Ordinance, but resulting in the creation or addition or replacement of 800 square feet or more of impervious surface area shall be designed to control pollutants, pollutant loads, and runoff volume as approved by the city.

SECTION 5707.5 STANDARD URBAN STORM WATER MITIGATION PLAN (SUSMP) – DEVELOPMENT PROJECTS.

(Added by Ord. 1095, adopted 01-23-01; amended by Ord. 1130, adopted 08-27-02; repealed by Ord. 1142, adopted 02-11-03)

SECTION 5708. URBAN RUNOFF REDUCTION REQUIREMENTS.

The following urban runoff reduction requirements shall apply to all persons submitting applications for new development or redevelopment projects within the City of Downey:

(a) New development and redevelopment projects within the City of Downey are required to prepare current condition and post proposed development hydrology studies based on current Los Angeles County Department of Public Works Design Storm and Hydrology methods.

(b) Where proposed development is expected to generate higher peak runoff flows, as compared to that which currently exists, the Director shall require reasonable drainage improvements within the lot, or public right-of-way, to accommodate the potential effect of such additional water flows.

(c) Where such proposed development may affect the existing flow of water, the flow of water in natural drainage courses, or within streets or other public rights-of-way, the Director shall require reasonable drainage improvements within the lot, water course, or public right-of-way, to accommodate the potential effect of such additional water flows.

SECTION 5709. TRANSFER OF PROPERTIES SUBJECT TO BMP MAINTENANCE REQUIREMENTS.

The transfer, sale, deed, or lease of a parcel, which is subject to a requirement for maintenance of structural and treatment control BMPs shall include conditions requiring and assigning the transferee, and its successors, to:

(a) Assume responsibility for maintenance and operation of any existing structural or treatment control BMP to at least MEP standard; or

(b) Replace any degraded structural or treatment control BMP with new control measures or BMPs meeting, the then current, standards of the City.

(c) Conduct BMP maintenance and inspections as required in the approved Low Impact Development (LID) Plan, Urban Runoff Mitigation-Plan, or the LID ordinance.

(d) Insure that all structural or treatment control BMPs are inspected at least yearly and retain proof of such inspections for at least three (3) years.

(e) For conditions, covenants and restrictions for properties which include structural or treatment control BMPs that are to be maintained by a homeowner's association, such conditions, covenants and restrictions shall provide for maintenance of the BMPs by the association.

(f) BMPs that are to be maintained by individual property owners, shall include a written explanation of the maintenance responsibilities with any deed transferring title to said property, as well as being attached to any property conditions, covenants and restrictions.

(g) If property, on which structural or treatment control BMPs are located, is to be dedicated to a governmental agency, the transferor shall remain responsible for the BMPs until the agency provides a signed assumption of responsibility and conformation that they meet agency design standards.

(h) All structural BMPs are required to be properly operated and maintained according to product specifications and site characteristics to maintain effectiveness in reducing the discharge of pollutants. Documentation on operation and maintenance activities shall be retained onsite at all times, and made available upon request by an authorized enforcement officer.

SECTION 5710. ENFORCEMENT.

Persons, and entities, discharging runoff or pollutants are made accountable for their actions through the mechanisms in this Section.

(a) Discharges to the MS4 are required to comply with the provisions and conditions of this Chapter and applicable Federal, State or LARWQCB permits, orders, contracts, model programs, or plans.

(b) Each of the following is hereby determined to be a threat to the public health, safety and welfare, and is declared and deemed a public nuisance, which may be abated or restored by any Authorized Enforcement Officer. A civil or criminal action to abate, enjoin or otherwise compel the cessation of such nuisance may be brought by the City Attorney, pursuant to the City's authority to abate nuisances:

(1) Any condition caused or permitted to exist in violation of any of the provisions of this Chapter; or

(2) Any failure to comply with applicable requirements of an approved LID Plan, Urban Runoff Mitigation Plan, or LID ordinance with respect to a property; or

(3) Any failure to comply with any applicable requirement of a contract to which the City is a party; or

(4) Any failure to comply with any applicable order or notice issued pursuant to this Section; or

(5) Any false certification or verification; or

(6) Any failure to comply with a certification or verification provided by a project applicant or the applicant's successor in interest; or

(7) Any failure to properly operate and maintain any structural or treatment control BMP in accordance with an approved LID Plan, Urban Runoff Mitigation Plan, or LID ordinance.

(c) The cost of nuisance abatement as provided in subsection (b), shall be borne by the property owner from which the discharge originated and the cost shall be assessed to that owner, pursuant to the procedure for cost recovery set forth in Chapter 2 of Article V of the DMC.

(d) If any violation of this Chapter constitutes a seasonal or recurrent nuisance, the Director shall so declare. The failure of any person to take appropriate annual precautions to prevent such pollution, after written notice of a determination under this subsection, shall constitute a public nuisance and a violation of this Chapter.

(e) Causing, permitting, aiding, abetting, or concealing a violation of any provision of this Chapter shall constitute a violation of this Chapter.

(f) In addition to other remedies in this Section, violations of this Chapter may be enforced by civil action brought by the City. During such action, the City many seek, as appropriate, any or all of the following remedies:

(1) A temporary or permanent injunction;

(2) Assessment upon the owner or violator of any investigation, inspection, or monitoring costs, which led to the establishment of the violation, and for the reasonable costs of preparing and bringing legal action under this subsection;

(3) Costs incurred in removing, correcting, or terminating the adverse effects resulting from violation;

(4) Compensatory damages for loss or destruction to water quality, wildlife, fish and aquatic life.

(g) When an Authorized Enforcement Officer finds that a discharge has taken or may take place in violation of this Chapter, the officer may issue an order to cease and desist said practice or operation causing, or likely to cause, such discharge. The Authorized Enforcement Officer may then direct that those persons not complying shall:

(1) Comply with the requirement;

(2) Comply with a time schedule for compliance, and

(3) Take appropriate remedial or preventive action to prevent the violation from recurring.

(h) Whenever an Authorized Enforcement Officer finds any pollutant upon any right of way, land, or ground adjoining an adjacent parcel, the officer may give notice to the owner of the adjacent property to remove such pollutant in any reasonable manner. The recipient of such notice shall undertake the activities as described in the notice.

(i) Violation of this Chapter shall be punishable as a misdemeanor as provided in Chapter 2 of Article 1 of this Code. Each day that a violation continues shall constitute a separate offense.

(j) To the extent the City makes compliance with this Chapter, or any provision of this Chapter, a condition of approval to the issuance of a permit or license, any person in violation of such condition is subject to the permit revocation procedures set forth elsewhere in this Code.

(k) Remedies contained within this Chapter are in addition to, and do not supersede or limit, any and all other remedies, whether they be civil or criminal. The remedies provided for in this Chapter shall be cumulative and not exclusive.

(l) Whenever necessary, interagency coordination will be employed to enforce the provisions of this chapter.

SECTION 5711. INSPECTIONS, SEARCHES, AND REPORT ACCESS.

Whenever necessary to make an inspection to enforce any provisions of this Chapter, an Authorized Enforcement Officer may enter any property in the City of Downey in a manner authorized by State law. The inspection authority pursuant to this Section shall include the authority to enter, sample, inspect, review records, copy records, and require regular reports from industrial, commercial and construction facilities and sites, with the potential to discharge pollution to the MS4.

SECTION 5712. FEES.

The City Council may establish fees for the services provided under this Chapter and such fees may be adjusted from time to time by City Council Resolution.

SECTION 2. The City Council finds, pursuant to State CEQA Guidelines Section 15378(a), that this Ordinance is exempt from the requirements of the California Environmental Quality Act (CEQA) in that it is not a "Project" as defined by CEQA. This Ordinance is further exempt from environmental review pursuant to the "general rule" at State CEQA Guidelines Section 15061(b)(3) because it can be seen with certainty that there is no possibility that it may have a significant effect on the environment.

SECTION 3. If any section, subsection, paragraph, sentence, clause or phrase of this Ordinance is declared by a court of competent jurisdiction to be unconstitutional or otherwise invalid, such decision shall not affect the validity of the remaining portions of this Ordinance. The City Council declares that it would have adopted this Ordinance, and each section, subsection, sentence, clause, phrase or portion thereof, irrespective of the fact that any one or more sections, subsections, phrases, or portions be declared invalid or unconstitutional.

SECTION 4. The City Clerk shall certify to the adoption of this Ordinance and cause the same to be published and posted in the manner required by law.

APPROVED AND ADOPTED this 22nd day of April, 2014.

FERNANDO VASQUEZ, Mayor

ATTEST:

ADRIA M. JIMENEZ, CMC
City Clerk

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES) ss.
CITY OF DOWNEY)

I HEREBY CERTIFY that the foregoing Ordinance No. 14 -1330 was introduced at a Regular Meeting of the City Council of the City of Downey held on the 8th day of April, 2014 and adopted at a Regular Meeting of the City Council of the City of Downey held on the 22nd day of April, 2014 by the following vote, to wit:

AYES:	Council Members:	Guerra, Saab, Marquez, Mayor Vasquez
NOES:	Council Member:	None
ABSENT:	Council Member:	None
ABSTAIN:	Council Member:	Brossmer.

I FURTHER CERTIFY that a Summary of the foregoing Ordinance No. 14 -1330, was published in a newspaper of general circulation in the City of Downey, on April 10, 2014 (after introduction), and on April 24, 2014 (after adoption, including the vote thereon). It was also posted in the regular posting places in the City of Downey on the same dates.

ADRIA M. JIMENEZ, CMC
City Clerk

RESOLUTION NO. 2013-50

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LAKEWOOD ADOPTING A GREEN STREETS POLICY

WHEREAS, the Municipal Separate Storm Sewer System (MS4) Permit (Order No. R-2012-0175) was adopted by the California Regional Water Quality Control Board, Los Angeles Region on November 8, 2012. Municipalities electing to prepare a Watershed Management Program under this Permit are required to demonstrate that Green Streets Policies are in place that specify the use of green street strategies for transportation corridors.; and

WHEREAS, Green Streets are enhancements to street and road projects to improve the quality of storm water and urban runoff through the implementation of infiltration, bio-treatment, xeriscaping parkways and tree lined streets.; and

WHEREAS, the City initiated the development of a Green Streets Policy and a corresponding Green Streets Manual prior to February 26, 2013.

THE CITY COUNCIL OF THE CITY OF LAKEWOOD DOES HEREBY RESOLVE AS FOLLOWS:

SECTION 1. The City Council of the City of Lakewood, hereby adopts the Green Street Policy as required by the Municipal Separate Storm Sewer System (MS4) Permit (Order No. R-2012-0175) and as set forth in the City of Lakewood's Green Streets Manual.

SECTION 1. The Director of Public Works is hereby directed to implement the Green Streets policy for transportation corridors as described in the City of Lakewood's Green Streets Manual. Routine maintenance, including but not limited to: slurry seals, grind and overlay, and reconstruction to maintain original line grade, are excluded from the Green Streets Policy.

SECTION 2. The Director of Public Works is authorized to modify the City of Lakewood's Green Streets Manual from time to time to maintain consistency with the latest MS4 permit and developments in technology.

ADOPTED AND APPROVED THIS 8TH DAY OF OCTOBER, 2013.

Mayor

ATTEST:

City Clerk

ORDINANCE NO. 2013-7

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF LAKEWOOD, CALIFORNIA, AMENDING THE LAKEWOOD MUNICIPAL CODE PERTAINING TO LOW IMPACT DEVELOPMENT

THE CITY COUNCIL OF THE CITY OF LAKEWOOD DOES FIND AND ORDAIN AS FOLLOWS:

SECTION 1. FINDINGS.

A. The City of Lakewood is authorized by Article XI, §5 and §7 of the State Constitution to exercise the police power of the State by adopting regulations to promote public health, public safety and general prosperity.

B. The City of Lakewood has authority under the California Water Code to adopt and enforce ordinances imposing conditions, restrictions and limitations with respect to any activity which might degrade the quality of waters of the State.

C. The City is a permittee under the "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4," issued by the California Regional Water Quality Control Board-Los Angeles Region," (Order No. R4-2012-0175) which also serves as a National Pollutant Discharge Elimination System (NPDES) Permit under the Federal Clean Water Act (NPDES No. CAS004001), as well as Waste Discharge Requirements under California law (the "Municipal NPDES permit"). In order to participate in a Watershed Management Program and/or Enhanced Watershed Management Program, the Municipal NPDES permit requires permittees to develop and implement a Low Impact Development (LID) Ordinance.

D. The City of Lakewood is committed to a stormwater management program that protects water quality and water supply by employing watershed-based approaches that balance environmental, social, and economic considerations.

E. Urbanization has led to increased impervious surface areas resulting in increased water runoff and less percolation to groundwater aquifers causing the transport of pollutants to downstream receiving waters.

F. The City of Lakewood needs to take a new approach to managing rainwater and urban runoff while mitigating the negative impacts of development and urbanization.

G. LID is widely recognized as a sensible approach to managing the quantity and quality of stormwater runoff by setting standards and practices to maintain or restore the natural hydrologic character of a development site, reduce off-site runoff, improve water quality, and provide groundwater recharge.

H. It is the intent of the City of Lakewood to replace the existing Standard Urban Stormwater Mitigation Plan (SUSMP) requirements by providing stormwater and rainwater LID strategies for Development and Redevelopment projects as defined under "Applicability." Where there are conflicts between this Ordinance and previously adopted SUSMP and/or LID standards, the standards in this Ordinance shall prevail.

I. The proposed LID Ordinance qualifies for a Class 8 California Exemption under the provisions of the California Environmental Quality Act (CEQA) Section 15308. Class 8 exempts actions taken by regulatory agencies as authorized by State or local ordinance to assure the maintenance, restoration, enhancement or protection of the environment where the regulatory process involves procedures for protection of the environment.

SECTION 2. Chapter 8 of Article V of the Lakewood Municipal Code pertaining to Stormwater and Runoff Pollution Control is hereby amended to repeal and delete Sections 5810 through 5832 and to add Section 5802 to read as follows:

5802. LOW IMPACT DEVELOPMENT. Provisions regarding the requirements for stormwater controls on private property are specified in Section 9379 et. seq. of the Lakewood Municipal Code.

SECTION 3. LOW IMPACT DEVELOPMENT ORDINANCE. Part 7 of Chapter 3 of Article IX of the Lakewood Municipal Code pertaining to General Provisions Relating to Uses is hereby amended by adding the following:

9379. LOW IMPACT DEVELOPMENT - DEFINITIONS.
For the purposes of this Section, the following definitions apply:

A. AUTOMOTIVE SERVICE FACILITY. Automotive Service Facility means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5541, 5511, provided that these facilities have no outside activities or materials that may be exposed to stormwater (Source: Order No. R4-2012-0175).

B. BASIN PLAN. Basin Plan means the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments (Source: Order No. R4-2012-0175).

C. BEST MANAGEMENT PRACTICE (BMP). BMP means practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters, or designed to reduce the volume of stormwater or non-stormwater discharged to the receiving water (Source: Order No. R4-2012-0175).

D. BIOFILTRATION. Biofiltration means a LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important

factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this Ordinance is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales (Modified from: Order No. R4-2012-0175).

E. BIORETENTION. Bioretention means a LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in the Municipal NPDES permit, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is designed or constructed with an underdrain it is regulated by the Municipal NPDES permit as biofiltration (Modified from: Order No. R4-2012-0175).

F. BIOSWALE. Bioswale means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes (Source: Order No. R4-2012-0175).

G. CITY. City means the City of Lakewood.

H. CLEAN WATER ACT (CWA). CWA means the Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

I. COMMERCIAL DEVELOPMENT. Commercial Development means any development on private land that is not heavy industrial or residential. The category includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities; mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes (Order No. R4-2012-0175).

J. COMMERCIAL MALLS. Commercial Malls means any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers (Source: Order No. R4-2012-0175).

K. CONSTRUCTION ACTIVITY. Construction Activity means any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that result in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and

restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See "Routine Maintenance" definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan (Source: Order No. R4-2012-0175).

L. CONTROL. Control means to minimize, reduce or eliminate by technological, legal, contractual, or other means, the discharge of pollutants from an activity or activities (Source: Order No. R4-2012-0175).

M. DEVELOPMENT. Development means construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail, and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

N. DIRECTLY ADJACENT. Directly Adjacent means situated within 200 feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area (Source: Order No. R4-2012-0175).

O. DISCHARGE. Discharge means any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

P. DISTRUBED AREA. Disturbed Area means an area that is altered as a result of clearing, grading, and/or excavation (Source: Order No. R4-2012-0175).

Q. FLOW-THROUGH BMPS. Flow-through BMPs means modular, vault type "high flow biotreatment" devices contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain (Modified from: Order No. R4-2012-0175).

R. FULL CAPTURE SYSTEM. Full Capture System means any single device or series of devices, certified by the Executive Officer, that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate Q resulting from a one-year, one-hour storm in the sub-drainage area (Order No. R4-2012-0175).

S. GENERAL CONSTRUCTION ACTIVITIES STORM WATER PERMIT (GCASP). GCASP means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from construction activities under certain conditions.

T. GENERAL INDUSTRIAL ACTIVITIES STORM WATER PERMIT (GIASP) GIASP means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from certain industrial activities under certain conditions.

U. GREEN ROOF. Green Roof means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain (Source: Order No. R4-2012-0175).

V. HAZARDOUS MATERIAL(S). Hazardous Material(s) means any material(s) defined as hazardous by Division 20, Chapter 6.95 of the California Health and Safety Code.

W. HILLSIDE. Hillside means a property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes (Source: Order No. R4-2012-0175).

X. IMPREVIOUS SURFACE. Impervious Surface means any man-made or modified surface that prevents or significantly reduces the entry of water into the underlying soil, resulting in runoff from the surface in greater quantities and/or at an increased rate, when compared to natural conditions prior to development. Examples of places that commonly exhibit impervious surfaces include parking lots, driveways, roadways, storage areas, and rooftops. The imperviousness of these areas commonly results from paving, compacted gravel, compacted earth, and oiled earth.

Y. INDUSTRIAL/COMMERCIAL FACILITY. Industrial/Commercial Facility means any facility involved and/or used in the production, manufacture, storage, transportation, distribution, exchange or sale of goods and/or commodities, and any facility involved and/or used in providing professional and non-professional services. This category of facilities includes, but is not limited to, any facility defined by either the Standard Industrial Classifications (SIC) or the North American Industry Classification System (NAICS). Facility ownership (federal, state, municipal, private) and profit motive of the facility are not factors in this definition (Order No. R4-2012-0175).

Z. INDUSTRIAL PARK. Industrial Park means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry (Source: Order No. R4-2012-0175).

AA. INFILTRATION BMP. Infiltration BMP means a LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended

onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement (Source: Order No. R4-2012-0175).

BB. LOW IMPACT DEVELOPMENT (LID). LID consists of building and landscape features designed to retain or filter stormwater runoff (Source: Order No. R4-2012-0175).

CC. MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4). The MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

1. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
2. Designed or used for collecting or conveying stormwater;
3. Which is not a combined sewer; and
4. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2. (40 CFR § 122.26(b)(8)) (Source: Order No. R4-2012-0175)

DD. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). NPDES means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA §307, 402, 318, and 405. The term includes an "approved program" (Source: Order No. R4-2012-0175).

EE. NATURAL DRAINAGE SYSTEM. Natural Drainage System means a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system (Source: Order No. R4-2012-0175).

FF. NEW DEVELOPMENT. New Development means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision (Source: Order No. R4-2012-0175).

GG. NON-STORMWATER DISCHARGE. Non-Stormwater Discharge means any discharge to a municipal storm drain system that is not composed entirely of stormwater (Source: Order No. R4-2012-0175).

HH. OUTFALL. Outfall means a point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances with connect segments of the same stream or other waters of the United Sates and are used to convey waters of the United States. (40 CFR Section 122.26(b)(9)) (Order No. R4-2012-0175).

II. PARKING LOT. Parking Lot means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces (Source: Order No. R4-2012-0175).

JJ. PERSON. Person means any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, state, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine and the singular shall include the plural where indicated by the context.

KK. PLANNING PRIORITY PROJECTS. Planning Priority Projects means development projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s) (Modified from: Order No. R4-2012-0175).

LL. POLLUTANT. Pollutant means any "pollutant" defined in Section 502(6) of the Federal Clean Water Act or incorporated into the California Water Code Sec. 13373. Pollutants may include, but are not limited to the following:

1. Commercial and industrial waste (such as fuels, solvents, detergents, plastic pellets, hazardous substances, fertilizers, pesticides, slag, ash, and sludge).

2. Metals (such as cadmium, lead, zinc, copper, silver, nickel, chromium, and non- metals such as phosphorus and arsenic).

3. Petroleum hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants, and grease).

4. Excessive eroded soil, sediment, and particulate materials in amounts that may adversely affect the beneficial use of the receiving waters, flora, or fauna of the State.

5. Animal wastes (such as discharge from confinement facilities, kennels, pens, recreational facilities, stables, and show facilities).

6. Substances having characteristics such as pH less than 6 or greater than 9, or unusual coloration or turbidity, or excessive levels of fecal coliform, or fecal streptococcus, or enterococcus.

MM. PROJECT. Project means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code §21065) (Source: Order No. R4-2012-0175).

NN. RAINFALL HARVEST AND USE. Rainfall Harvest and Use means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department (Source: Order No. R4-2012-0175).

OO. RECEIVEING WATER. Receiving Water means "water of the United States" into which waste and/or pollutants are or may be discharged (Source: Order No. R4-2012-0175).

PP. REDEVELOPMENT. Redevelopment means land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety (Source: Order No. R4-2012-0175).

QQ. REGIONAL BOARD. Regional Board means the California Regional Water Quality Control Board, Los Angeles Region.

RR. RESTAURANT. Restaurant means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812) (Source: Order No. R4-2012-0175).

SS. RETAIL GASOLINE OUTLET. Retail Gasoline Outlet means any facility engaged in selling gasoline and lubricating oils (Source: Order No. R4-2012-0175).

TT. ROUTINE MAINTENANCE. Routine Maintenance projects include, but are not limited to projects conducted to:

1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.
2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.
3. Includes road shoulder work, regrading dirt or gravel roadways and shoulders and performing ditch cleanouts.
4. Update existing lines[1] and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
5. Repair leaks

Routine maintenance does not include construction of new[2] lines or facilities resulting from compliance with applicable codes, standards and regulations.

UU. SIGNIFICANT ECOLOGICAL AREAS (SEAs). SEAs means an area that is determined to possess an example of biotic resources that cumulatively represent

[1] Update existing lines includes replacing existing lines with new materials or pipes.

[2] New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines (Source: Order No. R4-2012-0175).

biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan. Areas are designated as SEAs, if they possess one or more of the following criteria:

1. The habitat of rare, endangered, and threatened plant and animal species.
2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.
3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.
4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.
5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.
6. Areas important as game species habitat or as fisheries.
7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.
8. Special areas (Source: Order No. R4-2012-0175).

VV. SITE. Site means land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity (Source: Order No. R4-2012-0175).

WW. STORM DRAIN SYSTEM. Storm Drain System means any facilities or any part of those facilities, including streets, gutters, conduits, natural or artificial drains, channels, and watercourses that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the City of Lakewood.

XX. STORM WATER OR STORMWATER. Storm Water or Stormwater means water that originates from atmospheric moisture (rain or snow) and that falls onto land, water, or other surfaces. Without any change in its meaning, this term may be spelled or written as one word or two separate words.

YY. STORMWATER RUNOFF. Stormwater Runoff means that part of precipitation (rainfall or snowmelt) which travels across a surface to the storm drain system or receiving waters.

ZZ. SUSMP. SUSMP means the Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP was required as part of the previous Municipal NPDES Permit (Order No. 01-182, NPDES No. CAS004001) and required plans that designate best management practices (BMPs) that must be used in specified categories of development projects.

AAA. URBAN RUNOFF. Urban Runoff means surface water flow produced by storm and non-storm events. Non-storm events include flow from residential, commercial, or industrial activities involving the use of potable and non-potable water.

9379.1. STORMWATER POLLUTION CONTROL MEASURES FOR DEVELOPMENT PLANNING AND CONSTRUCTION ACTIVITIES

A. OBJECTIVE. The provisions of this Section establish requirements for construction activities and facility operations of Development and Redevelopment projects to comply with the current "Order No. R4-2012-0175," lessen the water quality impacts of development by using smart growth practices, and integrate LID practices and standards for stormwater pollution mitigation through means of infiltration, evapotranspiration, biofiltration, and rainfall harvest and use. LID shall be inclusive of new development and/or redevelopment requirements.

B. SCOPE. This Section contains requirements for stormwater pollution control measures in Development and Redevelopment projects and authorizes the City of Lakewood to further define and adopt stormwater pollution control measures, develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies, grant waivers from the requirements of the LID requirements, and collect funds for projects that are granted waivers. Except as otherwise provided herein, the City of Lakewood shall administer, implement and enforce the provisions of this Section.

C. APPLICABILITY. The following Development and Redevelopment projects, termed "Planning Priority Projects," shall comply with the requirements of Article IX, Section 9379 et seq. The design of any required BMP's shall be subject to plan check by Building and Safety prior to the issuance of building permits for the project.

1. **Development Projects.**

(a) All development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.

(b) Industrial parks 10,000 square feet or more of impervious surface area.

(c) Commercial malls 10,000 square feet or more of impervious surface area.

(d) Retail gasoline outlets with 5,000 square feet or more of impervious surface area.

(e) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of impervious surface area.

(f) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.

(g) Streets and roads construction of 10,000 square feet or more of impervious surface area.

(h) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area.

(i) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will:

1) Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and

2) Create 2,500 square feet or more of impervious surface area.

(j) New single-family dwelling and accessory structures are exempt from the Development Project requirements, as are any projects approved subject to a previously approved Vesting Tentative Map.

2. Redevelopment Projects.

(a) Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on Planning Priority Project categories.

(b) Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.

(c) Where redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

(d) Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety.

(e) Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity.

(f) Redevelopment does not include the repaving of existing roads to maintain original line and grade.

(g) Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements.

D. STORMWATER POLLUTION CONTROL REQUIREMENTS. The Site for every Planning Priority Project shall be designed in conformance with the City of Lakewood's "Low Impact Development (LID) Best Management Practices (BMP) Design Manual" to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use.

1. Street and road construction of 10,000 square feet or more of impervious surface shall follow the "City of Lakewood's Green Street Policy and Guidelines".

2. The remainder of Planning Priority Projects shall prepare a LID Plan to comply with the following:

(a) Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

(1) The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or

(2) The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

(b) Minimize hydromodification impacts to natural drainage systems as defined in order NO. R4-2012-0175.

(c) When, as determined by the Approving Agency, 100 percent onsite retention of the SWQDv is technically infeasible, partially or fully, the infeasibility shall be demonstrated in the submitted LID Plan. The technical infeasibility may result from conditions that may include, but are not limited to:

(1) The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite;

(2) Locations where seasonal high groundwater is within five to ten feet of surface grade;

(3) Locations within 100 feet of a groundwater well used for drinking water;

(4) Brownfield development sites or other locations where pollutant mobilization is a documented concern;

(5) Locations with potential geotechnical hazards;

(6) Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

(d) If partial or complete onsite retention is technically infeasible, the project Site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in the Municipal NPDES Permit.

(1) Additional alternative compliance options such as offsite infiltration may be available to the project Site.

(2) The project Site should contact the Approving Agency to determine eligibility. Alternative compliance options are further specified in CASQA's Post-Construction BMP Handbook.

(e) The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per the Municipal NPDES Permit. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

(1) 0.2 inches per hour, or

(2) The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

(f) A Multi-Phased Project may comply with the standards and requirements of this section for all of its phases by:

(1) Designing a system acceptable to the Approving Agency to satisfy these standards and requirements for the entire Site during the first phase, and

(2) Implementing these standards and requirements for each phase of Development or Redevelopment of the Site during the first phase or prior to commencement of construction of a later phase, to the extent necessary to treat the stormwater from such later phase. For purposes of this section, "Multi-Phased Project" shall mean any Planning Priority Project implemented over more than one phase and the Site of a Multi-Phased Project shall include any land and water area designed and used to store, treat

or manage stormwater runoff in connection with the Development or Redevelopment, including any tracts, lots, or parcels of real property, whether Developed or not, associated with, functionally connected to, or under common ownership or control with such Development or Redevelopment.

E. BIENNIAL STORMWATER FACILITY PERMIT AND INSPECTION. Each Planning Priority Project shall obtain and maintain a valid Biennial Stormwater Facility Permit issued by the Lakewood Public Works Department.

1. The Biennial Stormwater Facility Permit shall be obtained prior to clearance of the building permit final inspection.
2. Once every two years, or more often as need, an inspection shall be conducted to confirm that the BMP's are being maintained and are operating properly.
3. The property owner shall correct any deficiency in the BMP's within 14 days of a notice of maintenance failure or other deficiency.
4. The property owner shall pay the appropriate fees as established by separate resolution for the biennial permits and/or any special BMP inspections required for enforcement of the provisions of this Section.

F. COVENANT AND AGREEMENT. The property owner of each Planning Priority Project shall record with the County Recorder a "Covenant And Agreement Regarding On-site LID BMP Maintenance", to the satisfaction of the Public Works Director and prior to the clearance of the building permit final inspection, issuance of an occupancy permit or operation of the approved land use on the subject property.

1. The transfer or lease of a property subject to maintenance requirements for LID BMPs shall include conditions requiring the transferee and its successors and assigns to either:

(a) Assume responsibility for maintenance of any existing LID BMP, or

(b) Replace an existing LID BMP with new control measures or BMPs meeting the then current standards of the City and MS4 Permit.

(c) Such requirement shall be included in any sale or lease agreement or deed for such property.

2. The condition of transfer shall include a provision that the successor property owner or lessee conduct maintenance inspections of all LID BMPs at least once every two years and retain proof of inspection

SECTION 4. OTHER AGENCIES OF THE CITY. All City departments, offices, entities and agencies, shall establish administrative procedures necessary to implement the provisions of this Article on their development projects and report their activities annually to the Public Works Department.

SECTION 5. SEVERABLITY. The City Council hereby declares it would have passed this Ordinance sentence by sentence, paragraph by paragraph and section by section, and does hereby declare the provisions of this Ordinance are severable, and if for any reason any section of this Ordinance should be held invalid, such decision shall not affect the validity of the remaining parts of this Ordinance.

SECTION 6. The City Clerk shall certify to the adoption of this Ordinance. The City Council hereby finds and determines there are no newspapers of general circulation both published and circulated within the City and, in compliance with Section 36933 of the Government Code, directs the City Clerk to cause said Ordinance within fifteen (15) days after its passage to be posted in at least three (3) public places within the City as established by ordinance.

SECTION 7. This Ordinance shall become effective thirty (30) calendar days from and after its adoption.

ADOPTED AND APPROVED THIS 12TH DAY OF NOVEMBER, 2013, BY THE FOLLOWING ROLL CALL VOTE:

	AYES	NAYS	ABSENT
Council Member Rogers	X		
Council Member Piazza	X		
Council Member DuBois	X		
Council Member Wood	X		
Mayor Croft	X		

Mayor

ATTEST:

City Clerk

I, DENISE R. HAYWARD, do hereby certify that I am the City Clerk of the City of Lakewood, and the foregoing Ordinance was adopted and approved by the City Council of the City of Lakewood voting for and against the Ordinance as above set forth at a regular meeting thereof on the 12th day of November, 2013.

City Clerk

ORDINANCE NO. ORD-13-0024

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF LONG BEACH AMENDING THE LONG BEACH MUNICIPAL CODE BY AMENDING AND RESTATING TITLE 18 IN ITS ENTIRETY; AND BY REPEALING CHAPTER 21.65, ALL RELATING TO THE ADOPTION AND AMENDMENTS TO THE 2013 EDITION OF THE CALIFORNIA BUILDING STANDARDS CODES AND THE 1997 EDITION OF THE UNIFORM HOUSING CODE TO BE KNOWN AS THE LONG BEACH BUILDING STANDARDS CODE

The City Council of the City of Long Beach ordains as follows:

Section 1. Title 18 of the Long Beach Municipal Code is hereby amended in its entirety and restated as shown on Exhibit "A", which is attached hereto and incorporated herein by this reference as if set forth in full.

Section 2. Chapter 21.65 of the Long Beach Municipal Code is hereby repealed.

Section 3. The City Clerk shall certify to the passage of this ordinance by the City Council and cause it to be posted in three (3) conspicuous places in the City of Long Beach, and it shall take effect on the thirty-first (31st) day after it is approved by the Mayor, but in no event prior to January 1, 2014, with the exception that the "Low Impact Development Standards" codified in Chapter 18.74 shall become effective in accordance with Long Beach City Charter Section 210; and that the provisions of Chapter 18.76 relating to "Water Submeters" shall not become effective unless and until the City Council considers the adoption of "Consumer Protection Standards" relating to water

OFFICE OF THE CITY ATTORNEY
CHARLES PARKIN, City Attorney
333 West Ocean Boulevard, 11th Floor
Long Beach, CA 90802-4664

MJM:kjm A13-01772 10/22/13; 11/6/13
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RB-AR11197

submetering.

I hereby certify that the foregoing ordinance was adopted by the City Council of the City of Long Beach at its meeting of November 12, 2013 by the following vote:

Ayes: Councilmembers: Lowenthal, DeLong, O'Donnell, Andrews, Johnson, Austin, Neal.

Noes: Councilmembers: None.

Absent: Councilmembers: Garcia, Schipske.

City Clerk

Approved: 11/14/13
(Date)

Mayor

OFFICE OF THE CITY ATTORNEY
CHARLES PARKIN, City Attorney
333 West Ocean Boulevard, 11th Floor
Long Beach, CA 90802-4664

MJM:kjm A13-01772 10/22/13; 11/6/13
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CHAPTER 18.74 LOW IMPACT DEVELOPMENT STANDARDS

18.74.010 – Purpose.
18.74.020 – Definitions.
18.74.030 – LID requirements and applicability.
18.74.040 – LID plan review.
18.74.050 – LID plan review, permit and Offsite Runoff Mitigation fees.
18.74.060 – LID Best Management Practices Manual.
18.74.070 – Hardship determination.

RB-AR11199

CHAPTER 18.74
LOW IMPACT DEVELOPMENT STANDARDS

18.74.010 – Purpose.

The purpose of this chapter is to require the use of low impact development (LID) standards in the planning and construction of development projects. LID standards promote the goal of environmental sustainability by helping improve the quality of receiving waters, protecting the Los Angeles and San Gabriel River watersheds, maintaining natural drainage paths, and protecting potable water supplies within the City. The LID objective of controlling and maintaining flow rate is addressed through land development and stormwater management techniques that imitate the natural hydrology (or movement of water) found on the site. Using site design and best management practices that allow for storage and retention, infiltration, filtering, and flowrate adjustments achieve the goals of LID, advances sustainability and reduces the overall cost of stormwater management. The use of engineered systems, structural devices, and vegetated natural designs distributes stormwater and urban runoff across a development site maximizing the effectiveness of LID.

18.74.020 – Definitions.

"Brownfield" means a piece of industrial or commercial property that is abandoned or underused and often environmentally contaminated, especially one considered as a potential site for redevelopment.

"Development" means any constructionto build any new public or private residential projects (whether single-family, multi unit or planned unit development); new industrial, commercial, retail and other non-residential projects, including public agency projects; new impervious surface area; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

"LID Best Management Practices Manual" means a manual of LID standards and practices for stormwater pollution mitigation, including technical feasibility and implementation parameters, alternative compliance for technical infeasibility, as well as other rules, requirements and procedures as the City deems necessary, for implementing the provisions of this section of the Long Beach Municipal Code.

"Multi-Phased Project" shall mean any Development or Redevelopment implemented over more than one phase and the Site of a Multi-Phased Project shall include any land and water area designed and being used to store, treat or manage stormwater runoff in connection with the Development or Redevelopment, including any tracts, lots, or parcels of real property, whether Developed or not, associated with, functionally connected to, or under common ownership or control with such Development or Redevelopment.

"Offsite Runoff Mitigation Fee" means fee paid to the City for the management of storm water runoff generated from the 0.75-inch water quality storm in excess of the storm water runoff that is infiltrated, evapotranspired and/or stored for use. The Offsite Runoff Mitigation Fee shall be used by the City to construct or apply towards the construction of an offsite mitigation project within the same sub-watershed that will achieve at least the same level of water quality protection as if all of the runoff was retained on site.

"Redevelopment" means land-disturbing activities that result in the replacement of more than fifty percent (50%) of an existing building, structure or impervious surface area on an already developed site. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety or grinding/overlaying and replacement of existing parking lots.

"Site" means the land or water area where any "facility or activity" is physically located or conducted,

including adjacent land use in connection with the facility or activity.

18.74.030 – LID requirements and applicability.

A. The provisions of this section set forth the requirements for and shall apply to all new Development and Redevelopment projects in the City of Long Beach. The following Development or Redevelopment projects are exempt from the requirements of this chapter:

1. Any Development or Redevelopment projects that creates, adds or replaces less than five hundred (500) square feet of impervious surface area;

2. Any Development or Redevelopment projects involving emergency construction activities required to immediately protect public health and safety;

3. Any Development or Redevelopment projects involving the grinding/overlaying and replacement of existing parking lots;

4. Any Development or Redevelopment projects where land disturbing activities result in the replacement of fifty percent (50%) or less of an existing building, structure or impervious surface area; or

5. Any Development or Redevelopment projects that are technically infeasible pursuant to Subsection 18.74.040.B; or

6. Any Development or Redevelopment projects that do not require a building permit.

B. LID requirements for new Development or Redevelopment projects:

1. Residential Development of 4 units or less

a. For new Development less than one (1) acre, or if Redevelopment alters more than fifty percent (50%) of existing buildings, structures or impervious surfaces of an existing developed site, comply with the standards and requirements of this chapter and implement at least two (2) adequately sized LID BMP alternatives from the LID Best Management Practices Manual.

b. For new Development that is one (1) acre and greater, the entire Site shall comply with the standards and requirements of this chapter and the LID Best Management Practices Manual.

2. Residential Developments of 5 units or more and nonresidential Developments

For new Development, or if Redevelopment alters more than fifty percent (50%) of existing buildings, structures or impervious surfaces of an existing developed site, the entire Site shall comply with the standards and requirements of this chapter and of the LID Best Management Practices Manual.

3. Nonresidential Developments in the Port of Long Beach Harbor District

For new Development or Redevelopment projects located in the Port of Long Beach Harbor District as designated in Title 21 Zoning Regulations, the site shall comply with the LID BMP alternatives set forth in the Port of Long Beach Post-Construction Design Guidance Manual and in the LID Best Management Practices Manual.

C. This chapter shall not apply to those projects for which a building permit application has been filed for and deemed complete by the Building Official prior to February 19, 2013.

18.74.040 – LID plan review.

A. Compliance with the LID standards of this chapter shall be demonstrated through a LID plan review. Permit applicant shall be required to submit a LID plan for review to the Building Official. The LID plan shall demonstrate how the project will meet the standards and requirements of this chapter and of the LID Best Management Practices Manual. A submitted LID plan shall indicate compliance with the following standards:

1. Stormwater runoff will be infiltrated, captured and reused, evapotranspired, and/or treated onsite through stormwater best management practices allowed in the LID Best Management Practices Manual.

2. The onsite stormwater management techniques must be properly sized, at a minimum, to infiltrate, evapotranspire, and/or store for use without any storm water runoff leaving the site to the maximum extent feasible, for at least the volume of water produced by a storm event that results from:

   a. The volume of runoff produced from a 0.75 inch storm event; or

   b. The eighty-fifth (85^{th}) percentile twenty-four (24) hour runoff event determined as the maximized capture stormwater volume for the area using a fourty-eight (48) to seventy-two (72) hour draw down time, from the formula recommended in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998); or

   c. The volume of annual runoff based on unit basin storage water quality volume, to achieve eighty percent (80%) or more volume treatment by the method recommended in the California Stormwater Best Management Practices Handbook – Industrial/Commercial, (2003).

B. When the onsite LID requirements are technically infeasible, the infeasibility shall be demonstrated in the submitted LID plan and shall be reviewed in consultation with the Building Official. The technical infeasibility may result from conditions that may include, but are not limited to:

1. Locations where seasonal high groundwater is within ten (10) feet of surface grade;

2. Locations within one hundred (100) feet of a groundwater well used for drinking water;

3. Brownfield Development sites or other locations where pollutant mobilization is a documented concern;

4. Locations with potential geotechnical hazards; or

5. Locations with impermeable soil type as indicated in applicable soils and geotechnical reports.

C. If complete onsite compliance of any type is technically infeasible, a Development or Redevelopment project shall be required to comply with, at a minimum, all applicable Standard Urban Stormwater Mitigation Plan (SUSMP) requirements of Chapter 18.61 in order to maximize onsite compliance. For the remaining runoff that cannot feasibly be managed onsite, one or a combination of the following shall be required:

1. An Offsite Runoff Mitigation Fee pursuant to Subsection 18.74.050.B shall be paid to the City of Long Beach's Stormwater Pollution Abatement Fund for offsite mitigation, as described in the LID Best Management Practices Manual. The funding will be applied towards the construction of an offsite mitigation project(s) within the same sub-watershed that will achieve

at least the same level of water quality protection as if all of the runoff was retained onsite.

2. To provide an incentive for onsite management of storm water runoff, Development and Redevelopment projects will receive the following reduction in the Offsite Runoff Mitigation Fee based on the percentages of storm water runoff that is managed on site through infiltration, evapotranspiration, and/or capture and use:

Stormwater Runoff Managed Onsite	Fee Reduction
Between 90% and 99%	75%
Between 75% and 89%	50%
Between 50% and 74%	25%

3. A Multi-Phased Project must design a system acceptable to satisfy these standards and requirements for the entire Site during the first phase and will implement these standards and requirements for each phase of Development or Redevelopment projects of the Site during the first phase or prior to commencement of construction of a later phase, to the extent necessary to treat the stormwater from such later phase.

18.74.050 – LID plan review, permit, and Offsite Runoff Mitigation fees.

A. Permit applicants who seeks to engage in new Development or Redevelopment as defined in this chapter by obtaining a building permit shall pay the required plan examination and permit fees as set forth in Chapter 18.06.

B. Permit applicants who seeks to engage in new Development or Redevelopment as defined in this chapter by obtaining a building permit and does not demonstrate complete onsite compliance as described in the LID Best Management Practices Manual are required to pay an Offsite Runoff Mitigation Fee in the manner and amount as set forth in the schedule of fees and charges established by City Council resolution.

C. Any Development or Redevelopment projects that are exempted from this chapter shall have the option to voluntarily opt in and incorporate into the project the LID requirements of this chapter. In such case, the LID plan review, permit and Offsite Runoff Mitigation fees associated with the project shall be waived.

18.74.060 – Best Management Practices Manual.

A. The Building Official shall prepare, maintain, and update, as deemed necessary and appropriate, the LID Best Management Practices Manual to include LID standards and practices and standards for stormwater pollution mitigation. The LID Best Management Practices Manual shall also include technical feasibility and implementation parameters, alternative compliance for technical infeasibility, as well as other rules, requirements and procedures as the City deems necessary, for implementing the provisions of this chapter.

B. The Building Official shall develop, as deemed necessary and appropriate, in cooperation with other City departments and stakeholders, informational bulletins, training manuals and educational materials to assist in the implementation of the LID requirements.

18.74.070 – Hardship determination.

Whenever there are practical difficulties involved in carrying out the provisions of this chapter, the Director shall have the authority to grant modifications to the provisions of this chapter for individual cases, provided the Director shall first find that special individual reason makes the strict letter of this chapter impractical and the modification is in compliance with the intent and purpose of this chapter and that such modification does not lessen the goals of LID, sustainability or increase the overall cost of stormwater management.

RESOLUTION NO. 2014.072

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LYNWOOD ADOPTING A GREEN STREETS POLICY FOR MAJOR TRANSPORTATION CORRIDORS

WHEREAS, the new Municipal Separate Storm Sewer System (MS4) Permit (Order No. R-2012-0175) was adopted by the California Regional Water Quality Control Board, Los Angeles Region on November 8, 2012 and requires development of Watershed Management Programs (WMPs) or Enhanced Watershed Management Programs (EWMPs) for each watershed that an agency lies in among other requirements; and

WHEREAS, municipalities electing to prepare a WMP or an EWMP under this Permit are required to demonstrate that Green Street policies are in place that specify the use of green street strategies for transportation corridors; and

WHEREAS, Green Streets are enhancements to street and road projects to improve the quality of storm water and urban runoff through the implementation of infiltration measures such as bioretention and infiltration trenches and dry wells; bio-treatment/infiltration measures such flow-through planters and vegetated swales; treatment Best Management Practices (BMPs) such as catch basin filters and screens; and implementing and maintaining xeriscaped parkways and tree lined streets; and

WHEREAS, Prior to February 26, 2013, the development of a draft Green Street Policy had been initiated by the Gateway Water Management Authority of which Lynwood is a participating member; and

WHEREAS, The City of Lynwood is participating in one watershed group, Lower Los Angeles River which has elected to prepare a WMP.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF LYNWOOD DOES HEREBY RESOLVE, DECLARE, DETERMINE AND ORDER AS FOLLOWS:

Section 1. That the City Council hereby directs the Director of Public Works to implement Green Streets for transportation corridors as described in the City of Lynwood Green Streets Manual. The City of Lynwood Green Streets Manual is attached hereto. The USEPA's Wet Weather with Green Infrastructure guidance (December 2008 EPA-833-F-08-009) shall be followed to the maximum extent practicable.

Section 2. The Director of Public Works is authorized to make non-substantial modifications the Green Streets Manual to continue to working toward the goals of the MS4 permit and facilitate the use of the manual by the city and contractors.

Section 3. Routine maintenance of roadways and activities including but not limited to: application of seal coats, slurry seals, grind and overlays, and reconstruction to maintain original line and grade are excluded from the Green Streets Policy.

Section 4. The City Clerk shall certify to the adoption of this Resolution.

PASSED, APPROVED and ADOPTED this 6th day of May, 2014.

Aide Castro, Mayo

ATTEST:

Maria Quinonez, City Clerk

APPROVED AS TO FORM:

David A. Garcia, City Attorney

APPROVED AS TO CONTENT:

Sarah M. Withers, City Manager

Emilio Murga, P.E Director
Public Works/ City Engineer

STATE OF CALIFORNIA)
) **SS.**
COUNTY OF LOS ANGELES)

I, the undersigned, City Clerk of the City of Lynwood, do hereby certify that the foregoing Resolution was passed and adopted by the City Council of the City of Lynwood at a regular meeting held on the **6th** day of **May, 2014.**

AYES: **COUNCIL MEMBERS SANTILLAN-BEAS, SOLACHE, HERNANDEZ AND CASTRO**

NOES: **NONE**

ABSENT: **COUNCIL MEMBERS ALATORRE**

ABSTAIN: **NONE**

Maria Quinonez, City Clerk

STATE OF CALIFORNIA)
) **SS.**
COUNTY OF LOS ANGELES)

I, the undersigned, City Clerk of the City of Lynwood, and the Clerk of the City Council of said City, do hereby certify that the above foregoing is a full, true and correct copy of Resolution No. **2014.072** on file in my office and that said Resolution was adopted on the date and by the vote therein stated. Dated this **6th** day of **May, 2014**.

Maria Quinonez, City Clerk

ORDINANCE NO. 1671

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF LYNWOOD, AMENDING CHAPTER 14-13, STANDARD URBAN STORM WATER MITIGATION PLAN FOR STORM WATER POLLUTION CONTROL MEASURES FOR DEVELOPMENT PLANNING AND CONSTRUCTION ACTIVITIES, BY IMPOSING RAINWATER LOW IMPACT DEVELOPMENT (LID) STRATEGIES ON PROJECTS THAT REQUIRE BUILDING, GRADING AND ENCROACHMENT PERMITS

WHEREAS, the City of Lynwood City Council has previously adopted Ordinances 1443, 1500, 1636, and 1650 in response to requirements of prior Municipal Separate Storm Sewer System (MS4 or National Pollutant Discharge Elimination System (NPDES)) Permits; and

WHEREAS, additional changes to the Lynwood Municipal Code will be required to comply with the MS4 Permit requirements (as outlined in the California Regional Water Quality Control Board-Los Angeles Region Order No. R4-2012-0175) including but not limited to, enforcement of restrictive water quality criteria, and new regulations directed at achieving receiving water beneficial use objectives, that the City must anticipate shall be more strictly enforced in the immediate future; and

WHEREAS, the new MS4 Permit includes provisions and measures outlining significant fines and penalties for municipal non-compliance with its requirements; and

WHEREAS, is it the intent of the City to expand the applicability of the existing Low Impact Development (LID) requirements by providing stormwater and urban runoff LID strategies for all projects for Development and Redevelopment projects as defined under "Applicability"; and

WHEREAS, adopting this ordinance reduces potential environmental and public health and safety risks for the residential and business communities of the City of Lynwood; and

WHEREAS, the specified amendments to this chapter of the Lynwood Municipal Code will facilitate compliance with the latest MS4 Permit by the City of Lynwood, its residents and businesses; and

WHEREAS, the specified amendments to this chapter of the Lynwood Municipal Code will result in improved staff efficiency in anticipating and complying with these changing water quality initiatives.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF LYNWOOD DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1. Chapter 14-13 of the Lynwood Municipal Code is hereby amended in its entirety to read as follows:

"Chapter 14-13 – STORM WATER AND URBAN RUNOFF POLLUTION AND CONVEYANCE CONTROLS

14-13.1 Purpose And Intent:

a. The purpose of this chapter is to ensure the future health, safety and general welfare of the citizens of the City and the water quality of the receiving waters of the County of Los Angeles and surrounding coastal areas by:

1. Reducing pollutants in stormwater discharges to the maximum extent practicable;

2. Regulating illicit connections and illicit discharges and reducing the level of contamination of stormwater and urban runoff in the municipal stormwater system; and

3. Regulating non-stormwater discharges to the municipal stormwater system.

b. The intent of this chapter is to protect and enhance the quality of watercourses, water bodies, and wetlands within the City in a manner consistent with the federal Clean Water Act, the California Porter-Cologne Water Quality Control Act and the Municipal NPDES Permit.

c. This chapter is also intended to provide the City with the legal authority necessary to control discharges to and from those portions of the municipal stormwater system over which it has jurisdiction as required by the Municipal NPDES Permit, and fully and timely comply with the terms of the Municipal NPDES Permit while the Watershed Management Program is being developed by the permittees under the Municipal NPDES Permit, and in contemplation of the subsequent amendment of this chapter or adoption by the City of additional provisions of this chapter to implement the subsequently adopted Watershed Management Program, or other programs developed under the Municipal NPDES Permit.

d. This chapter also sets forth requirements for the construction and operation of certain commercial development, new development and redevelopment and other projects (as further defined herein) which are intended to ensure compliance with the stormwater mitigation measures prescribed in the current MS4 Permit This chapter authorizes the Director to define and adopt applicable best management practices and other stormwater pollution control measures, as provided herein, to carry out all inspections including entering entities discharging to the MS4, conduct surveillance, conduct monitoring, cite infractions and to impose fines pursuant to this chapter. Except as otherwise provided herein, the Director shall administer, implement and enforce the provisions of this section.

e. The City Council shall approve and enter into interagency agreements as deemed necessary by the City Council to control the contribution of pollutants of the shared MS4.

14-13.2 Definitions:

Except as specifically provided herein, any term used in this chapter shall be defined as that term is defined in the Municipal NPDES Permit, or if it is not specifically defined in the Municipal NPDES Permit, then as such term is defined in the Federal Clean Water Act, as amended, or the regulations promulgated thereunder. If the definition of any term contained in this section conflicts with the definition of the same term in the Municipal NPDES Permit, then the definition contained in the Municipal NPDES Permit shall govern. The following words and phrases shall have the following meanings when used in this chapter:

"Area susceptible to runoff" means any surface directly exposed to precipitation or in the path of runoff caused by precipitation which path leads off the parcel on which the surface is located.

"Automotive service facilities" means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes. For inspection purposes, Permittees need not inspect facilities with SIC codes 5013, 5014, 5511, 5541, 7532-7534, and 7536-7539 provided that these facilities have no outside activities or materials that may be exposed to stormwater.

"Best Management Practices (BMP)" means practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters, or designed to reduce the volume of stormwater or non-stormwater discharged to the receiving water. Examples of BMPs may include public education and outreach, proper planning of development projects, proper cleaning of catch basin inlets, and proper sludge- or waste-handling and disposal, among others.

"Biofiltration" means a LID BMP that reduces stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration. Incidental infiltration is an important factor in achieving the required pollutant load reduction. Therefore, the term "biofiltration" as used in this chapter is defined to include only systems designed to facilitate incidental infiltration or achieve the equivalent pollutant reduction as biofiltration BMPs with an underdrain (subject to approval by the Regional Board's Executive Officer). Biofiltration BMPs include bioretention systems with an underdrain and bioswales.

"Bioretention" means a LID BMP that reduces stormwater runoff by intercepting rainfall on vegetative canopy, and through evapotranspiration and infiltration. The bioretention system typically includes a minimum 2-foot top layer of a specified soil and compost mixture underlain by a gravel-filled temporary storage pit dug into the in-situ soil. As defined in this Ordinance, a bioretention BMP may be designed with an overflow drain, but may not include an underdrain. When a bioretention BMP is

designed or constructed with an underdrain it is regulated by the Municipal NPDES Permit as biofiltration.

"Bioswale" means a LID BMP consisting of a shallow channel lined with grass or other dense, low-growing vegetation. Bioswales are designed to collect stormwater runoff and to achieve a uniform sheet flow through the dense vegetation for a period of several minutes.

"City" means the City of Lynwood, California.

"Clean Water Act" (CWA) means the Federal Water Pollution Control Act enacted in 1972, by Public Law 92-500, and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless the discharge is in accordance with an NPDES permit.

"Commercial development" means any development on private land that is not heavy industrial or residential. The category includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities, mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes.

"Commercial Malls" means any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers.

"Construction" means any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that result in land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance activities required to maintain the integrity of structures by performing minor repair and restoration work, maintain the original line and grade, hydraulic capacity, or original purposes of the facility. See "Routine Maintenance" definition for further explanation. Where clearing, grading or excavating of underlying soil takes place during a repaving operation, State General Construction Permit coverage by the State of California General Permit for Storm Water Discharges Associated with Industrial Activities or for Stormwater Discharges Associated with Construction Activities is required if more than one acre is disturbed or the activities are part of a larger plan.

"Control" means to minimize, reduce, eliminate, or prohibit by technological, legal, contractual or other means, the discharge of pollutants from an activity or activities.

"Development" means any construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single family, multi-

unit or planned unit development); industrial, commercial, retail and other nonresidential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

"Directly adjacent" means situated within two hundred (200) feet of the contiguous zone required for the continued maintenance, function, and structural stability of the environmentally sensitive area.

"Director" means the City's Director of Public Works or his or her designee.

"Discharge" means when used without qualification the discharge of a pollutant.

"Discharge of a pollutant" means any addition of any pollutant or combination of pollutants to waters of the United States from any point source or, any addition of any pollutant or combination of pollutants to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. The term discharge includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by a state, municipality, or other person which do not lead to treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works.

"Discharging" directly means outflow from a drainage conveyance system that is composed entirely or predominantly of flows from the subject, property, development, subdivision, or industrial facility, and not commingled with the flows from adjacent lands.

"Discretionary project" is defined in the same manner as Section 15357 of the Guidelines for Implementation of the California Environmental Quality Act contained in Title 14 of the California Code of Regulations, as amended, and means a project which requires the exercise of judgment or deliberation when the City decides to approve or disapprove a particular activity, as distinguished from situations where the City merely has to determine whether there has been conformity with applicable statutes, ordinances or regulations.

"Disturbed area" means an area that is altered as a result of clearing, grading, and/or excavation.

"Environmentally Sensitive Area" (ESA) means an area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments (California Public Resources Code § 30107.5). Areas subject to storm water mitigation requirements are areas designated as Significant Ecological Areas by the County of Los Angeles (Los Angeles County Significant Areas Study, Los Angeles County Department of Regional Planning (1976) and amendments);

an area designated as a Significant Natural Area by the California Department of Fish and Games Significant Natural Areas Program, provided that area has been field verified by the Department of Fish and Game; an area listed in the Basin Plan as supporting the Rare, Threatened, or Endangered Species (RARE) beneficial use; and an area identified by the City as environmentally sensitive.

"Flow-through treatment BMPs" means a modular, vault type "high flow biotreatment" devices contained within an impervious vault with an underdrain or designed with an impervious liner and an underdrain.

"Full Capture System" means any single device or series of devices, certified by the Executive Officer, that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate Q resulting from a one-year, one-hour storm in the sub-drainage area.

"Good housekeeping practices" means common practices related to the storage, use or cleanup of materials, performed in a manner that minimizes the discharge of pollutants. Examples include, but are not limited to, purchasing only the quantity of materials to be used at a given time, use of alternative and less environmentally harmful products, cleaning up spills and leaks, and storing materials in a manner that will contain any leaks or spills.

"General Construction Activities Storm Water Permit" (GCASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from construction activities under certain conditions.

"General Industrial Activities Storm Water Permit" (GIASP) means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from certain industrial activities under certain conditions.

"Green Roof" means a LID BMP using planter boxes and vegetation to intercept rainfall on the roof surface. Rainfall is intercepted by vegetation leaves and through evapotranspiration. Green roofs may be designed as either a bioretention BMP or as a biofiltration BMP. To receive credit as a bioretention BMP, the green roof system planting medium shall be of sufficient depth to provide capacity within the pore space volume to contain the design storm depth and may not be designed or constructed with an underdrain.

"Hillside" means property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is twenty-five percent (25%) or greater and where grading contemplates cut or fill slopes.

"Illicit connection" means any human-made conveyance that is connected to the storm drain system without a permit, excluding gutters, roof-drains and other similar connections. Examples include channels, pipelines, conduits, inlets or outlets that are connected directly to the storm drain system.

"Illicit discharge" means any discharge to the storm drain system that is prohibited under local, state or federal statutes, ordinances, codes or regulations. This includes all non-stormwater discharges except discharges pursuant to a separate NPDES permit and discharges that are exempted or conditionally exempted in accordance with Part III the Municipal NPDES permit.

"Industrial/Commercial Facility" means any facility involved and/or used in the production, manufacture, storage, transportation, distribution, exchange or sale of goods and/or commodities, and any facility involved and/or used in providing professional and non-professional services. This category of facilities includes, but is not limited to, any facility defined by either the Standard Industrial Classifications (SIC) or the North American Industry Classification System (NAICS). Facility ownership (federal, state, municipal, private) and profit motive of the facility are not factors in this definition.

"Industrial Park" means land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry.

"Infiltration BMP" means a LID BMP that reduces stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Examples of infiltration BMPs include infiltration basins, dry wells, and pervious pavement.

"Infiltration" means the downward entry of water into the surface of the soil.

"Low Impact Development" (LID) consists of building and landscape features designed to retain or filter stormwater runoff.

"Material" means any substance including, but not limited to: garbage and debris; lawn clippings, leaves, and other vegetation; biological and fecal waste; sediment and sludge; oil and grease; gasoline; paints, solvents, cleaners, and any fluid or solid containing chemicals.

"Municipal NPDES Permit" means the Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles, and the Incorporated Cities Therein, Except the City of Long Beach (Order No. R4-2012-0175), NPDES Permit No. CAS00401, issued by the California Regional Water Quality Control Board—Los Angeles Region, and any successor permit to that permit.

"Municipal Separate Storm Sewer System" (MS4) means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

1. Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;

2. Designed or used for collecting or conveying stormwater;

3. Which is not a combined sewer; and

4. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR Section 122.2.

"New development" means land-disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision.

"Non-stormwater discharge" means any discharge to a municipal stormwater system that is not composed entirely of stormwater.

"NPDES permit" means any waste discharge requirements issued by the Regional Board or the State Water Resources Control Board in the form of an NPDES permit pursuant to Water Code Section 13370 (other than the Municipal NPDES Permit).

"Outfall" means a point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances with connect segments of the same stream or other waters of the United Sates and are used to convey waters of the United States. (40 CFR Section 122.26(b)(9)).

"Parking lot" means land area or a facility for the parking or storage of motor vehicles used for businesses, commerce, industry or personal use with a lot size of five thousand (5,000) square feet or more of surface area, or with twenty-five (25) or more parking spaces.

"Planning priority projects" means those projects specified in Section 14-13.3(c) of this chapter that are required to incorporate appropriate storm water mitigation measures into the design plan for their respective projects.

"Pollutant" means those pollutants defined in Section 502(6) of the federal Clean Water Act (33 U.S.C. Section 1362(6)), or incorporated into California Water Code Section 13373. Examples of pollutants include, but are not limited to the following:

1. Commercial and industrial waste (such as fuels, solvents, detergents, plastic pellets, hazardous substances, fertilizers, pesticides, slag, ash and sludge);

2. Metals such as cadmium, lead, zinc, copper, silver, nickel, chromium, and nonmetals such as phosphorus and arsenic;

3. Petroleum hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants and grease);

4. Excessive eroded soils, sediment and particulate materials in amounts which may adversely affect the beneficial use of the receiving waters, flora or fauna of the state;

5. Animal wastes (such as discharge from confinement facilities, kennels, pens, recreational facilities, stables and show facilities);

6. Substances having characteristics such as pH less than six or greater than nine, or unusual coloration or turbidity, or excessive levels of fecal coliform, or fecal streptococcus, or enterococcus;

The term "pollutant" shall not include uncontaminated stormwater, potable water or reclaimed water generated by a lawfully permitted water treatment facility.

"Project" means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (California Public Resources Code Section 21065).

"Rainfall Harvest and Use" means a LID BMP system designed to capture runoff, typically from a roof but can also include runoff capture from elsewhere within the site, and to provide for temporary storage until the harvested water can be used for irrigation or non-potable uses. The harvested water may also be used for potable water uses if the system includes disinfection treatment and is approved for such use by the local building department.

"Receiving Water" means "water of the United States" into which waste and/or pollutants are or may be discharged.

"Redevelopment" means land-disturbing activity that result in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of routine maintenance activity; and land disturbing activity related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor

does it include emergency construction activities required to immediately protect public health and safety.

"Regional Board" means the California Regional Water Quality Control Board—Los Angeles Region.

"Restaurant" means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption. (Standard Industrial Classification Code 5812).

"Retail gasoline outlet" means any facility engaged in selling gasoline and lubricating oils.

"Routine Maintenance" includes, but is not limited to, projects conducted to:

1. Maintain the original line and grade, hydraulic capacity, or original purpose of the facility.

2. Perform as needed restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.

3. Includes road shoulder work, regrading dirt or gravel roadways and shoulders and performing ditch cleanouts.

4. Update existing lines and facilities, which include replacing existing lines with new materials or pipes, to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.

5. Repair leaks.

Routine maintenance does not include construction of new lines or facilities resulting from compliance with applicable codes, standards and regulations.

"Runoff" means any runoff including storm water and dry weather flows from a drainage area that reaches a receiving water body or subsurface. During dry weather it is typically comprised of base flow either contaminated with pollutants or uncontaminated, and nuisance flows.

"Significant Ecological Areas" (SEAs) means an area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan Areas are designated as SEAs, if they possess one or more of the following criteria:

1. The habitat of rare, endangered, and threatened plant and animal species.

2. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind, or are restricted in distribution on a regional basis.

3. Biotic communities, vegetative associations, and habitat of plant and animal species that are either one of a kind or are restricted in distribution in Los Angeles County.

4. Habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or within Los Angeles County.

5. Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or represent an unusual variation in a population or community.

6. Areas important as game species habitat or as fisheries.

7. Areas that would provide for the preservation of relatively undisturbed examples of natural biotic communities in Los Angeles County.

8. Special areas.

"Site" means the land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity.

"Source control BMP" means any schedule of activities, prohibition of practices, maintenance procedures, managerial practices or operational practices that aim to prevent stormwater pollution by reducing the potential for contamination at the source of pollution.

"Standard urban stormwater mitigation plan" (SUSMP) means a report submitted by an applicant for approval by the Director prior to issuance of a building, grading, planning or similar permit outlining the necessary LID requirements and BMPs which must be incorporated into design plans for development or redevelopment projects.

"Storm Drain System" means any facility or any parts of the facility, including streets, gutters, conduits, natural or artificial drains, channels and watercourse that are used for the purpose of collecting, storing, transporting or disposing of stormwater and are located within the City.

"Stormwater runoff" means that part of precipitation (rainfall) which travels via flow across a surface to the MS4 or receiving waters from impervious, semi-pervious or pervious surfaces. When all other factors are equal, runoff increases as the perviousness of a surface decreases.

"Structural BMP" means any structural facility designed and constructed to mitigate the adverse impacts of stormwater and urban runoff pollution (e.g. canopy, structural enclosure). Structural BMPs may include both treatment control BMPs and source control BMPs.

"Treatment" means the application of engineered systems that use physical, chemical or biological processes to remove pollutants. Such processes include, but are not limited to, filtration, gravity settling, media adsorption, biodegradation, biological uptake, chemical oxidation and UV radiation.

"Treatment control BMP" means any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media adsorption or any other physical, biological or chemical process.

"Urban runoff" means surface water flow produced by non-stormwater resulting from residential, commercial and industrial activities involving the use of potable and nonpotable water.

14-13.3 Standard Urban Stormwater Mitigation Plan (SUSMP) And Low Impact Development (LID) Requirements For New Development and Redevelopment projects.

a. *Objective*- Pursuant to Part VI.D.7.b of the Municipal NPDES Permit, the provisions of this section establish requirements for construction activities and facility operations of development and redevelopment projects to comply with the current Municipal NPDES Permit to lessen the water quality impacts of development by using smart growth practices and integrate LID practices and standards for stormwater pollution mitigation through means of infiltration, evapotranspiration, biofiltration, and rainfall harvest and use. Except as otherwise provided herein, the City shall administer, implement and enforce the provisions of this section.

b. *Scope*- This section contains requirements for stormwater pollution control measures in development and redevelopment projects and authorizes the City to further define and adopt stormwater pollution control measures, and to develop LID principles and requirements, including but not limited to the objectives and specifications for integration of LID strategies. As specified in this section, certain Planning Priority Projects shall meet the requirements of this section through the preparation and submittal of a standard urban stormwater mitigation plan (SUSMP), which shall include the applicable LID requirements set forth in this section as an element of the SUSMP.

c. *Applicability – Planning Priority Projects*: The following development and redevelopment projects shall be designated as Planning Priority Projects, which are subject to City conditioning and approval for the design and implementation of post-construction controls to mitigate storm water pollution prior to completion of the projects, and shall meet the requirements of this section:

1. New Development Projects.

   A. All development projects equal to one (1) acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area.
   B. Industrial parks 10,000 square feet or more of surface area.
   C. Commercial malls 10,000 square feet or more of surface area.
   D. Retail gasoline outlets with 5,000 square feet or more of surface area.
   E. Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of surface area.
   F. Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.
   G. Streets and roads construction of 10,000 square feet or more of impervious surface area. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects.
   H. Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area.
   I. Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Areas (SEA), where the development will:

      i. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and
      ii. Create 2,500 square feet or more of impervious surface area.
      iii. Single-family hillside homes.

2. Redevelopment Projects

   A. Land disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on Planning Priority Project categories.
   B. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.
   C. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only

the alteration must be mitigated, and not the entire development.

D. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.
E. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

Specific Requirements- The site for every Planning Priority Project shall be designed to control pollutants, pollutant loads, and runoff volume to the maximum extent feasible by minimizing impervious surface area and controlling runoff from impervious surfaces through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use. In addition, the following specific requirements apply:

1. New Single-Family Hillside Homes. A new single-family hillside home development project shall include mitigation measures to:

   A. Conserve natural areas;
   B. Protect slopes and channels;
   C. Provide storm drain system stenciling and signage;
   D. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and
   E. Direct surface flow to vegetated areas before discharge, unless the diversion would result in slope instability.

2. Street and Road Construction of 10,000 square feet or more. Street and road construction of 10,000 square feet or more of impervious surface shall follow the City's Green Street Manual developed by the Director and approved by City Council Resolution. The City's Green Street Manual shall be based on the City of Lynwood's Green Streets Manual.

3. The remainder of Planning Priority Projects shall prepare a SUSMP to comply with the following:

   A. Retain stormwater runoff onsite for the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

i. The 85th percentile 24-hour runoff event as determined from the Los Angeles County 85th percentile precipitation isohyetal map; or
ii. The volume of runoff produced from a 0.75 inch, 24-hour rain event, whichever is greater.

B. Minimize hydromodification impacts to natural drainage systems as defined in the Municipal NPDES Permit.

C. To demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use, and that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect. Technical infeasibility may result from conditions including the following:

i. The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv onsite.
ii. Locations where seasonal high groundwater is within five to ten feet of surface grade;
iii. Locations within 100 feet of a groundwater well used for drinking water;
iv. Brownfield development sites or other locations where pollutant mobilization is a documented concern;
v. Locations with potential geotechnical hazards;
vi. Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.

D. If partial or complete onsite retention is technically infeasible, the project site may biofiltrate 1.5 times the portion of the remaining SWQDv that is not reliably retained onsite. Biofiltration BMPs must adhere to the design specifications provided in Municipal NPDES Permit.

i. Additional alternative compliance options such as offsite infiltration and groundwater replenishment projects may be available to the project Site. The project Site should contact the Department of Public Works to determine eligibility.

E. The remaining SWQDv that cannot be retained or biofiltered onsite must be treated onsite to reduce pollutant loading. BMPs must be selected and designed to meet pollutant-specific benchmarks as required per the Municipal NPDES Permit. Flow-through BMPs may be used to treat the remaining SWQDv and must be sized based on a rainfall intensity of:

i. 0.2 inches per hour, or
ii. The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, whichever is greater.

e. *Verify Maintenance of BMPs*: If a project applicant has included or is required to include structural or treatment control BMPs in project plans, the applicant shall provide verification of maintenance provisions. The verification shall include the applicant's signed statement, as part of its project application, accepting responsibility for all structural and treatment control BMP maintenance until such time, if any, the property is transferred.

f. *Issuance of Certificates of Occupancy*. As a condition for issuing a certificate of occupancy for a Planning Priority Project identified in this section, the Director shall require facility operators and/or owners to build all the stormwater pollution control BMPs and structural or treatment control BMPs that are shown on the approved project plans and to submit a signed certification statement stating that the site and all structural or treatment control BMPs will be maintained in compliance with the SUSMP and other applicable regulatory requirements.

g. *Transfer of Properties Subject to Requirement for Maintenance of Structural and Treatment Control BMPs:*

1. The transfer or lease of a property subject to a requirement for maintenance of structural and treatment control BMPs shall include conditions requiring the transferee and its successors and assigns to either (a) assume responsibility for maintenance of any existing structural or treatment control BMP or (b) to replace an existing structural or treatment control BMP with new control measures or BMPs meeting the then current standards of the City and the SUSMP. Such requirement shall be included in any sale or lease agreement or deed for such property. The condition of transfer shall include a provision that the successor property owner or lessee conduct maintenance inspections of all structural or treatment control BMPs at least once a year and retain proof of inspection.

2. For residential properties where the structural or treatment control BMPs are located within a common area which will be maintained by a homeowners association, language regarding the responsibility for maintenance shall be included in the projects conditions, covenants and restrictions (CC&Rs). The transfer of this information shall also be required with any subsequent sale of the property.
3. If structural or treatment control BMPs are located within an area proposed for dedication to a public agency, said BMPs shall be the responsibility of the developer until the dedication is accepted by the public agency.

14-13.4 Authority:

a. *Define And Adopt:* The public works director/city engineer shall have the authority to define and adopt a standard urban storm water mitigation plan and development best management practices necessary to control storm water pollution from new developments and facility operations to the maximum extent practicable pursuant to the Municipal NPDES Permit.

b. *Requirements:* The public works director/city engineer shall have the authority to withhold grading and/or building permits for developments until:

1. The applicant incorporates into the development; best management practices necessary to control storm water pollution in accordance with the Municipal NPDES Permit.
2. The City of Lynwood receives a covenant and agreement, signed by the owner(s) of the property and recorded by the Los Angeles County recorder, declaring that the best management practices necessary to control storm water pollution shall be installed and/or constructed and maintained in proper working conditions at all times.
3. The City of Lynwood receives from a certified and registered civil engineer, plans that depict specific best management practices incorporated into a project that identify storm water pollution prevention measures, during and after construction.

14-13.5 Supplemental Provisions:

Provisions of this section shall be complementary to, not replaced by, any requirements for storm water mitigation existing under the California Environmental Quality Act.

14-13.6 Authority To Inspect And Enforce Storm Water Pollution Control Measures:

a. Notwithstanding the provisions of the grading or building permit, noncompliance with any provisions of this section, or the required covenant and agreement shall be

considered an infraction. Each day of noncompliance may be considered a separate violation. Such infraction penalties are set forth by City Council resolution, as amended from time to time.

b. Whenever it is necessary to make an inspection to enforce or verify compliance with any storm water control provisions, as imposed by this section, the public works director/city engineer and/or his authorized representatives are hereby authorized to enter such property at any reasonable time to inspect for compliance with best management practices and perform any duty imposed by this section or other applicable law.

Section 2. The City Clerk shall certify to the passage and adoption of this ordinance, and shall make a minute of the passage and adoption thereof in the records of the proceedings of the City Council at which the same is passed and adopted. This ordinance shall be in full force and effect thirty (30) days after its final passage and adoption, and within fifteen (15) days after its final passage, the City Clerk shall cause it to be published in a newspaper of general circulation.

Section 3. If any provision of this Ordinance is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect remaining provisions of this Ordinance, which are declared to be severable.

First read at a regular meeting of the City Council held on the 6th day of May, 2014 and adopted and ordered published at a regular meeting of said Council on the 20th day of May, 2014.

PASSED, APPROVED and ADOPTED this 20th day of May, 2014.

Aide Castro, Mayor

ATTEST:

Maria Quinonez, City Clerk

APPROVED AS FOR FORM:

David A. Garcia, City Attorney

APPROVED AS TO CONTENT:

Sarah M. Withers, City Manager

Emilio Murga, P.E. Director
Public Works/ City Engineer

STATE OF CALIFORNIA)
) §
COUNTY OF LOS ANGELES)

I, the undersigned, City Clerk of the City of Lynwood, do hereby certify that the above and foregoing Ordinance was duly adopted by the City Council of the City of Lynwood at its regular meeting held on the **20th** day of **May, 2014**.

AYES: **COUNCIL MEMBERS ALATORRE, SOLACHE, HERNANDEZ AND CASTRO**

NOES: **NONE**

ABSENT: **COUNCIL MEMBER SANTILLAN-BEAS**

ABSTAIN: **NONE**

Maria Quinonez, City Clerk

STATE OF CALIFORNIA)
) §
COUNTY OF LOS ANGELES)

I, the undersigned, City Clerk of the City of Lynwood, and Clerk of the City Council of said City, do hereby certify that the above and foregoing is a full, true and correct copy of Ordinance No. **1671** in my office and that said Ordinance was adopted on the date and by the vote therein stated. Dated this **20th** day of **May, 2014.**

Maria Quinonez, City Clerk

October 28, 2014

Lower Los Angeles River Watershed Management Group
(See Distribution List)

REVIEW OF THE LOWER LOS ANGELES RIVER WATERSHED MANAGEMENT GROUP'S DRAFT WATERSHED MANAGEMENT PROGRAM, PURSUANT TO PART VI.C OF THE LOS ANGELES COUNTY MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT (NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175) AND PART VII.C OF THE CITY OF LONG BEACH MS4 PERMIT (NPDES PERMIT NO. CAS004003; ORDER NO. R4-2014-0024)

Dear Lower Los Angeles River Watershed Management Group:

The Regional Water Board has reviewed the draft Watershed Management Program (WMP) submitted on June 27, 2014 by the Lower Los Angeles River Watershed Management Group. This program was submitted pursuant to the provisions of NPDES Permit No. CAS004001 (Order No. R4-2012-0175), which authorizes discharges from the municipal separate storm sewer system (MS4) operated by 86 municipal Permittees within Los Angeles County (hereafter, LA County MS4 Permit). The LA County MS4 Permit allows Permittees the option to develop either a WMP or Enhanced Watershed Management Program (EWMP) to implement permit requirements on a watershed scale through customized strategies, control measures, and best management practices (BMPs). Development of a WMP or EWMP is voluntary and may be developed individually or collaboratively.

NPDES Permit No. CAS004003 (Order No. R4-2014-0024) authorizes discharges from the MS4 originating within the City of Long Beach (hereafter, Long Beach MS4 Permit). The Long Beach MS4 Permit similarly allows for the City of Long Beach to develop either a WMP or EWMP to implement permit requirements, with the option of collaborating with LA County MS4 Permit Permittees. For simplicity, this letter and its enclosures cite provisions in the LA County MS4 Permit even though the City of Long Beach is a member of the Lower Los Angeles River Watershed Management Group and is permitted under its own individual permit.

The purpose of a WMP or EWMP is for a Permittee to develop and implement a comprehensive and customized program to control pollutants in MS4 discharges of stormwater and non-stormwater to address the highest water quality priorities. These include complying with the required water quality outcomes of Part V.A (Receiving Water Limitations) and Part VI.E and Attachments L through R (Total Maximum Daily Load (TMDL) Provisions) of the LA County MS4 Permit. If a Permittee opts to develop a WMP or EWMP, the WMP or EWMP must meet the requirements, including conducting a Reasonable Assurance Analysis (RAA), of Part VI.C (Watershed Management Programs) of the LA County MS4 Permit and must be approved by the Regional Water Board.

RB-AR11227

RECYCLED PAPER

As stated above, on June 27, 2014, the Lower Los Angeles River Watershed Management Group (Group) submitted a draft WMP to the Regional Water Board pursuant to Part VI.C.4.c of the LA County MS4 Permit.

The Regional Water Board has reviewed the draft WMP and has determined that, for the most part, the draft WMP includes the elements and analysis required in Part VI.C of the LA County MS4 Permit. However, some revisions to the Group's draft WMP are necessary. The Regional Water Board's comments on the draft WMP, including detailed information concerning necessary revisions to the draft WMP, are found in Enclosure 1 and Enclosure 2. The LA County MS4 Permit includes a process through which necessary revisions to the draft WMP can be made (Part VI.C.4 in the LA County MS4 Permit). The process requires that a final WMP, revised to address Regional Board comments identified in the enclosures, must be submitted to the Regional Water Board not later than three months after comments are received by the Permittees on the draft program. Please make the necessary revisions to the draft WMP as identified in the enclosures to this letter and submit the revised WMP as soon as possible and no later than **January 28, 2015.**

The revised WMP must be submitted to losangeles@waterboards.ca.gov with the subject line "LA County MS4 Permit – Revised Draft Lower LA River WMP" with a copy to Ivar.Ridgeway@waterboards.ca.gov and Chris.Lopez@waterboards.ca.gov.

If the necessary revisions are not made, the Permittees will be subject to the baseline requirements in Part VI.D of the Order and shall demonstrate compliance with receiving water limitations pursuant to Part V.A and with applicable interim and final water quality-based effluent limitations (WQBELs) in Part VI.E and Attachment O pursuant to subparts VI.E.2.d.i.(1)-(3) and VI.E.2.e.i.(1)-(3), respectively.

Until the draft Lower Los Angeles River WMP is approved, the Permittees are required to:

(a) Continue to implement all watershed control measures in its existing storm water management programs, including actions within each of the six categories of minimum control measures consistent with Title 40, Code of Federal Regulations, section 122.26(d)(2)(iv);
(b) Continue to implement watershed control measures to eliminate non-storm water discharges through the MS4 that are a source of pollutants to receiving waters consistent with Clean Water Act section 402(p)(3)(B)(ii);
(c) Target implementation of watershed control measures in (a) and (b) above to address known contributions of pollutants from MS4 discharges to receiving waters; and
(d) Implement watershed control measures, where possible from existing TMDL implementation plans, to ensure that MS4 discharges achieve compliance with interim and final trash water quality-based effluent limits (WQBELs) and all other final WQBELs and receiving water limitations by the applicable compliance deadlines occurring prior to approval of the WMP.

In addition on June 27, 2014, the Lower Los Angeles River Watershed Management Group submitted a draft Coordinated Integrated Monitoring Program (CIMP) to the Regional Water Board pursuant to Part IV.C of Attachment E of the LA County MS4 Permit. The Regional Water Board review and comments on the draft CIMP will be provided under separate cover.

If you have any questions, please contact Mr. Ivar Ridgeway, Chief of the Storm Water Permitting Unit, by electronic mail at Ivar.Ridgeway@waterboards.ca.gov or by phone at (213) 620-2150.

Sincerely,

Samuel Unger, P.E.
Executive Officer

Enclosures:

Enclosure 1 – Summary of Comments and Necessary Revisions
Enclosure 2 – Comments on Reasonable Assurance Analysis

cc: John Hunter, John L. Hunter and Associates, Inc.

Lower Los Angeles River Mailing Distribution List

Name	City	Email Address
Jason Wen	Downey	JWen@downeyca.org
Konya Vivanti	Lakewood	kvivanti@lakewoodcity.org
Anthony Arevalo	Long Beach	Anthony.Arevalo@longbeach.gov
Emilio Murga	Lynwood	emurga@lynwood.ca.us
Sarah Ho	Paramount	sho@paramountcity.com
Arturo Cervantes	Pico Rivera	acervantes@pico-rivera.org
Steve Myrter	Signal Hill	SteveMyrter@cityofsignalhill.org
Mohammad Mostahkami	South Gate	mmostahkami@sogate.org
Angela George	LA County, DPW	ageorge@dpw.lacounty.gov
Robert Wu	Caltrans	robert.wu@dot.ca.gov
John Hunter	Consultant	jhunter@jlha.net

Enclosure 1 to October 28, 2014 Letter Regarding the Lower Los Angeles River Watershed Management Area Draft Watershed Management Program

Summary of Comments and Required Revisions to the Draft Watershed Management Program

LA County MS4 Permit Provision*	Summary of Comments and Necessary Revisions
Part VI.C.1.d (Purpose of Watershed Management Program, page 47)	Section 1.1 of the draft WMP states, "the goal of these requirements is to reduce the discharge of pollutants from MS4s to the maximum extent practicable." The goal of the three permits and of a WMP is broader than presented (p. 1-1). Per Part VI.C.1.d of the LA County MS4 Permit, the goals of the Watershed Management Programs are to "... ensure that discharges from the Permittee's MS4: (i) achieve applicable water quality-based effluent limitations in Part VI.E and Attachments L through R pursuant to the corresponding compliance schedules, (ii) do not cause or contribute to exceedances of receiving water limitations in Parts V.A and VI.E and Attachments L through R, and (iii) do not include non-storm water discharges that are effectively prohibited pursuant to Part III.A. The programs shall also ensure that controls are implemented to reduce the discharge of pollutants to the maximum extent practicable (MEP) pursuant to Part IV.A.1." The revised WMP needs to acknowledge the broader goals set forth in the permit.
Part VI.C.5.a.iii.(1)(a)(v) (Source Assessment, page 60)	The MS4 Permit requires that TMDL source investigations be considered in the source assessment. Although several TMDLs are discussed in Section 2.2, others with potentially useful insights such as the Los Angeles River metals TMDL were not. The group should consider the source investigations from all relevant TMDLs for possible insights into important sources that might be useful in designing an effective program.
Part VI.C.5.a.iii.(1)(a)(vi) (Source Assessment, page 60)	The MS4 Permit requires the source assessment to include data and conclusions from watershed model results. The Regional Water Board did not find any responsive information in the draft WMP and any available information should be noted in the final WMP. For example, relevant findings presented in the implementation plans for the LA River metals TMDL submitted in

LA County MS4 Permit Provision*	Summary of Comments and Necessary Revisions
	October 2010 by Reach 1 and Compton Creek participating jurisdictions and Reach 2 participating jurisdictions should be included.
Part VI.C.5.a.iii.(1)(a)(vii) (Source Assessment, page 60)	The MS4 Permit requires a map of the MS4 including major outfalls and major structural controls. Appendix H of the CIMP provides maps showing the major outfalls and Appendix D of the draft WMP provides a tabular list of existing and proposed BMPs. The revised WMP should include a map (or GIS project file) of these BMPs as well. Also, the outfall database should be submitted with the revised WMP. In addition, Section VII.A of Attachment E to the MS4 Permit requires maps of the drainage areas associated with the outfalls and these were not provided. Section 1.3.2 of the WMP does note that 53 catchments are located in the watershed, and maps showing these drainage areas should be provided. If these are not readily available, a process and timeline for developing this spatial information should be included in the revised WMP.
Part VI.C.5.a.iv.(1) (Prioritization, page 60)	The MS4 Permit requires a strategy to implement pollutant controls necessary to achieve WQBELs and/or receiving water limitations (RWLs) with compliance deadlines that have already passed and limitations have not been achieved. The LA River metals TMDL includes interim wet and dry water quality-based effluent limitations with a compliance deadline of January 2012; the WMP needs to address the compliance status of the Permittees with these limitations, and ensure compliance. In Section 3.4.1.6, the draft WMP states, "[a]s recognized by the footnote in Attachment K-4 of the Permit, the Participating Agencies have entered into an Amended Consent Decree with the United States and the State of California, including the Regional Board, pursuant to which the Regional Board has released the Participating Agencies from responsibility for toxic pollutants in the Dominguez Channel and the Greater Los Angeles and Long Beach Harbors." This statement misinterprets the Regional Water Board's findings. Footnote 1 to Table K-4 of the LA County MS4 Permit states, "[t]he requirements of this Order to implement the obligations of this TMDL do not apply to a Permittee to the extent that it is determined that the Permittee has been released from that obligation pursuant to the Amended Consent Decree entered in

LA County MS4 Permit Provision*	Summary of Comments and Necessary Revisions
	United States v. Montrose Chemical Corp., Case No. 90-3122 AAH (JRx)." As stated in the responses to comments received on the Dominguez Channel and Greater Harbor Waters Toxic Pollutants TMDL, "...primarily one pollutant, DDT, is associated with the Superfund site and also addressed by the TMDL. The TMDL addresses numerous pollutants and utilizes a different process than Superfund. The other pollutants – heavy metals, PAHs, PCBs and other legacy pesticides are not within Superfund's focus at the Montrose OU2 Site..." Further, the WQBELs in Attachment N, Part E of the LA County MS4 Permit and Part VIII.P of the Long Beach MS4 Permit are for ongoing discharges from the MS4, not for the historic contamination of the bed sediments. Therefore, the statement in the draft WMP incorrectly concludes that the aforementioned Consent Decree releases MS4 Permittees from any obligation to implement the WQBELs in the MS4 permits.
Part VI.C.5.a.iv.(2)(a) (Prioritization, page 60)	Where data indicate impairment or exceedances of RWLs and the findings from the source assessment implicate discharges from the MS4, the Permit requires a strategy for controlling pollutants that is sufficient to achieve compliance as soon as possible. Although Section 3 includes a compliance strategy, the program needs to more clearly demonstrate that the compliance schedule (Section 5) ensures compliance is "as soon as possible."
Part VI.C.5.b.iv.(5)(c) (Selection of Watershed Control Measures, page 64)	For waterbody-pollutant combinations not addressed by TMDLs, the MS4 Permit requires that the plan demonstrate using the reasonable assurance analysis (RAA) that the activities and control measures to be implemented will achieve applicable receiving water limitations as soon as possible. The RAA demonstrates the control measures would be adequate to comply with the limitations/deadlines for the "limiting pollutants" for TMDLs and concludes that this will ensure compliance for all other pollutants of concern. However, it does not address the question of whether compliance with limitations for pollutants not addressed by TMDLs could be achieved in a shorter time frame.
Part VI.C.5.b.iv.(4)(b)-(c) (Selection of Watershed Control Measures, page 63)	The MS4 Permit requires that the WMP provide specificity with regard to structural and non-structural BMPs, including the number, type, and location(s), etc. adequate to assess compliance. In a number of cases, additional specificity on the

LA County MS4 Permit Provision*	Summary of Comments and Necessary Revisions
	number, type and general location(s) of watershed control measures as well as the timing of implementation for each is needed. (Regional Water Board staff notes, for example, that many watershed control measures in the implementation schedule only reference the year (or years) that a measure or milestone will be implemented. This should be revised to include more specific and/or exact dates where appropriate.) Additionally, many watershed control measures in the implementation schedule are ongoing measures that are not new interim milestones (e.g. MCMs, implementation of SB 346, enhanced street sweeping, etc.). For transparency, Regional Water Board staff recommends that ongoing measures clearly be separated from interim milestones for structural controls and non-structural BMPs in the implementation schedule. Regional Water Board staff recognizes uncertainties may complicate establishment of specific implementation dates, however there should at least be more specificity on actions within the current and next permit terms. <u>Green Street Conversion</u>: The RAA identifies potential areas for green street conversion and assumes a 30% conversion of the road length in the suitable areas; however, the specific locations and projects are not identified. Although it may not be possible to provide detailed information on specific projects at this time, the WMP should at least commit to the construction of the necessary number of projects to ensure compliance with permit requirements per applicable compliance schedules. <u>Reductions from New Non-structural Controls</u>: The WMP assumes a 10% pollutant reduction from new non-structural controls. Although 10% is a modest fraction of the overall controls necessary, additional support for this assumption should be provided, or as part of the adaptive management process, the Permittees should commit to evaluate this assumption during program implementation and develop alternate controls if it becomes apparent that the assumption is not supported.
Part VI.C.5.b.iv.(4)(b)-(c) (Selection of Watershed Control Measures, page 63)	<u>Reductions in Irrigation Runoff</u>: For dry weather, the WMP assumes a 25% reduction in irrigation (which results in a 60% reduction in pollutant discharges);

LA County MS4 Permit Provision*	Summary of Comments and Necessary Revisions
	additional support should be provided for this assumption, or as part of the adaptive management process, the Permittees need to commit to evaluate this assumption during program implementation and develop alternate controls if it becomes apparent that the assumption is not supported. Regional BMPs: Section 1.4.2 of Attachment A to the RAA points out that additional potential regional BMPs were identified to provide the remaining BMP volume noted in Table 9-4. It indicates they can be found in Section 4 of the WMP (actually, they are found in Section 3). The RAA should clarify that sufficient sites were identified so that the remaining necessary BMP volume can be achieved by those sites that were not "excluded for privacy." Industrial Facilities: The draft WMP, including the RAA, excludes stormwater runoff from non-MS4 facilities within the WMA from the stormwater treatment target. In particular, industrial facilities that are permitted by the Water Boards under the Industrial General Permit or an individual stormwater permit were identified and subtracted from the treatment target. Regional Water Board staff recognizes that this was done with the assumption that these industrial facilities will retain their runoff and/or eliminate their cause/contribution to receiving water exceedances, as required by their respective NPDES permit. However, it is important that the Permittees' actions under its Industrial/Commercial Facilities Program—including tracking critical industrial sources, educating industrial facilities regarding BMP requirements, and inspecting industrial facilities—ensure that all industrial facilities are implementing BMPs as required. Caltrans Facilities: The draft WMP, including the RAA, takes a similar approach for areas under the jurisdiction of the California Department of Transportation (Caltrans). Caltrans facilities that are permitted under the Caltrans MS4 permit (Order No. 2012-0011-DWQ) were also identified and subtracted from the treatment target. It should be noted that the Amendment to the Caltrans Permit (Order WQ 2014-0077-DWQ) includes provisions to address TMDL requirements throughout the state. Revisions to Attachment IV of the Caltrans Permit require that Caltrans prioritize all TMDLs for implementation of source control measures and BMPs, with

LA County MS4 Permit Provision*	Summary of Comments and Necessary Revisions
	prioritization being "consistent with the final TMDL deadlines to the extent feasible." Additionally, the Caltrans Permit also includes provisions for collaborative implementation through Cooperative Implementation Agreements between Caltrans and other responsible entities to conduct work to comply with a TMDL. By contributing funds to Cooperative Implementation Agreements and/or the Cooperative Implementation Grant Program, Caltrans may receive credit for compliance units, which are needed for compliance under the Caltrans Permit. In a similar manner, the LA County MS4 Permit includes provisions for Permittees to control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other MS4 owners—such as Caltrans—to successfully implement the provisions of the Order (see Parts VI.A.2.a.viii and VI.A.4.a.iii). Therefore, the Permittees should ensure that they are closely coordinating with appropriate Caltrans District staff regarding the identification and implementation of watershed control measures to achieve water quality requirements (i.e. applicable Receiving Water Limitations and WQBELs). Regional Water Board Staff recognizes that the Group has taken the initial steps for such collaboration since Caltrans participates in the Group and the draft WMP notes Caltrans in its strategies for runoff reduction and total suspended solids reduction.
Part VI.C.5.b.iv.(4)(c) (Selection of Watershed Control Measures – SB 346 Copper Reductions)	The draft WMP appears to rely heavily on the phase-out of copper in automotive brake pads, via approved legislation SB 346, to achieve the necessary copper load reductions. Given the combination of other Cu sources identified in various LA TMDLs such as building materials, other vehicle wear, air deposition from fuel combustion and industrial facilities, and that SB 346 progressively phases out Cu content in brakes of new cars (5% by weight until 2021, 0.5% by weight until 2025), then other structural and non-structural BMPs may still be needed to reduce Cu loads sufficiently to achieve compliance deadlines for interim and/or final WQBELs.
Part VI.C.5.b.iv.(1)(a)(ii) (Minimum Control Measures – Industrial/Commercial Facilities	The Group proposes to alter the commercial and industrial facility inspection frequencies in Parts VI.D.6.d and VI.D.6.e of the LA

LA County MS4 Permit Provision*	Summary of Comments and Necessary Revisions
Program)	County MS4 Permit. The proposed modification includes a prioritization process in which the MS4 Permittees rate applicable facilities as high, medium, or low priority. High priority facilities are inspected more frequently and low priority facilities are inspected less frequently. The prioritization scheme included in Figure ICF-1 prioritizes facilities by their potential water quality impact. However, the draft WMP also notes that Cities "may follow an alternative prioritization method provided it results in a similar three-tiered scheme." The revised WMP should ensure that any alternative prioritization method used by a City must also be based on water quality impact. No statement to this effect was included. Furthermore, the draft WMP also notes that Cities can prioritize and reprioritize facilities at any time based on their discretion. The Group should revise their draft WMP to clearly state when the initial prioritization of facilities will occur. Additionally, the Group should be explicitly clear that during any reprioritization, the ratio of low priority to high priority facilities must always remain at 3:1 or lower to maintain inspection frequencies identified in the draft WMP.
Part VI.C.5.b.iv.(5)	The RAA identifies zinc as the limiting pollutant and notes that this pollutant will drive reductions of other pollutants. If the Group believes that that this approach demonstrates that activities and control measures will achieve applicable receiving water limitations, it should explicitly state and justify this for each category 1, 2, and 3 pollutant.
Part VI.C.5.c.iii.(3) (Compliance Schedules – Bacteria)	The draft WMP proposes a final compliance date of September 2030 for bacteria in the LA River Estuary. However, the Group does not provide sufficient justification for this date. The compliance date for the lower Reach 2 and Reach 1 of the LA River is 2024 for achieving the dry-weather WQBELs. A Load Reduction Strategy must be submitted for this segment (Segment A in the TMDL) by September 2016. These dates are more appropriate to guide the schedule to address bacteria discharges during dry weather to the LA River Estuary. Additional milestones and a schedule of dates for achieving milestones should be defined for addressing bacteria discharges

LA County MS4 Permit Provision*	Summary of Comments and Necessary Revisions
	to the LA River Estuary.

*Equivalent provisions are also found in the Long Beach MS4 Permit

TO: Lower Los Angeles River Watershed Management Group

FROM: C.P. Lai, Ph.D., P.E. and Thanhloan Nguyen
LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD

DATE: October 27, 2014

SUBJECT: COMMENTS ON REASONABLE ASSURANCE ANALYSIS REPORT FOR LOWER LOS ANGELES RIVER WATERSHED MANAGEMENT AREA

This memorandum contains comments on the Reasonable Assurance Analysis (RAA), dated June 27, 2014, which was submitted by the Lower Los Angeles River Watershed Management Group.

A. General comments on the draft Reasonable Assurance Analysis (RAA) section of the Watershed Management Program.

1. The Lower Los Angeles River Watershed Management Area (LLAR WMA) is subject to interim and final water quality-based effluent limitations pursuant to Attachment O, Part A "Los Angeles River Watershed Trash TMDL, Part B "Los Angeles River Nitrogen Compounds and Related Effects TMDL", Part C "Los Angeles River and Tributaries Metals TMDL", and Part D "Los Angeles River Watershed Bacteria TMDL". To the extent that MS4 Permittees within the LLAR WMA discharge directly to the Los Angeles River Estuary and/or San Pedro Bay, those discharges are subject to the WQBELs in Attachment N, Part E "Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL".[1]

   To the extent that discharges to the Los Angeles River Estuary are to be addressed by the LLAR WMP, pursuant to Part VI.C.5.a.iv(1) and VI.C.5.b.iv, pages 60 and 62-63 of the LA County MS4 Permit, the Lower Los Angeles River Group is required to conduct a reasonable assurance analysis to demonstrate that the WQBELs that are established in the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL shall be achieved through implementation of the watershed control measure proposed in the WMP. However, the Dominguez Channel and Greater Los

[1] The LLAR WMP states that, "[a]ll of the Lower LAR Agencies … discharge to the LAR above the Estuary." It also states, "[t]he areas under [the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants] TMDL discharging directly to the Los Angeles and Long Beach Harbors will be addressed separately in the Long Beach individual WMP…" (Section 3.4.1.6, p. 3-29). It is unclear whether discharges from the City of Long Beach to the Los Angeles River Estuary are being addressed in the LLAR WMP or in a separate individual WMP submitted by the City of Long Beach. In section 3.4.1.5, the draft WMP states, "[t]his Watershed Management Program incorporates the LARE…" (p. 3-28). Clarification is needed as to whether the LLAR WMP addresses discharges to the Los Angeles River Estuary or not.

Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL was appears to be completely omitted from the draft WMP. The draft WMP did not include and analyze a strategy to implement pollutant controls necessary to achieve all applicable interim and final water quality-based effluent limitations and/or receiving water limitations with interim or final compliance deadlines within the permit term pursuant to the corresponding compliance schedules in the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL.

2. The draft Lower Los Angeles River WMP identified water quality priorities for Los Angeles River (Estuary, Reaches 1 and 2), Compton Creek, and Rio Hondo), but not for San Pedro Bay. Pursuant to Section VI.C.5.a., the WMP should be revised to include an evaluation of existing water quality conditions, classify them into categories, identify potential sources, and identify strategies, control measures, and BMPs as required in the permit for San Pedro Bay unless MS4 discharges from the LLAR WMA directly to San Pedro Bay are being addressed in a separate WMP.

3. The draft WMP provided corresponding implementation schedules for nonstructural BMPs, which are assumed to result a 10% reduction in pollutant load. For structural BMPs, general implementation timeframes are given for the Proposition 84 Grant Award projects (section 5.2), implementation of the Planning and Land Development Program by Permittees (section 5.3.1), and wet weather volume reductions to meet 31% and 50% of the compliance target by 2017 and 2024, respectively. However, greater specificity should be provided with regard to these dates, and additional milestones and dates for their achievement between 2017 and 2024 should be included.

B. Modeling comments regarding analysis of copper, lead, zinc, DDT, PCB, PAH, and bacteria concentrations/loads in Appendix A-4-1 of the draft Lower Los Angeles River WMP:

1. The model predicted stormwater runoff volume is used as a surrogate for required pollutant load reductions for wet weather conditions. Thus, the predicted flow volume becomes a very important parameter for evaluating required volume reductions and BMP scenarios. Based on the results of the hydrology calibration shown in Table 4-2 and Table 4-3, the error differences between modeled flow volumes and observed data are 11.88% for the Lower Los Angeles River. For calibration purposes, upstream flow volume should be included to determine whether that improves the model performance to within the "Good" or "Very Good" range, per the RAA Guidelines. Once model calibration has been completed, the upstream flow volume can then be excluded when presenting the volume reduction targets in Tables 8-1 to 8-4.

2. While we understand that there is significant reliance on a volume-based approach, the predicted baseline concentrations and loads for all modeled pollutants of concern, including TSS, should be presented in summary tables for wet weather conditions. This model output should be available, since it is the basis for the percent reductions in pollutant load presented in Table 5-6. (See Table 5. Model Output for Both Process-based BMP Models and Empirically-based BMP Models, pages 20-21 of the RAA Guidelines).

3. Further, the differences between baseline concentrations/loads and allowable concentrations/loads should be presented in time series for each pollutant under long-term continuous simulation and as a summary of the differences between pollutant

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concentrations/loads and allowable concentrations/loads for the critical wet weather period. (See Table 5. Model Output for Both Process-based BMP Models and Empirically-based BMP Models, pages 20-21 of the RAA Guidelines).

4. We note that modeling was not conducted for organics (DDT, PCBs, and PAHs). It is not clear why these pollutants were not modeled or why previous modeling of these pollutants could not be used, such as that conducted during the development of the Dominguez Channel and Greater LA and Long Beach Harbor Waters Toxic Pollutants TMDL. An explanation for the lack of modeling is needed.

5. The report presents the existing runoff volumes, required volume reductions and proposed volume reductions from BMP scenarios to achieve the 85th percentile, 24-hour volume retention standard for each major watershed area. The same information on the runoff volume associated with the 85th percentile, 24-hour event and the proposed runoff volume reduction from each BMP scenario also needs to be presented for each modeled subbasin (e.g., a series of tables similar to 8-1 through 8-4 and 9-4 through 9-7). See Table 5 of the RAA Guidelines. Additionally, more explanation is needed as to what constitutes the "incremental" and "cumulative" critical year storm volumes in tables 9-4 through 9-7 and how these values were derived from previous tables.

6. The report needs to present the same information, if available, for non-stormwater runoff. Alternatively, the report should include a commitment to collect the necessary data in each watershed area, through the non-stormwater outfall screening and monitoring program, so that the model can be re-calibrated during the adaptive management process to better characterize non-stormwater flow volumes and to demonstrate that proposed volume retention BMPs will capture 100 percent of non-stormwater that would otherwise be discharged through the MS4 in each watershed area.

7. The ID number for each of the 147 subwatersheds from the model input file should be provided and be shown in the simulation domain to present the geographic relationship of subwatersheds, within each watershed area, that are simulated in the LSPC model.

RB-AR11241

November 25, 2014

Lower Los Angeles River Watershed Management Group
(See Distribution List)

REVIEW OF THE LOWER LOS ANGELES RIVER WATERSHED MANAGEMENT GROUP'S DRAFT COORDINATED INTEGRATED MONITORING PROGRAM, PURSUANT TO PART VI.B AND ATTACHMENT E PART IV.B OF THE LOS ANGELES COUNTY MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT (NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175) AND PART VII.B AND ATTACHMENT E, PART IV.B OF THE CITY OF LONG BEACH MS4 PERMIT (NPDES PERMIT NO. CAS004003; ORDER NO. R4-2014-0024)

Dear Lower Los Angeles River Watershed Management Group:

The Regional Water Board has reviewed the draft Coordinated Integrated Monitoring Program (CIMP) submitted on June 27, 2014 by the Lower Los Angeles River (LLAR) Watershed Management Group (WMG). This program was submitted pursuant to the provisions of NPDES Permit No. CAS004001 (Order No. R4-2012-0175), which authorizes discharges from the municipal separate storm sewer system (MS4) operated by 86 municipal Permittees within Los Angeles County (hereafter, LA County MS4 Permit).

The LA County MS4 Permit allows Permittees the option to develop and implement, in coordination with an approved Watershed Management Program per Part VI.C, a customized monitoring program that achieves the five Primary Objectives set forth in Part II.A of Attachment E and includes the elements set forth in Part II.E of Attachment E. Customized monitoring programs may be developed on an individual jurisdictional basis, referred to as an Integrated Monitoring Program (IMP), or on a watershed basis, referred to as a CIMP. These programs must be approved by the Executive Officer of the Regional Water Board.

NPDES Permit No. CAS004003 (Order No. R4-2014-0024) authorizes discharges from the MS4 operated by the City of Long Beach (hereafter, Long Beach MS4 Permit). The Long Beach MS4 Permit similarly allows the City of Long Beach to develop either an IMP or CIMP to implement Permit requirements, with the option of collaborating with LA County MS4 Permit Permittees. For simplicity, this letter and its enclosures cite provisions in the LA County MS4 Permit even though the City of Long Beach is a member of the LLAR WMG and is permitted under its own individual Permit.

The Regional Water Board has reviewed the draft CIMP and has determined that, for the most part, the CIMP includes the elements set forth in Part II.E and will achieve the Primary Objectives set forth in Part II.A of Attachment E of the LA County MS4 Permit and the

corresponding provisions of the Long Beach MS4 Permit. However, some additions and revisions to the CIMP are necessary. The Regional Water Board's comments on the CIMP, including detailed information concerning necessary additions and revisions to the CIMP, are found in Enclosure 1 and Enclosure 2.

Please make the necessary additions and revisions to the CIMP as identified in the enclosures to this letter and submit the revised CIMP as soon as possible and no later than **February 23, 2015.** The revised CIMP must be submitted to losangeles@waterboards.ca.gov with the subject line "LA County MS4 Permit – Revised LLAR CIMP" with a copy to Ivar.Ridgeway@waterboards.ca.gov.

Upon approval of the revised CIMP by the Executive Officer, the Permittees must prepare to commence their monitoring program within 90 days. If the necessary revisions are not made, the Permittees must comply with the Monitoring and Reporting Program (MRP) and future revisions thereto, in Attachment E of the LA County MS4 Permit and corresponding provisions in the Long Beach MS4 Permit.

Until the Permittees' CIMP is approved by the Executive Officer, the monitoring requirements pursuant to Order No. 01-182 and MRP CI 6948, Order No. 99-060 and MRP CI 8052 and pursuant to approved TMDL monitoring plans shall remain in effect for the Permittees.

If you have any questions, please contact Mr. Ivar Ridgeway, Chief of the Storm Water Permitting Unit, by electronic mail at Ivar.Ridgeway@waterboards.ca.gov or by phone at (213) 620-2150.

Sincerely,

for Samuel Unger, P.E.
Executive Officer

Enclosures:
Enclosure 1 – Summary of Comments and Necessary Revisions to CIMP
Enclosure 2 – Comments on Aquatic Toxicity Monitoring
Lower Los Angeles River WMG Distribution List

cc: John Hunter, John L. Hunter and Associates, Inc.
Marty Stevenson, Kinnetic Laboratories, Inc.

Enclosure 1 – Summary of Comments and Necessary Revisions to CIMP

Lower Los Angeles River Watershed Management Group

CIMP Reference	MRP Element/ Reference (Attachment E)	Comment and Necessary Revision
Receiving Water Monitoring		
Section 3.1.2	Section V (TMDL Monitoring)	The CIMP indicates that the coordinated monitoring plan (CMP) for the LA River Metals TMDL includes monitoring of five sites within the LLAR, one of which is proposed to be discontinued, and according to the CIMP, this would leave three remaining sites. Section 8.2 of the CIMP indicates that four sites in the CMP are located within the LLAR; the figure of "five" in section 3.1.2 may be a typographical error, and if so, should be corrected.
Section 3.1.2	Section V (TMDL Monitoring)	Section 3.1.2 of the CIMP mentions monitoring in the estuary required under the Long Beach City Beaches and Los Angeles River Estuary TMDLs for Indicator Bacteria. Monitoring required under the Harbor Toxics TMDL is also mentioned. The Group indicates that this will entail additional monitoring at the S10 site to quantify metals, DDT, PCBs, and PAHs associated with suspended particles. The Group indicates that this monitoring will complement monitoring within the Harbor waters and estuary that is already included in the Greater Harbor Waters Regional Monitoring Coalition. More clarity is needed on the integration/coordination of these monitoring efforts as they relate to meeting the primary objectives and required elements of the LA County MS4 Permit's monitoring and reporting program.
Section 3.1.2	Section V (TMDL Monitoring)	Table 3-2 indicates that the LA River Nitrogen Compounds and Related Effects TMDL has not yet been approved. The original TMDL was adopted by the Regional Water Board on July 10, 2003 and became effective on March 23, 2004. It was recently revised by the Regional Water Board on December 6, 2012 and became effective on August 7, 2014; the CIMP needs to be updated accordingly. It would also be more useful to replace the Regional Water Board approval dates in Table 3-2 with the TMDL effective dates instead. Effective dates are available on the Regional Water Board's website at: http://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/tmdl_list.shtml
Section 8.2	Section V (TMDL Monitoring)	The CIMP proposes to discontinue monitoring at LAR1-11, which had been included in the CMP approved by the Executive Officer for the LA River Metals TMDL. The CIMP contends that monitoring data show LAR1-11 tends to duplicate LAR1-13 and is not necessary; however, the CIMP should include monitoring data from these sites to better support this claim. The CIMP also notes that LAR1-11 is located just above the confluence of Compton Creek with the LA River and marks the lower end of Reach 2, while LAR1-13 is below the confluence and reflects pollutant contributions from Compton Creek. As such, used in conjuction with LAR1-13, LAR1-11 could help to measure the effects of

CIMP Reference	MRP Element/ Reference (Attachment E)	Comment and Necessary Revision
		BMP programs specifically for the Compton Creek drainage area. This factor should also be considered. For these reasons, the proposal to discontinue monitoring at LAR1-11 needs to be reconsidered and further justification provided if the Group still proposes to discontinue monitoring at LAR1-11.
Section 8.3	Section V (TMDL Monitoring)	The CIMP proposes quarterly monitoring for bacteria rather than monthly monitoring as required by a Basin Plan Amendment (Resolution No. R10-007). For consistency with the Basin Plan, the CIMP must be revised to include monthly (rather than quarterly) sampling.
Outfall-Based Monitoring		
Section 3.2	Part VIII.A.2.b (Representative Monitoring)	The MRP requires stormwater outfall-based monitoring that is representative of the land uses in the Permittees' jurisdictions. It also requires monitoring at a minimum of one major outfall in each HUC 12 drainage area. Appendix A provides a description of the four proposed monitoring locations; however, no land use information is provided for three of the four sites, and for LLAR2, the discussion is unclear regarding what the site is actually draining. Possibly the map in Figure 9-1 is intended to show the drainage areas of the four sites; however this should be clarified. Information is also needed concerning land use upstream of all the sites and within the permitted area overall to show that the monitoring locations would be representative of area permitted. Finally, section 3.2 notes that only two of three HUC 12 drainage areas in the watershed management area would be addressed by the draft CIMP and that the LLAR Group "understands" that the remaining drainage area would be covered by a neighboring group; this understanding needs to be confirmed in the final CIMP. Additionally, the table on page 10 seems inconsistent with the text. The text states that one outfall site will be located within the Alhambra Wash-Rio Hondo HUC area, however the table indicates that this HUC area is being monitored "By others." On the other hand, the text indicates that the Chavez Ravine-Los Angeles River HUC area will be monitored by the LA River Upper Reach 2 WMG, but the table indicates that the LLAR4 site addresses this HUC area.
Sections 3.2 and 4	Part VIII.B.1.a (Monitoring Frequency)	The MRP requires stormwater outfall monitoring at a minimum frequency of three times per year. The draft CIMP proposes to phase-in stormwater outfall monitoring over a three-year period, stating that two sites will be monitored in the first year. The CIMP delays monitoring at two of the outfalls until storm seasons 2016-17 and 2017-18, respectively. One of the four outfall sites, LLAR2 within the

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CIMP Reference	MRP Element/ Reference (Attachment E)	Comment and Necessary Revision
		Compton Creek/LA River HUC area, is an existing monitoring site. As such, the CIMP should be revised to ensure that the three new sites are phased-in over a two-year period instead of a three-year period. This will ensure that all four sites are being monitored by the 2016-17 storm season. The CIMP also needs to specify which sites will be monitored in the first year and should ensure that the site within the Alhambra Wash-Rio Hondo HUC area is one of the two sites established in the first year so that monitoring data is collected from both principal HUC-12 areas in the first year.
Section 5	Part XIV (Monitoring Provisions)	Monitoring for PCBs in sediment or water (section 5.4 of the CIMP) should be reported as the summation of a minimum of 40 (and preferably at least 50) congeners. See Table C8 in the state's Surface Water Ambient Monitoring Program's Quality Assurance Program Plan (Page 72 of Appendix C), which can be downloaded at http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/qapp/qaprp082209.pdf for guidance. It is preferable samples be analyzed using EPA Methods 8270 or 1668C (as appropriate), and High Resolution Mass Spectrometry. The CIMP in section 5.5 should utilize Method 245.7 or 1631E for mercury to get sufficiently sensitive minimum levels for analytical results to be compared with the water quality objective.
Section 10	Part IX.B.2 (Non-Storm Water Screening)	The MRP requires at least one re-assessment of the non-stormwater outfall-based screening and monitoring program during the permit term. A commitment for such a re-assessment was not found in the CIMP and needs to be added.
Section 10	Part IX.H (Non-Storm Water Sampling Methods)	The MRP includes specific methods for sampling of non-stormwater discharges. A commitment to follow these methods was not found in the CIMP and needs to be added.
Section 10.1	Parts IX.E and IX.G (Non-Storm Water Monitoring)	The MRP requires monitoring of significant non-stormwater discharges. Section 10.1 of the CIMP would exclude from further review outfalls less than 36 inches in diameter without evidence of industrial activities upstream. Outfalls without industrial activities upstream could still be significant sources of non-stormwater discharges and should not necessarily be excluded from further review. Rather the standard prioritization criteria in Section 10.1 should be used for all outfalls, particular those that discharge to a receiving water subject to a TMDL.
Section 10.3	VII.A.1-11 (MS4 Map and Outfalls)	The MRP includes a list of 11 requirements related to MS4 mapping, outfalls and land use within the watershed management area. These requirements are discussed in section 10.3 of the CIMP. Some of the

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CIMP Reference	MRP Element/ Reference (Attachment E)	Comment and Necessary Revision
		required information was provided and some will be acquired on an ongoing basis such as identification of outfalls with significant non-stormwater discharges. However, information in response to items #3 (land use overlay) and #10 (outfall catchment areas) was not found and should be provided with the final CIMP where readily available or a schedule for providing the information should be proposed. The CIMP should also provide a reference for the source of the GIS-based data and information presented in the CIMP.
Section 10.3	IX.D.4 (MS4 Outfall Inventory)	The MRP requires an annual update of the inventory of outfalls with significant non-stormwater discharges based on the most recent information. A commitment for this update was not found in the CIMP and needs to be added.
Appendix C	Part VIII.C.1-2 (Sampling Methods)	Appendix C is missing from the draft CIMP; it appears to be intended to provide additional information concerning sampling methods and needs to be included in the final CIMP.

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ENCLOSURE 2
COMMENTS ON AQUATIC TOXICITY TESTING
LOWER LOS ANGELES RIVER CIMP

Part XII.G.1. (Page E-30) and Part XII.G.2. (Page E-30) of the Monitoring and Reporting Program states that Permittees shall conduct aquatic toxicity monitoring utilizing the critical life stage chronic toxicity test methods listed. The draft CIMP does not propose use of critical life stage chronic toxicity test methods for assessment of toxicity in wet weather samples and instead proposes use of acute toxicity test methods. This is not acceptable; the appropriate chronic toxicity test method listed in the MRP must be used and both survival and sublethal endpoints must be reported. We suggest the group consult the State Water Resources Control Board 2011 publication, "Implementation Guidance: Toxicity Testing for Stormwater" to gain insight on how to run chronic toxicity tests on wet weather samples.

Part VIII.B.1.c.vi. (Page E-23) and Part VIII.G.1.d. (Page 27) of the Monitoring and Reporting Program states that where the TIE conducted at the downstream receiving water monitoring station was inconclusive then aquatic toxicity shall be monitored at the outfall. The draft CIMP does not propose conducting this required outfall toxicity monitoring.

While development of the proposed Discharge Assessment Plan (DAP) will be useful, it cannot take the place of the required outfall toxicity monitoring following an inconclusive TIE in the receiving water. And, while there may be situations where TIEs cannot be resolved due to non-persistent toxicity and no further action on that sample can be pursued, inconclusive TIEs often result from a lack of following well-defined procedures rather than non-persistent toxicity. As mentioned elsewhere in this comment letter, including pyrethroids in the TIE procedure will reduce the occurrence of inconclusive TIEs as will including chemical testing for fipronils and its degradates for comparison to U.S. EPA benchmarks.

Additionally, the toxicity flowcharts do not show the need to proceed to outfall toxicity testing should a TIE of a toxic receiving water sample be inconclusive and instead focus on the response to non-persistent toxicity. We strongly recommend a more cohesive approach whereby the Group develops a Toxicity Assessment Plan analogous to the Discharge Assessment Plan currently proposed in the CIMP.

Part XII.I.1. (Page E-33) of the Monitoring and Reporting Program states that a toxicity test sample is immediately subject to TIE procedures if either survival or sublethal endpoints demonstrate a Percent Effect value equal to or greater than 50% at the Instream Waste Concentration. The draft CIMP does not propose to perform a TIE when at least a 50% sublethal effect is seen but instead proposes to first collect a confirmatory sample two weeks later.

This is not an acceptable approach. The CIMP seems to be implying that chronic toxicity has some inherent non-persistent quality to it that makes the results unreliable. It also implies that chronic toxicity is of lesser importance. Although it would be hard to generalize to all possible situations, the fact that a large number of invertebrates (or fish) living in a receiving water can survive an ambient pollutant concentration but are impacted in terms of growth or reproduction means that the population as a whole will be impacted, and could eventually collapse. Some species living in the

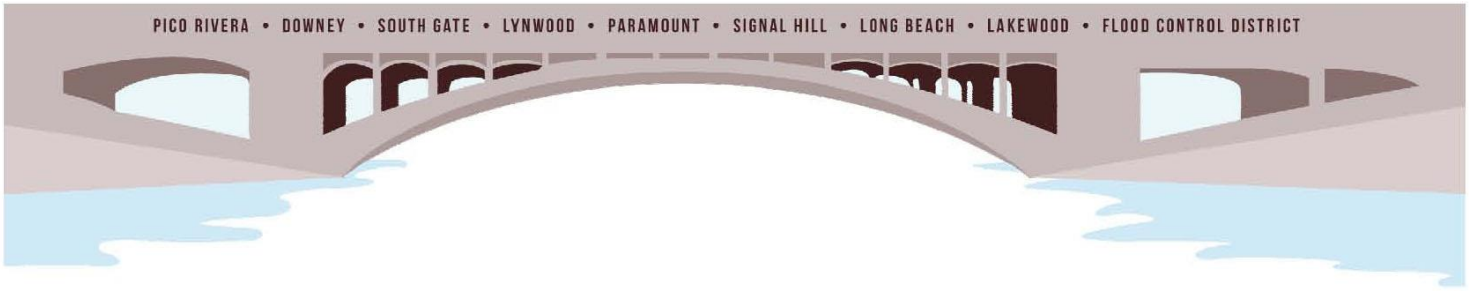
receiving water have very short lifespans and during critical times of the year may be prey for other organisms that will in turn be impacted by their population decline.

Suggested Special Study: The 2013 study released by the California Stormwater Quality Association (CASQA) entitled "Review of Pyrethroid, Fipronil and Toxicity Monitoring Data from California Urban Watersheds" reviewed stormwater data from studies conducted during 2005 - 2012 and highlighted the toxicity impacts from use of pesticides not currently required to be monitored for by the MRP. We suggest the group begin monitoring for these chemicals in the receiving water and, in addition, assess toxicity using the 2002 acute toxicity testing protocol (EPA-821-R-02-012) with the amphipod *Hyalella azteca* as the test organism. *H. azteca* is known to be much more sensitive to pyrethroids than is *Ceriodaphnia dubia*, while the latter is useful for its sensitivity to OP pesticides. The two species together may also prove to be more useful in detecting toxicity from fipronil. And, should 50% or greater effect be detected in the toxicity test, we suggest a procedure to incorporate pyrethroids into the subsequent TIE be documented (three possible treatments have been identified by researchers, see http://www.pubfacts.com/detail/20018342/Focused-toxicity-identification-evaluations-to-rapidly-identify-the-cause-of-toxicity-in-environment). While fipronil does not have a TIE procedure identified currently, chemical testing for the parameter (and degradates) and comparison to U.S. EPA Office of Pesticide Program's aquatic life benchmarks at http://www.epa.gov/oppefed1/ecorisk_ders/aquatic_life_benchmark.htm will aid in determining the cause(s) of toxicity in order to follow up with outfall testing of the parameter(s) with the ultimate goal of removing the source. This approach will also help minimize inconclusive TIE results which would lead to required toxicity testing in a representative upstream outfall.

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Lower Los Angeles River Mailing Distribution List

Name	City	Email Address
Jason Wen	Downey	JWen@downeyca.org
Konya Vivanti	Lakewood	kvivanti@lakewoodcity.org
Anthony Arevalo	Long Beach	Anthony.Arevalo@longbeach.gov
Emilio Murga	Lynwood	emurga@lynwood.ca.us
Sarah Ho	Paramount	sho@paramountcity.com
Gladis Deras	Pico Rivera	gderas@pico-rivera.org
Steve Myrter	Signal Hill	SteveMyrter@cityofsignalhill.org
Arturo Cervantes	South Gate	acervantes@sogate.org
Angela George	LA County, DPW	ageorge@dpw.lacounty.gov
Robert Wu	Caltrans	robert.wu@dot.ca.gov



Lower Los Angeles River Watershed Management Program

January 28, 2015

Prepared For:

Lower Los Angeles River Watershed Group

Prepared By:

John L. Hunter and Associates, Inc.

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EXECUTIVE SUMMARY

This Watershed Management Program (WMP) sets forth a path to achieve pollutant reductions in the waterbodies of the Lower Los Angeles River and its tributaries. The WMP includes a discussion of existing and planned watershed control measures, a Reasonable Assurance Analysis (RAA) based upon the Watershed Management Modeling System previously developed by the Los Angeles County Flood Control District in collaboration with the USEPA and a Coordinated Integrated Monitoring Program (CIMP) to be implemented over a three year period.

The Watershed Group has been working cooperatively towards the goal of a cleaner Los Angeles River for several years. Beginning in the late 2000s, all Cities within the Group (as part of a larger Gateway cities effort) pursued and were awarded a grant to install full trash-capture inserts and partial capture retractable screens catch basins. Thus far nearly 4,800 full capture inserts have been installed in the Lower LAR drainage area. In 2009 the Lower LAR cities again worked together, forming Technical Committees and funding the development of Implementation Plans for Reach 1 and Reach 2 and tributaries for the Metals TMDL of the Los Angeles River. The Technical Committees that were formed as a result of the Metals TMDL effort continued their effort and in 2011, applicable agencies of both the Reach 1 and 2 committees merged into a single Lower LAR Watershed Committee. The funding of Committee activities has been authorized by city council and governing board Memorandums of Understanding through 2028. This cooperative effort continues and in 2014, the Watershed Group was notified of their successful multi-city grant application (as part of a larger Gateway effort) to install 23 LID BMPs along selected major thoroughfares.

These efforts are in addition to many equally successful efforts by individual agencies which have resulted in the planning, construction and installation of both regional and local stormwater treatment systems. These include:

- The Los Angeles County Flood Control District's Dominguez Gap Wetlands,
- South Gate's Azalea infiltration system,
- South Gate's Atlantic Boulevard tree box filtration systems,
- Signal Hill's and Long Beach's Hamilton Bowl trash capture systems and
- Downey's over 500 treatment systems on individual parcels.

Many additional individual treatment systems are located in cities throughout the Lower LAR Watershed. This summer, ground breaking is anticipated for the City of Long Beach's Deforest Park natural habitat.

Prior to 2012, National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) Permits required cities and agencies to implement a series of best management practices such as street sweeping and catch basins cleaning to demonstrate compliance. With the adoption of the fourth term MS4 permit by the Los Angeles Regional Water Quality Control Board on November 8, 2012, the emphasis shifted to a more watershed based effort that includes the goals of achieving specific pollutant targets as runoff leaves the storm drain system and enters the main river channels.

This WMP is a long-term planning document that takes a comprehensive look at the Lower LAR Watershed, including its land uses, MS4 system, existing and planned control measures (both structural and nonstructural), existing storm water treatment systems, historical monitoring data and the various segments of the Los Angeles River and its tributaries that have been identified as impaired by various pollutants. Using that data, the Watershed Management Modeling System – one of the three modeling system authorized by the MS4 Permit – is used to generate the RAA which predicts an optimal combination of structural treatment systems and construction timelines to achieve the goals of the MS4 Permit. The RAA distributes the responsibility for implementation of future treatment systems amongst all Lower LAR Watershed Cities.

The RAA identifies wet weather zinc as the primarily pollutant of concern[1] and that by designing treatment systems and other non-structural controls measures for zinc, the targets for other pollutants of concern will also be met. The first target for zinc occurred in 2012, when 25% of the area within the Lower LAR Watershed was to meet the wet weather zinc reduction goal. The wetlands, detention basins, extensive number of per-parcel treatment systems and non-structural control measures were designed to achieve that goal along with other pollutant reductions and multi-use factors such as groundwater recharge and recreational use.

The next wet weather target specified in the MS4 Permit occurs in 2024 when 50% of the area must achieve the zinc reduction goal. In order to maintain continued progress towards the 2024 goal, this WMP establishes an early-action milestone of 31% that is to be achieved through an effective combination of enhanced non-structural control measures and structural treatment projects that have been completed or are substantially through the planning and design phase by December 28, 2017. The RAA provides a recommended volume of wet weather runoff on a city-by-city basis to be used as the target in order to meet the early-action step of 31% by December 28, 2017, and the MS4 Permit targets of 50% by 2024 and 100% by 2028. Cumulatively, the RAA establishes a final (2028) goal of capturing and treating 803.2 acre feet. The ultimate cost will vary considerably depending on the availability and configuration of suitable treatment locations and effectiveness of nonstructural watershed control measures but is estimated to be in the range of $156 million - $293 million. The treatment volumes recommended by the RAA are estimates based on current land used data, historical monitoring and assumed treatment system efficiencies. The WMP also incorporates an adaptive management strategy to adjust and modify the various control measures as necessary.

A Coordinated Integrated Monitoring Program (CIMP) has been developed at a part of this WMP which greatly expands the monitoring of water quality in the Lower LAR watershed. The CIMP goals are in part to measure the overall effectiveness of the control measures the Watershed Group is implementing. Four new outfall monitoring sites along the Los Angeles River Channel and three new bacteria TMDL monitoring sites within the Los Angeles River Estuary are scheduled to be phased in over a 3-year period. These will be in addition continued operation of three of the four existing Metals TMDL

[1] The discharge of copper is anticipated to be reduced as copper is removed from brake pads over the next decade. Trash is on a separate compliance path with cities individually reporting greater than 90 percent of all catch basins retrofitted with full trash capture inserts or equivalent within the current Trash TMDL reporting year (ending September 30, 2014)

monitoring stations and the existing Mass Emission Station currently operated by the Los Angeles County Flood Control District near the interface of the river and estuary which measures the comingled runoff from the entire Los Angeles River Watershed.

This WMP and its components, including Chapter 3 *Selection of Watershed Control Measures*, Chapter 4 *RAA* and Chapter 8 *CIMP* outline a path to achieve significantly improved water quality in the Lower LAR Watershed. The WMP outlines a path based on the optimal placement of treatment systems determined by the RAA, but this is not the only viable path. The Watershed Group can follow the adaptive management strategy described in Chapter 9 to adjust the number, locations and sizes of future treatment systems as long as the timelines and goals of this WMP are followed. While this WMP is developed for the Watershed Group to implement the recommended volume reduction goals on a city-by-city basis, it does not preclude participating agencies from collaborating on potentially more cost effective regional and multi-city runoff treatment systems.

As part of the overall collaborative and inclusive effort, this Draft Watershed Management Program was presented at a public stakeholder meeting at the Downey City Hall on May 1, 2014. The Watershed Control Measures, Reasonable Assurance Analysis and Coordinated Integrated Monitoring Programs were discussed and comments from interested members of the public were solicited.

1 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Watershed Management Program (WMP) has been developed to implement the requirements of Los Angeles Regional Water Quality Control Board Order Nos. R4-2012-0175 and R4-2014-0024 (National Pollutant Discharge Elimination System (NPDES) Permit Nos. CA004001, CA004003 respectively) on a watershed scale. In addition, elements of this WMP relating to Total Maximum Daily Loads (TMDLs) address requirements of California State Water Resources Control Board Order No. 2012-0011-DWQ (the Caltrans Stormwater Permit) for those TMDLs within the watershed area as described in the following section. Combined, the Orders set forth waste discharge requirements for the Municipal Separate Storm Sewer (MS4) discharges by Caltrans, the Los Angeles County Flood Control District (LACFCD), the County of Los Angeles and 85 cities within the coastal watersheds of Los Angeles County (Permittees). These requirements include three fundamental elements: (i) effectively prohibit nonstormwater discharges through the MS4, (ii) implement controls to reduce the discharge of pollutants to the maximum extent practicable, and (iii) other provisions the Regional Water Board has determined appropriate for the control of such pollutants.[1] The ultimate goals of the WMP are listed in Section 1.2.3.

1.1.1 PARTICIPATING AGENCIES

This WMP is a collaborative effort of ten participating agencies with MS4 facilities within the subwatersheds[2] of Reach 1 and Reach 2 of the Los Angeles River, Compton Creek and the Rio Hondo. For the purposes of this WMP, the area defined by the boundaries of the participating agencies with these subwatersheds is referred to as the Lower Los Angeles River Watershed (Lower LAR Watershed). The participating agencies and their respective MS4 stormwater Permits addressed by this WMP are listed in Table 1-1.

Table 1-1: Participating Agencies of the Lower LAR Watershed

Agency	Permit Order No.	Permit Name
Downey	R4-2012-0175	Los Angeles County NPDES MS4 Permit (LA MS4 Permit)
LACFCD[3]		
Lakewood		
Lynwood		
Paramount		
Pico Rivera		
Signal Hill		
South Gate		
Long Beach	R4-2014-0024	Long Beach NPDES MS4 Permit (LB MS4 Permit)
Caltrans[3]	2012-0011-DWQ	Caltrans Stormwater Permit (Caltrans MS4 Permit)

[1] 2012 LA NPDES MS4 Permit Findings, pg. 20

[2] Subwatersheds within this WMP are the "HUC-12 Equivalent" drainage areas as defined in 1.E.3.

[3] LACFCD and Caltrans participation is restricted to their land and facilities in the Lower LAR Watershed.

1.1.2 MS4 PERMITS ADDRESSED

As noted in Table 1-1, Caltrans and the City of Long Beach are regulated under their own MS4 Permits, separate from the Los Angeles MS4 Permit. The extent to which this impacts the contents of this WMP is explained in this section.

LONG BEACH AND LOS ANGELES MS4 PERMITS

The Long Beach and Los Angeles MS4 Permits, adopted by the Los Angeles Regional Water Quality Control Board (Regional Board) within 15 months of each other, contain similar language and requirements. Specifically, both Permits include a WMP approach to compliance. These similarities allow for the preparation of one WMP to address the requirements of both permits. Except where otherwise noted, the term *MS4 Permit* will refer exclusively to the Los Angeles and Long Beach MS4 Permits.

CALTRANS STORMWATER PERMIT

Discharges to Caltrans' MS4 are regulated through the Caltrans MS4 Permit. Although the Caltrans Stormwater Permit does not include a WMP compliance approach like the Los Angeles and Long Beach MS4 Permits, its TMDL provisions do require cooperation with agencies subject to the same TMDLs. As such, Caltrans' participation is restricted to those sections of the WMP related to TMDL requirements. Caltrans has acknowledged their intent to participate.

1.1.3 NON-PARTICIPATING AGENCIES

All other permitted agencies within these subwatersheds that are not listed above have developed either individual or collaborative WMPs or draft EWMPs separately and are not participating in this WMP. Non-participating agencies include the County of Los Angeles (unincorporated areas), the Cities of Los Angeles, Compton and Carson and multiple cities within Reach 2 of the Los Angeles River and the Rio Hondo. Figure 1-1 shows the participating agencies within the Lower LAR.

1.1.4 THE LOWER LOS ANGELES RIVER WATERSHED GROUP

DESIGNATION

The participating agencies have a long history of working together to address TMDL issues. Prior to the adoption of the current MS4 Permits[4], the agencies were under a Memoranda of Understanding to develop Implementation Plans for the Los Angeles River Metals TMDL. After Permit adoption, the agencies decided to continue their collaborative efforts to develop a WMP. In addition, the LACFCD decided to participate in this joint effort. The agencies' intent was to focus collective resources on water quality prioritization and implementation efforts to their shared receiving waters. The ten agencies submitted a Notice of Intent to develop a WMP to the Regional Board prior to the June 28, 2013[5], deadline and each signed a Memoranda of Understanding to develop the WMP.

[4] The Los Angeles MS4 Permit adopted November 8, 2012, expires December 28, 2017 and the Long Beach MS4 Permit adopted February 6, 2014, expires March 28, 2019

[5] The Notice of Intent was approved by the Regional Board on September 25, 2013

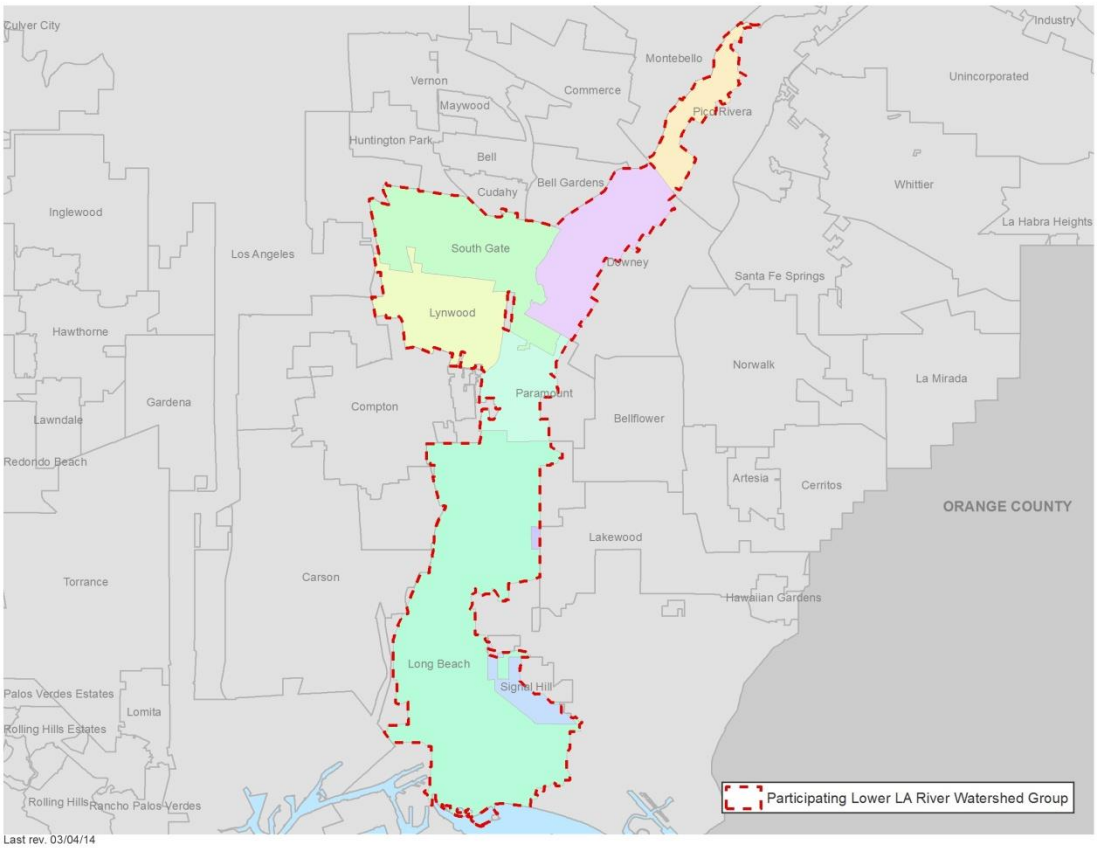


Figure 1-1: Participating Agencies Map

BOUNDARIES

The Lower LAR Watershed is located within the Los Angeles River Watershed Management Area (WMA) as designated in the Los Angeles MS4 Permit (Figure B-4). The three main water bodies located within the Lower LAR - Compton Creek, Los Angeles River (Reach 1 and 2)[6] and Rio Hondo Reach 1 - are defined by the Regional Board as inland Surface Waters of the State. As part of the main stem of the Los Angeles River, Reaches 1 and 2 and the Estuary are designated Waters of the United States (EPA, 2010). By definition its tributaries are also Waters of the United States, which includes Compton Creek and Rio Hondo.

Within the Lower LAR Watershed, the main channels of the Los Angeles River, Compton Creek and the Rio Hondo and most of their tributaries are owned by the LACFCD. The Army Corps of Engineers does not have ownership of channels, although there are privately owned and maintained drains and open channels.

[6] The LAR Estuary is not considered an inland Surface Water of the State

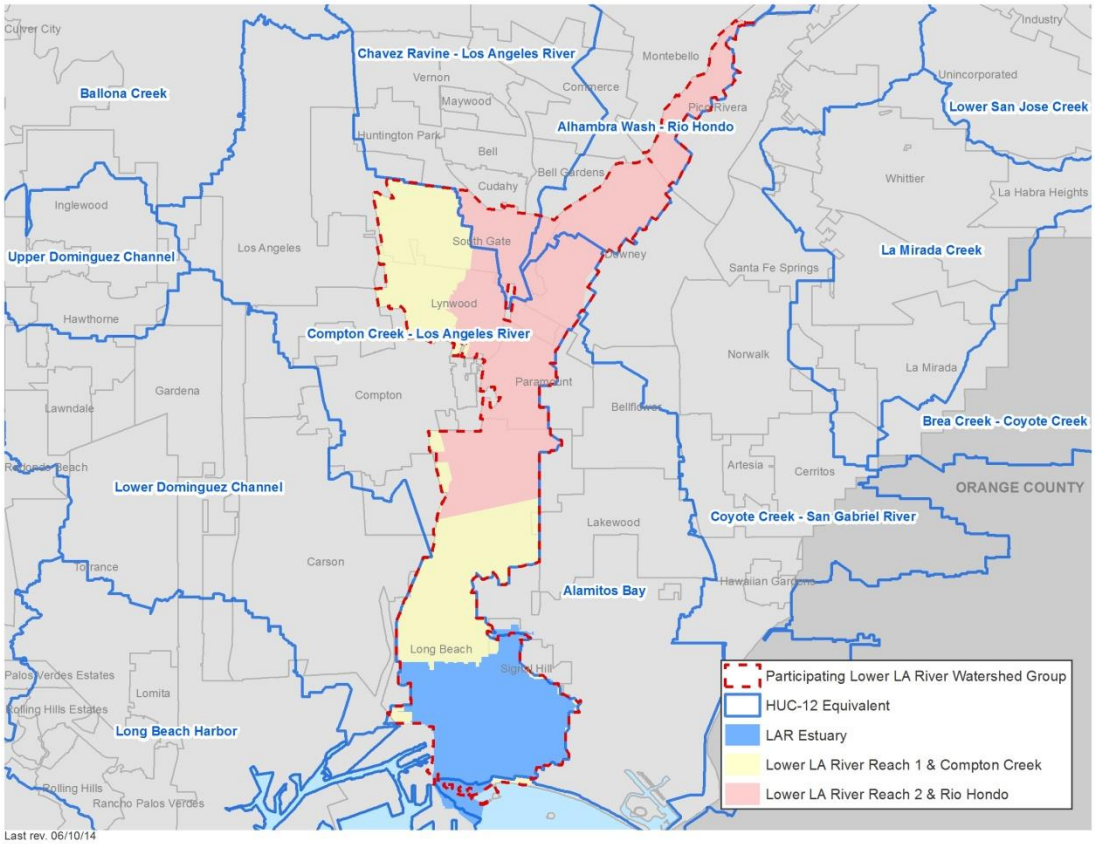


Figure 1-2: Watershed Map with HUC-12 Equivalent Subwatersheds

HYDROLOGIC UNIT CODES (HUC)

The United States Geological Survey's (USGS) Hydrologic Unit Codes (HUCs) are referenced in the MS4 Permit requirements. The HUC system divides the United States into a hierarchical classification of defined, hydrologically-based watersheds. The LACFCD found that some of the HUC boundaries within the Los Angeles Basin were incorrect and have since developed more accurate "HUC equivalents". Following the HUC equivalent system, Compton Creek and the Los Angeles River Estuary and Reach 1 are within subwatershed 180701050402, the Los Angeles River Reach 2 is within subwatersheds 180701050401 and 180701050402 and Rio Hondo Reach 1 is within subwatershed 180701050303. The subwatersheds of the Lower LAR are shown in Figure 1-2 and listed in Table 1-2.

The subwatersheds defined by these 12 digit numbers are referred to as HUC-12. Groups of subwatersheds that share a common downstream waterbody form a watershed. A watershed is designated by the first 10 digits of a HUC-12 and as such is referred to as HUC-10. In the case of the Lower LAR Watershed, Compton Creek and Los Angeles River Reach 1 and 2 are within the Lower Los Angeles River HUC-10 watershed and the Rio Hondo Reach 1 is within the neighboring Rio Hondo HUC-10 watershed. Both watersheds are within the Los Angeles HUC-08 subbasin, which shares most of its borders with the Los Angeles River WMA (Figure B-4).

Table 1-2: Subwatersheds/Water Bodies within the Lower LAR Watershed

Subwatershed/ Water Body	HUC 12 Equivalent	HUC Name	Area within Lower LAR Watershed (mi^2)
Compton Creek	180701050402	Compton Creek – Los Angeles River	6.83
LA River Reach 1	180701050402	Compton Creek – Los Angeles River	16.3
LA River Reach 2	180701050402	Compton Creek – Los Angeles River	16.18
	180701050401	Chavez Ravine – Los Angeles River	
LA River Estuary	180701050402	Compton Creek – Los Angeles River	
Rio Hondo Reach 1	180701050303	Alhambra Wash – Rio Hondo	6.04

WATERSHED AUTHORITY GROUP

Watershed Authority Groups (WAGs) as described in State Assembly Bill 2554, which in 2010 amended the Los Angeles County Flood Control District Act, are referenced in the MS4 Permits. The purpose of the WAGs is to implement collaborative water quality improvement projects and services, with the goal of improving water quality and reducing stormwater and urban runoff pollution. The creation and funding of the WAGs has not yet occurred - it is dependent upon voter approval of the LACFCD's Water Quality Funding Initiative (a countywide parcel fee). AB 2554 divides the County into nine WAGs - the Lower LAR Watershed is located within the Lower Los Angeles River WAG, which shares borders with the Lower Los Angeles River HUC-10 watershed. Figure 1-3 is a complete map of the WAG groups.

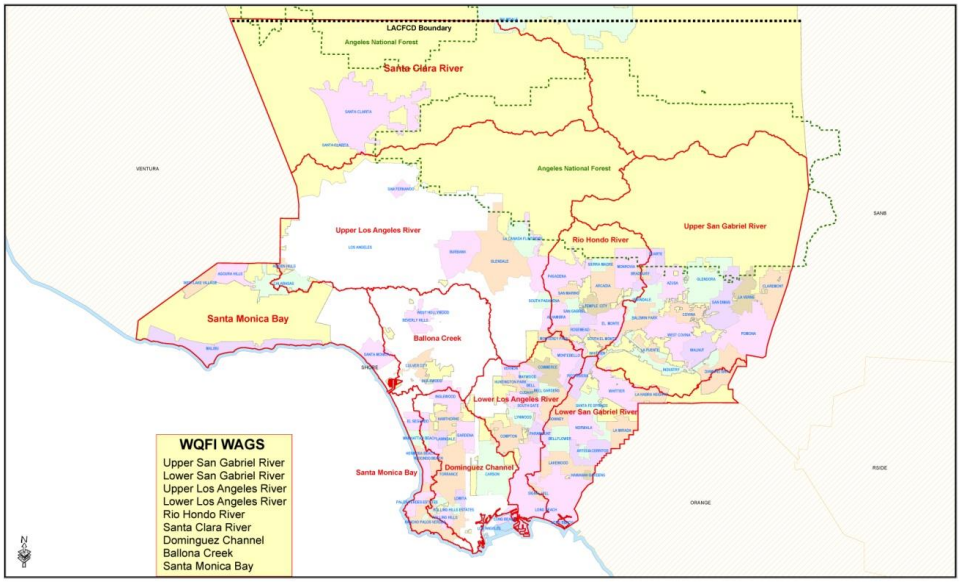


Figure 1-3: Watershed Authority Groups Map

1.2 THE WATERSHED MANAGEMENT PROGRAM

1.2.1 PURPOSE OF THE MS4 PERMIT

MS4s receive stormwater and non-stormwater discharges from various sources, including municipal MS4s and other public agencies, discharges under NPDES permits or authorized by the USEPA[7], groundwater and natural flow. As the discharges flow over the urban landscape, they may pick up pollutants generated by urban activities, such as metals, bacteria, pesticides, fertilizers and trash. Polluted stormwater and non-stormwater discharges conveyed through the MS4 ultimately reach receiving waters, resulting in adverse water quality impacts.[8]

The goal of the MS4 Permit is to reduce the discharge of these pollutants from MS4s to the maximum extent practicable.

1.2.2 WATERSHED MANAGEMENT EMPHASIS

The watershed management approach to permit implementation – described in the current MS4 Permits as a voluntary approach to compliance – is a departure from previous permit structures. The previous MS4 Permits (Order Nos. 01-182 and 99-060) addressed implementation through jurisdictional Stormwater Quality Management Programs (SQMPs). The Los Angeles countywide SQMP, prepared jointly by the Permittees and approved by the Regional Board in 2001, described the controls to be implemented in order to comply with the special provisions (now referred to as the Minimum Control Measures, or MCMs) of the MS4 Permit. These controls were identical for each Permittee and did not 1) differentiate between watersheds or agencies or 2) target or identify priority pollutants.

The emphasis of the prior SQMP approach was rote program development and implementation. In contrast, management actions under the WMP are driven by the water quality conditions of the receiving waters and outfalls within the watershed.

The Regional Board outlines several reasons for this shift in emphasis from the previous MS4 Permit. A watershed based structure for permit implementation is consistent with TMDLs developed by the Regional Board and USEPA, which are established at a watershed or subwatershed scale and are a prominent part of the MS4 Permit. The participating agencies have already begun collaborating on a watershed scale to develop monitoring and implementation plans required by TMDLs.

1.2.3 WATERSHED MANAGEMENT GOALS

Addressing MS4 discharges on a watershed scale focuses on water quality results by emphasizing the receiving waters and outfalls within the watershed[9]. The conditions of the receiving waters drive

[7] Including discharges subject to a decision document approved pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

[8] MS4 Permit Fact Sheet (pg. F7)

[9] MS4 compliance is measured at 1) Receiving water monitoring, 2) Stormwater outfall based monitoring, 3) Non-storm water outfall based monitoring, and 4) New Development/Re-development effectiveness tracking.

management actions, which in turn focus on the measures to address pollutant contributions from MS4 discharges.

The ultimate goals of the Watershed Management Programs is to ensure that discharges from the MS4:

1. Achieve applicable Water Quality Based Effluent Limitations (WQBELs) that implement TMDLs,
2. Do not cause or contribute to exceedances of receiving water limitations,
3. Nonstormwater discharges from the MS4 are not a source of pollutants to receiving waters.

1.2.4 WATERSHED MANAGEMENT APPROACH

In order to achieve the goals listed in the previous section, the approach of the WMP is to:

- Prioritize water quality issues resulting from stormwater and non-stormwater discharges from the MS4 to receiving waters,
- Identify and implement strategies, control measures, and BMPs that:
    - Achieve applicable water quality-based effluent limitations[10]
    - Do not cause or contribute to exceedances of receiving water limitation[11]
    - Do not include non-stormwater discharges that are effectively prohibited[12]
    - Ensure that controls are implemented to reduce the discharge of pollutants to the maximum extent practicable[13]
- Execute an integrated monitoring program and assessment program[14] to determine progress towards achieving applicable limitations and/or action levels
- Modify strategies, control measures, and BMPs as necessary based on analysis of monitoring data collected pursuant to the Monitoring and Reporting Program (MRP) to ensure that applicable water quality-based effluent limitations and receiving water limitations and other milestones set forth in the WMP are achieved in the targeted timeframes.
- Provide opportunity for meaningful stakeholder input. This includes participation in a permit-wide WMP technical advisory committee (TAC) that advises and participates in the development of the WMP from month six through the date of program approval.

The overall approach is adaptive, whereby BMPs will be implemented, their effectiveness monitored and modifications to this WMP will be made as needed. These modifications will maintain consistency with the assumptions and requirements of applicable TMDL Waste Load Allocations.

1.2.5 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The goals and objectives of the WMP may be achieved by development of storm water structural controls that may require discretionary approval subject to review under the California Environmental

[10] Pursuant to Part VI.E and Attachments L through R pursuant to corresponding compliance schedules
[11] Pursuant to Parts V.A and VI.E and Attachments L through R of the Permit
[12] Pursuant to Part III.A of the Permit
[13] Pursuant to Part IV.A.1 of the Permit
[14] Pursuant to Attachment E – MRP, Part IV of the Permit

Quality Act (CEQA). The participating agencies intend to comply with CEQA when implementing structural BMPs. Public agencies responsible for carrying out or approving stormwater structural controls are identified as the lead agency. The environmental review required imposes both procedural and substantive requirements. At a minimum, the lead agency must adhere to the consultation and public notice requirements set forth in the CEQA Guidelines, make determinations whether the proposed stormwater structural control is a "project", and if so, conduct an initial review of the project and its environmental effects. The lead agency must identify and document the potential environmental impacts of the proposed project in accordance with CEQA, (Public Resources Code Section 21000 et seq.), and the CEQA Guidelines (Title 14 of the California Code of Regulations, Section 15000, et seq.).

Certain classes of projects have been determined not to have significant effect on the environment and are exempt from the provisions of CEQA by statute or category. When a public agency decides that a project is exempt from CEQA, and the public agency approves or determines to carry out the project, the agency may file a Notice of Exemption. For projects deemed not exempt, the lead agency will prepare and Initial Study and decide whether a Negative Declaration will be required for the project, or depending on the potential effects, a further, and more substantial review may be conducted in the form of an Environmental Impact Report (EIR). A project may not be approved as submitted if feasible alternatives or Mitigation Measures are able to substantially lessen the significant environmental effects of the project. Moreover, environmental review must include provisions for wide public involvement, formal and informal, in order to receive and evaluate public reactions to environmental issues, and when deciding the matter, the lead agency must consider all comments it receives (Cal. Pub. Res. Code § 21091(d)(1); 14 CCR § 15074(b)). The lead agency will use the EIR in determining the environmental effects of the proposed storm water treatment control project, and whether or not to approve the proposed project. If the proposed project is approved, all conditions and mitigations made in the adopted EIR will become part of any subsequent actions taken by the lead agency. The EIR will also be used by permitting agencies, funding agencies and the public to support proposed project decisions.

The National Environmental Quality Act (NEPA) comes into play less often than CEQA, but may be included for storm water treatment control projects involving federal funding. A joint NEPA and CEQA review process is encouraged to improve coordination and avoid redundancies. Like CEQA, NEPA process provides opportunities to address issues related to proposed projects early in the planning stages. NEPA was codified under Title 42 of the United States Code sections 4331 et seq. (42 U.S.C. 4331 et seq.).

1.3 LOWER LOS ANGELES RIVER WATERSHED

1.3.1 OVERVIEW OF THE LOS ANGELES RIVER WATERSHED

The Los Angeles River Watershed drains a watershed of 824 square miles[15]. The Los Angeles River WMA is one of the largest in the region and is also one of the most diverse in terms of land use patterns. Approximately 324 square miles of the watershed are covered by forest or open space land including the area near the headwaters, which originate in the Santa Monica, Santa Susana, and San Gabriel Mountains. The remainder of the watershed is highly developed. The river flows through the San Fernando Valley past heavily developed residential and commercial areas. From the confluence with the Arroyo Seco, north of downtown Los Angeles, to the confluence with the Rio Hondo, the river flows through industrial and commercial areas and is bordered by rail yards, freeways, and major commercial and government buildings. From the Rio Hondo to the Pacific Ocean, the river flows through industrial, residential, and commercial areas, including major refineries and petroleum products storage facilities, major freeways, rail lines, and rail yards serving the Ports of Los Angeles and Long Beach. Due to major flood events at the beginning of the century, by the 1950s most of the Los Angeles River was lined with concrete. The Los Angeles River tidal prism/estuary begins in Long Beach at Willow Street and runs approximately three miles before joining with Queensway Bay. The channel has a soft bottom in this reach with concrete-lined sides.

The remaining discussion on the watershed will solely refer to the specific characteristics of the Lower Los Angeles River Watershed.

1.3.2 LOWER LOS ANGELES RIVER WATERSHED AREA

REGIONAL AND LOCAL SETTING

The Lower LAR Watershed encompasses approximately 43.7 square miles (27,981 acres) within Los Angeles County and comprises 5.3% of the drainage area of the Los Angeles River Watershed. The boundaries of the watershed are shown in Figure 1-1 and further explained in Section 1.1.

CLIMATE

Average annual precipitation for the watershed area is highly variable and terrain-dependent, averaging fifteen (15) inches annually and mainly occurring during the winter months (November through April). Due to the atmospheric dominance of the stable marine layer, significant precipitation is rare between May and October.

During the winter months Pacific storms often push cold fronts across California from northwest to southeast. These storms and frontal systems account for the vast bulk of the area's annual rainfall. Such rainy season storms are migratory, with wet and dry periods alternating during the winter and early

[15] MS4 Permit Fact Sheet (pg. F94)

spring with irregularity in timing and duration. Rainfall patterns average 3.68 inches of rainfall in February to 0.01 inches of rainfall in July[16].

With the highly developed conditions within the watershed, most stormwater flows generated by the rainfall is routed to the ocean through the curb and gutters along the streets, catch basins and storm drains into the Los Angeles River. The velocity of the storm flows within this watershed ranges up to 20 feet per second within the waterways.

RAINFALL AND FLOW CHARACTERISTICS

Historical rainfall records from two existing rain gauges located near the Lower LAR Watershed were obtained and utilized in this analysis. These meteorological stations and resulting rain gauge data are maintained by National Climatic Data Center. The gauges were chosen due to their active status and the duration of available data. Their locations are shown in Figure 1-4 with detailed location information provided in Table 1-3.

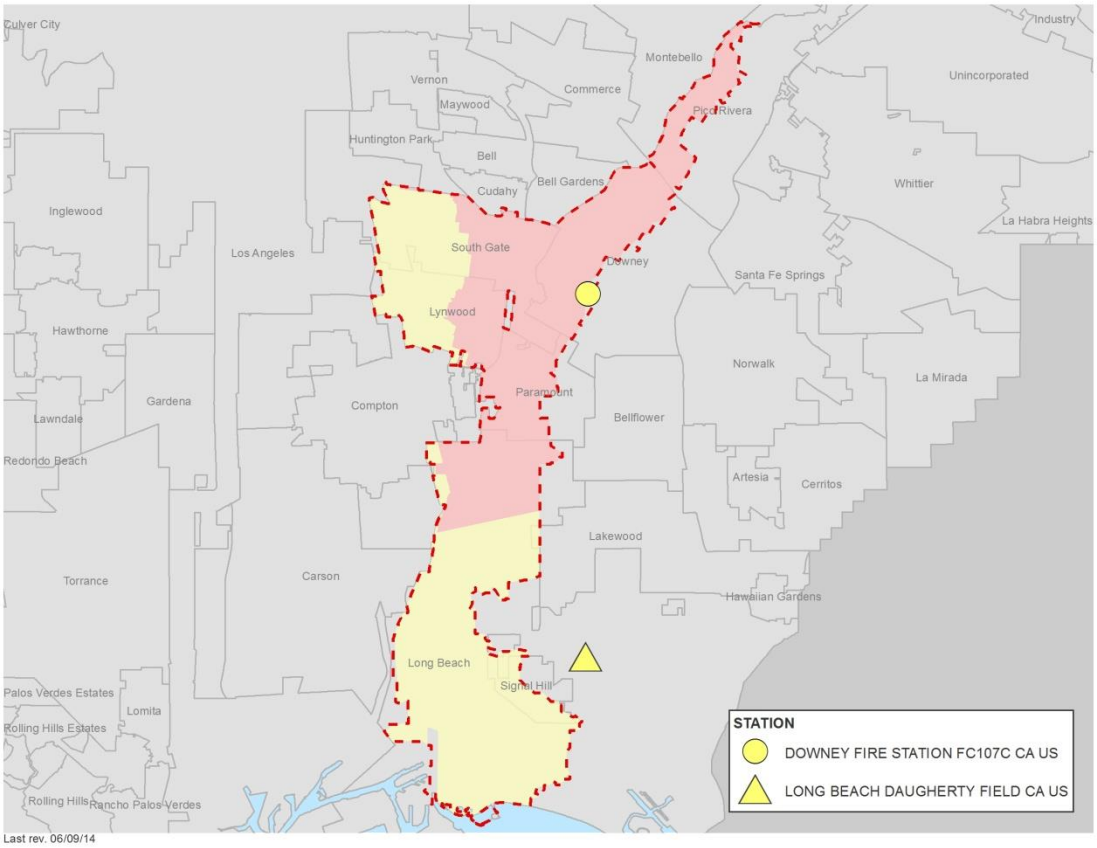


Figure 1-4: Rainfall Gauge Stations in Downey and Long Beach (Yellow Squares)

[16] National Climatic Data Center, http://lwf.ncdc.noaa.gov

Table 1-3: Rainfall Data Summary

Station ID	Station	Period	Latitude	Longitude	Elevation (ft)	Mean Annual Precipitation (in)	85th Percentile Storm (in)
USC00042494	Downey Fire Station	1949 - 2012	33.929	-118.145	110.0	12.32	0.22
USW00023129	Long Beach Daugherty Field	1949-2014	33.811	-118.146	30.84	11.20	0.18

(1) National Climatic Data Center, http://lwf.ncdc.noaa.gov

Average monthly rainfall for the historical record has been calculated for each rain gauge and is provided in Table 1-4. The monthly values are similar among the two rain gauges.

Table 1-4: Summary of Average Monthly Rainfall (in)

Month	Downey Fire Station	Long Beach Daugherty Field
January	3.0	2.6
February	3.2	2.9
March	2.4	1.8
April	1.1	0.7
May	0.2	0.2
June	0.1	0.1
July	<0.1	<0.1
August	0.1	0.1
September	0.3	0.2
October	0.4	0.4
November	1.6	1.2
December	2.5	1.8
Total Average Monthly Rainfall	**1.2**	**1.0**

(1) National Climatic Data Center, http://lwf.ncdc.noaa.gov

DRY WEATHER FLOWS TO THE LOWER LOS ANGELES RIVER

Dry weather flow in the Los Angeles River comes predominantly from effluent discharges and groundwater inflow. Sources of effluent discharges in the Lower LA River watershed include wastewater treatment plants, urban runoff such as irrigation overflows and car wash water, and various industrial discharges.

The Sanitation Districts of Los Angeles County maintain a regional, interconnected sewerage system called the Joint Outfall System. The Joint Outfall System includes six satellite water reclamation plants (WRPs), including the Whittier Narrows WRP, which discharges effluent during dry weather into the Rio Hondo above the Whittier Narrows dam. The Whittier Narrows WRP is located at 301 N. Rosemead Boulevard in the City of El Monte. The plant occupies 27 acres south of the Pomona (60) Freeway, and provides primary, secondary and tertiary treatment for 15 million gallons of wastewater per day. Most of the reclaimed water is reused as groundwater recharge into the Rio Hondo and San Gabriel Coastal

Spreading Grounds, or for irrigation at an adjacent nursery. Remaining effluent is discharged directly into the Rio Hondo and the San Gabriel River at 3 effluent discharge points.

The average monthly effluent discharge from the LA County Sanitation District's Whittier Narrows Water Reclamation Plant was 6.44 MGD in 2012, with the average monthly max being 8.05 MGD and the average monthly minimum flows measured at 4.97 MGD.

The three publicly owned treatment works (POTWs) discharge to the Los Angeles River (Tillman Water Reclamation Plant, LA-Glendale Water Reclamation Plant, and Burbank Water Reclamation Plant) and constitute the majority of the flow and metals loadings during dry weather[17]. The critical flow for the entire river (each reach and tributary) is 203 cfs, which is equal to the combined design flow of the three POTWs (169 cfs) plus the median flow from the storm drains and tributaries (34 cfs).

WET WEATHER FLOWS TO THE LOWER LOS ANGELES RIVER

In addition to stormwater flows within the Los Angeles Basin, wet weather flows from the Santa Monica Mountains, the Verdugo Mountains, the Santa Susana Mountains and the San Gabriel Mountains also contribute to flows in the Los Angeles River.

WATERSHED CATCHMENT HYDROLOGIC CONNECTIVITY

The upstream limit of the LLAR subwatershed begins at the north stem of Reach 2 Los Angeles River within the City of South Gate and the downstream limit ends at the Estuary. The main reach through the watershed is the Los Angeles River, with Compton Creek and the Rio Hondo as major tributaries. The stretch of Los Angeles River within the watershed consists of a concrete lined channel spanning 400 to 465 feet in width. Compton Creek and the Rio Hondo are primarily concrete channels within the Lower LAR Watershed. Figure 1-5 shows the LACFCD storm drain system within the Lower LAR Watershed as well as its main channels and tributaries.

The Compton Creek subwatershed drains approximately 42 square miles to its confluence with the Los Angeles River. The subwatershed is almost entirely developed.

The Rio Hondo subwatershed drains approximately 143 square miles to its confluence with the Los Angeles River.

The Lower LAR Watershed drains runoff directly from urbanized area totaling approximately 43.7 square miles. From its upstream beginning in South Gate to its downstream confluence with the Los Angeles River Estuary, the Lower LAR stretches approximately 13.3 miles.

The Los Angeles County Department of Public Works provided the delineation of the catchments within each subwatershed. Approximately 53 catchments are located within this watershed[18]. These delineations are based on a combination of contour information and existing underground storm drain systems.

[17] Los Angeles River Metals TMDL Basin Plan Amendment, 2006

[18] Los Angeles County Watershed Management Modeling System, http://dpw.lacounty.gov/wmd/wmms/

Drainage areas for individual outfalls are not readily available at this time. Defining these areas would require significant resources. The Group proposes to provide drainages areas for major outfalls with significant discharges and outfalls to be monitored as part of the CIMP. To complete this task, existing drainage maps from the LACFCD and/or cities will be obtained and converted to GIS project files. This task will be completed within one year of WMP approval.

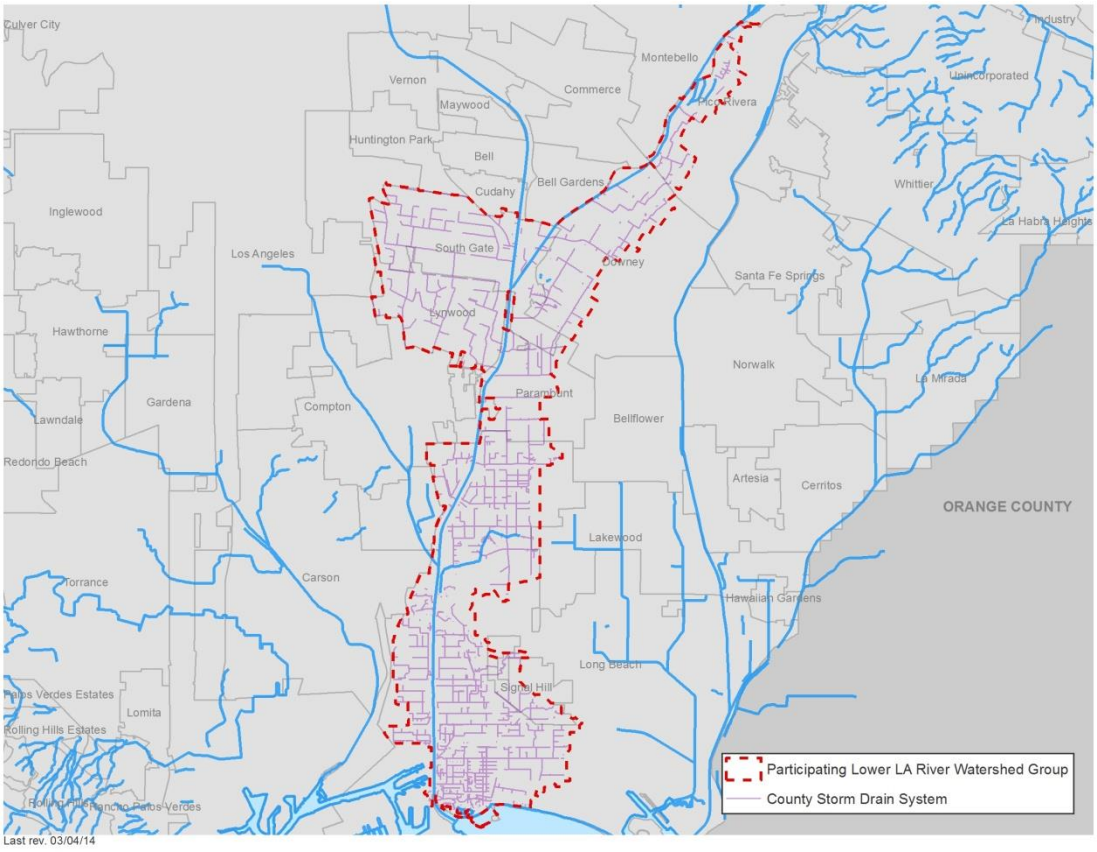


Figure 1-5: LACFCD Storm Drains

The watershed is predominantly served by storm sewer systems, across ten agency jurisdictions, connecting drainage in urbanized areas with the main tributaries. Due to the narrow shape of the watershed, the participating agencies are directly adjacent to either the Lower LAR or its main tributaries Compton Creek and the Rio Hondo.

GEOPHYSICAL SETTING

TOPOGRAPHY

Natural topography is comprised of the existing soils, ground elevation/slope, vegetation, stream network, and groundwater. These features impact each other in both the natural and built

environments, and therefore should not be analyzed independently when evaluating BMP location options.

SOILS

The Lower LAR Watershed can be characterized as having seven soil types. Figure 1-6 shows the various soil types underlying the watershed. Soils range from sandy loam to clay loam, having a varying range of saturated hydraulic conductivity.

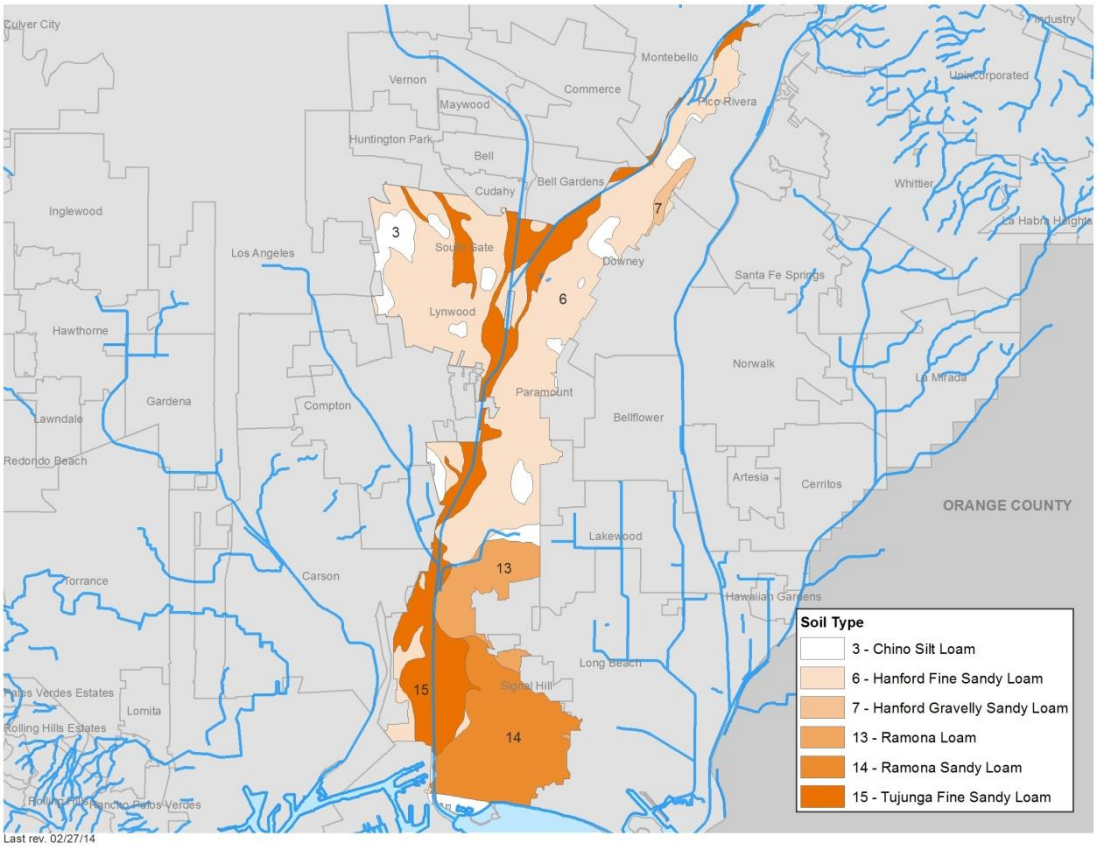


Figure 1-6: Soil Types[19]

GROUNDWATER

Groundwater flow in the Lower LAR Watershed generally mimics surface topography. Depth to the groundwater varies from 11 feet to greater than 40 feet. Figure 1-7 shows the groundwater basin for the Lower LAR Watershed.

WATERSHED LAND AREA

Table 1-5 lists the percent land area within the Lower LAR for each participant.

LAND USES

[19] Source: LA County Department of Public Works, **http://ladpw.org/wrd/publication/Engineering/hydrology/soil_types.zip**

Table 1-6 lists and Figure 1-8 shows the developed and undeveloped land within the Lower LAR Watershed.

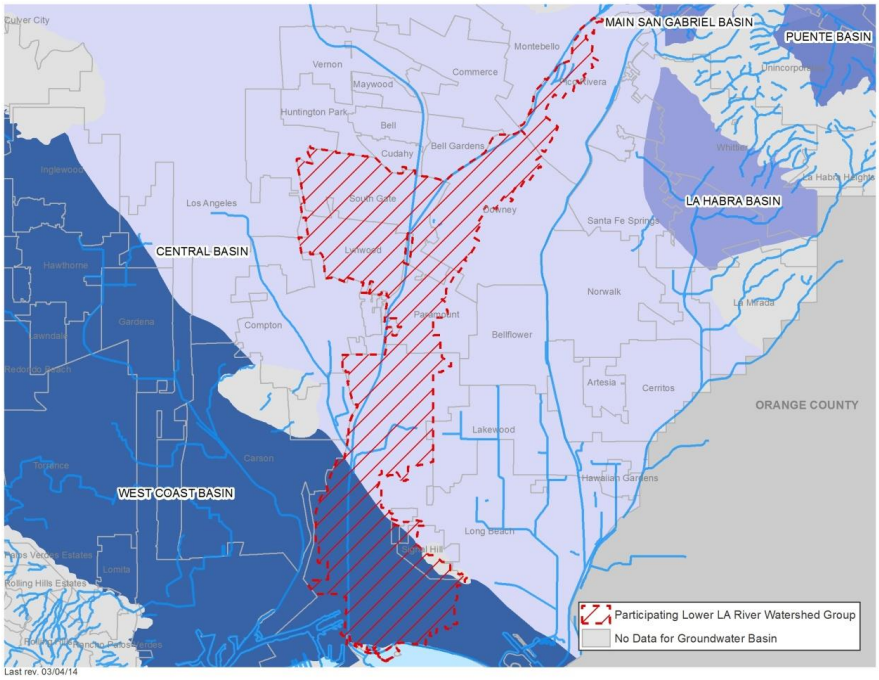


Figure 1-7: Groundwater Basins

Table 1-5: Watershed Land Area by Participant

Agency	Land area (Acres)	Percent of total area (%)
Downey	3,546	13
Lakewood	51	<1
Long Beach	12,301	42
Lynwood	3,098	11
Paramount	1,997	7
Pico Rivera	1,510	5
Signal Hill	774	3
South Gate	4,704	15
Caltrans	Caltrans owns and operates approximately 4% of the watershed	
LACFCD	N/A	N/A

Table 1-6: Developed and Undeveloped Land

Agency	Acres developed	Acres undeveloped	% Developed lands
Downey	5,074	379	93%
LACFCD	ND	ND	ND
Lakewood	47	3	94%
Long Beach	18,068	1,320	93%
Lynwood	2,180	50	98%
Paramount	3,350	26	99%
Pico Rivera	1,580	13	99%

Signal Hill	1,890	17	99%
South Gate	3,820	14	99%
Caltrans	ND	ND	ND

ND - Not delineated

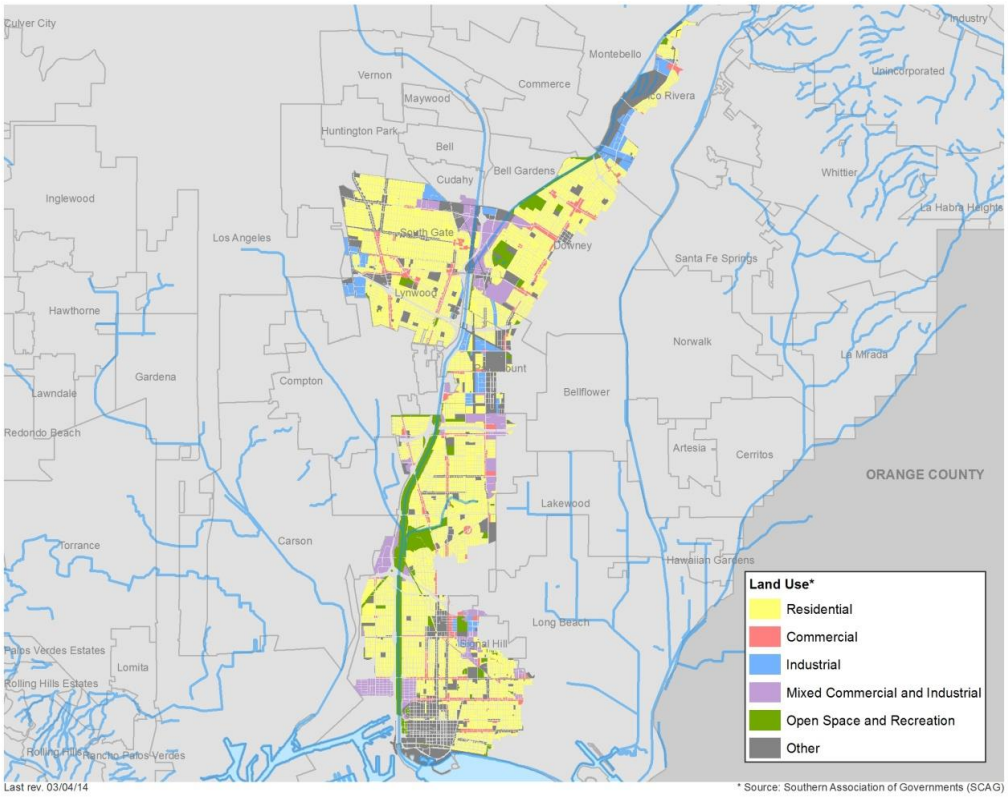


Figure 1-8: Land Use Map

DISADVANTAGED COMMUNITY

The Lower LAR Watershed is in a geographic area encompassing all or part of eight cities. This area is a high-minority and economically disadvantaged region. Of the eight cities participating in this WMP, three are categorized as disadvantaged communities as a whole, meaning that the median income levels in the city as a whole are less than 80% of the state's median household income ($48,706)[20]. All of the remaining five cities that are not disadvantaged as a whole are disadvantaged in part. Table 1-7 lists the income statistics for each city and Figure 1-9 is a map of the disadvantaged communities.

Table 1-7: DAC Percentage by City

City	DAC Percentage[1]
Downey	29%
Lakewood	3%
Long Beach	49%
Lynwood*	100%

[20] Integrated Regional Water Management, Grants, DAC Maps, *www.water.ca.gov/irwm/grants/resourceslinks.cfm*

Paramount*	100%
Pico Rivera	34%
Signal Hill	34%
South Gate*	100%

* Denotes disadvantaged community as a whole

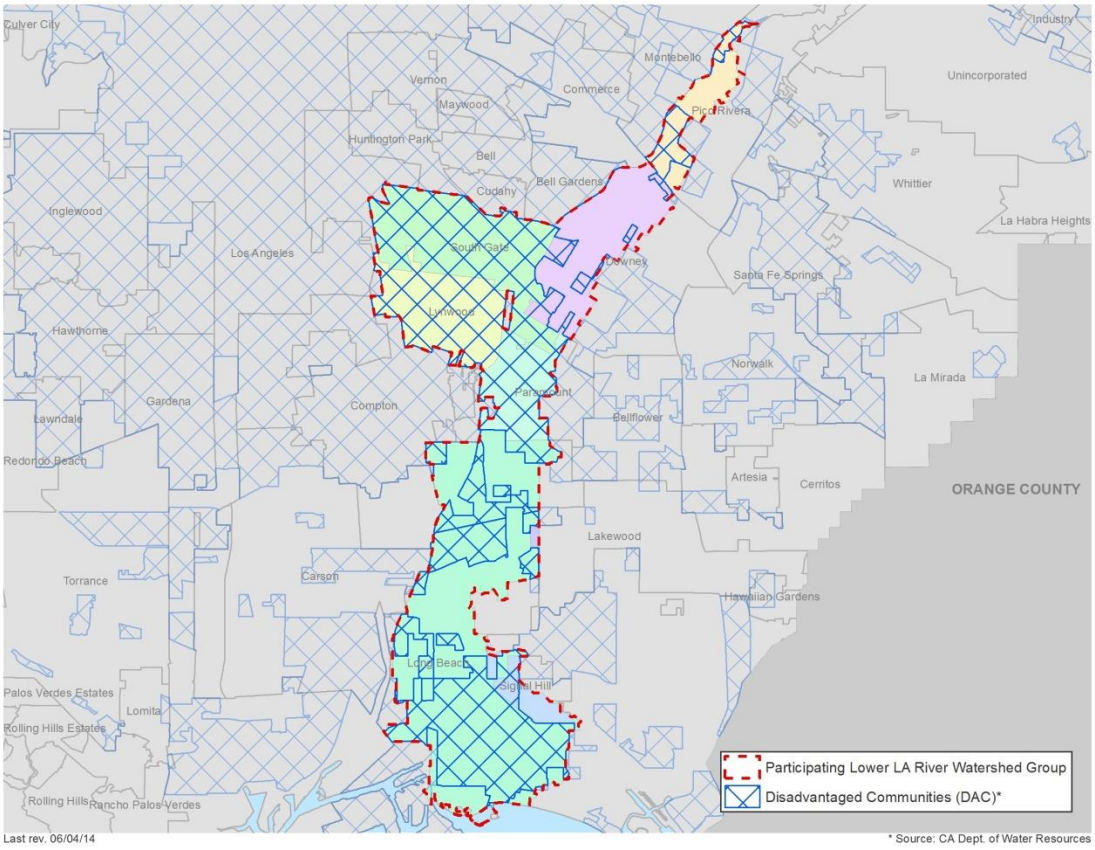


Figure 1-9 - Disadvantaged Community Map

1.4 WATER QUALITY IMPAIRMENTS

1.4.1 HISTORY OF IMPAIRMENTS IN THE LOWER LAR WATERSHED

Various reaches within the Lower LAR Watershed are on the 2010 CWA Section 303(d) List of impaired water bodies for trash, nitrogen compounds and related effects (ammonia, nitrate, nitrite, algae, pH, odor, and scum), metals (copper, cadmium, lead, zinc, aluminum and selenium), bacteria, and historic pesticides. Beneficial uses impaired by trash in the Los Angeles River are REC-1, REC-2, WARM, WILD, EST, MAR, RARE, MIGR, SPWN, COMM, WET and COLD. The excess nitrogen compounds may be causing impairments to the WARM and WILD designated beneficial uses of Los Angeles River. Excess metals may be causing impairments to the WILD, RARE, WARM, WET, and GWR designated beneficial uses of the Los Angeles River and its tributaries. Elevated indicator bacteria densities are listed impairments to the REC-1 and REC-2 designated beneficial uses of Los Angeles River.

1.4.2 ORGANIZING TO ADDRESS TMDLS

TMDLs represent large-scale efforts crossing jurisdictional boundaries and often encompassing the entire drainage of a major regional waterbody (e.g., Los Angeles River). Within the Lower LAR, these efforts have included the following:

- Beginning in 2009, the Los Angeles River working group was formed for development of the Metals TMDL implementation plan. The group eventually developed into the Lower LAR Watershed group to develop this WMP.
- All Lower LAR cities participated in and received funding as part of a grant to sixteen cities in the Gateway region whereby city-owned and LACFCD owned catch basins were retrofitted with full-capture trash inserts[21].
- The Cities of Signal Hill and Long Beach (together with the LACFCD) worked together and were awarded a grant to install full capture end-of-pipe trash nets and screens in Hamilton Bowl.
- The Cities of Downey, Lynwood, Paramount, Pico Rivera, Signal Hill and South Gate were awarded a Proposition 84 grant to install Low Impact Development (LID) BMPs along high traffic transportation corridors.

1.5 WATER QUALITY ISSUES AND THE HISTORY OF WATER QUALITY REGULATIONS

1.5.1 FEDERAL AND STATE LAW

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for all inland surface waters, estuaries, and coastal waters. The federal Environmental Protection Agency (EPA) is ultimately responsible for

[21] State Water Board Project No C-06-6439-110, December 2011

implementation of the CWA and its associated regulations. However, the CWA allowed EPA to authorize the NPDES Permit Program to state governments, enabling states to perform many of the permitting, administrative, and enforcement aspects of the NPDES Program. California, like other states, implements the CWA by promulgating its own water quality protection laws and regulations. As long as this authority provides equivalent protections as the federal CWA, EPA can delegate CWA responsibilities to the state while retaining oversight responsibilities. In some cases, California has established requirements that are more stringent than federal requirements.

The 1970 Porter-Cologne Water Quality Control Act granted the California State Water Resources Control Board (SWRCB) and nine California Regional Water Quality Control Boards (Regional Boards) broad powers to protect water quality. This Act and its governing regulations provide the basis for California's implementation of CWA responsibilities. The Los Angeles Regional Water Quality Control Board (Regional Board) is the governing regulatory agency for the Lower LAR Watershed.

Section 303(d) of the CWA requires waterbodies not meeting water quality objectives even after all required effluent limitations have been implemented (e.g. through wastewater or stormwater discharge permits) to be regularly identified. These waters are often referred to as "303(d) listed" or "impaired" waters. Waterbodies that are listed on the 303(d) list typically require development of a Total Maximum Daily Load (TMDL) for the pollutant(s) impairing the use of the water. Development and approval of the 303(d) list is a lengthy state and federal process. A list is not effective until the EPA approves the list. The current EPA-approved 303(d) list for California is the 2010 list, which can be found in Appendix A-2-2.

A TMDL establishes the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. Depending on the nature of the pollutant, TMDL implementation requires limits on the contributions of pollutants from point sources (waste load allocation), nonpoint sources (load allocation), or both. The Regional Board is responsible for TMDL development in the Lower LAR Watershed.

Adoption of a TMDL requires an amendment to the Water Quality Control Plan (known as the Basin Plan) for the Los Angeles Region. The Regional Board's Basin Plan is designed to preserve and enhance water quality and protect the beneficial uses of regional waters. Specifically, the Basin Plan (i) designates beneficial uses for surface and ground waters, (ii) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy, and (iii) describes implementation programs to protect all waters in the Region. The Basin Plan is reviewed and updated as necessary (Regional Board 1994, as amended). Following adoption by the Regional Board, the Basin Plan and subsequent amendments are subject to approval by the State Board, the State Office of Administrative Law (OAL), and the Environmental Protection Agency (EPA).

1.5.2 WATER QUALITY REQUIREMENTS

The Regional Board designates "beneficial uses" for waterbodies in the watersheds that it governs and adopts water quality objectives to protect these uses[22]. In some cases, EPA may also promulgate objectives where it makes a finding that the state's objectives are not protective enough to protect the beneficial use. The nature of the objectives is directly related to the type of beneficial use. For example, the freshwater warm habitat beneficial use protects aquatic organisms resident in warm-water streams. The associated water quality objectives are for those constituents known to affect both the growth and reproduction of aquatic life. These objectives range from physical characteristics such as temperature, dissolved oxygen, and pH to potential toxic constituents including metals and organics. In California, the objectives for metals and a number of organic compounds have been established by the federal EPA rather than the state (California Toxics Rule, 2000). The EPA promulgated numeric water quality criteria for priority toxic pollutants and other water quality standards provisions based on the determination that the numeric criteria were necessary (since the state had been without numeric water quality criteria for many priority toxic pollutants as required by the CWA) to protect human health and the environment. These Federal criteria are legally applicable in the state for inland surface waters, enclosed bays and estuaries for all purposes and programs under the CWA.

1.6 MS4 PERMIT REQUIREMENTS

The development of this WMP is a compliance option of the MS4 permits held by the Permittees[23]. The WMP includes an evaluation of existing water quality conditions, including characterization of storm water and non-storm water discharges from the MS4 and receiving water quality to support identification and prioritization/sequencing of management actions. At a minimum, water quality priorities within each Watershed Management Area must include achieving applicable water quality based effluent limitations and/or receiving water limitations established.

The MS4 permit requires that this WMP identifies strategies, control measures, and BMPs to implement through the stormwater management programs on a watershed scale, with the goal of creating an efficient program to focus collective resources on watershed priorities and effectively eliminate the source of pollutants. Customization of the BMPs to be implemented, or required to be implemented, is

[22] See Regional Board's 1994 Los Angeles Region Basin Plan, as amended.

[23] The Cities of Pico Rivera, Downey, Lynwood and Signal Hill (hereinafter "the Cities") submitted Administrative Petitions (Petitions) to the California State Water Resources Control Board (SWRCB) pursuant to section 13320(a) of the California Water Code requesting that the SWRCB review various terms and requirements set forth in the 2012 MS4 Permit, Order No. R4-2012-0175 (2012 Permit) adopted by the California Regional Water Quality Control Board, Los Angeles Region (Regional Board)." These Cities have participated in good faith in the development of this Lower Los Angeles River Watershed Management Program (WMP). Nothing in this WMP shall affect those cities' administrative petitions, nor shall anything in this WMP constitute a waiver of any positions or rights therein.

done with the goal of creating an efficient program to focus individual and collective resources on watershed priorities.

On the basis of the evaluation of existing water quality conditions, waterbody-pollutant combinations are classified into one of the following three categories:

- CATEGORY 1 (HIGHEST PRIORITY): Waterbody-pollutant combinations for which water quality based effluent limitations and/or receiving water limitations are included in the MS4 Permits to implement TMDLs.
- CATEGORY 2 (HIGH PRIORITY): Pollutants for which data indicate water quality impairment in the receiving water according to the State's Listing Policy and for which MS4 discharges may be causing or contributing to the impairment.
- CATEGORY 3 (MEDIUM PRIORITY): Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable receiving water limitations contained in the MS4 permit and for which MS4 discharges may be causing or contributing to the exceedances.

Sources for the waterbody-pollutant combinations are identified by considering the following:

- Review of available data, including historical findings from the participating agencies' Minimum Control Measure and TMDL programs, watershed model results and other pertinent information, data or studies.
- Locations of major MS4 outfalls and major structural controls for stormwater and nonstormwater that discharge to receiving waters.
- Other known and suspected sources of pollutants from the MS4 to receiving waters.

Based on the findings of the source assessment, the issues within the watershed are prioritized and sequenced. Factors considered in establishing watershed priorities include:

1. Pollutants for which there are water quality based effluent limitations and/or receiving water limitations with interim or final compliance deadlines within the permit term.
2. Pollutants for which there are water quality based effluent limitations and/or receiving water limitations with interim or final compliance deadlines between October 26, 2012 and October 25, 2017.
3. Pollutants for which data indicate impairment in the receiving water and the findings from the source assessment implicates discharges from the MS4, but no TMDL has been developed.

1.6.1 REASONABLE ASSURANCE ANALYSIS AND WATERSHED CONTROL MEASURES

As part of the WMP plan, a Reasonable Assurance Analysis (RAA) is conducted for each waterbody-pollutant combination. The RAA consists of an assessment, through quantitative analysis or modeling, to demonstrate that the activities and control measures (i.e. BMPs) identified in the Watershed Control Measures section of the WMP are performed to demonstrate that applicable water quality based

effluent limitations and/or receiving water limitations with compliance deadlines during the permit term will be achieved. Watershed Control Measures are subdivided into 1) Minimum Control Measures, 2) Non-Stormwater Discharge Measures 3) TMDL Control Measures and 4) other control measures for water-body pollutant Categories 1, 2 and 3.

Schedules are developed for strategies, control measures and BMPs to be implemented by each individual Permittee within its jurisdiction and for those that will be implemented by multiple Permittees on a watershed scale. The schedules will measure progress at least twice during the permit term and incorporate 1) Compliance deadlines occurring within the permit term for all applicable interim and/or final water quality based effluent limitations and/or receiving water limitations to implement TMDLs, 2) Interim deadlines and numeric milestones within the permit term for any applicable final water quality based effluent limitation and/or receiving water limitation to implement TMDLs, where deadlines within the permit term were not otherwise specified, and 3) For watershed priorities related to addressing exceedances of receiving water limitations.

1.6.2 ADAPTIVE MANAGEMENT

An adaptive management process will be implemented every two years from the date of program approval, adapting the WMP to become more effective, based on, but not limited to the following:

1. Progress toward achieving the outcome of improved water quality in MS4 discharges and receiving waters through implementation of the watershed control measures,
2. Progress toward achieving interim and/or final water quality based effluent limitations and/or receiving water limitations, or other numeric milestones where specified, according to established compliance schedules,
3. Re-evaluation of the highest water quality priorities identified for the Watershed Management Area based on more recent water quality data for discharges from the MS4 and the receiving water(s) and a reassessment of sources of pollutants in MS4 discharges,
4. Availability of new information and data from sources other than the Permittees' monitoring program(s) within the Watershed Management Area that informs the effectiveness of the actions implemented by the Permittees,
5. Regional Water Board recommendations; and
6. Recommendations for modifications to the WMP solicited through a public participation process

Based on the results of the iterative process, modifications necessary to improve the effectiveness of the WMP will be reported in the Annual Report, and as part of the Report of Waste Discharge (ROWD). Any necessary modifications to the WMP will be implemented upon acceptance by the Regional Water Board Executive Officer or within 60 days of submittal if the Regional Water Board Executive Officer expresses no objections.

2 IDENTIFICATION OF WATER QUALITY PRIORITIES

2.1 WATERBODY POLLUTANT CLASSIFICATION

One of the goals of this Watershed Management Program (WMP) is to identify and address water quality priorities within the Lower Los Angeles River (Lower LAR) Watershed. In order to begin prioritizing water quality issues within the Lower LAR Watershed, an evaluation of existing water quality conditions, including characterization of stormwater and nonstormwater discharges from the Municipal Separate Storm Sewer System (MS4) and receiving waters has been completed per section VI.C.5.a of the MS4 Permit.

The existing water quality conditions of the Lower LAR Watershed were used to classify pollutants into three categories each containing specific subcategories. These categories form the basis for identifying watershed priorities, which include, at a minimum, achieving applicable water quality-based effluent limitations and/or receiving water limitations established pursuant to TMDLs. The three categories and their subcategories are described below:

CATEGORY 1: Waterbody-pollutant combinations for which water quality-based effluent limitations and/or receiving water limitations are established in Part VI.E TMDL Provisions and Attachments L through R of the MS4 Permit.

- CATEGORY 1A: Final deadlines within Permit term (after approval of WMP[1] and prior to December 28, 2017)
- CATEGORY 1B: Interim deadlines within Permit term (after approval of WMP[2] and prior to December 28, 2017)
- CATEGORY 1C: Final deadlines between December 29, 2017 - December 28, 2022
- CATEGORY 1D: Interim deadlines between December 29, 2017 - December 28, 2022
- CATEGORY 1E: Interim and final deadlines after December 28, 2022
- CATEGORY 1F: Past final deadlines (final deadlines due prior to approval of WMP)
- CATEGORY 1G: USEPA established TMDLs with no implementation schedule

CATEGORY 2: Pollutants for which data indicate water quality impairment in the receiving water according to the State Board's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) and for which MS4 discharges may be causing or contributing to the impairment.

- CATEGORY 2A: Non-legacy pollutants
- CATEGORY 2B: Bacterial indicators
- CATEGORY 2C: Legacy pollutants

[1] Upon approval and no later than April 28, 2015.
[2] *Ibid.*

- CATEGORY 2D: Water quality indicators

CATEGORY 3: Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable receiving water limitations contained in this Order and for which MS4 discharges may be causing or contributing to the exceedance.

- CATEGORY 3A: Non-legacy pollutants
- CATEGORY 3B: Bacterial indicators
- CATEGORY 3C: Legacy pollutants
- CATEGORY 3D: Water quality indicators

The Lower LAR Watershed encompasses Reaches 1 and 2 of the Los Angeles River, the Los Angeles River Estuary, Reach 1 of the Rio Hondo, and Compton Creek. The pollutants for which the Lower LAR Watershed is listed as impaired for are shown on Figure 2-1.

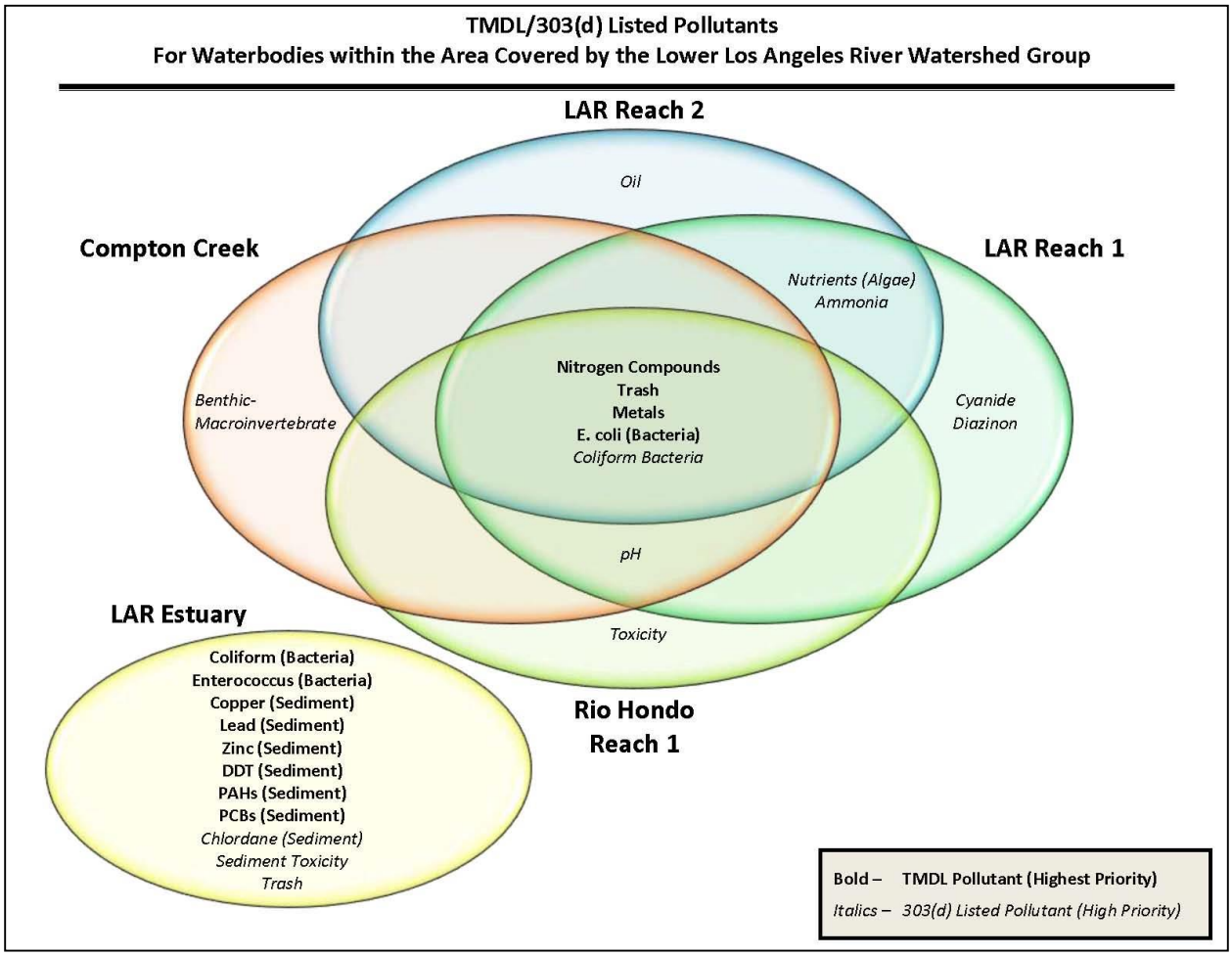


Figure 2-1: Lower Los Angeles River Watershed Pollutant Venn Diagram

The pollutant categories for the Lower LAR are summarized below including the weather condition for which impairment was determined:

CATEGORY 1A

- TRASH – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)
- NITROGEN COMPOUNDS – Los Angeles River Reach 1(Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)

CATEGORY 1B

- COPPER – Los Angeles River Estuary (Wet and Dry)
- LEAD – Los Angeles River Estuary (Wet and Dry)
- ZINC – Los Angeles River Estuary (Wet and Dry)
- DDT – Los Angeles River Estuary (Wet and Dry)
- PAHS – Los Angeles River Estuary (Wet and Dry)
- PCBS – Los Angeles River Estuary (Wet and Dry)

CATEGORY 1C

- BACTERIA (E. COLI) – Los Angeles River Reach 1 (Wet and Dry), Compton Creek (Wet and Dry)

CATEGORY 1E

- CADMIUM – Los Angeles River Reach 1 (Wet), Los Angeles River Reach 2 (Wet), Compton Creek (Wet), Rio Hondo Reach 1 (Wet)
- COPPER – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)
- LEAD – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)
- ZINC – Los Angeles River Reach 1 (Wet), Los Angeles River Reach 2 (Wet), Compton Creek (Wet), Rio Hondo Reach 1 (Wet and Dry)
- BACTERIA (E. COLI) – Los Angeles River Reach 2 (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)

CATEGORY 1G (USEPA ESTABLISHED)

- BACTERIA (COLIFORM AND ENTEROCOCCUS) – Los Angeles River Estuary (Wet and Dry)

CATEGORY 2A

- CHLORDANE (SEDIMENT) – Los Angeles River Estuary (Wet and Dry)
- CYANIDE – Los Angeles River Reach 1 (Wet and Dry)
- DIAZINON – Los Angeles River Reach 1 (Wet and Dry)
- OIL – Los Angeles River Reach 2 (Wet and Dry)
- TRASH – Los Angeles River Estuary (Wet and Dry)

CATEGORY 2B

- COLIFORM BACTERIA – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)

CATEGORY 2C

- ALUMINUM– Los Angeles River Reach 1(Wet and Dry)
- SELENIUM – Los Angeles River Reach 1 (Dry), Los Angeles River Reach 2(Dry)

CATEGORY 2D

- PH – Los Angeles River Reach 1 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)
- SEDIMENT TOXICITY[3] – Los Angeles River Estuary (Wet and Dry)
- BENTHIC-MACROINVERTEBRATE (BMI) BIOASSESSMENTS – Compton Creek (Wet and Dry)
- TOXICITY – Rio Hondo Reach 1 (Wet and Dry)
- MBAS – Los Angeles River Reach 1, Los Angeles River Reach 2 (Wet)

CATEGORY 3A

- BIS(2-ETHYLHEXYL)PHTHALATE – Los Angeles River Reach 1 (Wet and Dry)
- CHLORIDE – Los Angeles River Reach 1 (Dry), Los Angeles River Reach 2 (Dry), Rio Hondo Reach 1 (Wet)
- Chlorpyrifos – Compton Creek (Dry)
- CYANIDE – Rio Hondo Reach 1 (Wet and Dry)
- DIAZINON – Rio Hondo Reach 1 (Wet)
- PAHS – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry)

CATEGORY 3C

- MERCURY – Los Angeles River Reach 1 (Wet and Dry)
- NICKEL – Los Angeles River Reach 1 (Dry)
- Thallium – Los Angeles River Reach 1 (Dry), Los Angeles River Reach 2 (Dry)

CATEGORY 3D

- DISSOLVED OXYGEN[4] – Los Angeles River Reach 1 (Wet), Los Angeles River Reach 2 (Wet)
- PH – Rio Hondo Reach 1 (Wet and Dry)

Tables 2-1 and 2-2 summarize the waterbody pollutant combinations for the Lower LAR Watershed Group.

[3] It is anticipated that the control measures used to address the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Toxics TMDL will address sediment toxicity in the Los Angeles River.
[4] This listing is based on an exceedance that occurred during the 03-04 storm year. There have been no exceedances since that time.

Table 2-1: Wet Weather Waterbody/Pollutant Classifications for the Lower LAR Watershed Group

Category	Pollutant	Waterbody				
		LARE[(a)]	LAR1[(b)]	LAR2[(c)]	CC[(d)]	RH1[(e)]
1	Cadmium		×	×	×	×
	Copper	×	×	×	×	×
	Lead	×	×	×	×	×
	Zinc	×	×	×	×	×
	Trash[1]		×	×	×	×
	Nitrogen Compounds[2]		×	×	×	×
	DDT	×				
	PCBs	×				
	PAHs	×				
	E. coli		×	×	×	×
	Coliform and Enterococcus	×				
2	Chlordane (sediment)	×				
	Coliform Bacteria		×	×	×	×
	Aluminum		×			
	Diazinon		×			
	Oil			×		
	Trash	×				
	Toxicity					×
	Sediment Toxicity	×				
	Cyanide		×			
	MBAS		×	×		
	Benthic Macroinvertebrate Bioassessments				×	
	pH		×		×	×
3	Chloride					×
	Mercury		×			
	Diazinon					×
	PAHs		×	×		
	Bis(2-ethylhexyl)phthalate		×			
	Cyanide					×
	pH					×
	Dissolved Oxygen		×	×		

(a) Los Angeles River Estuary
(b) Los Angeles River Reach 1
(c) Los Angeles River Reach 2
(d) Coyote Creek
(e) Rio Hondo Reach 1

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia and Nutrients (algae) included in nitrogen compounds for category 1

Table 2-2: Dry Weather Waterbody/Pollutant Classifications for the Lower LAR Watershed Group

Category	Pollutant	Waterbody				
		LARE[(a)]	LAR1[(b)]	LAR2[(c)]	CC[(d)]	RH1[(e)]
1	Copper	×	×	×	×	×
	Lead	×	×	×	×	×
	Zinc	X				×
	Trash[1]		×	×	×	×
	Nitrogen Compounds[2]		×	×	×	×
	DDT	×				
	PAHs	×				
	PCBs	×				
	E. coli		×	×	×	×
	Coliform and Enterococcus	×				
2	Chlordane (sediment)	×				
	Coliform Bacteria		×	×	×	×
	Aluminum		×			
	Selenium		×	×		
	Cyanide		×			
	Oil			×		
	Trash	×				
	Toxicity					×
	Sediment Toxicity	×				
	Benthic Macroinvertebrate Bioassessments				×	
	pH		×		×	×
3	Chloride		×	×		
	Cyanide					×
	pH					×
	Mercury		×			
	Nickel		×			
	Thallium		×	×		
	Chlorpyrifos				×	
	PAHs		×	×		
	Bis(2-ethylhexyl)phthalate		×			

(a) Los Angeles River Estuary
(b) Los Angeles River Reach 1
(c) Los Angeles River Reach 2
(d) Coyote Creek
(e) Rio Hondo Reach 1

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia and Nutrients (algae) included in nitrogen compounds for category 1

2.1.1 CATEGORY 1 POLLUTANTS

TRASH

Trash is classified as a Category 1A pollutant for the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines within the MS4 Permit term.

NITROGEN COMPOUNDS (INCLUDING AMMONIA)

Nitrogen compounds are classified as a Category 1A pollutant for the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines within the MS4 Permit term.

METALS (CADMIUM, COPPER, LEAD, AND ZINC)

Cadmium, Copper, Lead, and Zinc (herein collectively referred to as "Metals") are classified as a Category 1E pollutant for the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines after December 28, 2022.

According to the California 2010 Integrated Report, cadmium is being considered for removal from the 303(d) list for Los Angeles River Reach 1. The weight of evidence indicated that there is sufficient justification for removing this water segment pollutant combination from the 303(d) list based on the conclusion that the data used satisfies the quality requirements of the State's Listing Policy, and the amount of samples exceeding water quality objectives do not exceed the allowable frequency listed in Table 4.1 of the State's Listing Policy. It has been recommended that the decision to remove Cadmium be approved by the State Board; however, it has not yet been removed from the 303(d) list for Reach 1 of the Los Angeles River[5].

ESTUARY METALS (COPPER, LEAD, AND ZINC)

Copper, Lead, and Zinc are classified as a Category 1B pollutant for the Los Angeles River Estuary, which has an interim TMDL deadline within the MS4 Permit term[6].

BACTERIA (E. COLI)

E. Coli bacteria is classified as a Category 1C pollutant for the Los Angeles River Reach 2 which has a final TMDL deadline between December 29, 2017 to December 28, 2022 and a Category 1E for the Los Angeles River Reach 1, Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines after December 28, 2022.

BACTERIA (COLIFORM AND ENTEROCOCCUS)

Coliform and enterococcus bacteria are classified as a Category 1G pollutant for the Los Angeles River Estuary.

[5] Based on data from the State Listing Policy lines of evidence ID #2332 and #2331 collected by the County of Los Angeles Department of Public Works.
[6] Dominguez Channel and Great Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL

2.1.2 CATEGORY 2 POLLUTANTS

The following pollutants have been categorized as Category 2 because data indicate water quality impairment according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy)[7].

ALUMINUM

LA County Flood Control District (LACFCD) mass emissions station S(10) detected 30 out of 40 wet weather and 11 out of 23 dry weather exceedances of the USEPA National Recommended Water Quality Criteria for aluminum between 2002 and 2012. Since this meets the State Listing Policy for 303(d) listing, aluminum will be classified as a Category 2C pollutant for Reach 1 of the Los Angeles River.

COLIFORM BACTERIA

Coliform bacteria are microorganisms known to be harmful in water with high concentrations. The 303(d) List has indicated that the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 are impaired by coliform bacteria; therefore, coliform bacteria is classified as a Category 2B pollutant for Reaches 1 and 2 of the Los Angeles River, Compton Creek, and Reach 1 of the Rio Hondo.

BENTHIC-MACROINVERTEBRATE (BMI) BIOASSESSMENTS

Benthic macroinvertebrate (BMI) communities are both bioindicators of stream condition and a food resource for fish. The 303(d) List has indicated that Compton Creek is impaired as indicated through BMI bioassessments; therefore, BMIs are classified as a Category 2D for Compton Creek.

The State Water Board staff has determined that BMI populations are impacted by a wide range of anthropogenic stressors and has recommended listing for benthic-macroinvertebrate bioassessment. It is anticipated that the BMI population will be subsequently improved by the control measures implemented for other pollutants.

CHLORDANE (SEDIMENT)

Chlordane is an organochlorine compound used as a pesticide. The 303(d) List has indicated that sediment in Los Angeles River Estuary is impaired by chlordane; therefore, chlordane is classified as a Category 2A pollutant for the Los Angeles River Estuary.

CYANIDE

Cyanide is an inorganic chemical compound. The 303(d) List has indicated that Los Angeles River Reach 1 is impaired by cyanide; therefore, cyanide is classified as a Category 2A pollutant for the Reach 1 of the Los Angeles River.

[7] An excerpt of the 2010 California 303(d) List of Water Quality Limited Segments for Region 4 is included in Appendix 2-1.

DIAZINON

Diazinon is an organophosphate insecticide. The 303(d) List has indicated that Los Angeles River Reach 1 is impaired by diazinon; therefore, diazinon is classified as a Category 2A pollutant for the Reach 1 of the Los Angeles River.

METHYLENE BLUE ACTIVE SUBSTANCE (MBAS)

An MBAS assay is used to detect the presence of detergents or foaming agents in water samples.

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by MBAS, the LACFCD Mass Emissions station S(10) in the LA River collected 11 out of 40 wet weather samples that exceeded the LA Basin Plan Water Quality Objective (WQO) for MBAS between 2002 and 2012, which meets the State Listing Criteria for 303(d) listing[8]. Therefore, MBAS will be classified as a Category 2D within this WMP. It is anticipated that the control measures used to address the pollutants of concern in this watershed will subsequently address MBAS levels; however, if exceedances are found to occur and the implemented or proposed control measures do not address MBAS, the WMP will be revised to include control measures to address the pollutant directly.

OIL

Oil is a chemical substance. The 303(d) List has indicated that the Los Angeles River Reach 2 is impaired by oil; therefore, oil is classified as a Category 2A pollutant for Reach 2 of the Los Angeles River.

PH

pH is a measure of the acidity or basicity of an aqueous solution. The 303(d) List has indicated that Los Angeles River Reach 1, Compton Creek, and Rio Hondo Reach 1 are impaired by pH; therefore, pH is classified as a Category 2D for Reach 1 of the Los Angeles River, Compton Creek, and Reach 1 of the Rio Hondo.

SEDIMENT TOXICITY

Sediment Toxicity is a measurement of toxicity within a sediment sample. The 303(d) List has indicated that the Los Angeles River Estuary contains sediment toxicity; therefore, it is classified as a Category 2D for the Los Angeles River Estuary. It is anticipated that sediment toxicity in the Los Angeles River Estuary will be addressed through the Dominguez Channel and Greater Los Angeles and Long Beach Harbors Toxics TMDL.

SELENIUM

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by selenium, the LACFCD Mass Emissions station S(10) in the LA River collected 2 out of 23 dry weather samples that exceeded the CTR Chronic WQO for selenium between 2002 and 2012, which meets the State Listing

[8] According to the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List Minimum Number of Measured Exceedances Needed to Place a Water Segment on the Section 303(d) List for Toxicants and Conventionals – Tables 3.1 and 3.2.

Criteria for 303(d) listing[9]. Selenium will be considered as a Category 2C pollutant within this WMP when determining the control measures to be implemented in the Los Angeles River Reaches 1 and 2. It is anticipated that the control measures used to address the pollutants within Los Angeles River and Tributaries Metals TMDL will subsequently address selenium levels; however, if exceedances are found to occur and the implemented or proposed control measures do not address selenium, the WMP will be revised to include control measures to address the pollutant directly.

TOXICITY

The 303(d) List has indicated that Rio Hondo Reach 1 is impaired by toxicity; therefore, toxicity is classified as a Category 2D for Reach 1 of Rio Hondo.

TRASH

Although the Los Angeles River Estuary is not included in the Los Angeles River Watershed Trash TMDL, the 303(d) List has indicated that the Los Angeles River Estuary is impaired by trash; therefore, trash is classified as a Category 2A pollutant for the Los Angeles River Estuary.

2.1.3 CATEGORY 3 POLLUTANTS

The waterbody-pollutant combinations described below have been identified as exceeding water quality objectives (WQOs) in the Lower LAR Watershed. Through the adaptive management process, water quality priorities identified in this WMP will be re-evaluated every two years, and if exceedances of Category 3 WQOs are identified through monitoring, then the WMP will be adapted to become more effective in addressing these constituents, per Section VI.C.8.a.ii of the MS4 Permit.

BIS(2-ETHYLHEXYL)PHTHALATE

LACFCD mass emission station S(10) detected 2 out of 40 wet weather and 4 out of 23 dry weather exceedances of the National Toxics Rule WQO for bis(2ethylhexyl)phthalate between 2002 and 2012. Therefore, bis(2ethylhexyl)phthalate will be classified as a Category 3A pollutant within this WMP for Reach 1 of the Los Angeles River.

CHLORIDE

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by chloride, the LACFCD Mass Emissions station S(10) in the LA River collected 1 out of 23 dry weather samples, and the tributary station TS06 (Rio Hondo) collected 1 out of 9 wet weather samples exceeding the Basin Plan WQO for this pollutant between 2002 and 2012. Chloride will be considered as a Category 3A pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures

[9] According to the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List Minimum Number of Measured Exceedances Needed to Place a Water Segment on the Section 303(d) List for Toxicants – Table 3.1.

are not expected to address chloride pollutants, the WMP will be revised to include control measures to address the pollutant directly.

CHLORPYRIFOS

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by chlorpyrifos, data from the LACFCD mass emission monitoring and the City of Los Angeles Status and Trends Monitoring program detected 3 out of 91 dry weather exceedances in Los Angeles River Reach 1 and 2 9ut of 112 dry weather exceedances in Los Angeles River Reach 2 of the CTR WQO for chlorpyrifos between 2001 and 2013. Chlorpyrifos is classified as a Category 3A pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address chlorpyrifos, the WMP will be revised to include control measures to address the pollutant directly.

CYANIDE

Cyanide is listed as a Category 2 pollutant for the LA River Reach 1; however, no other reaches are listed on the State's 303(d) list for cyanide. Although the other waterbodies are not listed as impaired by cyanide, the LACFCD Tributary station TS(06) in the Rio Hondo collected 1 out of 9 wet weather samples and 2 out of 3 dry weather samples exceeding the CTR WQO for this pollutant between 2002 and 2012. Cyanide will be considered as a Category 3A pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address cyanide, the WMP will be revised to include control measures to address the pollutant directly.

DIAZINON

Diazinon is listed as a Category 2 pollutant for the LA River Reach 1; however, no other reaches are listed on the State's 303(d) list for Diazinon. Although the other waterbodies are not listed as impaired by Diazinon, the LACFCD Tributary station TS(06) in the Rio Hondo collected 3 out of 9 wet weather samples exceeding the California Department of Fish and Game's WQO for this pollutant between 2002 and 2012. Diazinon will be considered as a Category 3A pollutant within thisWMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address diazinon, the WMP will be revised to include control measures to address the pollutant directly.

DISSOLVED OXYGEN

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by low dissolved oxygen, the LACFCD Mass Emissions station S(10) in the LA River collected 1 out of 39 wet weather samples below the dissolved oxygen water quality criteria between 2002 and 2012. This exceedance occurred during the 2003-04 storm year and there have been no exceedances since this time. Therefore, dissolved oxygen will be classified as a Category 3D within this WMP, however will not be addressed directly through this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address dissolved oxygen, the WMP will be revised to include control measures to address it directly.

MERCURY

LACFCD mass emission station S(10) detected 1 out of 40 wet weather and 1 out of 23 dry weather exceedances of the USEPA National Recommended Water Quality Criteria for mercury between 2002 and 2012. Therefore, mercury will be classified as a Category 3C pollutant within this WMP for Reach 1 of the Los Angeles River.

NICKEL

LACFCD mass emission station S(10) detected 1 out of 23 dry weather exceedances of the CTR WQO for nickel between 2002 and 2012. Therefore, nickel will be classified as a Category 3C pollutant within this WMP for Reach 1 of the Los Angeles River.

PH

pH is listed as a Category 2 pollutant for the LA River Reaches 1 and 2 and Compton Creek; however, no other reaches are listed on the State's 303(d) list for pH. Although the other waterbodies are not listed as impaired by pH, the LACFCD Tributary station TS(06) in the Rio Hondo collected 1 out of 9 wet weather samples and 1 out of 3 dry weather samples exceeding the LA Basin Plan WQO for this pollutant between 2002 and 2012. pH will be considered as a Category 3D pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address pH, the WMP will be revised to include control measures to address the pollutant directly.

POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

PAHs are chemical compounds that occur naturally in the environment and can also be man-made. PAHs are created during incomplete combustion of coal, oil, gas, and garbage. According to the Toxic Release Inventory, there are approximately twenty compounds defining this group, even though there are hundreds of PAH combinations.

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by PAHs, a five year SCCRWP study conducted partially in the watershed estimates that the LA River is a source of PAH loading to the ocean. Therefore, PAHs will be classified as Category 3A pollutants within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address PAH pollutants, the WMP will be revised to include control measures to address them directly.

THALLIUM

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by thallium, the LACSD WRP effluent monitoring collected 1 out of 4 dry weather samples exceeding the USEPA National Recommended Water Quality Criteria this pollutant between 2009 and 2011. Thallium is classified as a Category 3C pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address thallium, the WMP will be revised to include control measures to address the pollutant directly.

2.1.4 POLLUTANT CLASSIFICATION

In order to determine the sequence of addressing pollutants of concern, the pollutants have been placed into classification groups. Pollutants have been identified to be in the same "class" if they have a similar fate and transport, can be addressed via the same types of control measures, and can be addressed within the same timeline. The seven following classes have been identified:

- Metals
- Nutrients
- Pesticides
- Bacteria
- Semivolatile Organic Compounds (SVOC)Water Quality Indicators/General
- Trash

The specific classes and pollutants associated can be found below. Since similar control measures and timelines are to be implemented for pollutants within the same class, each class will be treated with the highest priority of any one pollutant within that class. See Section 2.4 for a table of Water Quality Priorities (WQPs). Watershed Control Measures and Implementation Schedules are discussed in Sections 3 and 5, respectively.

METALS	PESTICIDES	WATER QUALITY INDICATORS/GENERAL	TRASH
Aluminum	Chlordane	Benthic-Macroinvertebrate (BMI)	Trash
Cadmium	Chlorpyrifos	Chloride	
Copper	DDT	Cyanide	
Lead	Diazinon	Dissolved Oxygen	
Mercury	PCBs	MBAS	
Nickel		Oil	
Selenium		pH	
Thallium		Sediment Toxicity	
Zinc		Toxicity	

NUTRIENTS	BACTERIA	SVOC
Ammonia	Coliform and	Bis(2ethylhexyl)phthalate
Nitrogen Compounds	Enterococcus	PAHs
Nutrients (Algae)	e. Coli	

2.2 WATER QUALITY CHARACTERIZATION

In order characterize existing water quality conditions in the Lower LAR watershed, and to identify pollutants of concern for prioritization per section VI.C.5.a.ii of the MS4 Permit, available monitoring data collected during the previous ten years were analyzed. The following sources were utilized during the water quality characterization:

- LACFCD Mass Emission and Tributary Monitoring Programs
- LA County Sanitation Districts Monitoring
- City of Long Beach Stormwater Monitoring Program
- LAR Metals, Trash, and Bacteria TMDL Monitoring Programs
- Southern California Coastal Water Research Project (SCCWRP) Pollutant Loading Study
- Los Angeles River Watershed Monitoring Program (LARWMP)

A summary of each of these monitoring efforts and relevant findings is presented below. In addition to providing a characterization of the current conditions within the watershed, this information will be used to target watershed management efforts in the Lower LAR watershed.

2.2.1 MASS EMISSIONS HISTORICAL DATA ANALYSIS

Since 1994, the LACFCD has conducted stormwater monitoring in Los Angeles County. The LACFCD operates seven mass emission monitoring stations, which collect runoff from the major watersheds in the county with the goal of estimating the mass emissions from the MS4, assessing mass emissions trends, and determining whether the MS4 is contributing to exceedances of water quality objectives by comparing results to applicable objectives in the Water Quality Control Plan for the Los Angeles Region (Basin Plan), and the California Toxics Rule (CTR).

The LACFCD Monitoring Station, S(10), collects samples that are applicable to the Lower LAR Watershed. Station S(10) is located in the Los Angeles River at the existing stream gauge station (Stream Gauge No. F319-R) between Willow Street and Wardlow Road in the City of Long Beach and is shown in Figure 2-2. At this location, which was chosen to avoid tidal influences, the total upstream tributary drainage area for the Los Angeles River is 825 square miles. Station S(10) is equipped with automated samplers with integral flow meters, and collects flow composite samples from a minimum of three storm events, including the first storm, and two dry weather events in accordance with the 1996 MS4 Permit.

Monitoring data from stormwater collected at Station S(10) during the previous ten years of monitoring (2002-2012) were compared to the most stringent applicable water quality objectives (WQOs)to date to determine exceedances of receiving water limitations. WQOs were determined pursuant to TMDLs, the Basin Plan and the California Toxics Rule, 40 CFR Part 131.38 (CTR). Water quality objectives for chlorpyrifos and diazinon are determined using the freshwater final acute criteria set by the California Department of Fish and Game. Many of the WQOs were used as benchmarks for determining Water Quality Priorities, and should not be used for compliance purposes. Please refer to the Lower LAR

Watershed Coordinated Integrated Monitoring Plan (CIMP) for a table of monitored constituents along with their most up-to-date WQOs.

A summary of the constituents not attaining WQOs at station S(10) during the monitoring years 2002-2012 is presented in Tables 2-3 and 2-4. Complete tables of monitoring results can be found in Appendix A-2-2.

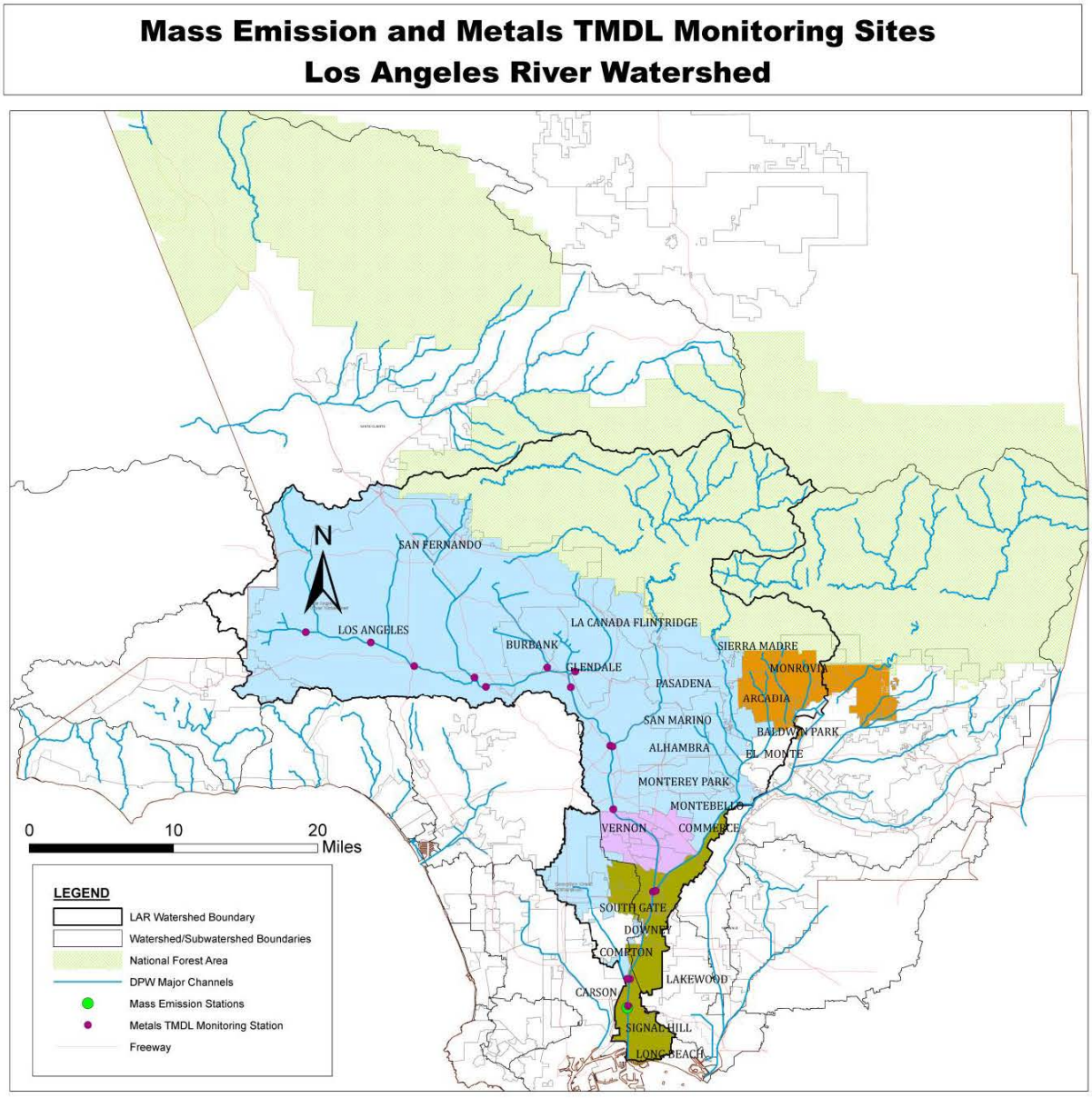


Figure 2-2: Mass emission and metals TMDL monitoring sites courtesy of LACFCD

Table 2-3: S10 Constituents exceeding WQOs during wet weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	40	9	23	0.022	CTR Freshwater Aquatic Life Protection, Acute
pH	40	5	13	6.5-8.5	LA Basin Plan
DO	39	1	3	5	LA Basin Plan
Total Coliform	40	40	100	10000	LA Basin Plan - Marine Waters
Fecal Coliform	40	39	98	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	40	40	100	104	LA Basin Plan - Marine Waters
MBAS	40	11	28	0.5	LA Basin Plan
Total Aluminum	40	30	75	750	USEPA National Recommended WQ Criteria
Total Cadmium	40	5	13	3.1	LA River Metals TMDL
Total Copper	40	33	83	17	LA River Metals TMDL
Total Lead	40	10	25	62	LA River Metals TMDL
Total Mercury	40	1	2.5	0.051	CTR Human Health
Dissolved Zinc	40	9	23	120	CTR-100mg/L CMC
Total Zinc	40	24	60	159	LA River Metals TMDL
Bis(2-ethylhexyl)phthalate	40	2	5	5.9	National Toxics Rule Human Health
Diazinon	40	2	5	0.08	CADF&G

Table 2-4: S10 Constituents exceeding WQOs during dry weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	23	20	87	0.0052	CTR Freshwater Aquatic Life Protection, Chronic
pH	23	11	48	6.5-8.5	LA Basin Plan
Total Coliform	22	6	27	10000	LA Basin Plan - Marine Waters
Fecal Coliform	23	11	48	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	23	14	61	104	LA Basin Plan - Marine Waters
Chloride	23	1	4	150	LA Basin Plan
Nitrate	8	2	25	8	LA River Nutrient TMDL
Nitrite	22	6	27	1	LA River Nutrient TMDL
Total Aluminum	23	11	48	87	USEPA National Recommended WQ Criteria
Total Copper	23	2	9	23	LA River Metals TMDL
Total Mercury	23	1	9	0.051	CTR Human Health
Total Nickel	23	1	9	24	CTR Chronic
Total Selenium	23	2	9	5	National Toxics Rule
Total Zinc	23	1	4	131	LA River Metals TMDL
Bis(2-ethylhexyl)phthalate	23	4	17	5.9	National Toxics Rule Human Health
Diazinon	23	2	9	0.05	CADF&G

2.2.2 LACFCD TRIBUTARY MONITORING

In addition to the Mass Emission Station monitoring, LACFCD conducted tributary monitoring during the 2002-03 and 2003-04 storm years. This monitoring occurred at 1 tributary station in the Lower LAR Watershed: Rio Hondo (TS06). Rio Hondo Channel monitoring station is located on Beverly Boulevard, downstream of Whitter Narrows dam, at the USGS – U.S. Army Corps of Engineers (ACOE) Stream gage No. 1102300 or E327-R. The upstream tributary watershed area is approximately 142 square miles.

Monitoring data from stormwater collected at station TS06 was compared to the most stringent applicable water quality objectives (WQOs) to determine exceedances of receiving water limitations. WQOs were determined pursuant to TMDLs, the Basin Plan and the California Toxics Rule, 40 CFR Part 131.38 (CTR). Water quality objectives for chlorpyrifos and diazinon were determined using the freshwater final acute criteria set by the California Department of Fish and Game. Many of the WQOs were used as benchmarks for determining Water Quality Priorities, and should not be used for compliance purposes. Please refer to the Lower LAR Watershed Coordinated Integrated Monitoring Plan (CIMP) for a table of monitored constituents along with their most up-to-date WQOs.

A summary of the constituents not attaining WQOs at station TS06 during the monitoring years 2002-2012 is presented in Tables 2-5 and 2-6. Complete tables of monitoring results can be found in Appendix A-2-2.

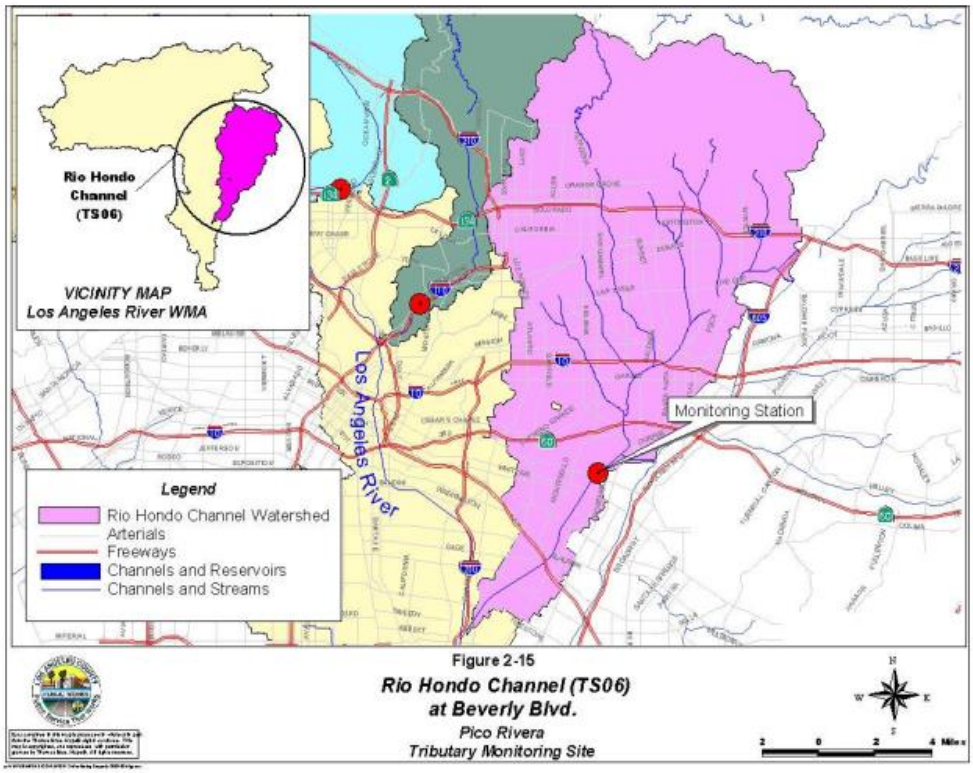


Figure 2-3: Rio Hondo tributary station

Table 2-5: TS06 constituents exceeding WQOs during wet weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	9	1	11	0.022	CTR Freshwater Aquatic Life Protection, Acute
pH	9	1	11	6.5-8.5	LA Basin Plan
Total Coliform	9	9	100	10000	LA Basin Plan - Marine Waters
Fecal Coliform	9	9	100	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	9	9	100	104	LA Basin Plan - Marine Waters
Chloride	9	1	11	150	LA Basin Plan
Total Copper	9	4	44	17	LA River Metals TMDL
Total Lead	9	1	11	62	LA River Metals TMDL
Total Zinc	9	1	11	159	LA River Metals TMDL
Diazinon	9	3	33	0.08	CADF&G

Table 2-6: TS06 constituents exceeding WQOs during dry weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	3	2	67	0.0052	CTR Freshwater Aquatic Life Protection, Chronic
pH	3	2	67	6.5-8.5	LA Basin Plan
Total Coliform	3	1	33	10000	LA Basin Plan - Marine Waters
Fecal Coliform	3	2	67	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	3	2	67	104	LA Basin Plan - Marine Waters
Total Copper	3	2	67	13	LA River Metals TMDL

2.2.3 LA COUNTY SANITATION DISTRICT MONITORING

The County Sanitation Districts of Los Angeles County (LACSD) are a confederation of 23 independent special districts serving the water pollution control management needs of about 5.7 million people in Los Angeles County. The Sanitation Districts' service area covers approximately 820 square miles and encompasses 78 cities and unincorporated territory within the County. With regard to wastewater treatment, the Sanitation Districts construct, operate and maintain facilities to collect, treat and dispose of wastewater and industrial wastes.

Seventeen of the 23 districts are signatory to an agreement which provides for sewerage service to the majority of residential, commercial and industrial users (IUs) within the County, but mostly located outside of the City of Los Angeles service area. This treatment system, known as the Joint Outfall System (JOS), currently consists of the Joint Water Pollution Control Plant (JWPCP) located in the City of Carson and six upstream water reclamation plants (WRPs); the Whittier Narrows WRP near the City of South El Monte, the Los Coyotes WRP in the City of Cerritos, the San Jose Creek WRP adjacent to the City of Industry, the Long Beach WRP in the City of Long Beach, the Pomona WRP in the City of Pomona and the La Cañada WRP in La Cañada Flintridge. All JOS facilities except the La Cañada WRP are regulated under the NPDES program; all six WRPs are subject to California Waste Discharge or Water Reclamation Requirements. See Chapter 1 Introduction for more detail on the WRP discharges within the Lower LAR Watershed.

The LACSD monitors its effluent at multiple locations within the Lower LAR Watershed. Data from 2004 to 2012 was analyzed and exceedances of WQOs were added to the Lower LAR WQPs.

2.2.4 LOS ANGELES RIVER METALS TMDL MONITORING DATA ANALYSIS

The Los Angeles River Metals TMDL became effective on October 29, 2008. For compliance with the requirements of this TMDL, a Coordinated Monitoring Plan (CMP) was developed and implemented jointly by the responsible LA River Watershed MS4 Permittees in October 2008. Wet and dry weather monitoring began at 13 locations in the LA River and major tributaries (shown in Figure 2-2) in 2008 to characterize ambient water quality and measure attainment of effluent limitations set forth in the TMDL and outlined in Table 2-7.

Table 2-7: Los Angeles River Metals Water Quality Based Effluent Limitations (Total Recoverable)

	Effluent Limitations Daily Maximum (µg total recoverable metals/L)		
Waterbody	Copper	Lead	Zinc
LA River Reach 2	WER[1] x 22	WER[1] x 11	-
LA River Reach 1	WER[1] x 23	WER[1] x 12	-
Compton Creek	WER[1] x 19	WER[1] x 8.9	-
Rio Hondo Reach 1	WER[1] x 13	WER[1] x 5.0	WER[1] x 131

[1] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.

Five of the thirteen monitoring locations identified in the CMP are located within, and collect runoff from, the Lower LAR Watershed:

LAR I-9: The LAR I-9 sampling site is located between the 710 Freeway bridge to the north and Imperial Highway bridge to the south in the main channel, upstream of the Rio Hondo confluence. The site is located in Reach 2.

LAR I-10: LAR I-10 is currently monitored by the City of Los Angeles as part of its Status and Trends Monitoring Program. The site is located in Reach 2.

LAR I-11: LAR I-11 is located in Long Beach at Del Amo Boulevard in the main channel upstream of the Compton Creek confluence. The site is located at the bottom of Reach 2.

LAR I-12: LAR I-12 is currently monitored by the City of Los Angeles as part of its Status and Trends Monitoring Program. The site is located in Reach 1.

LAR I-13: LAR I-13 is an existing Los Angeles County mass emission sampling site located in Long Beach south of Wardlow Road and north of Willow Street in the main channel. This is the location of an existing Los Angeles County gauging station identified as F319-R. The site is located in Reach 1.

A summary of the constituents not attaining applicable WQBELs at these monitoring locations during the monitoring years 2008-2012 is shown in Tables 2-8 and 2-9. Note that while some collected samples were found to exceed WQBELs during this time, the watershed is on schedule to meet applicable interim and final WLAs as outlined in the LA River Metals TMDL and the JG1 and JG2 LA River Metals TMDL Implementation Plans.

Table 2-8: Lower LAR metal exceedances, dry weather exceedances by location (total dry samples)

Constituent	LAR I-9 Reach 2 at 710 Freeway	LAR I-10 Rio Hondo	LAR I-11 Reach 2 at Rio Hondo	LAR I-12 Compton Creek	LAR I-13 Reach 1 at Wardlow
Total Recoverable Copper	0	7(10)	0	0	0
Total Recoverable Zinc	0	0	0	0	0
Total Recoverable Lead	0	2(10)	0	0	0

Table 2-9: Lower LAR metal exceedances, wet weather exceedances by location (total dry samples)

Constituent	LAR I-11 Reach 2 at Rio Hondo	LAR I-13 Reach 1 at Wardlow
Total Recoverable Copper	17(17)	20(20)
Total Recoverable Zinc	3(17)	4(20)
Total Recoverable Lead	16(17)	16(20)
Total Recoverable Cadmium	0	0

*Only sampling locations LAR I-11 and LA I-13 are sampled during wet weather in the Lower LAR Watershed

2.2.5 CITY OF LONG BEACH STORMWATER MONITORING

The City of Long Beach first established a monitoring site at the Dominguez Gap Pump Station during the 2000/2001 wet season. Refer to Section 5 (the RAA) for further information on the project.

The Dominguez Gap Pump Station and adjacent infiltration/detention basin started undergoing major renovations during the summer of 2006 and work extended through most of the 2007/2008 wet season. During that time period, land disturbances associated with development of the wetland system resulted in elevated levels of sediment. By late 2009 the wetland vegetation had become well established and the water quality changes observed during the construction phase were no longer evident.

The Dominguez Gap has been determined to play a critical role in attainment of TMDL requirements for Reach 1. Discussions with the LACFCD have emphasized the benefits of operating water levels to benefit both the wetland habitat and minimize mass emissions of trace metals and other contaminants to (or back to) the Los Angeles River.

The Los Angeles River Metals TMDL established concentration-based targets at 23 µg/L for total recoverable copper and 12 µg/L for total recoverable lead at the downstream Wardlow monitoring site during dry weather. A summary of all dry weather monitoring data from the Dominguez Gap Pump Station for these metals (Tables 2-10 and 2-11 and Figure 2-4) shows consistently low concentrations of copper, lead and zinc in both the total recoverable and dissolved forms. Concentrations of these metals in Dominguez Gap Pump Stations dry weather discharges have also remained lower than measurements made within the Los Angeles River by the Coordinated Monitoring Program. This indicates that the wetland system is has very effective in removing these metals.

The Los Angeles River Metals TMDL establishes wet weather water quality targets based on the acute CTR criteria and the 50th percentile hardness values for stormwater collected at the County's Wardlow water quality monitoring site on the Los Angeles River. These targets are for total recoverable metals:

- Cadmium: 3.1 ug/l
- Copper: 17 ug/l
- Lead: 62 ug/l
- Zinc: 159 ug/l

In a total of 37 monitored storm events concentrations of total cadmium have never exceeded 0.55 mg/L and the median concentration has been 0.26 mg/L. Long-term trends for discharges of total copper, lead and zinc are illustrated in Figure 2-5. This figure examines trends in flow, concentrations of the target metals, and loads of trace metal discharges. The graphs on the left side of the figure illustrate trends both before and after implementation of the TMDL while the graphs on the right side of the figure trends without regard to the implementation date. Stormwater discharges have tended to decrease over time however this watershed was reconfigured when the treatment wetland system was created. It now has a smaller drainage area. Concentrations of total copper, total lead and total zinc were all increasing prior to both completion of the wetland treatment system and implementation of the TMDL. General trends suggest that loads of all three metals have been decreasing in recent years but further data will be necessary to confirm this trend. Concentrations of total copper still occasionally exceed the current water quality target established for the Los Angeles River at Wardlow (17 ug/L) but measured concentrations in the past three years have never exceeded 21 ug/L. Concentrations of total lead present in wet weather discharges from the Dominguez Gap Pump Station are less than 25% of the established objective. Concentrations of total zinc are also declining and, in recent years, have remained less than 2/3 of the water quality target in Los Angeles River Reach 1.

The Los Angeles River Nitrogen TMDL established WLAs for both ammonia-N and nitrate-N that apply to minor discharges that discharge both below the Los Angeles-Glendale WRP and within Reach 1 of the Los Angeles River. Ammonia-N WLAs were established for a 1-hour average (8.7 mg/L) and a 30-day average (2.4 mg/L). WLAs for both nitrate-N and nitrate+nitrite-N were both set at 8.0 mg/L for a 30-day average. Concentrations of ammonia-N have consistently been less than 0.7 mg/L during both dry and wet weather monitoring (Figure 2-6). Median concentrations of ammonia are 0.18 mg/L during dry weather and 0.38 mg/L during wet weather discharges. Concentrations of nitrate-N in dry weather discharges have never exceeded 1.9 mg/L and all wet weather discharges have had concentrations of less than 1.4 mg/L. Thus all discharges from the Dominguez Gap Pump Station continue to achieve the WLAs established for nitrogen compounds. Furthermore, total nitrogen (TKN plus nitrate/nitrite-N) concentrations typically range between 2.0 and 3.0 mg/L with the highest measured concentration being reported at 5.02 mg/L during a wet weather discharge.

Table 2-10: Total metals in dry weather discharges from the Dominguez Gap pump station

Statistic	*Copper*	*Lead*	*Zinc*
LA River @ Wardlow TMDL objective	23	12	
No. of Events	7	7	7
Mean	4.2	3.5	23.8
Standard Deviation	2.2	1.5	12.0
Minimum	1.7	2.2	8.8
Median	3.9	3.1	21
Maximum	8.8	6.5	47

Table 2-11: Dissolved metals in dry weather discharges from the Dominguez Gap pump station

Statistic	*Copper*	*Lead*	*Zinc*
CTR Objective (median hardness 282 mg/L, 10^{th} percentile hardness 219 mg/L)	22	7.6	230
No. of Events	7	7	7
Mean	1.88	0.6	12.8
Standard Deviation	1.04	0.22	6.68
Minimum	0.54	0.39	6.3
Median	2.1	0.62	11
Maximum	3.6	1.0	24

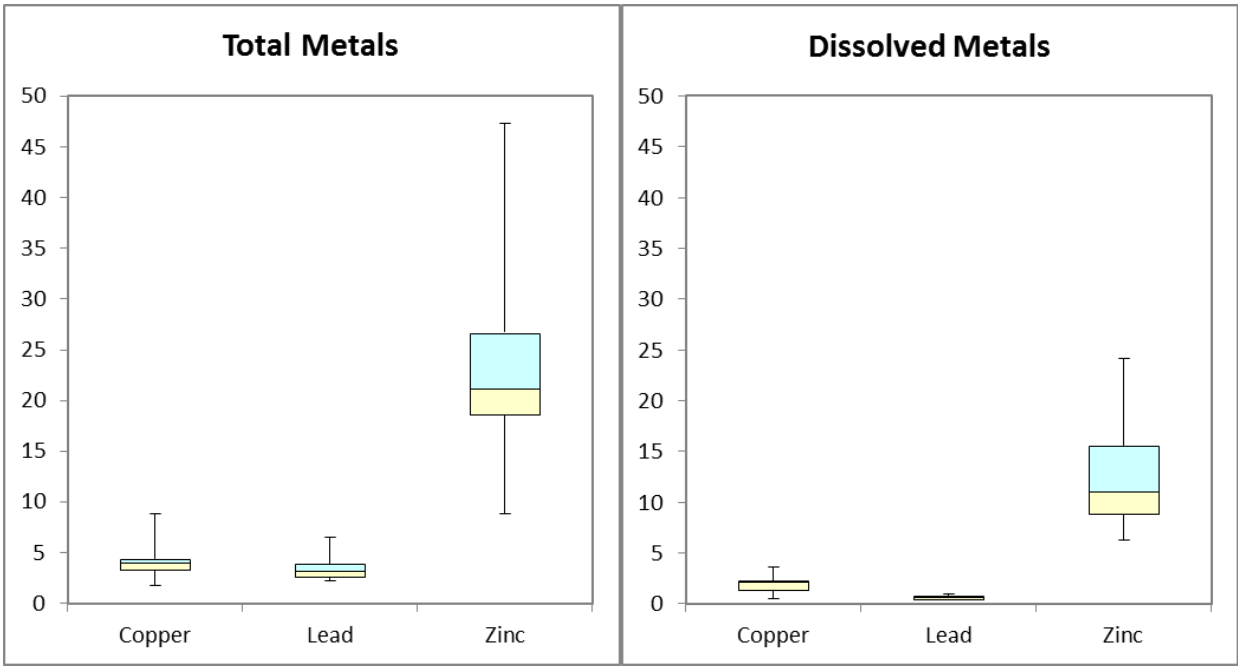
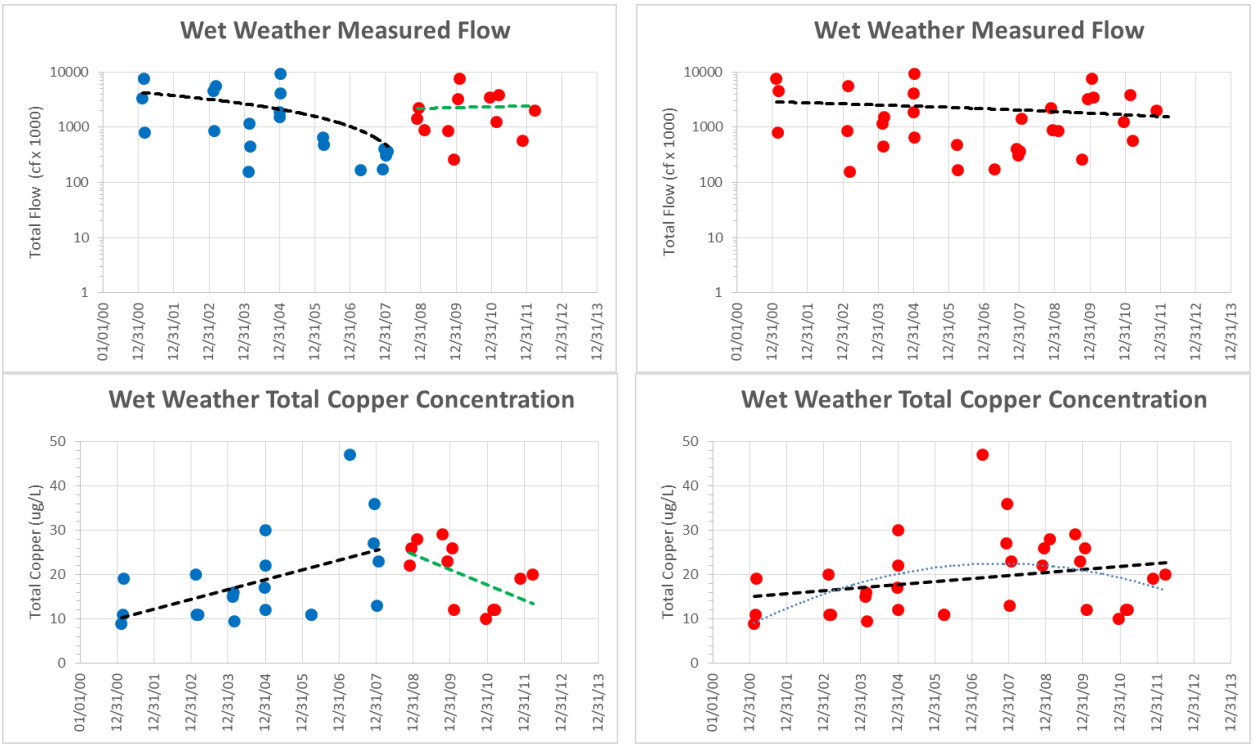
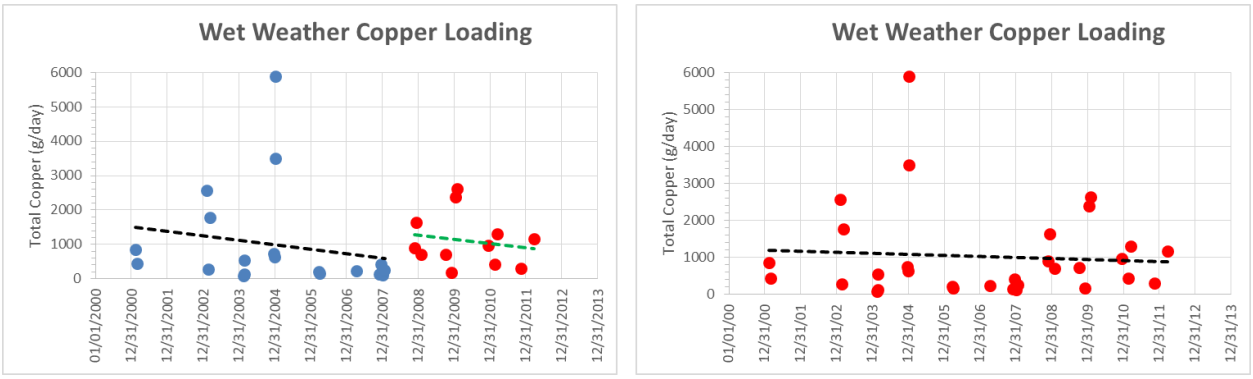


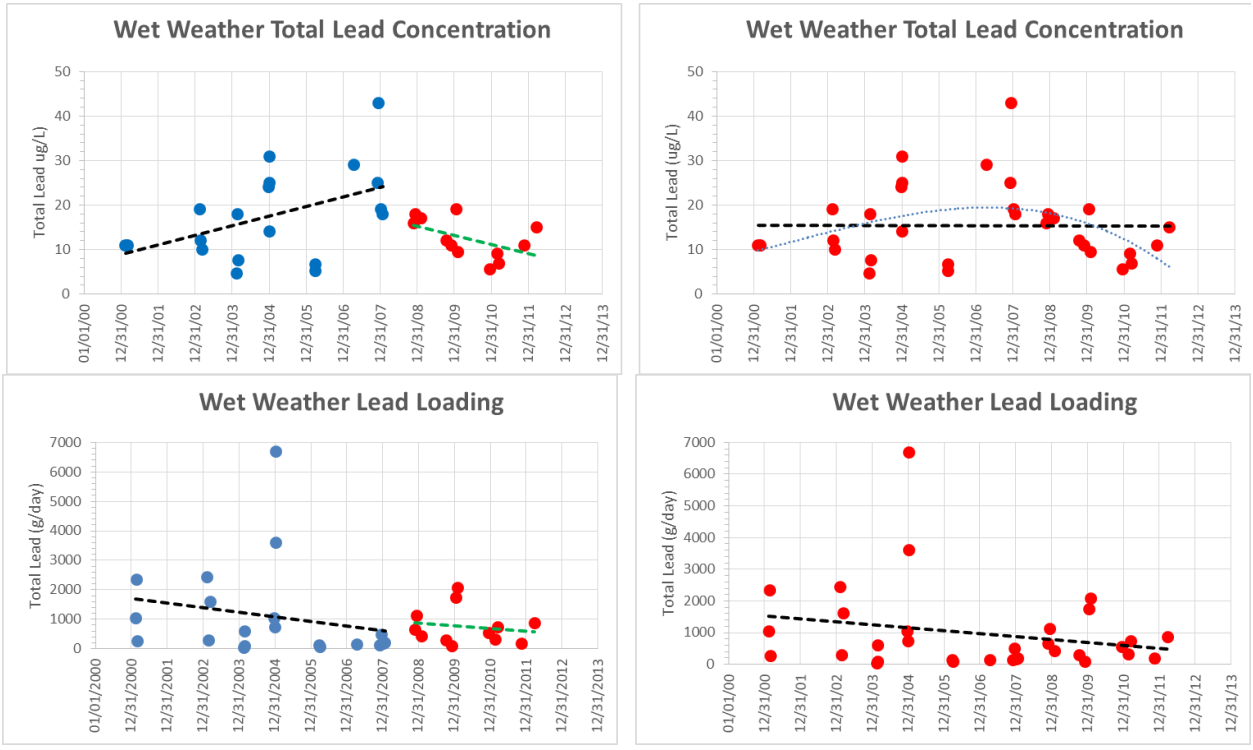
Figure 2-4: Total and dissolved metals in dry weather discharges from the Dominguez Gap pump station

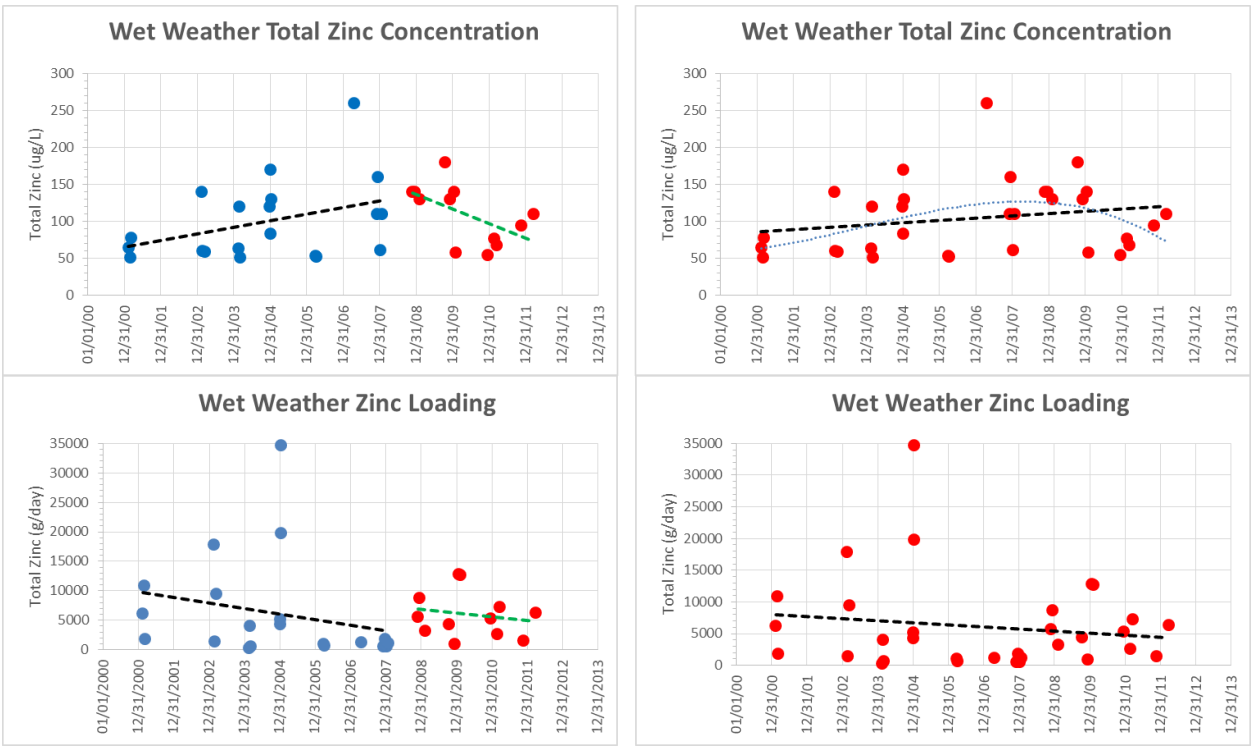




Note: Graphs on the left illustrate samples taken before and after the effective date of the TMDL (10/29/2008). Graphs on the right illustrate trends without consideration of the effective date of the TMDL. Dashed lines are based upon simple linear regression. The fine dotted line represents a non-linear regression.

Figure 2-5: Stormwater flow, concentration and loads for total Cu, Pb and Zn at the Dominguez Gap





Note: Graphs on the left illustrate samples taken before and after the effective date of the TMDL (10/29/2008). Graphs on the right illustrate trends without consideration of the effective date of the TMDL. Dashed lines are based upon simple linear regression. The fine dotted line represents a non-linear regression.

Figure 2-5 (Cont.): Stormwater flow, concentration and loads for total Cu, Pb, Zn - Dominguez Gap pump station

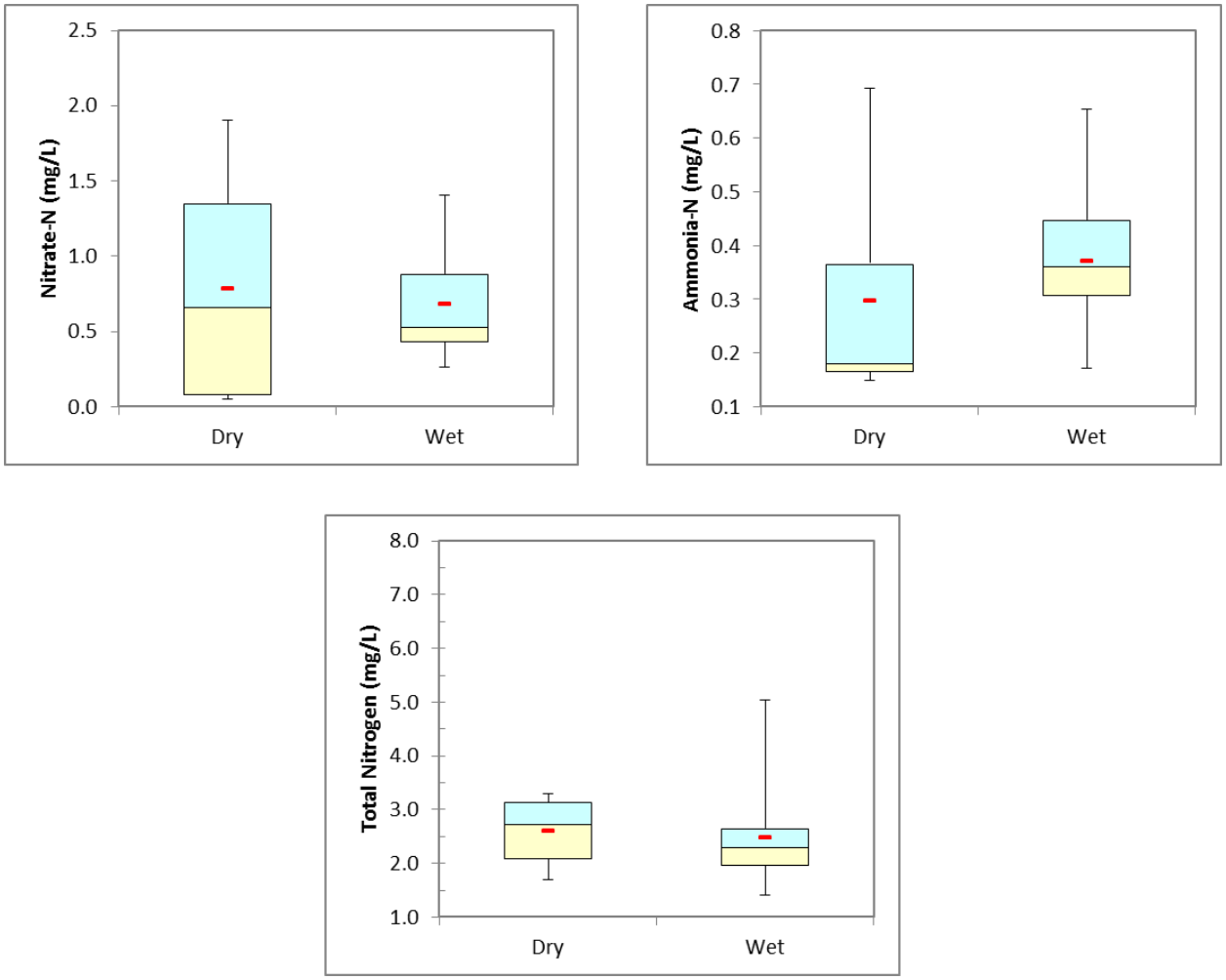


Figure 2-6: Distribution of Ammonia-N, Nitrate-N and Total Nitrogen measured in both dry and wet weather discharges from the Dominguez pump station, 2008-2013

2.2.6 LOS ANGELES RIVER BACTERIA SOURCE IDENTIFICATION STUDY/CLEANER RIVERS THROUGH EFFECTIVE STAKEHOLDER-LED TMDLS (CREST) STUDY

Multiple data sets were analyzed during the development of the LA River Bacteria TMDL. Data from the City of Los Angeles' Status and Trends monitoring program, the Monitoring and Reporting Programs for the City of Los Angeles' LA-Glendale and D.C. Tillman Water Reclamation Plants and the Burbank Water Reclamation Plant, and data from the Mass Emission and Tributary instream monitoring stations under the Monitoring and Reporting Program of the MS4 Permit were analyzed over a period beginning November 1997 and ending February 2008.

The data in Table 2-12 were compiled by the Regional Board for the Los Angeles River Watershed Bacteria TMDL. Exceedance percentages, which are calculated as the number of single sample exceedances of Rec-1 WQOs divided by sample count are shown for the monitoring locations relevant to the Lower LAR Watershed. The exceedance count and sample count are also listed next to the exceedance percentage in parentheses.

On average, E. Coli and fecal coliform samples exceeded WQOs over 80% of the time in the LA River, and over 75% of the time in LA River Tributaries.

It should be noted that the Regional Board recognizes that there are natural sources of bacteria within watersheds that may contribute to exceedances of the Rec-1 WQOs, and have implemented a reference system/antidegradation compliance procedure. According to the LA River Bacteria TMDL, under this protocol, "*a certain frequency of exceedance of the single sample objectives shall be permitted on the basis of the observed exceedance frequency in the selected reference system(s) or the targeted waterbody*"(Staff Report pg. 18). In addition, the LA River and the Rio Hondo are subject to the high flow suspension (HFS) of Rec-1 WQOs for bacteria during days with rainfall of 0.5" inches or greater and the following 24 hours, so many of the wet weather exceedances expressed above over- represent the bacterial impairment in these waterbodies[10].

A map of monitoring locations sampled is shown in Figure 2-7.

[10] Los Angeles River Watershed Bacteria Total Maximum Daily Load. Staff Report, California Regional Water Quality Control Board, Los Angeles Region. July 15, 2010

Table 2-12: LA River bacteria source identification study monitoring data exceedance summary

	Parameter	LA River Reach 1 Nov '97-Feb '08 Exceedance %	LA River Reach 2 Jan '01-Feb '08 Exceedance %	Compton Creek Jan '02-Feb '08 Exceedance %	Rio Hondo Reach 1 Jan '02-Feb '08 Exceedance %
Single Sample	Fecal Coliform	86.2% (50/58)	80.0% (4/5)	87.5% (14/16)	90.9% (10/11)
	E. Coli	83.1% (226/272)	81.9% (443/541)	53.3% (48/90)	69.1% (56/81)
	Exceedance Days	84.4% (276/327)	82.3% (445/541)	57.3% (59/103)	79.0% (64/81)
	Dry Weather	79.4% (189/238)	79.3% (345/435)	58.7% (54/92)	78.3% (54/69)
	Wet Weather	91.6% (87/95)	88.5% (100/113)	45.5% (5/11)	83.3% (10/12)
	Summer	77.0% (134/174)	79.2% (244/313)	90.5% (38/42)	49.2% (38/48)
	Winter	89.3% (142/159)	87.7% (201/229)	63.4% (21/33)	68.8% (22/32)
Geometric Means	Fecal Coliform	100.0% (11/11)	N/A	N/A	N/A
	E.Coli	100.0% (22/22)	100.0% (59/59)	N/A	N/A
	Exceedance Days	100.0% (33/33)	100.0% (59/59)	N/A	N/A
	Summer	100.0% (3/3)	100.0% (6/6)	N/A	N/A
	Winter	100.0% (30/30)	100.0% (53/53)	N/A	N/A

** Data expressed in terms of exceedance days of the Basin Plan Rec-1 WQO in which single sample bacteria densities exceed bacteria water quality standards for Rec-1 Beneficial Use.
***LA River is subject to the High Flow Suspension of Rec-1 WQOs, therefore these exceedances may be overrepresented

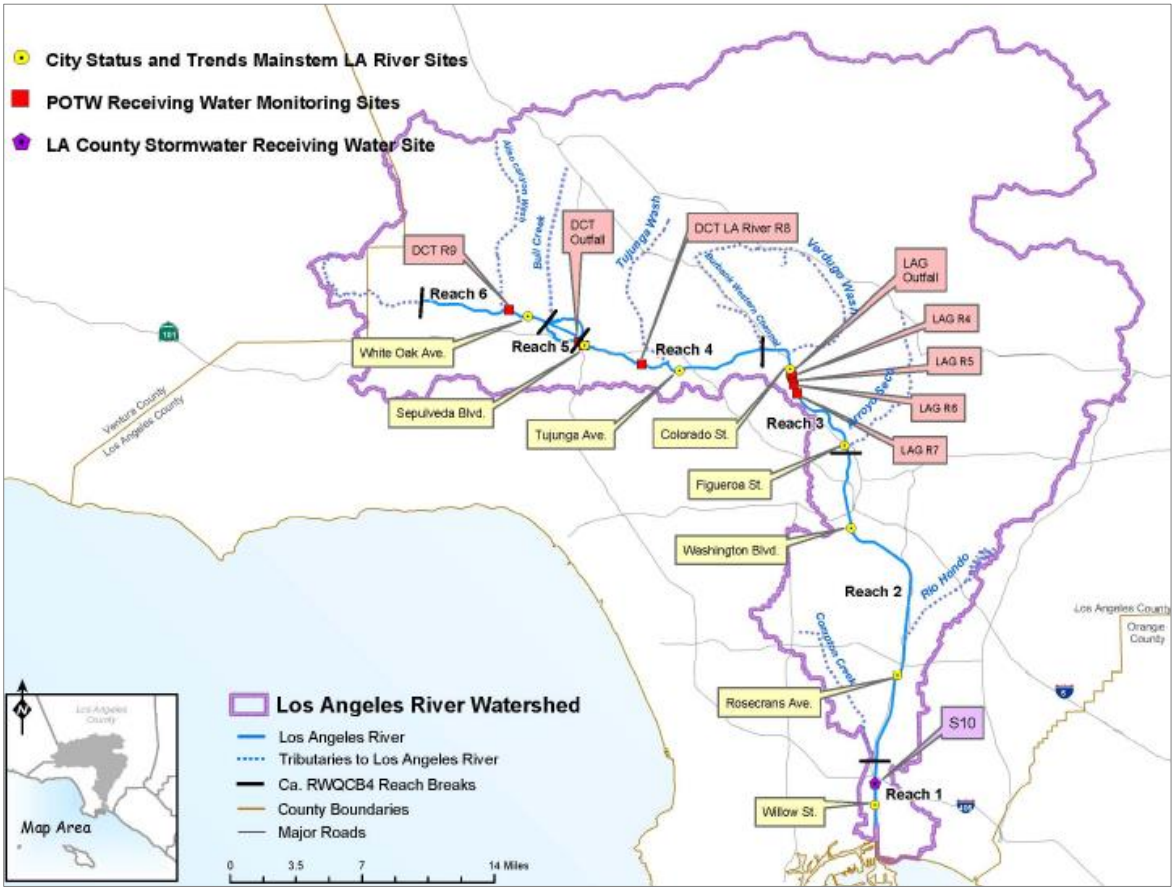


Figure 2-7: LA River Bacteria Source Identification Study monitoring locations

2.2.7 LA RIVER TRASH TMDL DATA

The Cities have successfully implemented the LA River Trash TMDL, achieving a greater than 80% reduction in trash through the installation of certified full capture catch basin inserts, trash nets, and retention basins. Table 2-13 displays each City's status in achieving 100% trash capture.

Table 2-13: Percentage of catch basins equipped with full capture devices by City

City	Percentage of Catch Basins Equipped with Full Capture Device
Downey	90
Lakewood	100
Pico Rivera	84
Paramount	94
Signal Hill	89
South Gate	86
Long Beach	90

2.2.8 SCCRWP POLLUTANT LOADING STUDY

The Southern California Coastal Water Research Project, which was formed in 1969 to "enhance the scientific understanding of linkages among human activities, natural events, and the health of the Southern California coastal environment" conducted a five-year study of the spatial and temporal patterns of stormwater contaminants from 2000 through 2005 in five watersheds throughout Los Angeles County. They collected data during 11 storm events from twelve mass emissions sites and eight land use types to characterize pollutant loading of trace metals, organic compounds, and bacteria. Ten (10) to fifteen (15) grab samples were collected for each event, and samples were targeted at early season storms and large rainfall events. Data was collected from the LA River at Wardlow, making the results of this study applicable to the Lower LAR Watershed.

Researchers found that stormwater concentrations of trace metals exceeded CTR WQOs in greater than 80% of the wet weather samples at mass emissions sites. They also found consistent fecal indicator bacteria exceedances at both mass emissions and land use sites. Results also indicated that annual loading of Polycyclic aromatic hydrocarbons (PAHs) from the Los Angeles River watershed into the Pacific Ocean is approximately 92.8 kg/year. The EPA regulatory guidelines suggest a practical PAH detection limit between 1 - 5ug/L, and this study mostly found mean PAH concentrations below this threshold. However, they suggest that PAH concentrations may be underreported due to the fact that most monitoring efforts collect composite samples, and this study observed almost all PAH pollutant loading to occur during the first flush of a storm event.

2.2.9 COUNCIL FOR WATERSHED HEALTH LOS ANGELES RIVER WATERSHED MONITORING PROGRAM

Since 2007, the Los Angeles River Watershed Monitoring Program (LARWMP), a group of stakeholders representing major permittees, regulatory and management agencies, and conservation groups led by the

Council for Watershed Health, has conducted watershed scale monitoring at targeted and random sites throughout the Los Angeles River watershed. A map of monitoring locations is shown in Figure 2-8.

Significant observations found during the 2010 monitoring season under this program are as follows[11]:

- "The ambient condition of streams in the Los Angeles River Watershed was assessed using a variety of indicators collected at randomly selected sites in three sub-regions (natural, urban and effluent dominated). Indicators included water chemistry, toxicity, bioassessment and physical habitat condition."
- "Dissolved oxygen, pH and temperature were greatest at effluent dominated sites and lowest at natural upper watershed sites. Water Reclamation Plants and urban run-off discharge into concrete lined channels, with limited canopy cover. Therefore, sunlight has the opportunity to increase water temperature and encourage photosynthesis, which results in cyclic oscillation in pH and dissolved oxygen."
- "The concentrations of zinc, selenium, and lead were highest at effluent dominated sites and arsenic, chromium and copper were higher at urban sites. Other than copper and selenium in urban streams, concentrations of the other metals were generally below CTR thresholds."
- "Effluent-dominated sites had higher median concentrations of dissolved nutrients compared to the other sub-regions and the range of values was greatest at the urban sites. Nitrogen concentrations at all watershed sub-regions were below the basin plan objective of 10 mg/L-N for nitrate and 1.0 mg/L-N for nitrite."
- "Watershed-wide, 80% of the random sites sampled had IBI scores that indicated degraded habitat or ecosystem conditions, most of these were concrete lined channels in the urban and effluent dominated sub-regions. The BMI communities were strongly affected by the 2009 Station Fire which reduced the biological condition in the upper watershed."
- "Physical habitat conditions, as measured by CRAM, were poorest in the lower watershed, where concrete channels predominate, and best in the upper watershed."
- "There was a strong positive correlation between good biological conditions (IBI scores) and canopy cover and stream slope. Each of these habitat characteristics was favorable for BMIs in the upper watershed where IBI scores were correspondingly high. IBI scores were generally lowest in the urban and effluent sub regions, where concrete lined channels predominate."

The Lower LAR Watershed will use these results, and continue to track future LARWMP results to help target watershed control measures identified in the WMP.

[11] Morris, K. et al.



Figure 2-8: LARWMP 2010 monitoring locations

2.3 SOURCE ASSESSMENT

This section identifies the potential sources of pollutants within the Lower LAR Watershed for the waterbody-pollutants classified in section 2.2. Information was gathered from several water quality monitoring programs and special studies related to pollutant sources and conditions that contribute to the highest water quality priorities to identify known and suspected stormwater and nonstormwater pollutants sources to and from the Municipal Separate Storm Sewer System (MS4).

The pollutants addressed in this section are bacteria, nutrients, metals, sediment, and trash. To generally describe the potential sources in the Lower LAR Watershed for these pollutants, pollutant sources have been divided into the following categories: NPDES discharges, road infrastructure, atmospheric deposition, and wastewater from sanitary sewer and SSOs.

2.3.1 NPDES SOURCES

There are two categories of pollutant sources, point sources and non-point sources. Point source discharges are regulated through National Pollutant Discharge Elimination System (NPDES) permits. Point sources include those associated with the MS4 (stormwater and urban runoff) and other NPDES discharges. Stormwater runoff in the watershed is regulated through four types of permits including MS4 permits, a statewide stormwater permit for Caltrans; a statewide Construction General Permit (CGP); and a statewide Industrial General Permit (IGP). The NPDES IGP regulates stormwater discharges and authorized non-stormwater discharges from ten specific categories of industrial facilities, including manufacturing facilities, oil and gas mining facilities, landfills, and transportation facilities. Furthermore, the NPDES CGP regulates stormwater discharges from construction sites that result in land disturbances equal to or greater than one acre. Point source discharges from thee IGP, CGP, residential, commercial and transportation activities can be a significant source of pollutant loads.

Non-point sources, by definition, include pollutants that reach waters from a number of land uses and are not regulated through NPDES permits. Non-point sources include existing contaminated sediments within the watershed and direct air deposition to the waterbody surface.

The following provides additional discussion regarding the presence of pollutants in stormwater runoff within the Lower LA River watershed.

BACTERIA

As discussed in Section 2.2.6 relating to the CREST study for the LA River Bacteria TMDL, based on the assessment from several monitoring programs, on average E. Coli and fecal coliform samples exceeded WQOs over 80% of the time in the LA River and over 75% of the time in LA River Tributaries. According to the Bacteria TMDL, dry weather urban runoff and stormwater conveyed by storm drains are the primary sources of elevated bacterial loadings in the watershed[12]. Significant contributors of bacteria are

[12] LARWQCB (Los Angeles Regional Water Quality Control Board). 2010. Los Angeles River Watershed Bacteria Total Maximum Daily Load. California Regional Water Quality Control Board- Los Angeles, CA

associated with categories such as anthropogenic, non-anthropogenic, and environmental sources, which may include:

SANITARY SEWERS OVERFLOWS (SSOS)

SSOs are potential sources of contaminants. Aging systems in need of repair or replacement, severe weather, improper system operation and maintenance (O&M), clogs, and root growth can contribute to sanitary sewer leaks and overflows. When sanitary sewers overflow or leak, they can release raw sewage into the environment, which can contain pollutants such as suspended solids, pathogenic organisms, toxic pollutants, oil and grease but in particular, high concentrations of bacteria and nutrients[13]. SSOs can occur during the dry or wet weather and at any point in the collection system, include overflows from manholes.

According to the Sanitary Sewer Overflow (SSO) database in the California Integrated Water Quality System (CIWQS), a total of 226 SSOs have been recorded within the watershed since 2006. Table 2-14 includes information on the total reported SSO discharges[14].

Table 2-14: Total number of SSOs and volume

Total SSOs	Total Volume (gal)
226	360,476

ANIMAL WASTES

The bacteria indicators used to assess water quality are not specific to human sewage; therefore, natural influences of fecal matter from animals and birds can also be a source of elevated levels of bacteria[12].

ILLICIT CONNECTIONS AND ILLICIT DISCHARGES (IC/IDS)

IC/IDs to the MS4 are also likely sources of bacteria in stormwater discharges[12]. Table 2-15 includes data based on annual reports submitted to the LA County DPW (the previous Principal Permittee), for illicit connections and illicit discharges. Current data on the constituents for the IC/IDs recorded during this period is not available.

Table 2-15: Illicit Connections/Illicit Discharges 2001-2012

Agency	Illicit Connections	Illicit Discharges
Downey	6	467
Lakewood	0	162
Long Beach	No Data	No Data
Lynwood	1	38
Pico Rivera	No Data	No Data
Signal Hill	0	88
South Gate	0	104
Total	7	917

[13] SWRCB (State Water Resources Control Board). 2014. Sanitary Sewer Overflow (SSO) Reduction Program. http://www.waterboards.ca.gov/wate_issues/programs/sso/.

[14] SWRCB (State Water Resources Control Board). 2014. California Integrated Water Quality System Project (CIWQS). Spill Public Report - Summary Page. http://www.waterboards.ca.gov/ciwqs

WASTEWATER TREATMENT PLANTS

According to the Bacteria TMDL Staff Report for the Los Angeles River, during dry weather, effluent discharged from wastewater reclamation plants accounts for roughly 72% of the flow in the river and less than 1% in the wet weather. Although wastewater treatment plants are not considered to be a source of exceedances of bacteria water quality objectives in the river, when these systems do fail they may be sources of bacteria loads during the wet or dry weather conditions.

OTHER SOURCES

Urban runoff has also been found to carry high levels of bacteria and can be expected to exceed water quality criteria for bacteria during and immediately after storm events. During dry weather, flows into the storm drain system include residential and commercial runoff from activities such as over-irrigation, car washes, pavement cleaning, etc. Organic debris from gardens, landscaping, parks, food waste and illegal dumping from recreational vehicle holding tanks among others, can be a source of elevated levels of total coliform bacteria. In addition, decaying vegetation and soils can play a role in bacterial loadings in the watershed[15].

NUTRIENTS

Possible sources of nutrients include runoff from residential and commercial areas due to landscaping activities and use of fertilizer for lawns and gardens, including organic debris. Activities such as washing cars, parking lots and driveways can contribute to nutrients pollutants in the MS4 since most of the detergents used contain phosphorus[16]. Other sources of nutrients include food wastes, domestic animal waste; and human waste from areas inhabited by the homeless. These pollutants build up and are then washed into the waterways through the storm drain system when it rains. These kinds of loads are typically highest during the first major storm flush and even after extended periods of dry weather when pollutants have accumulated. Other major categories of nutrients sources include:

- As discussed in the TMDL for Nitrogen Compounds and Related Effects, direct discharges from wastewater reclamation plants within the Los Angeles River comprise the largest source of nutrients loadings. The three largest POTWs within the LA River watershed are: Donald C. Tillman Water Reclamation Plant, Los Angeles Glendale Water Reclamation Plant, and Burbank Water Treatment Plant, which provide an average of 2,243 MT/yr in total nitrogen loadings[16].
- Golf courses – these are a major source of nutrients since fertilization activities and watering rates are generally much greater than the residential and commercial areas. The excess nutrients

[15] LARWQCB (Los Angeles Regional Water Quality Control Board). 2006. Total Maximum Daily Loads for Bacterial Indicator Densities in Ballona Creek, Ballona Estuary, and Sepulveda Channel. California Regional Water Quality Control Board- Los Angeles, CA

[16] LARWQCB (Los Angeles Regional Water Quality Control Board). 2003. Total Maximum Daily Loads for Nitrogen Compounds and Related Effects. California Regional Water Quality Control Board, Los Angeles Region, Los Angeles, CA.

accumulated in the soils can be transported to waterways through excess irrigation or stormwater runoff. There are approximately 15 golf courses within the watershed area.

METALS

Heavy metals including copper, lead, and zinc are Category 1 pollutants in the Lower LAR Watershed. Although naturally occurring, concentrations of these metals are a concern in many watersheds because of potential industrial and urban discharges. The Los Angeles River TMDL for Metals addresses the main types of sources within the watershed. During dry weather, Publicly Owned Treatment Works (POTWs) account for the majority of flow and metal loadings, the remaining loading sources are identified from other permitted NPDES discharges which include Industrial General Permit (IGP) covered facilities, Construction General Permit (CGP) covered facilities, and other types of urban activities[17]. According to the Los Angeles River Metals TMDL, most of the annual metal loadings are associated with wet weather. The final staff reports estimates stormwater flows contributing as much as 40 percent of the cadmium loading, 80 percent of the copper loading, 95 percent of the lead loading and 90 percent of the zinc loading on an annual basis.

POTWS

POTWS are considered significant contributors of metals in the river. During dry weather, they constitute the majority of discharge in the river. Monitoring data as evaluated in the Metals TMDL indicates POTWs as contributing fairly large percentages of the total dry-weather metal loadings. The concentrations of metals from the POTWs may be low, but loadings are high due to their large flows[18].

INDUSTRIAL GENERAL PERMIT ACTIVITIES

The types of facilities covered under the IGP have the potential for metal loads, in particular metal plating, transportation, scrap yards and recycling and manufacturing facilities.

According to the Stormwater Multiple Application and Report Tracking System (SMARTS) database, there are approximately 227 current active industrial permits within the watershed; and from 2002-2012 there have been approximately 287 combined, active/terminated, industrial permits. Approximately 141 violations were recorded on the SMARTS database for inspections conducted from 2002-2012[18]. No further data is available to determine the kind of violations or the kind of pollutants these facilities contributed to.

[17] LARWQCB (Los Angeles Regional Water Quality Control Board). 2005. Total Maximum Daily Load for Metals Los Angeles River and Tributaries. California Regional Water Quality Control Board- Los Angeles, CA prepared in Coordination with Environmental Protection Agency Region 9.

[18] SWRCB (State Water Resources Control Board). 2014. Storm Water Multiple Application and Report Tracking System (SMARTS). http://www.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

Table 2-16: Active IGP Facilities as of May 1, 2014[18]

Agency	Total
Downey	22
Lakewood	1
Long Beach	78
Lynwood	15
Paramount	40
Pico Rivera	12
Signal Hill	6
South Gate	53
Total	227

CONSTRUCTION GENERAL PERMIT ACTIVITIES

Discharges covered under the CGP also have the potential to contribute metals loading from construction sites. Sediment delivered from construction sites can contain metals from construction materials and heavy equipment. Additionally, metals can leach out of building materials and construction waste exposed to stormwater[19].

Pollutants sources from construction activities are not considered a major concern since the watershed is mainly built-out. However, according to the SMARTS database, there are approximately 78 current active constructions permits within the watershed; and from 2002-2012 there have been approximately 337 combined, active/inactive, construction permits[18]. Approximately 28 violations were recorded on the SMARTS database for inspections conducted from 2002-2012. No further data is available to determine the kind of violations or the kind of pollutants these facilities contributed to.

Table 2-17: Active CGP sites as of May 1, 2014[18]

Agency	Total
Downey	7
Lakewood	4
Long Beach	44
Lynwood	3
Paramount	2
Pico Rivera	9
Signal Hill	5
South Gate	4
Total	78

LAND USE ACTIVITIES

These include general wear and tear of automotive parts which can be a significant source of metals. For example, brake wear can release copper, lead, and zinc into the environment and this contributes to concentrations of metals in urban runoff. Motor oil and automotive coolants spills are another potential land use source of metals. Pesticides, algaecides, wood preservatives, galvanized metals, and

[19] Raskin, L., M.J. Singer, and A. DePaoli. 2004. Final Report to the State Water Resources Control Board Agreement number 01-269-250. University of California, Davis, CA.

paints used across the watershed can also contain these metals. In the watershed, sources for these heavy metals have been identified as automotive repair, maintenance, fueling, cleaning and painting locations, metal fabrication facilities, and transportation activities and facilities[20].

The fertilizers used for lawn and landscape maintenance are also a source of metals and organic chemicals. Fertilizers, herbicides, and pesticides contain metals such as cadmium, copper, mercury, zinc, lead, iron, and manganese, which are also distributed when applying fertilizers and pesticides[21].

Monitoring program activities, which includes the mass emission monitoring as discussed in the Metals TMDL Implementation Plan for Jurisdiction 1, dry weather analysis predicted an exceedance frequency ranging between 3 and 12 percent for copper and 5 to 9 percent for lead[22]. Samples analyzed from 2009-2010 indicated that no samples exceeded the numeric water quality targets for dry weather. Based on the same historic monitoring information, the TMDL Implementation Plan for Jurisdiction 1 indicated wet weather flows routinely exceed numeric water quality targets for copper and zinc and to a lesser degree lead and cadmium for Reaches 2 through 6.

TRASH

According to the Trash TMDL for the Los Angeles River, the primary source of trash in the river results from litter, which is intentionally or accidentally discarded in watershed drainage areas. Transport mechanisms include storm drains, wind action and direct disposal. Several studies have shown that commercial operations generate more pollutants than residential operations, and as much as three times the amount generated from light industrial operations[23]. The TMDL also states that based on several studies, urban runoff is the dominant source of trash. The large amounts of trash conveyed by urban stormwater to the LA River is evidenced by the amount of trash that accumulated at the base of the storm drains. The amount and type of trash that is washed into the storm drain system appears to be a function of the surrounding land use.

2.3.2 ROAD INFRASTRUCTURE SOURCES

Runoff from highways and roads carries a significant load of pollutants. Pollutants originate from cars, roadway degradation, and surrounding landscape. Typical contaminants associated with these include sediment, heavy metals, oils and grease, debris, fertilizers, and pesticides, among others[24]. The use and wear of cars is one of the most prevalent sources of roadway pollutants. A study found that cars are the leading source of metal loads in stormwater, producing over 50 percent of copper, cadmium, and zinc

[20] City of San Diego and Caltrans. 2012. Tecolote Watershed Comprehensive Load Reduction Plan. Final Report. San Diego, CA

[21] County of Los Angeles. 2010. Multi-pollutant TMDL Implementation Plan for the Unincorporated County Area of Los Angeles River Watershed. County of Los Angeles, Los Angeles, CA

[22] Los Angeles River Jurisdictional Group 1. 2010. Metals TMDL Implementation Plan. Los Angeles, CA

[23] LARWQCB. 2007. Trash Total Maximum Daily Loads for the Los Angeles River Watershed. Los Angeles, CA.

[24] Caltrans (California Department of Transportation). 2003. Discharge characterization study report. California Department of Transportation, Sacramento, CA.

loads[25]. Vehicle brake pads constitute the single largest source of copper[26]. Simultaneously, tires, and engine parts are also a significant source of metals pollutants; almost 50 percent of tire wear accounts for over 50 percent of the total cadmium and zinc loads[27]. Roadways can also be a source of nutrients because nutrients are found in fertilizers that are commonly applied.

Table 2-18: Typical Sources of Pollutants from Road Infrastructure[28]

Source	Cadmium	Chromium	Copper	Iron	Nickel	Lead	Zinc	PAHs	Nutrients	Synthetic Organic Chemicals
Gasoline	●		●			●	●			
Exhaust					●	●		●		●
Motor oil and grease				●	●	●	●	●		
Antifreeze	●	●	●	●		●	●	●		
Undercoating						●	●			
Brake Linings			●	●	●	●	●			
Tires	●		●			●	●	●		
Asphalt	●		●		●		●	●		
Concrete			●		●		●			
Diesel Oil	●	●				●	●			●
Engine wear				●	●	●	●			
Fertilizers, pesticides, and herbicides	●		●	●	●		●		●	●

2.3.3 ATMOSPHERIC DEPOSITION

Atmospheric deposition is the direct and indirect transfer of pollutants from the air to surface waters. Pollutants in the atmosphere deposit onto solid surfaces and can then be washed off by rain, becoming part of the stormwater runoff that reaches the watershed. Atmospheric deposition of pollutants can be a large source of contamination to surface waters. Typical pollutants associated with atmospheric deposition are metals, PAHs, PCBs, and, to a lesser extent, nutrients. These pollutants enter the atmosphere from point sources (i.e., industrial facility emitting metals into the air). A comparison of trace metal contributions from aerial deposition, sewage treatment plans, industrial activities, and power plants is shown in Table 2-19.

[25] Schueler, T., and H.K. Holland. 2000. The Practice of Watershed Protection. Center for Watershed Protection, Ellicott City.
[26] TDC Environmental 2004, Copper Sources in Urban and Shoreline Activities. San Francisco, CA.
[27] Davis A.P., M. Shokouhian, and S. Ni. 2001. Loading estimates of lead, copper, cadmium, and zinc in urban runoff from specific sources. Chemosphere.
[28] Nixon, H., and J.D. Saphores. 2007. Impacts of motor vehicle operation on water quality: Clean-up costs and policies. Transportation Research Part D. Transport and Environment.

In addition to the trace metals, nutrients are also atmospherically deposited. The annual loading of nitrogen through atmospheric deposition in the Los Angeles River watershed is 5,559 tons per year, with 845 tons per year in the neighboring Ballona Creek watershed.[29]

Table 2-19 Comparison of source annual loadings to Santa Monica Bay (metric tons/year)

Metal	Aerial Deposition	Non-Aerial Sources		
		Sewage Treatment Plants	Industrial	Power Plants
Chromium	0.5	0.6	0.02	0.14
Copper	2.8	16	0.03	0.01
Lead	2.3	<0.01	0.02	<0.01
Nickel	0.45	5.1	0.13	0.01
Zinc	12.1	21	0.16	2.4

2.3.4 EXISTING WATERSHED MODEL RESULTS

The technical modeling used to develop the Los Angeles River Metals TMDL applied hydrodynamic and water quality models to assess the effects of metal loadings under both dry and wet weather conditions[30]. For dry weather, the model indicated concentrations below the CTR standards, which was consistent with the monitoring data since POTWs provide most of the dry-weather flows and generally discharge effluent that meets water quality standards. Estimates of storm loadings by the wet weather model were higher than loadings estimated from monitoring data.

A quantification methodology was used in the Reach 2 Metals TMDL Implementation Plan to evaluate the effectiveness of non-structural BMPs and to estimate the pollutant load reductions achieved through BMP implementation[31]. Pollutant buildup and wash-off analyses were completed for specific sources of metals. Hydrologic simulations were used to estimate the wash-off pollutant from the watershed surface, while exponential functions were used to estimate pollutant buildup and wash-off associated with specific sources of metals in the watershed. This approach demonstrated the mass of accumulated sediment on a given day is an exponential function of the 1) maximum carrying capacity, 2) residual pollutant not washed off during the preceding runoff event, and 3) dry days prior to the event. Pollutant buildup occurs at the fastest rate in the initial days following a wash-off event, but declines as buildup approaches the maximum carrying capacity over longer dry periods.

Chapter 4 of this plan includes details of the Reasonable Assurance Analysis conducted for the LLAR Watershed. A computer based modeling system was used to quantify flow and loadings from known watershed pollutants sources. Pollutant loading estimates were developed for the modeled constituents

[29] Lu, R., K. Schiff, S. Solzenbach, and D. Keith. 2004. *Nitrogen Deposition on Coastal Watersheds in the Los Angeles Region*. Southern California Coastal Water Research Project Annual Report. 2003-2004. pp. 73– 81.

[30] Tetra Tech. 2004. Modeling Analysis for Development of TMDL for Metals in the Los Angeles River and Tributaries. Prepared for LARWQCB and EPA Region 9.

[31] CDM. 2010. Los Angeles and Tributaries Total Maximum Daily Load for Metals Final Implementation Plan for Reach 2 Participating Jurisdictions.

including bacteria (fecal coliform), nutrients (nitrogen and phosphorus), metals (copper, lead and zinc) and sediment. A summary of the model performance by constituent can be found in Appendix A-4-1.

2.3.5 SUMMARY

Typical sources of these pollutants are summarized in Table 2-20.

Table 2-20: Typical sources of pollutants[32]

	Pollutants			
Potential Source	Bacteria	Nutrients	Metals	TSS/ Turbidity
NPDES Sources				
Residential land areas	●	●		●
Agricultural activities (i.e., animal operations, land applications)	●	●		●
Metallurgical industries/activities			●	
Construction activities			●	●
Industrial/municipal activities	●		●	
POTW discharges			●	
Landscaping, fertilizers		●		
Homeless encampments	●			
Pet waste	●	●		
Wildlife	●			
Native geology		●	●	
Land surface erosion			●	●
Detergents		●		
Car washing				●
Road Infrastructure				
Transportation sources (i.e., copper brake pads, tire wear)			●	
Pavement erosion			●	●
Atmospheric Deposition				
Industrial activities			●	
Construction activities			●	
Roofing			●	
Resuspension of historic emissions in road dusts and soil particles			●	
Land surface erosion		●		
Sanitary Sewer and sanitary sewer overflows (SSOs)				
Sewer Leaks, SSOs, illicit discharges, septic systems	●	●		●
POTW discharges		●	●	

[32] City of San Diego and Caltrans. 2012. Tecolote Watershed Comprehensive Load Reduction Plan. Final Report. San Diego, CA

2.4 PRIORITIZATION

Section VI.C.5.a.iv of the MS4 Permit outlines factors that should be considered when developing the sequence of addressing pollutants of concern within the Lower LAR Watershed. Based on the source assessment analysis, Water Quality Priorities (WQPs) within the watershed have been determined based on the following:

HIGHEST WQPS: TMDLS

- TMDL pollutants with past due interim or final limits
- TMDL pollutants with interim and final limits that fall within the MS4 Permit term, or the time period: September 6, 2012 – October 25, 2017
- Pollutants that are in the same class as a TMDL pollutant

HIGH WQPS: OTHER RECEIVING WATER CONSIDERATIONS

- Pollutants on the 303(d) List for which MS4 discharges are a suspected source based on findings from the source assessment
- Pollutants that exceed receiving water limitations and the findings from the source assessment indicate the MS4 as a source (these pollutants will be evaluated based on monitoring data collected as part of the CIMP).

All Category 1 pollutants with TMDL compliance deadlines that are past due, or that fall within the MS4 Permit term are prioritized as a Highest WQP. In addition, pollutants that fall within the same class (as defined in Section 2.1) as a TMDL pollutant with a compliance deadline that is past due or falls within the MS4 Permit term are prioritized as a Highest WQP. All other pollutants that are associated with the MS4 (based on the Source Assessment in Section 2.3) are prioritized as a High WQP. Table 2-21 summarizes the WQPs for the watershed based on the criteria described above.

Table 2-21: WQPs

Category	Class	Pollutant	Waterbody	Associated with MS4	Priority
Category 1	Trash	Trash	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
	Nutrients	Nitrogen Compounds	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
	Metals	Copper	Los Angeles River Estuary	Yes	Highest
		Lead	Los Angeles River Estuary	Yes	Highest
		Zinc	Los Angeles River Estuary	Yes	Highest
	Pesticides	DDT	Los Angeles River Estuary	Yes	Highest
		PCBs	Los Angeles River Estuary	Yes	Highest
	SVOC	PAHs	Los Angeles River Estuary	Yes	Highest
	Bacteria	Coliform & Enterococcus	Los Angeles River Estuary	Yes	High
	Metals	Cadmium	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
		Copper	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
		Lead	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
		Zinc	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
	Bacteria	e.Coli	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	High
Category 2	Metals	Aluminum	Los Angeles River Reach 1	UTD	Highest
		Selenium	Los Angeles River Reach 1 & 2	UTD	Highest
	Bacteria	Coliform and Enterococcus	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	High
	Pesticides	Chlordane	Los Angeles River Estuary	UTD	High
		Diazinon	Los Angeles River Reach 1	UTD	High
	Water Quality Indicators/ General	BMI	Compton Creek	UTD	High
		Cyanide	Los Angeles River Reach 1	UTD	High
		Oil	Los Angeles River Reach 2	Yes	High
		pH	Los Angeles River Reach 1, Compton Creek, and Rio Hondo Reach 1	UTD	High
		Toxicity	Los Angeles River Estuary, Rio Hondo Reach 1	Yes	High
		MBAS	Los Angeles River Reach 1 & 2	UTD	High
	Trash	Trash	Los Angeles River Estuary	Yes	Highest
Category 3	Metals	Mercury	Los Angeles River Reach 1	UTD	Highest
		Nickel	Los Angeles River Reach 1	UTD	Highest
		Thallium	Los Angeles River Reach 1, Los Angeles River Reach 2	UTD	Highest
		Dissolved Oxygen	Los Angeles River Reach 1 & 2	UTD	High

	Water Quality Indicators/ General	pH	Rio Hondo Reach 1	UTD	High
	SVOC	Bis(2-ethylhexyl)phthalate	Los Angeles River Reach 1	UTD	High
		PAHs	Los Angeles River Reach 1 & 2	Yes	Highest
	Water Quality Indicators/ General	Chloride	Los Angeles River Reach 1 & 2, Rio Hondo Reach 1	UTD	High
		Cyanide	Rio Hondo Reach 1	UTD	High
	Pesticides	Chlorpyrifos	Compton Creek	UTD	High
		Diazinon	Rio Hondo Reach 1	UTD	High

UTD – Unable to determine at this time

3 SELECTION OF WATERSHED CONTROL MEASURES

This chapter identifies Watershed Control Measures (WCMs) to implement through the Participating Agencies' jurisdictional stormwater management programs, and collectively on a watershed scale. The WCMs are structural and/or nonstructural controls designed with the following objectives:

- Prevent or eliminate nonstormwater discharges to the MS4 that are a source of pollutants from the MS4 to receiving waters.
- Implement pollutant controls necessary to achieve all applicable interim and final water quality-based effluent limitations and/or receiving water limitations pursuant to corresponding compliance schedules.
- Ensure that discharges from the MS4 do not cause or contribute to exceedances of receiving water limitations.

The goal is to create an efficient program that focuses individual and collective resources on water quality priorities (WQPs). The WCMs are categorized as

- Minimum Control Measures (MCMs),
- Nonstormwater Discharge (NSWD) Measures and
- Targeted Control Measures (TCMs), which are designed to achieve applicable water quality-based effluent limitations and receiving water limitations.

Each WCM category may be further categorized as either structural or nonstructural (nonstructural includes operation and maintenance procedures and pollution prevention measures) as well as either existing or proposed. Combined with Chapter 4 (RAA) and Chapter 5 (Compliance Schedules), the WMP includes the nature, scope and timing of implementation for each WCM and provides interim milestones for the WCMs to achieve TMDL compliance. Also included are the responsibilities of each Permittee.

3.1 STRATEGY FOR SELECTION AND IMPLEMENTATION OF WATERSHED CONTROL MEASURES

Pursuant to Part VI.C.1.a of the MS4 Permit (Part VII.C.1.a - LB Permit), the Watershed Group has developed customized strategies, control measures and BMPs to implement the requirements of the MS4 Permit. Addressing WQPs will be based on a multi-faceted strategy initially focused on source control, including total suspend solids (TSS) reduction and runoff reduction. If pollutants are not generated or released, they will not be available for transport to the receiving waters. In addition, if soils can be stabilized, sediment controlled, and dry-weather runoff and initial flushes of stormwater runoff eliminated or greatly reduced, the major transportation mechanisms will be eliminated or greatly reduced, and fewer pollutants will reach the receiving waters.

The Watershed Group is particularly focused on source control because major sources of many of the highest WQPs, such as copper, lead and zinc, are released into the atmosphere, resulting in widespread

aerial deposition onto impervious surfaces in the Watershed. In addition, these pollutants are discharged directly onto streets, highways, parking lots, and driveways from motor vehicle components such as brakes, wheel weights, and tires. The Participating Agencies have concluded that the most cost-effective and long-lasting way to address WQPs is to develop and support state-wide or regional measures that will encourage or require, if necessary, product or material substitution at the manufacturing stage. This can be a complex and time-consuming process, but the payoff in water quality improvement can be tremendous.

For example, the recent efforts of the California Stormwater Quality Association (CASQA) and Sustainable Conservation that led to the passage of the SB 346 legislation is a milestone that will significantly reduce the level of copper in metropolitan area waters throughout the state. SB 346 requires incremental reduction in the amount of copper in vehicle brake pads, which constitute the single largest source of copper in metropolitan environments. Based on available information, which was largely developed through a lengthy collaboration among brake pad manufacturers, government agencies, and environmental groups in the Brake Pad Partnership, a preliminary estimate of copper runoff reduction due to this piece of legislation was developed[1]. The estimate examined three scenarios and determined a 45 - 60% reduction in copper in runoff could be attributed to reduction of its use in brake pads. Already in effect, new edge codes required on brake pads sold in California will provide information on copper content and a notice that on and after January 1, 2014 any motor vehicle brake friction materials sold in California must contain no more than 0.1 percent by weight of the following materials: cadmium and its compounds, chromium (VI) salts, lead and its compounds, mercury and its compounds, and asbestiform fibers.

In addition, the Department of Toxic Substances Control (DTSC) adopted new Safer Consumer Product Regulations that became effective October 1, 2013. These regulations contain a process for identifying and prioritizing Chemicals of Concern in Priority Products containing these constituents, as well as a process for eliminating or reducing the adverse impacts of Chemicals of Concern in Priority Products. It will apply to most consumer products placed into the stream of commerce in California. It specifically applies to adverse environmental impacts, including adverse water quality impacts, and it contains a petition process for identification and prioritization of chemicals and projects. CASQA, supported by Watershed Group, has started the process of conducting research and building a file of critical information to support the designation of zinc in tires as a future priority product/constituent combination.

As explained later in this chapter, many of the new requirements of the MS4 Permit also involve enhanced source control measures that will be implemented such as enhanced inspections programs and outfall screening measures. The *Targeted Control Measures* section of this chapter supplements these efforts with targeted source control measures such as incentives for irrigation control and upgraded street sweeping equipment, designed with the objective of achieving interim and final water quality-based effluent limitations and/or receiving water limitations.

[1] Based on the Los Cerritos Channel Watershed Group commissioned study, "Estimate of Urban Runoff Copper Reduction in Los Angeles County from the Brake Pad Copper Reductions Mandated by SB 346."

In concert with these initial source control efforts, which constitute 10% of the load reduction in the RAA (higher reductions may be realized), structural controls will also be implemented. The MS4 Permit mandates implementation of structural LID BMPs for certain classes of new developments and roadway projects. In addition, the *Targeted Control Measures* section of this chapter describes supplemental targeted structural BMPs. These structural controls are used to meet the load reduction requirements and structural BMP capacities for each participating agency as noted in Chapter 4 (the RAA) following the schedules provided for each agency in Chapter 5 (Compliance Schedules).

3.2 MINIMUM CONTROL MEASURES

The Minimum Control Measures (MCMs) are baseline WCMs required for all Permittees. The MCMs are defined in the MS4 Permit (excluding modifications set forth in an approved WMP) and are generally implemented individually by each Permittee. The objectives of the MCMs are to 1) result in a significant reduction in pollutants discharged into receiving waters and 2) satisfy the requirements of 40 CFR §122.26(d)(2)(iv). The MCMs are separate from Targeted Control Measures, which are developed by the Watershed Group and included in the WMP to specifically address WQPs.

The MS4 Permit allows the modification of several MCMs programs, so long as the modified actions are set forth in the approved WMP and are consistent with 40 CFR §122.26(d)(2)(iv). The modifications are based on an assessment to identify opportunities for focusing resources on WQPs. The term "modifications" refers only to instances where language from the MS4 Permit MCM provisions is removed and/or replaced. Any control measures that are strictly enhancements of the existing programs (i.e. do not conflict with the MS4 Permit MCM provisions) are included in the separate category of Targeted WCMs.

The following sections include a summary of the assessment of each MCM program as well as a determination as to whether each Participating Agency will implement the MCM provisions 1) as explicitly stated in the corresponding section of the MS4 Permit or 2) with modifications to focus resources on WQPs. Independent of the determinations made, the Agencies may consider additional MCM modifications through the Adaptive Management Process. Implementation of the MCMs will follow the approval of this WMP by the Regional Board Executive Officer following MS4 Permit §VI.D.1.b (LB Permit - §VII.D.1.ii).

3.2.1 LOS ANGELES COUNTY FLOOD CONTROL DISTRICT MINIMUM CONTROL MEASURES

The LACFCD will implement the MCMs as defined from §VI.D.1 to §VI.D.4 of the MS4 Permit. See Appendix A-3-4 for additional information.

3.2.2 ASSESSMENT OF MINIMUM CONTROL MEASURES (CITIES ONLY)

Pursuant to MS4 Permit §VI.C.5.b.iv.(1).(a) (LB Permit - §VII.C.5.h.i), the following section is an assessment of the MS4 Permit MCMs, intended to identify opportunities for focusing resources on WQPs.

3.2.2.1 DEVELOPMENT CONSTRUCTION PROGRAM

ASSESSMENT

Although controlling sediment is not a WQP, the reduction of sediment through an effective Development Construction Program will address WQPs. This is because sediment mobilizes other pollutants, including many of the WQP pollutants. As such the Development Construction Program is an integral component of each City's jurisdictional stormwater management program.

Compared to the prior MS4 Permit, the current Permit expands the provisions for the Development Construction Program. This expansion includes additional or enhanced requirements for plan review, site tracking, inspection frequencies, inspection standards, BMP implementation and employee training. If implemented effectively, these enhancements will aid in the control of sediment within the Watershed, and consequently, will address WQPs. As such, no modifications to the provisions of the Development Construction Program have been identified.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.8 of the MS4 Permit (§VII.D.K of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.2 INDUSTRIAL/COMMERCIAL FACILITIES PROGRAM

ASSESSMENT

The MS4 Permit provisions for the Industrial/Commercial Facilities Program provide opportunities for customization to address WQPs. Specifically, §VI.D.6.e.i.4 (§VII.D.G.5.i.4 - LB Permit) states that industrial inspection frequencies may be modified through the WMP development process. The Cities propose modifying the inspection frequencies of both industrial and commercial facilities based on a facility prioritization scheme that considers WQPs. For example, facilities that are deemed to have a high potential to discharge metals (a WQP pollutant) may be prioritized as "High" and inspected more frequently while facilities that have a small likelihood to adversely impact WQPs may be prioritized as "Low" and inspected less frequently.

DETERMINATION

Sections VI.D.6.d and VI.D.6.e of the MS4 Permit (Sections VII.D.G.4 and VII.D.G.5 of the LB Permit) will be replaced with the language in Table 3-3, which is located in the following *New Fourth Term Permit MCMs* section of this chapter and is identified as MCM-ICF-3.

In order to provide clarity to the Cities, one combined guidance document has been prepared for the Program, with the prioritization and revised inspection frequencies included – see Appendix A-3-1. The document is also intended to assist the Cities in the development and implementation of a jurisdictional program.

3.2.2.3 ILLICIT CONNECTION AND ILLICIT DISCHARGES ELIMINATION PROGRAM

ASSESSMENT

The purpose of the Illicit Connection and Illicit Discharges Elimination (ICID) Program is to detect, investigate and eliminate IC/IDs to the MS4. In order to address WQPs, a potential modification to MS4 Permit provisions would be the inclusion of a proactive approach for the detection of illicit discharges. However such an approach will be addressed through nonstormwater outfall based screening monitoring as outlined in the MRP. Also, such activities do not conflict with the MS4 Permit provisions for an IC/ID Program, and as such would be classified as a Targeted Control Measure. As such there is no need to modify the base provisions of the program.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.10 of the MS4 Permit (§VII.D.M of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.4 PLANNING AND LAND DEVELOPMENT PROGRAM

ASSESSMENT

Following MS4 Permit §VI.C.5.b.iv.1.a (LB Permit - §VII.C.5.h.i.), the Planning and Land Development Program was not assessed for potential modifications.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.7 of the MS4 Permit (§VII.D.J of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.5 PUBLIC AGENCY ACTIVITIES PROGRAM

ASSESSMENT

The Public Agency Activities Program is divided into several sub-programs. Many of the MS4 Permit provisions within the sub-programs consist of baseline BMPs that do not suggest modification. The sub-programs that do suggest a prioritized approach – such as street sweeping and catch basin cleaning frequencies – already provide this opportunity (frequencies are based on a City's assessment of trash and debris generation). The Public Facility Inventory sub-program also provides a prioritization opportunity, based on the tracking data obtained for each facility. However, since these facilities are not subject to regular "public agency" inspections as in the Industrial/Commercial Facilities Program, there is little utility in incorporating such a prioritization. The provisions of the public construction activities sub-

program are considered an integral component of the jurisdictional stormwater program, for the reasons explained in the assessment of the Development Construction Program provisions. In summary there is no need to modify the MS4 Permit provisions of the program.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.9 of the MS4 Permit (§VII.D.L of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.6 PUBLIC INFORMATION AND PARTICIPATION PROGRAM

ASSESSMENT

The MS4 Permit allows a City to implement the requirements of the Public Information and Participation Program (PIPP) 1) by participating in a County-wide effort, 2) by participating in a Watershed Group effort, 3) individually within its jurisdiction or 4) through a combination of these approaches. The Cities will implement the PIPP following a combination of approaches. Consequently some clarifications of the MS4 Permit provisions are necessary.

In terms of modifications to address WQPs, the MS4 Permit provisions for the PIPP are not particularly prescriptive, thus allowing the Cities the flexibility to focus efforts on WQPs through the development of the program. As such, there is no need to modify the MS4 permit provisions of the program.

DETERMINATION

The table below provides clarification on elements of the MS4 Permit provisions for the PIPP:

Permit section	Clarification
§VI.D.5.c.(i) - MS4 Permit §VII.D.F.3.i - LB Permit Public Participation	Each City will participate in a County-wide sponsored PIPP to provide a means for public reporting of clogged catch basin inlets and illicit discharges/dumping, faded or missing catch basin labels, and general stormwater and nonstormwater pollution prevention information.
§VI.D.5.d - MS4 Permit §VII.D.F.4- LB Permit Residential Outreach Program	Each City will work in conjunction with a County-wide sponsored PIPP to implement the Residential Outreach Program. Elements of the program that will not be administered or implemented as a county-wide effort (currently the provision to provide educational materials to K-12 school children) will be addressed individually by each City or jointly on a watershed level. Through the adaptive management process, PIPP participation may develop into a watershed group or individual effort, or some combination of these approaches.

In order to provide clarity to the Cities, one combined guidance document has been prepared for the Program, with the approach for each provision (i.e. joint or individual effort) included – see Appendix A-3-1. The document is also intended to assist the Cities in the development and implementation of a jurisdictional program.

3.2.2.7 PROGRESSIVE ENFORCEMENT AND INTERAGENCY COORDINATION

ASSESSMENT

Following MS4 Permit §VI.C.5.b.iv.1.a (LB Permit - §VII.C.5.h.i), the Progressive Enforcement and Interagency Coordination Program was not assessed for potential modifications.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.2 of the MS4 Permit (§VII.D.2 of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.3 THIRD TERM MS4 PERMIT MINIMUM CONTROL MEASURES

Until the WMP is approved by the Executive Officer of the Regional Board, the MCM provisions of the prior third term MS4 permit continue to be implemented by the participating agencies. Some of the MCMs of the current MS4 Permit are relatively unchanged carry-overs from the prior third term permit. The remaining MCMs are either enhancements of the third term MCMs or entirely new provisions. These new and enhanced fourth term MCMs are described in the following section.

3.2.4 NEW FOURTH TERM MS4 PERMIT MINIMUM CONTROL MEASURES (CITIES ONLY)

Part VI.D of the MS4 Permit and Part VII.D of the LB Permit (the MCM provisions) introduces many new provisions and program elements to be developed and incorporated within each participating agency's jurisdictional stormwater program. This section briefly describes the new and enhanced MCMs required for the Cities (City MCMs), excluding those required for the LACFCD in §VI.D.4. An MCM is considered new if it was not required by the prior MS4 Permit and is considered enhanced if it is an enhancement of a related provision of the prior MS4 Permit.

The details of each provision may be found in the relevant sections of the MS4 Permit, which are included. Unless an alternate date is provided in the MS4 Permit or in this section, the adoption date for the City MCMs coincides with the approval of the WMP by the Regional Board's Executive Officer.

3.2.4.1 STRUCTURAL CONTROLS

The new and enhanced MCMs consist primarily of nonstructural control measures, with the marked exception of the Planning and Land Development provisions, described as follows.

LID AND HYDROMODIFICATION

MS4 Permit §VI.D.7 (LB Permit §VII.D.J)

The LID and hydromodification provisions of the Planning and Land Development program are a significant enhancement from the prior MS4 Permit. The implementation of structural LID BMPs at new developments throughout the watershed will appreciably decrease the effective impervious area,

reducing flow and, consequently, pollutant loads. The program is unique in that it will increase in effectiveness over time as more and more existing developments are redeveloped and bound to the LID/hydromodification requirements.

TRASH EXCLUDER INSTALLATION

MS4 Permit §VI.D.9.h.vii.(1) (LB Permit §VII.D.L.8. vii.(1))

In areas that are not subject to a trash TMDL, the Public Agency Activities Program includes a requirement to install excluders (or equivalent devices) on or in Priority A (MS4 Permit §VI.D.9.h.iii.(1)), LB Permit §VII.D.L.8. iii.(1)) area catch basins or outfalls to prevent the discharge of trash to the MS4. For LA MS4 Permittees, the deadline is no later than four years after the effective date of the Permit. This provision may be supplanted by the statewide trash amendments, which in their current draft iteration include the installation of full-capture devices in the priority land use areas of high density residential, industrial, commercial, mixed urban and public transportation stations as a compliance route.

3.2.4.2 NONSTRUCTURAL CONTROLS

Table 3-2 lists the new and enhanced nonstructural City MCMs as well as the new and enhanced NSWD measures. The BMP effectiveness from Table 3-2 is based on similar BMPs listed in Tetra Tech's Comprehensive Load Reduction Plan (CLRP) for Chollas Creek Watershed in San Diego County, 2012. The correlation of BMP effectiveness with WQPs is based on Table 3-1. The pages following Table 3-2 describe each of the listed controls.

Table 3-1 Pollutant Category versus Water Quality Classification

Waterbody-pollutant classification	Type of pollutant								
	Bacteria	Metals	Organics	Sediment	Pesticides	Nutrients	Oil and grease	Dissolved minerals	Trash
Category 1	✗	✗	✗		✗	✗			✗
Category 2	✗	✗	✗		✗	✗			✗
Category 3		✗	✗					✗	

Table 3-2: New Fourth Term MS4 Permit Nonstructural MCMs (Cities only) and NSWDs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency									
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Flood Control	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
		Planning and Land Development															
1	MCM-PLD-1	Amend development regulations to facilitate LID implementation	◆	◆	◈	◆	◆	✗	✗	✗	✗	✗	--	✗	✗	✗
2	MCM-PLD-2	Post-construction BMP tracking, inspections and enforcement	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
		Existing Development															
3	MCM-ICF-1	Increase in facility types inspected and number of inspections conducted	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
4	MCM-ICF-2	Business assistance program and BMP notification	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
5	MCM-ICF-3 (TCM-ICF-1)	Prioritize facilities/inspections based on water quality priorities	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
		Construction															
6	MCM-DC-1	Enhanced plan review program	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
7	MCM-DC-2	Enhanced inspection standards and BMP requirements	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	--	✗	✗	✗

Table 3-2: New Fourth Term MS4 Permit Nonstructural MCMs (Cities only) and NSWDs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency									
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Flood Control	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
8	MCM-DC-3	Increased inspection frequencies	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	- -	✗	✗	✗
9	MCM-TRA-1	Enhanced staff training program	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	- -	✗	✗	✗
		Illicit Discharge Detection/Elimination														
10	MCM-ICID-1	Enhanced IC/ID enforcement and written procedures	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗	✗
11	NSWD-1	Outfall screening and source investigations	◈	◈	◈	◈	◆	✗	✗	✗	✗	✗	✗	✗	✗	✗
12	MCM-TRA-1	Enhanced staff/contractor training	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗	✗
		Dry weather runoff reduction														
13	NSWD-1	Outfall screening and source investigations	◈	◈	◈	◈	◆	✗	✗	✗	✗	✗	✗	✗	✗	✗
14	NSWD-2	Enhanced conditions for NSWDs, including irrigation reduction	◆	◆	◈	◆	◆	✗	✗	✗	✗	✗	✗	✗	✗	✗
		Public Information and Participation														

Table 3-2: New Fourth Term MS4 Permit Nonstructural MCMs (Cities only) and NSWDs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency									
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Flood Control	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
15	MCM-PIP-1	Stormwater resources on City website	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
		Public Agency Activities														
16	MCM-PAA-1	Enhanced BMP requirements for fixed facility/field activities	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
17	MCM-PAA-2	Reprioritization of catch basins and clean-out frequencies	◆	◆	◆	◆	◇	✗	✗	✗	✗	✗	--	✗	✗	✗
18	MCM-PAA-3	Integrated Pest Management Program	◈	◈	◈	◇	◇	✗	✗	✗	✗	✗	--	✗	✗	✗
19	MCM-PAA-4	Enhanced measures to control infiltration from sanitary sewers	◆	◆	◇	◇	◇	✗	✗	✗	✗	✗	--	✗	✗	✗
20	MCM-PAA-5	Inspection and maintenance of Permittee owned treatment controls	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗
21	MCM-TRA-1	Enhanced inspector/staff training	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	--	✗	✗	✗

✗ – To be implemented by agency within current MS4 Permit term. MCM – Minimum Control Measure. NSWD – Nonstormwater discharge measure.

◆ Primary pollutant reduction ◈ Secondary pollutant reduction ◇ Pollutant not addressed

BMP effectiveness ratings based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012.

ENHANCED STAFF/CONTRACTOR TRAINING PROGRAMS ***MCM-TRA-1***

MS4 Permit §VI.D.7.d.iv.(b), §VI.D.8.l, §VI.D.9.k, §VI.D.10.f (LB Permit §VII.D.J.5.iv.(b), §VII.D.K.xiv, §VII.D.L.11, §VII.D.M.6)

Measures introduced:

- Prescriptive staff training requirements to the Development Construction, Illicit Connections and Illicit Discharges Elimination and Public Agency Activities Programs. For example, relevant staff involved with the Construction Program must be knowledgeable in procedures consistent with the State Water Board sponsored Qualified SWPPP Practitioner/Developer (QSP/QSD) program.
- Inspections of structural BMPs under the Planning and Land Development Program must be conducted by trained personnel.
- Outside contractors are bound to the same training standards as in-house staff

These new and enhanced provisions will increase the overall effectiveness of the jurisdictional stormwater management programs (JSWMPs).

AMEND DEVELOPMENT REGULATIONS TO FACILITATE LID IMPLEMENTATION ***MCM-PLD-1***

MS4 Permit §VI.C.4.c.i, §VI.D.7.d.i (LB Permit §VII.C.4.c.i, §VII.D.J.5.i)

The participating agencies have developed and adopted LID ordinances and Green Street Policies. These measures will facilitate LID implementation.

POST-CONSTRUCTION BMP TRACKING, INSPECTIONS AND ENFORCEMENT ***MCM-PLD-2***

MS4 Permit §VI.D.7.d.iv (LB Permit §VII.D.J.5.iv)

The Cities must track post-construction BMPs, conduct BMP verification and maintenance inspections and follow the Progressive Enforcement Policy in cases of non-compliance. This will improve the effectiveness of the Planning and Land Development program.

INCREASE IN FACILITY TYPES INSPECTED AND NUMBER OF INSPECTIONS CONDUCTED ***MCM-IFC-1***

MS4 Permit §VI.D.6.d, §VI.D.6.e (LB Permit §VII.D.G.4, §VII.D.G.5) also affected by NPDES No. CAS000001, the State Water Resources Control Board's (SWRCB) Industrial General Permit (IGP)

Measures introduced:

- Inspect nurseries and nursery centers
- Perform follow-up *No Exposure Verification* inspections for at least 25% of industries that have filed a *No Exposure Certification (NEC)*
- Inspect light industrial facilities. Under the SWRCB's IGP adopted in April 1, 2014, light industries previously excluded from coverage under the IGP must now obtain coverage. Light industry is defined as SICs 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39 and 4221-4225. This includes facilities ubiquitous

in industrial zones such as warehouses and machine shops. Although many of these facilities will likely qualify for the NEC, the type and number of facilities requiring inspection under the MS4 Permit will still increase.

These new and enhanced measures will increase the effectiveness of the Industrial/Commercial Facilities Program.

BUSINESS ASSISTANCE PROGRAM AND BMP NOTIFICATION ***MCM-IFC-2***

MS4 Permit: §VI.D.6.c (LB Permit §VII.D.G.3)

Measures introduced:

- Notify industrial/commercial owner/operators of applicable BMP requirements.
- Implement a Business Assistance Program to provide technical information to businesses to facilitate their efforts to reduce the discharge of pollutants in stormwater. The business assistance program described in the prior LA MS4 Permit was an optional provision.

These new and enhanced measures will increase the effectiveness of the Industrial/Commercial Facilities Program.

PRIORITIZE FACILITIES/INSPECTIONS BASED ON WATER QUALITY PRIORITIES ***MCM-IFC-3 (TCM-ICF-1)***

MS4 Permit: Modified MCM (replaces §VI.D.6.d, §VI.D.6.e), LB Permit: (replaces §VII.D.G.4, §VII.D.G.5)

A program has been developed to prioritize industrial/commercial facilities based on their potential to adversely impact WQPs. The resulting prioritization scheme determines the inspection frequency, replacing the uniform inspection frequency provided in the MS4 Permit. This allows Cities to concentrate efforts on WQPs. Sections VI.D.6.d and VI.D.6.e of the MS4 Permit (Sections VII.D.G.4 and VII.D.G.5 of the LB Permit) will be replaced with the language presented in Table 3-3.

TABLE 3-3

REPLACES §VI.D.6.D AND §VI.D.6.E OF THE MS4 PERMIT
***REPLACES*§VII.D.G.4 AND §VII.D.G.5 OF THE LB PERMIT**

MS4 PERMIT VI.D.6.d (LB Permit VII.D.G.4) Prioritize Critical Industrial/Commercial Sources

MS4 Permit VI.D.6.d.i (LB Permit VII.D.G.4.i) Prioritization Method

Prioritizing facilities by potential water quality impact provides an opportunity to optimize the effectiveness of the Industrial/Commercial Facilities Program and to focus efforts on water quality priorities. The inventory fields in Part VI.D.6.b.ii (VII.D.G.2.i) provide information that allows for such a facility prioritization. Based on these fields, Figure ICF-1 establishes a method for each City to prioritize all industrial/commercial facilities into three tiers – High, Medium and Low. A City may follow an alternative prioritization method provided it is based on water quality impact and results in a similar three-tiered scheme.

Prioritization factors

Factor	Description
A	Status of exposure of materials and industrial/commercial activities to stormwater
B	Identification of whether the facility is tributary to a waterbody segment with impairments[2] for pollutants that are also generated by the facility
C	Other factors determined by the City, such as size of facility, presence of exposed soil or history of stormwater violations

Utilizing these factors, follow steps 1, 2 and 3 below:

1. Collect necessary information to evaluate factors

Factor	Initial method	Subsequent method
A	Satellite imagery	Results of stormwater inspection
B	Cross reference Table 4 or Table 5* with tributary TMDL/ 303(d) pollutants	Cross reference inspection results with tributary TMDL/ 303(d) pollutants
C	Varies	

* See pages 9 and 10 of Appendix A-3-1 ICF (guidance for the Industrial/Commercial Facilities Program)

2. Evaluate factors

Factor	Result	Score
	Low or no exposure	0
A	Moderate exposure	½
	Significant exposure	1
B	No**	0
	Yes***	1
	Low	0
C	Medium	½
	High	1

** No pollutant generation/impairment matches
*** ≥ 1 pollutant generation/impairment matches

3. Prioritize facilities

		C Score		
		0	**½**	**1**
A×B Score	**0**	Low	Medium	High
	½	Medium	High	High
	1	High	High	High

This method serves only as a guide to prioritization. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C.

Figure ICF-1: Industrial/Commercial Facility Prioritization Scheme

Step 3 in Figure ICF-1 may also be expressed by the relationships $A \cdot B + C \geq 1 \rightarrow$ High, $1 > A \cdot B + C > 0 \rightarrow$ Medium

[2] CWA §303(d) listed or subject to a TMDL

and A·B + C = 0 → Low. The purpose of multiplying A and B is to scale the impact of the presence of the pollutants at a facility (B) by the likelihood that they will be discharged to the MS4 (A). Factor C quantifies water quality concerns that are independent of A or B and as such is incorporated through addition. The purpose of this numerical approach is to provide consistency to the prioritization process. It is intended solely as a guide. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C as listed in Figure ICF-1.

MS4 Permit VI.D.6.d.i.(1), (LB Permit VII.D.G.4.(1)), Prioritization Condition
The following condition will be met during the prioritization process: ***The total number of low priority facilities is less than or equal to 3 times the number of high priority facilities***. This condition is applied to maintain a minimum inspection frequency as explained in Section VI.D.6.e.i.

MS4 Permit VI.D.6.d.i.(2), (LB Permit VII.D.G.4.(2)), Prioritization Frequency
The default priority for a facility is Medium. Facilities will be reprioritized as necessary following the results of routine inspections. The City may also use any readily available information that clarifies potential water quality impacts (e.g., satellite imagery) in order to prioritize a facility before the initial inspection. Reprioritization may also be conducted at any time as new water quality based information on a facility becomes available. During reprioritization, the ratio of low priority to high priority facilities will remain at 3:1 or lower. Figure ICF-2 is a flowchart of the prioritization process.
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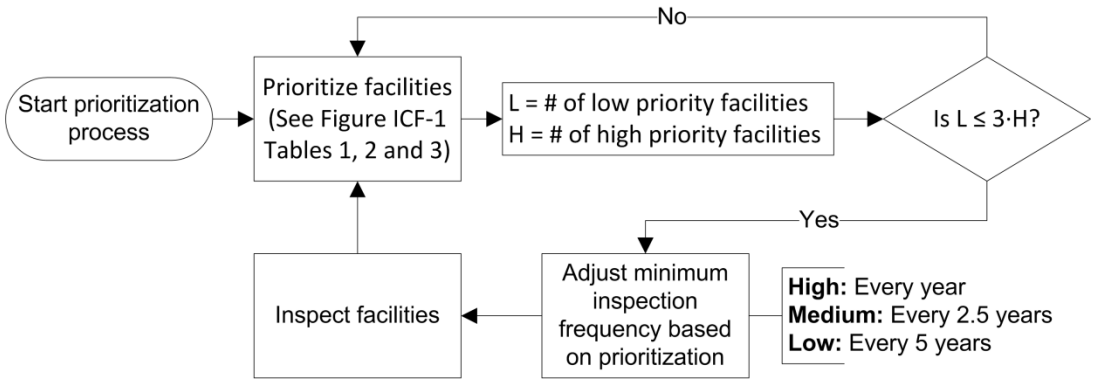


Figure ICF-2

MS4 Permit VI.D.6.e (LB Permit VII.D.G.5) Inspect Critical Industrial/Commercial Sources

MS4 Permit VI.D.6.e.i (LB Permit VII.D.G.5.i) Frequency of Industrial/Commercial Inspections
Following the facility prioritization method in Part VI.D.6.d.i, each City will inspect high priority facilities annually, medium priority facilities semi-quinquennially (once every 2.5 years) and low priority facilities quinquennially (once every five years). The frequencies may be altered by the exclusions defined in Part VI.D.6.e.i.(1). The condition in Part VI.D.6.d.i.(1) ensures at least the same average number of inspections conducted per year as the semi-quinquennial frequency defined in the MS4 Permit.

Each City will conduct the first compliance inspection for all industrial/commercial facilities within one year of the approval of their Watershed Management Program by the Executive Officer. A minimum interval of six months between the first and the second mandatory compliance inspection is required.

MS4 Permit VI.D.6.e.i.(1) (LB Permit VII.D.G.5.i(1)) Exclusions to the Frequency of Industrial Inspections

TABLE 3-3

REPLACES §VI.D.6.D AND §VI.D.6.E OF THE MS4 PERMIT
***REPLACES*§VII.D.G.4 AND §VII.D.G.5 OF THE LB PERMIT**

MS4 Permit VI.D.6.e.i.(1).(a) (LB Permit VII.D.G.5.i(1).(a)) Exclusion of Facilities Previously Inspected by the Regional Water Board

Each City will review the State Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS) database at defined intervals to determine if an industrial facility has recently been inspected by the Regional Water Board. The first interval will occur approximately 2 years after the effective date of the Order. The City does not need to inspect the facility if it is determined that the Regional Water Board conducted an inspection of the facility within the prior 24 month period. The second interval will occur approximately 4 years after the effective date of the Order. Likewise, the City does not need to inspect the facility if it is determined that the Regional Water Board conducted an inspection of the facility within the prior 24 month period.

MS4 Permit VI.D.6.e.i.(1).(b) (LB Permit VII.D.G.5.i(1).(b)) No Exposure Verification

As a component of the first mandatory inspection, each City will identify those facilities that have filed a No Exposure Certification with the State Water Board. Approximately 3 to 4 years after the effective date of the Order, each City will evaluate its inventory of industrial facilities and perform a second mandatory compliance inspection at a minimum of 25% of the facilities identified to have filed a No Exposure Certification. The purpose of this inspection is to verify the continuity of the no exposure status.

MS4 Permit VI.D.6.e.ii (LB Permit VII.D.G.5.ii) Scope of Industrial/Commercial Inspections

MS4 Permit VI.D.6.e.ii.(1) (LB Permit VII.D.G.5.ii.(1) Scope of Commercial Inspections

Each City will inspect all commercial facilities to confirm that stormwater and nonstormwater BMPs are being effectively implemented in compliance with municipal ordinances. At each facility, inspectors will verify that the operator is implementing effective source control BMPs for each corresponding activity. Each City will require implementation of additional BMPs where stormwater from the MS4 discharges to a significant ecological area (SEA), a water body subject to TMDL provisions in Part VI.E, or a CWA §303(d) listed impaired water body. Likewise, for those BMPs that are not adequately protective of water quality standards, a City may require additional site-specific controls.

MS4 Permit VI.D.6.e.ii.(2) (LB Permit VII.D.G.5.ii.(2) Scope of Industrial Inspections

Each City will confirm that each industrial facility:

a) Has a current Waste Discharge Identification (WDID) number for coverage under the Industrial General Permit, and that a Stormwater Pollution Prevention Plan (SWPPP) is available on-site; or
b) Has applied for, and has received a current No Exposure Certification for facilities subject to this requirement;
c) Is effectively implementing BMPs in compliance with municipal ordinances. Facilities must implement the source control BMPs identified in Table 10, unless the pollutant generating activity does not occur. The Cities will require implementation of additional BMPs where stormwater from the MS4 discharges to a water body subject to TMDL Provisions in Part VI.E, or a CWA §303(d) listed impaired water body. Likewise, if the specified BMPs are not adequately protective of water quality standards, a City may require additional site-specific controls. For critical sources that discharge to MS4s that discharge to SEAs, each City will require operators to implement additional pollutant-specific controls to reduce pollutants in stormwater runoff that are causing or contributing to exceedances of water quality standards.
d) Applicable industrial facilities identified as not having either a current WDID or No Exposure Certification will be notified that they must obtain coverage under the Industrial General Permit and will be referred to the Regional Water Board per the Progressive Enforcement Policy procedures identified in Part VI.D.2 of the MS4 Permit (Part VII.D.2 of the LB Permit).

ENHANCED PLAN REVIEW PROGRAM *MCM-DC-1*

MS4 Permit: §VI.D.8.h, §VI.D.8.i (LB Permit: §VII.D.K.x, §VII.D.K.xi)

In general the MS4 Permit introduces provisions that conform to the SWRCB's Construction General Permit. For construction sites one acre or greater, measures include the following:

- Construction activity operators must submit Erosion and Sediment Control Plans (ESCPs) prior to grading permit issuance, developed and certified by a QSD to SWPPP standards.
- Operators must propose minimum BMPs that meet technical standards. The cities must provide these standards.
- Develop procedures and checklists to review and approve relevant construction plans.

These new and enhanced measures will increase the effectiveness of the Development Construction Program, which in turn is expected to reduce TSS loading into the MS4. TSS reduction is an integral component in addressing WQPs.

ENHANCED INSPECTION STANDARDS/BMP REQUIREMENTS AT CONSTRUCTION SITES *MCM-DC-2*

MS4 Permit: §VI.D.8.d, §VI.D.8.i, §VI.D.8.j (LB Permit: §VII.D.K.vi, §VII.D.K.xi, §VII.D.K.xii)

Measures introduced:

- Ensure BMPs from the ESCPs are properly installed and maintained.
- Ensure the minimum BMPs for sites less than one acre are installed and maintained.
- Develop and implement standard operating procedures for City stormwater inspections of construction sites.
- Require activity-specific BMPs for paving projects.

These new and enhanced measures will increase the effectiveness of the Development Construction Program, which in turn is expected to reduce TSS loading into the MS4. TSS reduction is an integral component in addressing WQPs.

INCREASED INSPECTION FREQUENCIES *MCM-DC-3*

MS4 Permit: §VI.D.8.j (LB Permit: §VII.D.K.xii)

The inspection frequency for construction sites one acre or more has significantly increased. The prior LA MS4 Permit required a minimum of one inspection during the rainy season. The current MS4 Permit requires monthly inspections year-round, as well as mandatory inspections based on the phase of construction. This enhanced measure will increase the effectiveness of the Development Construction Program, which in turn is expected to reduce TSS loading into the MS4. TSS reduction is an integral component in addressing WQPs.

ENHANCED IC/ID ENFORCEMENT AND WRITTEN PROGRAM PROCEDURES *MCM-ICID-1*

MS4 Permit: §VI.D.2, §VI.D.10; LB Permit: §VII.D.2 , §VII.D.M

Measures introduced:

- Develop and implement a Progressive Enforcement Policy that applies to the IC/ID Elimination, Development Construction, Planning and Land Development and Industrial/Commercial Facilities Programs. The Progressive Enforcement Policy is an augmentation of the policy listed in the prior LA MS4 Permit, which was restricted to the Industrial/Commercial Facilities Program.
- Maintain written procedures for receiving complaints, conducting investigations and responding to spills.

These new and enhanced measures will increase the effectiveness of the IC/ID Elimination program, as well as the related enforcement components of the Development Construction, Planning and Land Development and Industrial/Commercial Facilities Programs.

STORMWATER RESOURCES ON CITY WEBSITE ***MCM-PIP-1***

MS4 Permit: §VI.D.5.d.i.(4) (LB Permit: §VII.D.F.4.i.(4))

Measures introduced:

- The MS4 Permit introduces a requirement to maintain a stormwater webpage or provide links to stormwater websites via the City's website. The website (in-house or linked) will include:
    - Educational material and
    - Opportunities for the public to participate in stormwater pollution prevention and clean-up activities.

ENHANCED BMP REQUIREMENTS FOR FIXED FACILITY/FIELD ACTIVITIES ***MCM-PAA-1***

MS4 Permit: §VI.D.9.e (LB Permit: §VII.D.L.5)

Measures introduced:

- Implement effective source control BMPs for 65 specific pollutant-generating activities such as mudjacking, shoulder grading and spall repair.
- Contractually require hired contractors to implement and maintain the activity specific BMPs. Conduct oversight of contractor activities to ensure the BMPs are implemented and maintained.

These new and enhanced measures will increase the effectiveness of the Public Agency Activities program.

REPRIORITIZATION OF CATCH BASINS AND CLEAN-OUT FREQUENCIES ***MCM-PAA-2***

MS4 Permit: §VI.D.9.h.iii (LB Permit: §VII.D.L.8.iii)

In areas not subject to a trash TMDL, measures introduced include the following:

- Determine priority areas and update the map of catch basins with GPS coordinates and priority.
- Include the rationale or data to support the priority designations.

These new and enhanced measures will increase the effectiveness of the Public Agency Activities program.

INTEGRATED PEST MANAGEMENT PROGRAM

MCM-PAA-3

MS4 Permit: §VI.D.9.g (LB Permit: §VII.D.L.7)

The MS4 Permit introduces entirely new, prescriptive requirements to implement an Integrated Pest Management (IPM) Program for public agency activities and at public facilities. These requirements include adopting and verifiably implementing policies, procedures and/or ordinances that support the IPM program. Intertwined with the IPM provisions are additional requirements to control and minimize the use of fertilizers. These new and expansive measures will increase the effectiveness of the Public Agency Activities program and address WQPs.

ENHANCED MEASURES TO CONTROL INFILTRATION FROM SANITARY SEWERS

MCM-PAA-4

MS4 Permit: §VI.D.9.ix (LB Permit: §VII.D.L.ix)

The MS4 Permit introduces specific requirements to control infiltration from the sanitary sewer into the MS4. The measures include adequate plan checking, preventative maintenance, spill response, enforcement, interagency coordination and staff/contractor education. The requirements may be fulfilled through implementation of a Sewer System Management Plan in accordance with the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.

INSPECTION AND MAINTENANCE OF PERMITTEE OWNED TREATMENT CONTROLS

MCM-PAA-5

MS4 Permit: §VI.D.9.x (LB Permit: §VII.D.L.x)

The MS4 Permit introduces requirements to implement an inspection and maintenance program for all Permittee owned treatment control BMPs, including post-construction treatment control BMPs. This measure will increase the effectiveness of the Public Agency Activities program.

3.3 NONSTORMWATER DISCHARGE MEASURES

The Participating Agencies will require dischargers that drain to their respective MS4s to implement the Nonstormwater Discharge (NSWD) Measures as defined in §III.A of the MS4 Permit (§IV.B of the LB Permit). If the Participating Agencies identify nonstormwater discharges from the MS4 as a source of pollutants that cause or contribute to exceedances of receiving water limitations, the WCMs will be modified and implemented – subject to the adaptive management process – to effectively eliminate the source of pollutants consistent with MS4 Permit §III.A and §VI.D.10 (LB Permit §IV.B and §VII.D.M). In these instances, potential WCMs may include prohibiting the nonstormwater discharge to the MS4, requiring the responsible party to 1) incorporate additional BMPs to reduce pollutants in the nonstormwater discharge or conveyed by the nonstormwater discharge or 2) divert to a sanitary sewer for treatment, or strategies to require the nonstormwater discharge to be separately regulated under a general NPDES permit.

It is important to note that the nonstormwater Outfall Based Screening and Monitoring Program (MRP §IX) introduces additional NSWD measures through the intensive procedures required for the identification of NSWDs from MS4 outfalls.

3.3.1 NEW FOURTH TERM PERMIT NONSTORMWATER DISCHARGE MEASURES

Parts III.A and VI.B (MRP IX) of the MS4 Permit (Parts IV.B and VII.B (MRP IX) of the Long Beach Permit introduce new provisions and program elements that address NSWDs. This section briefly describes these new and enhanced NSWD measures. A NSWD measure is considered new if it was not required by the prior MS4 Permit and is considered enhanced if it is an enhancement of a related provision of the prior MS4 Permit.

Table 3-2 from the previous section lists the new and enhanced nonstructural NSWD measures as well as the City MCMs. The BMP effectiveness from Table 3-2 is based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012. The correlation of BMP effectiveness with WQPs is based on Table 3-1. The following pages describe each of the listed controls. The details of each provision may be found in the relevant sections of the MS4 Permit, which are included. Unless an alternate date is provided in the MS4 Permit or in this section, the adoption date for the NSWD measures coincides with the approval of the WMP by the Regional Board's Executive Officer.

NSWD-1 OUTFALL SCREENING AND SOURCE INVESTIGATIONS ***NSWD-1***

MS4 Permit: §VI.B (MRP §IX) (LB Permit: MRP §IX)

The outfall screening and source investigation provisions of the MS4 Permit constitute an entirely new, expansive addition to each City's JSWMP. Implementing these new provisions will significantly support the control of unauthorized nonstormwater discharges.

ENHANCED CONDITIONS FOR EXEMPT NONSTORMWATER DISCHARGES ***NSWD-2***

MS4 Permit: §III.A (LB Permit: §IV.B)

The NSWD prohibitions of the MS4 Permit, which include specific measures to reduce irrigation runoff, are a significant enhancement from the prior LA MS4 Permit. Measures introduced include the following:

- Require the implementation of BMPs following established BMP manuals for discharges from non-emergency fire fighting activities and drinking water supplier distribution systems. Require specific BMPs for lake dewatering, landscape irrigation, pool and fountain discharges and non-commercial car washing.
- Require notification, monitoring (i.e. sampling) and reporting for drinking water supplier discharges and lake dewatering greater than 100,000 gallons.
- Require advance notification for any discharge of 100,000 gallons or more into the MS4.
- Minimize discharge of landscape irrigation through implementation of an ordinance specifying water efficient landscaping standards.
- Promote water conservation programs to minimize the discharge of landscape irrigation water into the MS4. This includes the following, where applicable:
    - Coordinate with local water purveyor(s) to promote:
        - Landscape water efficiency requirements for existing landscaping,
        - Drought tolerant, native vegetation, and
        - Less toxic options for pest control and landscape management.
    - Develop and implement a coordinated outreach and education program to minimize the discharge of irrigation water and pollutants associated with irrigation water.
- If monitoring results indicate that a conditionally exempt NSWD is a source of pollutants that causes or contributes to exceedances of applicable receiving water limitations and/or water quality-based effluent limitations, the Permittee must either:
    - Effectively prohibit the nonstormwater discharge to the MS4, or
    - Impose additional conditions, subject to approval by the Regional Water Board Executive Officer, or
    - Require diversion of the NSWD to the sanitary sewer, or
    - Require treatment of the NSWD prior to discharge to the receiving water.

Implementing these enhanced provisions will significantly support the control of unauthorized nonstormwater discharges.

3.4 TARGETED CONTROL MEASURES

Targeted Control Measures (TCMs) are additional control measures beyond the baseline MCMs and NSWD measures of the MS4 Permit that are intended to target the Watershed Group's WQPs. TCMs may be divided into two categories: nonstructural and structural. The selection of structural and nonstructural control measures to address WQPs within the Watershed Group is a vital component of the WMP planning process.

The Participating Agencies have already proposed and implemented a number of structural and nonstructural control measures in the watershed that collectively may contribute to considerable pollutant load reductions. These existing and planned BMPs provide a head start in the planning process to address WQPs within the Watershed Group. There are many different types of structural and nonstructural control measures that provide varying benefits from their implementation. The following sections describe Planned TCMs to be implemented, Potential TCMs that may be implemented (implementation is conditional upon factors such as site constraints, governing body approval, etc.) as well types of structural BMPs available to the Watershed Group.

3.4.1 CONTROL MEASURES IDENTIFIED IN TMDLS/IMPLEMENTATION PLANS

This section describes the control measures that have been previously identified in TMDLs and corresponding implementation plans and the status of their implementation. For those TMDLs that do not sufficiently identify control measures, or if implementation plans have not yet been developed, control measures are identified in the planned Targeted Control Measures as described in the following sections in this chapter.

3.4.1.1 LOS ANGELES RIVER NITROGEN COMPOUNDS AND RELATED EFFECTS

The Los Angeles River Nitrogen TMDL is the only TMDL applicable to the Lower Los Angeles River Watershed in which final water quality based effluent limits (WQBELs) went into effect prior to the MS4 Permit. The TMDL was adopted by the Regional Board (Resolution 2003-16) on December 4, 2003, and became effective on September 27, 2004.[3] Waste load allocations (WLAs) for point sources were established and required MS4 Permittees to: 1) submit a monitoring plan (completed March 23, 2005), and 2) incorporate monitoring at the Wardlow (S10) Mass Emission station in the LA River. Specific control measures were not included. The MS4 Permit modified the requirements of the TMDL by assigning WQBELs (MS4 Permit Appendix O).

CONTROL MEASURES AND IMPLEMENTATION

The LA River Nitrogen TMDL recommended implementation alternative allowed time for NPDES permitted Publically Owned Treatment Plants (POTWs) that discharge into the LA River to complete an upgrade of treatment facilities to nitrification/denitrification facilities without increasing current ammonia, nitrate and nitrite loads in the interim period. As the nitrification/denitrification facilities came on board, the reductions in ammonia and nitrate loads significantly reduced impairments caused

[3] MS4 Permit Fact Sheet (Page F-87)

by nutrient effects. These upgrades, in combination with the control measures the Watershed Group is implementing, appear to be effectively meeting the targets of the TMDL.

3.4.1.2 LOS ANGELES RIVER TRASH TMDL

In August 2007, The Regional Board adopted the Trash TMDL, which set a numeric limit of zero trash being discharged into the receiving water bodies from the storm drain system by the year 2016.

The MS4 permit provides four methodologies to determine compliance:

1. Full Capture Systems - The Regional Board's Executive officer has certified eight types of trash capture systems to be full capture[4]:
    a. Vortex Separation Systems (which include CDS units)
    b. Catch basin inserts (brush inserts; mesh screens; vertical and horizontal trash capture screens; and connector pipe screen (CPS).
    c. Specific designs of trash nets (including the Fresh Creek system at Hamilton Bowl)
    d. Two gross solids removal devices (including the Linear Radial systems at Hamilton Bowl)
2. Partial Capture Devices and institutional controls
    a. Partial capture devices estimated on demonstrated performance
    b. Daily Generation Rate (DGR) Studies
3. Combined Compliance Approaches
4. Minimum Frequency Assessment and Collection Approach (MFAC)[5]

CONTROL MEASURES AND IMPLEMENTATION

The Cities have implemented an effective combination of: (1) Full and partial capture catch basin inserts, (2) regional trash capture projects, and (3) institutional controls.

FULL CAPTURE INSERTS

In 2009, the Gateway Water Management Authority (GWMA) received funding from the State Revolving Fund through the American Recovery and Reinvestment Act to install full capture trash systems (CPS devices). The funding was for retrofitting all catch basins with full capture systems. Due primarily to physical constraints some of the catch basins could not be retrofitted and instead partial capture systems were installed. In some cases no systems were able to be installed due to retrofitting constraints.

PARTIAL CAPTURE SYSTEMS

During the installation of the full capture systems, on average, 8% - 16% of catch basins could not be retrofitted for a variety of reasons. This included: size constraints where the catch basin was found to be too small; catch basin outlets on the bottom which would compromise the CPS overflow capabilities and increase the chance of flooding; and inlets on the catch basins sides which would prevent the trash

[4] NPDES MS4 Permit, VI.E.5.b.

[5] Not a listed compliance option in the Los Angeles River Trash TMDL

laden flows from entering the CPS. Many of these catch basins could be retrofitted with an Automatic Retractable Screen (ARS) which has been demonstrated to be 86 percent effective[6].

Table 3-4: Number of catch basins installed with Full capture (CPS) and Partial Capture (ARS) systems

City	Catch basins installed with CPS	Catch basins in City	Catch basins with CPS (%)	Catch basins with only ARS	Catch basins with only ARS (%)
Downey	399	444	90	4	0.1
Lakewood	4	6	67	0	0
Long Beach	2707	3042	89	137	5
Lynwood	579	630	92	29	5
Paramount	230	245	94	0	0
Pico Rivera	56	67	84	8	12
Signal Hill	138	175	79	0 (2)	
South Gate	684	796	86	60	8

Regional Full Capture Systems

In addition to the catch basin inserts and screens, the following regional full capture systems are in place in the Lower LAR Watershed.

Table 3-5: Regional full trash capture systems

System	Description/location
Trash nets/radial systems	4 creek trash nets and two linear Radial systems installed in Hamilton Bowl beginning in the mid 2000s and subsequently by the City of Signal Hill as part of a Grant from the State Water Resources Board[7].
Long Beach trash nets	Trash nets have been installed at pump stations 3, 5, and 6 located along the LA River.
Long Beach CDS (vortex)	Walnut Ave and pump station 11
Lakewood Retention basin	Cherry Cove Park

Non-Structural and Institutional Controls

In addition to the structural controls summarized above, the agencies of the Lower LAR continue to implement a program of effective institutional controls. These programs are described below.

Daily Generation Rate Studies

Permittees have been authorized by the Regional Board to comply with the interim effluent limitations through the installation of partial capture devices and the implementation of institutional controls. The Cities of South Gate, Lynwood and Pico Rivera have participated in Daily Generation Rate (DGR) studies to determine the effectiveness of the institutional control measures in place (see Section 3.2 Minimum Control Measures, Section 3.3 Nonstormwater Discharge Measures, and Section 3.4 Targeted Control Measures for more detail on institutional control measures in the Lower LAR Watershed). The DGR uses a mass balance equation to estimate the amount of trash being deposited on the cities' public streets. To establish the DGR, trash from approximately 10% of the cities' curb miles in designated areas was collected prior to regularly scheduled street sweepings. The collected trash was quantified and used to calculate the amount of trash flowing into the storm drain systems to determine the level of

[6] City of Los Angeles Bureau of Sanitation, Watershed Protection Division, June 2006. *Technical Report: Assessment of Catch Basin Opening Screens Covers.*

[7] Systems are currently being replaced as part of recreational upgrade to Hamilton Bowl by the City of Long Beach

compliance. The studies have been conducted for several years and have determined that participating cities' are below the Trash TMDL levels and therefore in compliance. This compliance level is pre-insert and demonstrates that the participating cities' non-structural controls have a significant impact towards reducing the baseline amount of anthropogenic trash.

SUMMARY

The cities have implemented an effective program of structural and non-structural control measures and are currently meeting the interim WQBELs. See Section 5 Compliance Schedule for an analysis of achieved trash capture effectiveness to date along with future WQBEL compliance dates.

3.4.1.3 LOS ANGELES RIVER METALS TMDL

The Los Angeles River Metals TMDL was adopted by the Regional Board on June 2, 2005 and became effective on October 29, 2008. The TMDL establishes WQBELs for copper, lead and zinc. Separate WQBELs are established for each waterbody segment in the Los Angeles River and tributaries, but the TMDL does not extend to the Los Angeles River Estuary.

There are two reaches within the Lower LAR Watershed (Reach 1 and 2) and two tributaries (Compton Creek and the Rio Hondo) with WLAs under this TMDL. Responsible Agencies within the Lower LAR Watershed are listed in Table 3-6 along with the applicable segment to which they discharge or contribute runoff.

Table 3-6: Lower LAR Agencies and LAR Waterbody Segment

Agency	LAR Reach 1	LAR Reach 2	Compton Creek	Rio Hondo Reach 1
Downey		×		×
Lakewood	×			
Long Beach	×	×	×	
Lynwood			×	
Paramount		×		
Pico Rivera				×
Signal Hill	×			
South Gate			×	×
LACFCD	×	×	×	×

CONTROL MEASURES AND IMPLEMENTATION

The Los Angeles River metals TMDL established compliance goals by waterbody segment. The cities draining to Reach 1 of the Los Angeles River and Compton Creek joined to form Jurisdiction Group 1. Similarly, many agencies of Reach 2 of the Los Angeles River and the Rio Hondo joined to form Jurisdictional Group 2. The Lower LAR WMP encompasses parts of both Jurisdictional Groups.

On October 11, 2010 both of these Jurisdictional Groups submitted separate Implementation Plans to the Regional Board[8]. These implementation plans took slightly differing approaches to attaining

8 Jurisdiction Group 1. Metals TMDL Implementation Plan Reach 1 of the Los Angeles River and Compton Creek for the Cities of Carson, Compton, Huntington Park, Lakewood, Long Beach, Lynwood, Signal Hill, and South Gate, and

compliance. Jurisdiction Group 1 focused on Source Control as a means of achieving WQBELs. In addition to Source Control Strategies, the Jurisdictional Group 1 Metals TMDL Implementation Plan took advantage of existing flood control basins and wetlands, which were and still are, receiving runoff from tributary areas along the lower portions of the LAR. Additionally, Structural Controls were discussed as potential BMPs to address metals if other control measures did not address the water quality issues.

The Jurisdictional Group 2 Metals TMDL Implementation Plan categorizes BMP implementation into three key areas:

- New Development and Significant Redevelopment – Water quality benefits to be obtained through ongoing implementation of new development and significant redevelopment activities;
- Non-structural BMPs – Identifying new or enhanced existing non-structural BMP activities that will result in reductions of metals in urban runoff; and
- Structural BMPs – Identifying and implementing the necessary structural BMPs to fill expected water quality gaps not addressed by any of the above.

The BMPs are discussed in these Implementation Plans are discussed in detail in Section 3.2 Minimum Control Measures, Section 3.3 Nonstormwater Discharge Measures, and Section 3.4 Targeted Control Measures and Section 3.4.2 Structural Targeted Control Measures.

MONITORING

In order to measure the progress toward achieving the Metals TMDL WQBELs, the two Jurisdictional Groups commenced a Coordinated Monitoring Program (CMP) beginning in October of 2008. This monitoring program consists of wet and dry weather sampling at two sampling stations in the Lower LAR Watershed (Wardlow Blvd. and Del Amo Blvd).

SUMMARY

The Participating Agencies have been and will continue to implement a multi-faceted approach towards achieving the Water Quality Based Effluent Limitations. The CMP monitoring that has been conducted to date indicates that the Lower LAR Watershed is meeting the TMDL dry weather targets. Specifically, the Reach 2 Implementation Plan indicates that the 2012 dry weather targets are currently being met and analyses of the Reach 2 watershed (which includes the Rio Hondo Spreading Grounds) indicates that the 2012 wet weather target is currently being met.[9] With recent existing Reach 1 Regional Projects and the continued implementation of SUSMP/LID projects and nonstructural controls, the Group considers that the 2012 targets for Reach 1 have also been met.

the California Department of Transportation (Caltrans). Prepared by John L. Hunter and Associates, Inc., Richard Watson and Associates, Inc., California Watershed Engineering, Inc., and Kinnetic Laboratories, Inc. October 11, 2010; and Los Angeles River and Tributaries Total Maximum Daily Loads for Metals Final Implementation Plan for Reach 2 Participating Jurisdictions. Prepared by CDM. October 11, 2010.

[9] Los Angeles River and Tributaries Total Maximum Daily Loads for Metals Final Implementation Plan for Reach 2 Participating Jurisdictions. Prepared by CDM. October 11, 2010.

Wet weather targets will be achieved through the Watershed Control Measures described in the rest of this Chapter and demonstrated by the Reasonable Assurance Analysis (Chapter 4).

3.4.1.4 LOWER LOS ANGELES RIVER BACTERIA TMDL

The Los Angeles River Bacteria TMDL (Resolution R1-007) was adopted by the Regional Board on July 9, 2010 and subsequently went into effect on March 23, 2012. The TMDL establishes WLAs for E.Coli in wet and dry weather and determines an allowable number of exceedances days of these objectives.

CONTROL MEASURES AND IMPLEMENTATION

For compliance purposes, the main stem of the river was broken down into segments, each with its own allocations and compliance schedule. During dry weather, the segments are phased into compliance through the development and implementation of a Load Reduction Strategy (LRS).

> *A LRS is "both [1] a suite of actions performed by MS4 Permittees along a Los Angeles River segment or tributary and [2] a document submitted to the Regional Board Executive Officer for approval. The document must describe the suite of actions that will be performed and demonstrate reasonable assurance of interim and final WLA attainment. A LRS may include 1) outfall methods such as structural methods like dry weather diversions, 2) source control and, in appropriate circumstances, 3) downstream methods to treat waters at the end of tributaries[10].*

Tables 3-7 summarizes the first compliance deadline and the submittal of the Load Reduction Strategy for the Agencies within the Lower LAR Watershed during dry weather. During wet weather there is not a phased implementation schedule similar to dry-weather. The final wet weather WQBELs go into effect on March 23, 2037.

Table 3-7: Lower LAR Load Reduction Strategy Submittal Deadline

Segment B, 2014-2022: Lower LAR Agencies discharging to Los Angeles River (main channel) Between Rosecrans Avenue and Patata Street RR Bridge)		
Agencies	Implementation Action	Deadline
South Gate, Downey, Lynwood, Paramount, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	September 23, 2014
Segment A, 2014-2024: Lower LAR Agencies discharging to Segment A of the Los Angeles River (main channel) Between Estuary (Willow Avenue) and Rosecrans Avenue		
Agencies	Implementation Action	Deadline
Lakewood, Long Beach, Lynwood, Paramount, Signal Hill, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	September 23, 2016
Rio Hondo 2014-2023:Lower LAR Agencies discharging to Rio Hondo		
Agencies	Implementation Action	Deadline*
Pico Rivera, South Gate, Downey, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	March 23, 2016
Compton Creek 2014-2025:Lower LAR Agencies with discharges entering Compton Creek		

[10] Los Angeles Regional Water Quality Control Board. Los Angeles River Watershed Bacteria TDML Staff Report. Attachment A to Resolution No. R10-007. July 15, 2010.

Agencies	Implementation Action	Deadline*
Long Beach, Lynwood, South Gate, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	March 23, 2018

*If compliance targets are not being met, submit new LRS by September 23, 2026 to begin second phase

SUMMARY

The Agencies within the Lower LAR Watershed Group will submit a LRS in accordance with the deadlines in Table 3-7. The Control Measures discussed in the remainder of this Chapter will address bacteria loads and provide reasonable assurance of meeting WQBELs, however the LRS will outline a more targeted approach to address bacteria in the Lower LAR Watershed.

3.4.1.5 LOS ANGELES RIVER ESTUARY BACTERIA TMDL

On March 26, 2012, the US EPA adopted the Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL. This TMDL establishes numeric WLAs for E.Coli (freshwater), fecal coliform, enterococcus, and total coliform (marine) in the Los Angeles River Estuary (LARE) and the Long Beach shoreline beaches and determines an allowable number of exceedances days of these objectives.

This Watershed Management Program incorporates the LARE which extends from Willow Ave to the mouth of the Estuary (Queensway Bay near the site of the Queen Mary). The portion of this TMDL dealing with the Long Beach Shoreline beaches will be addressed in a separate watershed management program to be submitted by the City of Long Beach.

CONTROL MEASURES AND IMPLEMENTATION

In contrast to TMDLs adopted by the Regional Board, US EPA TMDLs do not contain an Implementation Plan or Schedule. The Regional Board has the option of adopting a separate implementation plan through a Basin Plan amendment or issuing a compliance schedule in a separate enforcement order. As the Regional Board has not adopted either of these alternatives, and given the limited amount of time to comply with this TMDL, the Regional Board has determined that:

> *…numeric water quality based effluent limitation for these USEPA established TMDLS are infeasible at the present time. The Regional Board may at its discretion revisit this decision within the term of the [MS4 Permit] or in a future permit, as more information is developed to support the inclusion of numeric water quality based effluent limitations[11].*

In lieu of the inclusion of numerical limits in the MS4 Permit, the Agencies subject to this TMDL are required to propose and implement Best Management Practices (BMPs) in the Watershed Management Program to meet WLAs.

. As the ultimate receiving water for all upstream waters, it is appropriate that the development and submittal of the estuary's LRS begin no earlier than the last of the Los Angeles River's main channel and tributary segments. Otherwise, the Permitees discharging to the estuary would be responsible for exceedances caused by upstream

[11] California Regional Water Quality Control Board, Los Angeles Region Los Angele County MS4 Permit Response to Comments on the Tentative Order TMDL (General) Matrix.

agencies that have not yet implemented their LRS and for which the estuary agencies would have no control over. As such, the LRS proposes to follow the milestones which coincide with the LRS schedule for the tributaries of Segment C and D. Table 3-8 summarizes the proposed timeline for submittal of the LRS for Agencies discharging to the LAR Estuary.

Table 3-8 Lower LAR Estuary Load Reduction Strategy Submittal Deadline

Lower LAR Permittees	Implementation Action	Deadline*
Long Beach, Signal Hill, and LACFCD	Submit Load Reduction Strategy (LRS) to Regional Board	March 23, 2023
	Complete Implementation of LRS	September 23, 2027
	Achieve interim (dry-weather) WQBEL and submit report to Regional Board	September 23, 2030
	Achieve final WQBELS or demonstrate that noncompliance is due to upstream contributions and submit report to Regional Water Board	September 23, 2030

*If compliance targets are not being met, a new LRS to begin the second phase will be submitted by September 23, 2031, with complete implementation of this LRS by March 23, 2035, and final WQBELs achieved by March 23, 2037.

The Lower LAR Agencies discharging to the LAR Estuary have already taken some early action steps towards low flow diversion projects to address bacteria loading. Table 3-9 summarizes the status of Control Measures that are currently in progress.

Table 3-9: Status of Lower LAR Dry-Weather Diversion Projects (as of June 1, 2014)

Agency	Conceptual Design	Approved Project	Design Plans	Constructed
Signal Hill	10% design complete	--	--	--
Long Beach	--	x	--	--

SUMMARY

In order to meet the LAR Estuary Bacteria TDML WLA, a LRS or equivalent will be developed and submitted to the Regional Board in accordance with the schedule outlined in Table 3-9. The Control Measures discussed in the remainder of this Chapter will address bacteria loads and provide reasonable assurance of meeting WQBELs, however the LRS will outline a more targeted approach to address bacteria in the Lower LAR Estuary Watershed. The CIMP is proposing initiating quarterly monitoring of the estuary for bacteria beginning in 2015.

3.4.1.6 DOMINGUEZ CHANNEL AND GREATER LOS ANGELES AND LONG BEACH HARBOR WATERS TOXIC POLLUTANTS TMDL

This TMDL was adopted by the Regional Board on May 5, 2011 and became effective on March 23, 2012. It establishes WQBELs for Copper, Lead, Zinc, PAHs, DDT, and PCBs. This TMDL effectively divides the Lower LAR into two compliance areas: (1) those areas tributary to the LAR above the estuary; and (2) those areas tributary directly to the estuary. The areas under this TMDL discharging directly to the Los Angeles and Long Beach Harbors will be addressed separately in the Long Beach individual WMP tentatively scheduled for submittal in March 2015.

CONTROL MEASURES AND IMPLEMENTATION

This TMDL does not assign a WLAs or WQBELs for agencies with discharges above the estuary. All of the Lower LAR Agencies subject to this TMDL (Cities of Signal Hill, Long Beach, Caltrans, and the LACFCD[12]) discharge to the LAR above the Estuary (which begins at Willow Street). For these agencies, The TMDL requires:

- Monitoring (which will be addressed separately in the CIMP) and
- A Report of Implementation, to be submitted on December 15, 2013 and annually thereafter to describe how current activities support the downstream TMDL. The MS4 Annual Report with the inclusion of data gathered from the CIMP will constitute reporting of activities in support of the downstream monitoring TMDL.

In addition, the Cities of Signal Hill and Long Beach, and the LACSD developed a Contaminated Sediment Management Plan to support the long-term recovery of sediment and water quality in the Long Beach Harbor, Eastern San Pedro Bay, and the LAR Estuary. This Plan outlines an approach to sediment contamination reduction. This approach summarizes a process for identifying and designating areas for remediation and determining the appropriate management alternatives to implement. The approach considers the following sediment management alternatives:

- Source Control
- Monitored Natural Recovery
- Enhanced Natural Recovery
- Capping
- In Situ Treatment
- Dredging

SUMMARY

The Watershed Control Measures described in this chapter will provide reasonable assurance that the Lower LAR Agencies are addressing the TMDL pollutants of concern in their discharges and conducting activities to support the achievement of WQBELs. Monitoring conducted through the CIMP along with an Annual Report of Implementation will document the Lower LAR Watershed Group's progress. In addition, the sediment management efforts in the LAR Estuary will likely achieve significant contaminant reduction.

As recognized by the footnote in Attachment K of the Permit, the Participating Agencies have entered into an Amended Consent Decree with the United States and the State of California, including the Regional Board. The footnote specifically states: "The requirements of this Order to implement the obligations of [the Dominguez Channel and Greater Los Angeles and Long

[12] Paramount and Lakewood are incorrectly included in MS4 Permit Table K-5. The TMDL does not list Paramount or Lakewood and being subject to the Estuary provisions of the TMDL. Lakewood and Paramount are listed in Table K-7 under the Los Cerritos Channel Watershed area. These two cities will not be further addressed under this section.

Beach Harbor Waters Toxic Pollutants TMDL] do not apply to a Permittee to the extent that it is determined that the Permittee has been released from that obligation pursuant to the Amended Consent Decree entered in *United States v. Montrose Chemical Corp.*, Case No. 90-3122 AAH (JRx)." The submission of this WMP and its associated CIMP and any action or implementation taken pursuant to it shall not constitute a waiver of any such release of obligations established by that Amended Consent Decree.

3.4.2 NONSTRUCTURAL TARGETED CONTROL MEASURES

3.4.2.1 TOTAL SUSPENDED SOLIDS REDUCTION

As explained in the introduction to this chapter, emphasis is placed on source control as a cost-effective measure to reduce pollutant loads. In this WMP, the chief approach is controlling Total Suspended Solids (TSS) at the source, as explained in the following section. Combining this approach with true source control, low impact development, green streets, and the MCMs constitutes a strong and effective initial implementation of the WMP, providing time for funding measures to be put in place to pay for the design, construction, and operation of stormwater capture and low flow diversion facilities and to develop working relationships with water and wastewater agencies.

BACKGROUND

TSS is the governing pollutant for metals. This is consistent with that found within the USEPA approved *Los Angeles River Metals TMDL* which represents metals (copper, lead, and zinc) through their associations with sediment. Reducing TSS in the receiving waters is anticipated to result in a significant reduction of metals in the receiving waters since both pollutant groups adhere to sediment; therefore initial implementation will focus on TSS reduction. Initial emphasis on TSS reduction should reduce the volume of water that ultimately needs to be captured and infiltrated or used to achieve standards for the Category 1 pollutants being addressed by the WMP – namely metals. This would make implementation of the WMP more cost-efficient.

Documentation is not available for the Lower LAR watershed; however it is available for the adjacent Los Cerritos Channel (LCC) Watershed, of which many Lower LAR watershed Cities drain to in part. For that watershed, Table 3-10 provides a summary of TSS concentrations at the Stearns Street monitoring site over a 13-year period based on 74 wet-weather observations and 25 dry-weather observations.

Table 3-10: TSS statistics measured at LCC TMDL Monitoring Site

Statistic	Wet weather (mg/L)	Dry weather (mg/L)
No. of observations	74	25
Minimum	17	2
Maximum	1700	128
1st Quartile	96	7.5
Median	155	13
3rd Quartile	260	41
Mean	227	27
Standard deviation (n-1)	256	30

Although the RAA is only assuming a 5% pollutant load reduction through implementation of the TSS Reduction Strategy, the Watershed Group is targeting greater reductions. In an analysis performed by the Los Cerritos Channel WMP Group, it was determined that the expected reduction in the mean concentration of TSS at Stearns Street from 227 mg/l to 150 mg/l, which would be a 34% reduction in the mean concentration of TSS. The reduced value is consistent with those found in other watersheds with similar land uses. A quantification of the program's potential effectiveness is included in Section 4.3.1.

TSS REDUCTION STRATEGY

The core of the TSS Reduction Strategy is the Group's soil stabilization/sediment control. Two key components of this strategy are implementation of enhanced erosion and sediment control at construction sites, in accordance with each city's Development Construction Program, and stabilization of exposed soil not associated with construction sites. Initial assessments conducted by the LCC Watershed Group have indicated that vacant lots, Caltrans rights-of-way and transmission line rights-of-way are the primary areas of exposed soil not associated with construction sites. Specific control measures for these areas are explained in the following section.

3.4.2.2 LIST OF NONSTRUCTURAL TARGETED CONTROL MEASURES

Table 3-11 lists planned and potential nonstructural TCMs for each participating agency. The BMP effectiveness from Table 3-2 is based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012. The correlation of BMP effectiveness with WQPs is based on Table 3-1. The pages following Table 3-11 describe each of the listed controls.

The responses for each agency under Table 3-11 are defined as follows:

- ✗ *Planned TCM*. Under the presumption that 1) the TCM will likely not require approval of the governing body and 2) the governing body approves adequate staff/budget (if necessary), the TCM will be implemented.
- **P** *Potential TCM*. The TCM is under consideration by the agency, however implementation is contingent upon yet to be determined factors. These factors include approval by the governing body, additional time needed to inform the governing body and/or relevant staff and approval of service contracts. As such implementation cannot be assured at this time. If the Potential TCM is not adopted by the agency within the first two years of the implementation of the WMP, it will be reconsidered through the adaptive management process.
- **C** *Completed TCM*. The TCM is preexisting (has been in effect for several years or more).

It is important to note that Caltrans and the LACFCD are operating regional stormwater programs and consequently incorporating localized institutional TCMs may not be feasible. As such their exclusion from such TCMs is justified.

The schedule of implementation for the TCMs is provided in Chapter 5.

Table 3-11 Nonstructural TCMs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency									
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	LACFCD	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
		Planning and Land Development															
1	TCM-PLD-1	Train staff/councils to facilitate LID and Green Streets implementation	◈	◈	◈	◈	◈	✗	N/A	✗	✗	✗	✗	✗	✗	✗
2	TCM-PLD-2	Ordinance requires LID BMPs for projects below MS4 Permit thresholds	◆	◆	◈	◆	◆	✗	N/A		✗				✗	✗
		Existing Development															
3	TCM-ICF-1 (MCM-ICF-3)	Prioritize facilities/inspections based on water quality priorities	◈	◈	◈	◈	◈	✗	N/A	✗	✗	✗	✗	✗	✗	✗
4	TCM-TSS-1	Exposed soil ordinance	◈	◈	◈	◆	◇		N/A		P		P	P	✗	✗
5	TCM-TSS-2	Erosion repair and slope stabilization on private property	◈	◈	◈	◆	◇		N/A		P		P	P	✗	
6	TCM-TSS-3	Private parking lot sweeping ordinance	◆	◆	◆	◆	◇	✗	N/A		P		P		✗	
7	TCM-TSS-4	Sweeping of private roads and parking lots	◆	◆	◆	◆	◇	✗	N/A		P		P		✗	
8	TCM-TSS-5	Negotiations with regulated utilities for erosion control within R.O.W.	◈	◈	◈	◆	◇			**Watershed Group**						

Table 3-11 Nonstructural TCMs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency									
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	LACFCD	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
9	TCM-RET-1	Encourage retrofitting of downspouts (downspout disconnect)	◈	◈	◈	◈	◆	✗	N/A		P	✗	P	✗		✗
		Dry weather runoff reduction														
10	TCM-NSWD-1	Incentives for irrigation reduction practices	◆	◆	◈	◆	◆	✗	N/A	✗	✗	✗	✗	✗	✗	✗
		Public Information and Participation														
11	TCM-PIP-1	Refocused outreach to target audiences and water quality priorities	◆	◆	◆	◆	◆	**Watershed Group**								
		Public Agency Activities														
12	TCM-PAA-1	Upgraded sweeping equipment (e.g. regenerative)	◆	◆	◆	◆	◇	✗	N/A	C	P	C	C	C	C	C
13	TCM-PAA-2	Adopt Sewer System Management Plan (SSMP)	◆	◆	◇	◇	◇	✗	N/A	✗	✗	✗	✗	✗	✗	✗
14	TCM-PAA-3	Increased street sweeping frequency or routes	◆	◆	◆	◆	◇	P	N/A			P	✗			
15	TCM-TSS-6	Erosion repair and slope stabilization on public property and right of way	◈	◈	◈	◆	◇	✗	N/A		✗		P		✗	
		Reporting/Adaptive Management														

Table 3-11 Nonstructural TCMs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency								
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	LACFCD	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
16	TCM-MRP-1	Enhanced tracking through use of online GIS MS4 Permit database	◈	◈	◈	◈	◈	✗		✗	P	✗	✗	P	✗	✗
		Jurisdictional SW Management														
17	TCM-SWM-1	Prepare guidance documents to aid in implementation of MS4 Permit MCMs	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗	✗
		Initiatives														
18	TCM-INI-1	Copper reduction through implementation of SB 346	◆	◆	◆	◇	◇	✗	✗	✗	✗	✗	✗	✗	✗	✗
19	TCM-INI-2	Lead reduction through implementation of SB 757	◆	◆	◆	◇	◇	✗	✗	✗	✗	✗	✗	✗	✗	✗
20	TCM-INI-3	Support zinc reduction in tires through safer consumer product regs	◆	◆	◆	◇	◇	**Watershed Group**								
21	TCM-INI-4	Apply for grant funding for stormwater quality/capture projects	◆	◆	◈	◆	◆	✗	✗		✗	✗	✗	✗	✗	✗

✗ – Planned TCM. **P** – Potential TCM. **C** – Completed/implemented TCM.

◆ Primary pollutant reduction ◈ Secondary pollutant reduction ◇ Pollutant not addressed

BMP effectiveness ratings based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012.

ENHANCED TRACKING THROUGH USE OF ONLINE GIS MS4 PERMIT DATABASE ***TCM-MRP-1***

Measures:

- Enter the enhanced tracking requirements of the fourth term MS4 Permit on an online GIS database management system dedicated to Phase I MS4 Permit compliance. Program elements addressed include all the MCMs (Development Construction, Planning and Land Development, Industrial/Commercial Facilities, Public Agency Activities, Public Information and Participation and Illicit Connection/Discharge Elimination) and the Monitoring and Reporting Program.
- Use the consolidated tracking data to:
    - Improve the effectiveness of the JSWMP (e.g. examine geospatial trends in IC/IDs, which could be used to strategically distribute public education materials) and WMP.
    - Assess the JSWMP and improve the annual reporting process.
    - Guide the adaptive management process through this assessment.

Many of the cities are implementing the measures through the use of *MS4Front*, a propriety online GIS MS4 Permit database management system.

TRAIN STAFF TO FACILITATE LID AND GREEN STREETS IMPLEMENTATION ***TCM-PLD-1***

Measures:

- Conduct training for relevant staff in LID and Green Streets implementation prior to the onset of the programs. The elements of the training follow the provisions listed in MS4 Permit §VI.D.7.
- Educate governing bodies in LID and Green Streets implementation (optional).

Several cities have already accomplished these measures, which facilitate LID implementation and address WQPs.

ORDINANCE REQUIRES LID BMPS FOR PROJECTS BELOW MS4 PERMIT THRESHOLDS ***TCM-PLD-2***

Measures:

- Adopt an ordinance requiring LID BMPs for smaller development projects that are below the thresholds for inclusion under the Planning and Land Development MCM Program.

Downey, South Gate and Signal Hill have already accomplished this measure, which facilitates LID and addresses WQPs.

PRIORITIZE FACILITIES/INSPECTIONS BASED ON WATER QUALITY PRIORITIES ***TCM-ICF-1 (MCM-ICF-3)***

MS4 Permit: Modified MCM (replaces §VI.D.6.d, §VI.D.6.e)

A program has been developed to prioritize industrial/commercial facilities based on their potential to adversely impact WQPs. The resulting prioritization scheme determines the inspection frequency, replacing the uniform inspection frequency provided in the MS4 Permit. This allows Cities to concentrate efforts on WQPs.

The complete program is detailed in the Minimum Control Measures section of this chapter – see MCM-ICF-3.

EXPOSED SOIL ORDINANCE

TCM-TSS-1

This TCM is an element of the TSS Reduction Strategy.

- Adopt ordinances that require landscaping, erosion control, and sediment control on vacant lots and other significant sources of exposed dirt.
- These efforts are distinct from construction activity control measures, which are addressed under the Development Construction MCM program.

Within the neighboring Lower San Gabriel River Watershed, the City of Whittier has successfully adopted and implemented such an ordinance. The ordinance also requires drought tolerant landscaping/xeriscaping. The ordinance language may be used as a template to develop similar ordinances for the other participating agencies, and as such is included in Appendix A-3.2.

Due to the considerable amount of exposed dirt within their jurisdiction, the City of Signal Hill has agreed to develop and adopt a similar ordinance. This ordinance may also be used as a template for the remaining Watershed Group Cities.

EROSION REPAIR AND SLOPE STABILIZATION ON PRIVATE PROPERTY

TCM-TSS-2

This TCM is an element of the TSS Reduction Strategy. Measures include:

- If adopted, enforce the ordinances from TCM-TSS-1.
- Proactively enforce the existing stormwater ordinance regarding TSS-laden stormwater discharges (or potential discharges) from significant sources of exposed dirt and follow the Progressive Enforcement Policy. This may include observing site conditions prior to rain events and visual monitoring of stormwater discharges.

Within the neighboring Lower San Gabriel River Watershed, the City of Whittier has successfully implemented an ordinance that conforms to TCM-TSS-1. The following are pictures of some of the landscaped lots.





Wardman St and Philadelphia St, NW corner (1)



Greenleaf Ave and Philadelphia St, east side

Wardman St and Philadelphia St, NW corner (2)



Bailey St and Comstock Ave, NW corner

A similar effort will be undertaken by the City of Signal Hill. Pending adoption, the City of Signal Hill's Exposed Soil Ordinance (see the description for TCM-TSS-1) will also be implemented and enforced.

PRIVATE PARKING LOT SWEEPING ORDINANCE ***TCM-TSS-3***

This TCM is an element of the TSS Reduction Strategy.

- Adopt an ordinance that requires sweeping of private parking lots. Example Municipal Code language from the City of Signal Hill is included in Appendix A-3.3.

SWEEPING OF PRIVATE ROADS AND PARKING LOTS ***TCM-TSS-4***

This TCM is an element of the TSS Reduction Strategy.

- If adopted, enforce the ordinance from TCM-TSS-3.
- Proactively enforce the existing stormwater ordinance regarding TSS-laden stormwater discharges (or potential discharges) for private roads and parking lots and follow the Progressive Enforcement Policy. This may include observing site conditions prior to rain events and visual monitoring of stormwater discharges.

NEGOTIATIONS WITH REGULATED UTILITIES FOR EROSION CONTROL WITHIN R.O.W. ***TCM-TSS-5***

This TCM is an element of the TSS Reduction Strategy.

- As a Watershed Group, pursue agreements between cities and utilities regarding erosion and sediment control in rights-of-way.

Since Caltrans is a participant in the Watershed Group, the cities will work with Caltrans to ensure that its rights-of-way are stabilized in a timely manner. However, since the public and private utilities whose rights-of-way must be stabilized are not members of the Watershed Group, negotiations with the utilities on how best to keep sediment from their rights-of-way out of the storm drain system will be necessary.

EROSION REPAIR AND SLOPE STABILIZATION ON PUBLIC PROPERTY *TCM-TSS-6*

This TCM is an element of the TSS Reduction Strategy.

- Implement landscaping, erosion control, and sediment control on significant sources of exposed dirt on public property.

ENCOURAGE RETROFITTING OF DOWNSPOUTS (DOWNSPOUT DISCONNECT) *TCM-RET-1*

Measures:

- Encourage owners/operators of existing developments to disconnect existing downspouts from the MS4.

INCENTIVES FOR IRRIGATION REDUCTION PRACTICES *TCM-NSWD-1*

Measures:

- Provide incentives such as rebates for irrigation reduction (i.e. runoff reduction) practices such as xeriscaping and turf conversion.

All cities are currently involved in this effort through the Metropolitan Water District's water conservation rebate program.

REFOCUSED OUTREACH TO TARGET AUDIENCES AND WATER QUALITY PRIORITIES *TCM-PIP-1*

Measures:

- Within the Public Information and Education Program, elements such as material use/development and advertisements will address WQPs. The development of this effort will be ongoing throughout the MS4 Permit term, and may be regarded as a Watershed Group effort.

UPGRADED SWEEPING EQUIPMENT (E.G. REGENERATIVE) *TCM-PAA-1*

Measures:

- Upgrade street sweeping equipment to regenerative or other high-efficiency new technology.

Most of the Cities contract street sweeping to private companies. These companies have already phased in regenerative sweepers. The City of Whittier has been phasing in regenerative sweepers and expects to be 100% regenerative by the end of the MS4 Permit term. The City of Long Beach operates vacuum sweepers over regenerative due to maintenance concerns. However the City is considering contracting this service in the near future. If this occurs, the vacuum sweepers will likely be replaced with regenerative sweepers provided by the contractor.

ADOPT SEWER SYSTEM MANAGEMENT PLAN (SSMP): *TCM-PAA-2*

All agencies are enrolled in the statewide Waste Discharge Requirements for Sanitary Sewer Systems, which required the development and implementation of a SSMP in mid 2009. The goal of the SSMP is to

reduce and prevent sanitary sewer overflows (SSOs), as well as mitigate any SSOs that do occur. This goal also addresses WQPs. Elements of the SSMP include:

- Sanitary sewer system operation and maintenance program
- Design and performance provisions
- Overflow emergency response plan
- FOG Control Program
- System Evaluation and Capacity Assurance Plan

Following these SSMP elements will address WQPs.

INCREASED STREET SWEEPING FREQUENCY OR ROUTES ***TCM-PAA-3***

Measures:

- Increase the street sweeping frequency, jurisdiction-wide or in high trash-generating areas and/or include additional routes (e.g. center medians and intersections).

PREPARE GUIDANCE DOCUMENTS TO AID IMPLEMENTATION OF MS4 PERMIT MCMS ***TCM-SWM-1***

This WMP includes in Appendix A-3-1 guidance documents and template forms to aid the Agencies in implementation of the MS4 Permit MCMs. These documents were developed to address two issues: 1) the MS4 Permit introduces many new and enhanced MCM provisions that do not have preexisting guidance documentation and 2) the model Stormwater Quality Management Program (SQMP) – which was required in the prior LA MS4 Permit and served as a guide to permit implementation – is now obsolete. Unlike the SQMP, the Agencies are not bound to the guidance and forms provided. They are provided as a resource to improve the effectiveness of the JSWMPs.

COPPER REDUCTION THROUGH IMPLEMENTATION OF SB 346 ***TCM-INI-1***

This initiative TCM has been completed recently. The impact of the TCM over time has been incorporated into the RAA.

LEAD REDUCTION THROUGH IMPLEMENTATION OF SB 757 ***TCM-INI-2***

This initiative TCM has been completed recently.

SUPPORT ZINC REDUCTION IN TIRES THROUGH SAFER CONSUMER PRODUCT REGULATIONS ***TCM-INI-3***

Measures:

- As a Watershed Group, plan to work with others to use the Department of Toxic Substances Control's Safer Consumer Product Regulations to reduce the zinc in tires, which one of the greatest sources of zinc in urban areas.

APPLY FOR GRANT FUNDING FOR STORMWATER CAPTURE PROJECTS ***TCM-INI-4***

Measures:

- Initiate Individual or multi-jurisdictional efforts to apply for grant funding for stormwater quality/capture projects.

In April 2014, The Gateway Water Management Authority received grant funding of $1.3 million for LID projects in the Cities of Downey, Lynwood, Paramount, Pico Rivera, Signal Hill and South Gate (as well as Norwalk, Santa Fe Springs and Whittier).

3.4.3 Structural Targeted Control Measures

Structural TCMs are Structural BMPs, in addition to MCMs, designed with the objective to achieve interim and final water quality-based effluent limitations and/or receiving water limitations. Structural TCMs are an important component of the Watershed Group's load reduction strategy. These BMPs are constructed to capture runoff and filter, infiltrate, or treat it. If properly maintained, these BMPs can have high pollutant removal efficiencies (see the *Performance Evaluation of Structural BMPs* element of this section); however, they tend to be more expensive than nonstructural BMPs. The two prevailing approaches for implementing Structural BMPs are regional and distributed approaches. Both serve important purposes and should be considered in combination to determine the best possible implementation strategy to meet the Watershed Group's water quality goals.

Distributed BMPs

Distributed Structural BMPs are generally built at the site-scale. They are intended to treat stormwater runoff at the source and usually capture runoff from a single parcel or site.



Figure 3-1: Distributed BMP Schematic

Regional BMPs

Regional BMPs refer to large structural BMPs that receive flows from neighborhoods or large areas and may serve dual purposes for flood control or groundwater recharge[13].

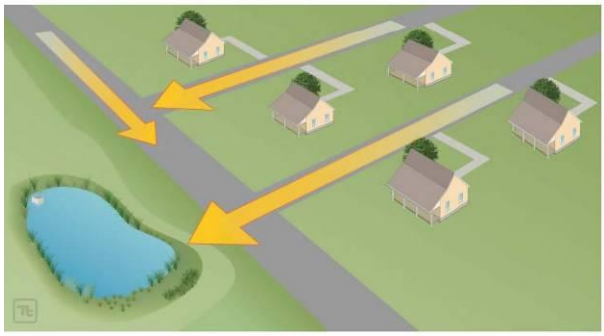


Figure 3-2: Regional BMP Schematic

[13] San Diego River Watershed Comprehensive Load Reduction Plan (2012)

3.4.3.1 STRUCTURAL BMP SUBCATEGORIES

Structural BMPs fall under a variety of subcategories that correspond to their function and water quality benefit. Some of the most common of these subcategories are described below. These subcategories will be used throughout the WMP to describe existing, planned, and potential regional and distributed BMPs.

INFILTRATION BMPS

Infiltration BMPs allow for stormwater to percolate through the native soils and recharge the underlying groundwater table, subsequently decreasing the volume of water discharged to the downstream waterbodies. These BMPs must be constructed in areas where the native soils have percolation rates and groundwater levels sufficient for infiltration.

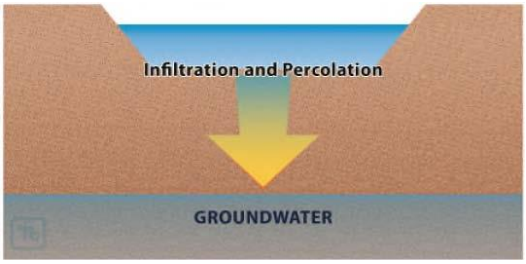


Figure 3-3: Infiltration BMP Schematic

INFILTRATION BASIN

An infiltration basin consists of an earthen basin with a flat bottom. An infiltration basin retains stormwater runoff in the basin and allows the retained runoff to percolate into the underlying soils. The bottom of an infiltration basin is typically vegetated with dryland grasses or irrigated turf grass.

INFILTRATION TRENCH

An infiltration trench is a long, narrow, rock-filled trench with no outlet other than for overflow. Runoff is stored in the void space between stones and infiltrates through the bottom and sides of the trench. Infiltration trenches provide the majority of their pollutant removal benefits through volume reduction. Pretreatment is important for limiting amounts of coarse sediment entering the trench which can clog and render the trench ineffective.

BIORETENTION WITH NO UNDERDRAIN

Bioretention facilities with no underdrain are landscaped shallow depressions that capture and infiltrate stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, engineered media, and vegetation. As stormwater passes down through the media, pollutants are filtered, adsorbed, and biodegraded by the soil and vegetation.



Figure 3-4: Bioretention without underdrain schematic

DRYWELL

Drywells are similar to infiltration trenches in their design and function; however, drywells generally have a greater depth to footprint area ratio and can be installed at relatively deep depths. A drywell is a subsurface storage facility designed to temporarily store and infiltrate runoff. A drywell may be either a small excavated pit filled with aggregate or a prefabricated storage chamber or pipe segment.

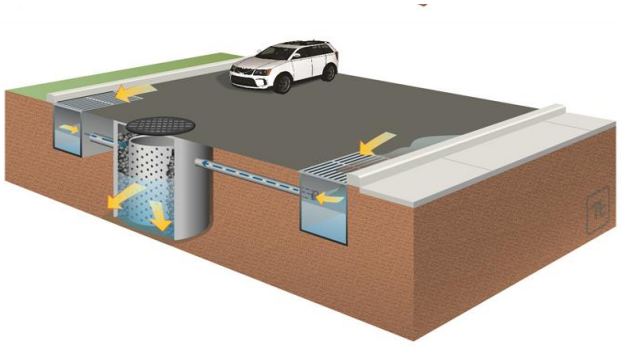


Figure 3-5: Drywell schematic

POROUS PAVEMENT

Porous pavement (concrete, asphalt, and pavers) contain small voids that allow water to pass through to a gravel base. They come in a variety of forms; they may be a modular paving system (concrete pavers, grass-pave, or gravel-pave) or poured in place pavement (porous concrete, permeable asphalt). Porous pavements treat stormwater and remove sediments and metals within the pavement pore space and gravel base. While conventional pavement results in increased rates and volumes of surface runoff, properly constructed and maintained porous pavements allow stormwater to percolate through the pavement and enter the soil below. This facilitates groundwater recharge while providing the structural and functional features needed for the roadway, parking lot, or sidewalk. The paving surface, subgrade, and installation requirements of porous pavements are more complex than those for conventional asphalt or concrete surfaces.

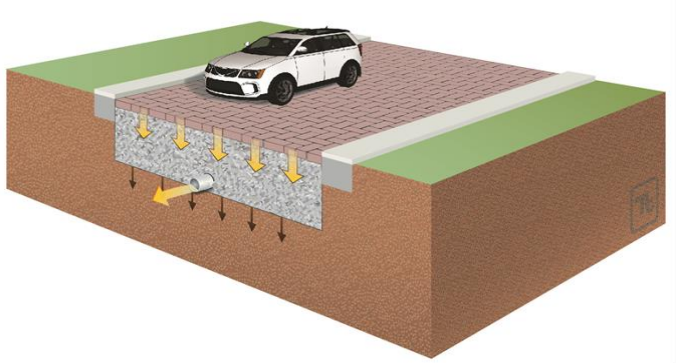


Figure 3-6: Porous pavement schematic

BIOTREATMENT BMPS

Biotreatment BMPs treat stormwater through a variety of physical, chemical, and biological processes prior to being discharged to the MS4 system. These BMPs should be considered where Infiltration BMPs are infeasible.

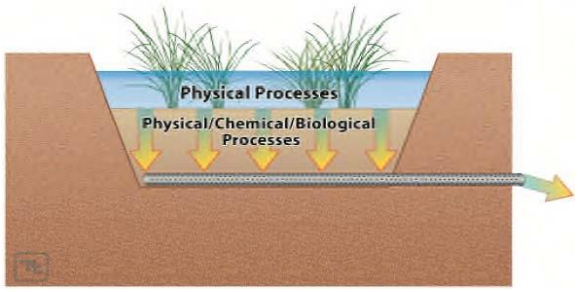


Figure 3-7: Biotreatment BMP schematic

BIORETENTION WITH UNDERDRAINS

Bioretention stormwater treatment facilities are landscaped shallow depressions that capture and filter stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, engineered media, and vegetation. As stormwater passes down through the media, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and vegetation. Bioretention with underdrain systems are utilized for areas containing native soils with low permeability or steep slopes, where the underdrain system routes the treated runoff to the storm drain system.

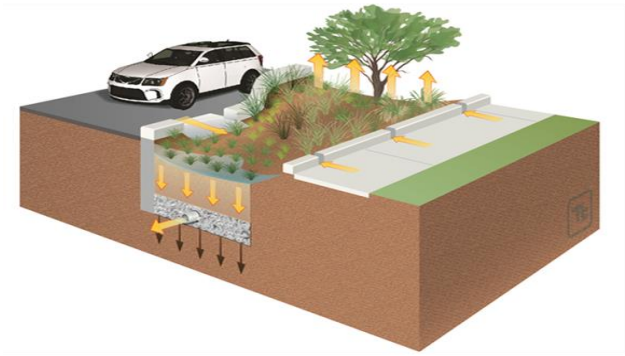


Figure 3-8: Bioretention with Underdrains schematic

VEGETATED SWALES

Vegetated swales are open, shallow channels with low-lying vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. Vegetated swales provide pollutant removal through settling and filtration in the vegetation (usually grasses) lining the channels. In addition, although it is not their primary purpose, vegetated swales also provide the opportunity for volume reduction through subsequent infiltration and evapotranspiration and reduce the flow velocity. Where soil conditions allow, volume reduction in vegetated swales can be enhanced by adding a gravel drainage layer underneath the swale allowing additional flows to be retained and infiltrated. Where slopes are shallow and soil conditions limit or prohibit infiltration, an underdrain system or low flow channel for dry weather flows may be required to minimize ponding and convey treated and/or dry weather flows to an acceptable discharge point. An effective vegetated swale achieves uniform sheet flow through a densely vegetated area for a period of several minutes (depending on design standard used).

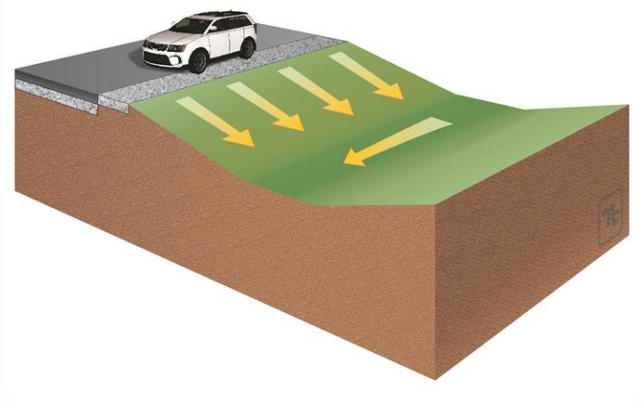


Figure 3-9: Vegetated swale schematic

WET DETENTION BASIN

Wet detention basins are constructed, naturalistic ponds with a permanent or seasonal pool of water (also called a “wet pool” or “dead storage”). Aquascape facilities, such as artificial lakes, are a special form of wet pool facility that can incorporate innovative design elements to allow them to function as a

stormwater treatment facility in addition to an aesthetic water feature. Wet ponds require base flows to exceed or match losses through evaporation and/or infiltration, and they must be designed with the outlet positioned and/or operated in such a way as to maintain a permanent pool. Wet ponds can be designed to provide extended detention of incoming flows using the volume above the permanent pool surface.

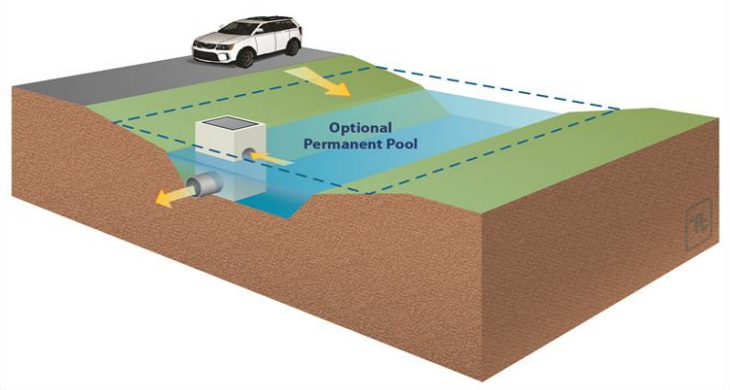


Figure 3-10: Wet detention basin schematic

Dry Extended Detention Basin

Dry extended detention basins are basins whose outlets have been designed to detain the stormwater runoff to allow particulates and associated pollutants to settle out. Dry extended detention basins do not have a permanent pool; they are designed to drain completely between storm events. They can also be used to provide hydromodification and/or flood control by modifying the outlet control structure and providing additional detention storage. The slopes, bottom, and forebay of Dry extended detention basins are typically vegetated.

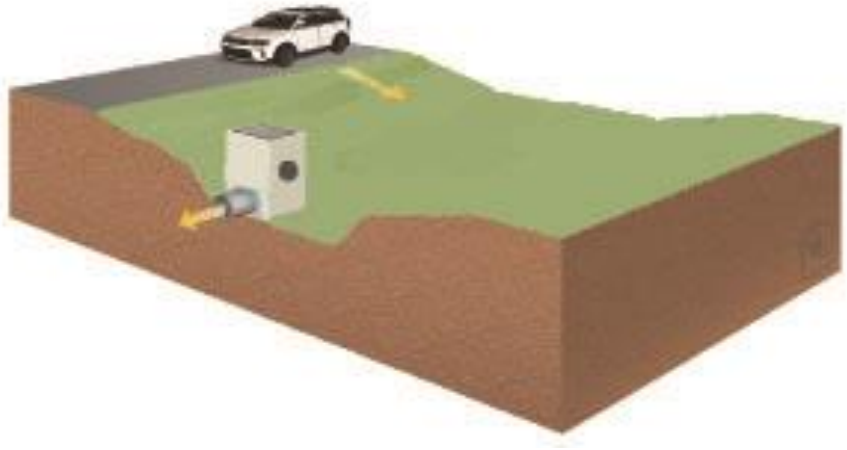


Figure 3-11: Dry extended detention basin schematic

PRE TREATMENT BMPS

Pre-treatment BMPs are typically not used as primary treatment; however, they are highly recommended for preliminary treatment in order to prolong the life and prevent clogging of the downstream system in a treatment train.

MEDIA FILTERS

Media filters are usually designed as multi-chambered stormwater practices; the first is a settling chamber, and the second is a filter bed filled with sand or another filtering media. As stormwater flows into the first chamber, large particles settle out, and then finer particles and other pollutants are removed as stormwater flows through the filtering medium. They can also be used as pre-treatment, with their location prior to any infiltration or biotreatment BMP.

CATCH BASIN INSERTS

Catch basins inserts typically include a grate or curb inlet and a sump to capture sediment, debris, and pollutants. Filter fabric can also be included to provide additional filtering of particles. The effectiveness of catch basins, their ability to remove sediments and other pollutants, depends on its design and maintenance. Some inserts are designed to drop directly into existing catch basins, while others may require retrofit construction. Similar to media filters, catch basin filters can also be used as a pre-treatment BMP for infiltration and biotreatment BMPs.



Figure 3-12: Pre-treatment BMP schematic

RAINFALL HARVEST

Rainfall Harvest BMPs capture rainwater to be reused in lieu of discharging directly to the MS4.

ABOVE GROUND CISTERNS

Cisterns are large above ground tanks that store stormwater collected from impervious surfaces for domestic consumption. Above ground cisterns are used to capture runoff. Mesh screens are typically used to filter large debris before the stormwater enters the cistern. The collected stormwater could

potentially be used for landscape irrigation and some interior uses, such as toilets and washing machines. The collection and consumption of the stormwater results in pollution control, volume reduction, and peak flow reduction from the site.

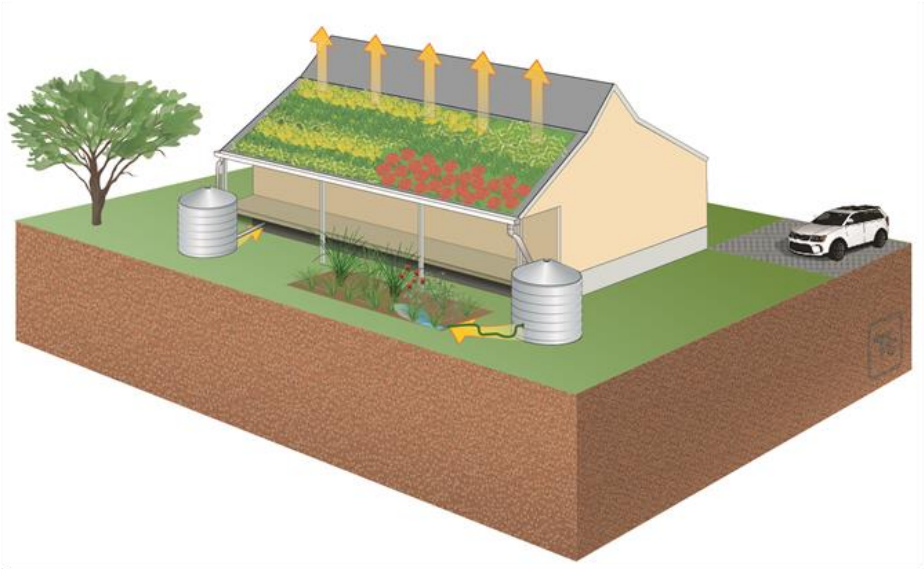


Figure 3-13: Above ground cisterns schematic

Underground Detention

Underground detention systems function similarly to above ground cisterns in that they collect and use stormwater from impervious surfaces. These systems are concealed underground and can allow for larger stormwater storage and capture additional impervious surfaces not easily captured in an above ground system (e.g. parking lots and sidewalks).



Figure 3-14: Underground detention schematic

DIVERSION SYSTEMS

LOW FLOW DIVERSION

Flow diversion systems collect and divert runoff. Flow diversion structures can primarily be used in two ways. First, flow diversion structures may be used to direct dry weather flows to a treatment facility, preventing the runoff from reaching a receiving water body. This is typically done with low flow runoff, which occurs during periods of dry weather. Second, flow diversion structures can also be modified by incorporating them into other BMPs. For example, diverted flow can be fed into a regional BMP. Properly designed stormwater diversion systems are very effective for preventing stormwater from being contaminated and for routing contaminated flows to a proper treatment facility.

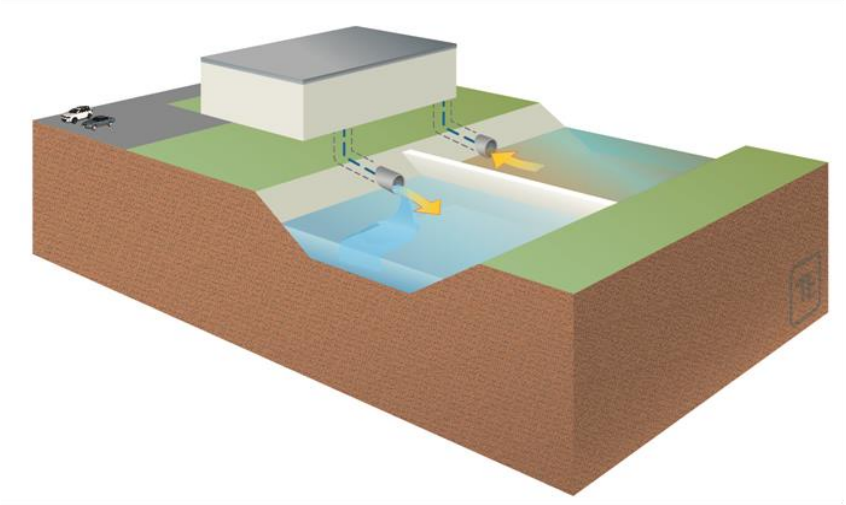


Figure 3-15: Low flow diversion schematic

3.4.3.2 PERFORMANCE EVALUATION OF STRUCTURAL BMPS

It is important to take the performance of stormwater BMPs into consideration during the planning and implementation process. This section provides an analysis of specific BMPs to determine the pollutant removal effectiveness of those BMPs. The International Stormwater BMP Database[14] (BMP Database) project website was used to analyze different BMP types for their effectiveness in removing specific pollutants. The website features a database of over 530 BMP studies, performance analysis results, BMP performance tools, monitoring guidance and other study-related publications. Performance studies relevant to BMPs matching the criteria for an effective regional or distributed application were analyzed to include the following:

- Bioretention
- Bioswale
- Detention Basin

[14] Geosyntec Consultants, Wright Water Engineers. International Stormwater Best Management Practices (BMP) Database Pollutant Category Summary Statistical Addendum: TSS, Bacteria, Nutrients, and Metals. July 2012.

- Grass Strip
- Porous Pavement
- Retention Pond
- Wetland Basin
- Wetland Channel

The average influent and effluent concentrations for the 95th percentile confidence interval were analyzed for pollutants of concern for the Lower LAR watershed available through the BMP Database. The following pollutants were analyzed:

- Cadmium (Dissolved)
- Cadmium (Total)
- Copper (Dissolved)
- Copper (Total)
- E. coli
- Enterococcus
- Fecal Coliform
- Kjeldahl Nitrogen (Total)
- Lead (Dissolved)
- Lead (Total)
- Nickel (Dissolved)
- Nickel (Total)
- Nitrogen (Total)
- NOx as Nitrogen
- TSS
- Zinc (Dissolved)
- Zinc (Total)

The majority of the BMPs analyzed by the BMP Database project are located in major transportation corridors. Land use categories such as residential, commercial, and industrial are not heavily represented in the analysis. The BMP effectiveness may also vary with regional conditions. Many BMPs were monitored in areas where a higher intensity and volume of rainfall than LA County is observed. Additionally, some of the BMPs monitored were designed in the 1990s, 1980s, or earlier. These are expected to have been designed with less stringent guidelines resulting in a more conservative analysis. Although the conditions noted above may result in a slight variance in BMP effectiveness, the pollutant removal efficiencies are considered to be applicable.

It is important to note that the majority of pollutant load reduction is achieved using infiltration BMPs which result in an overall volume reduction. The analysis emphasizes reduction in concentrations of constituents, rather than volume or load reduction. Flow reduction analyses were not performed due to the dependence on rainfall intensity, soil types, and other site-specific conditions. The RAA has determined the volume reduction needed to meet compliance goals.

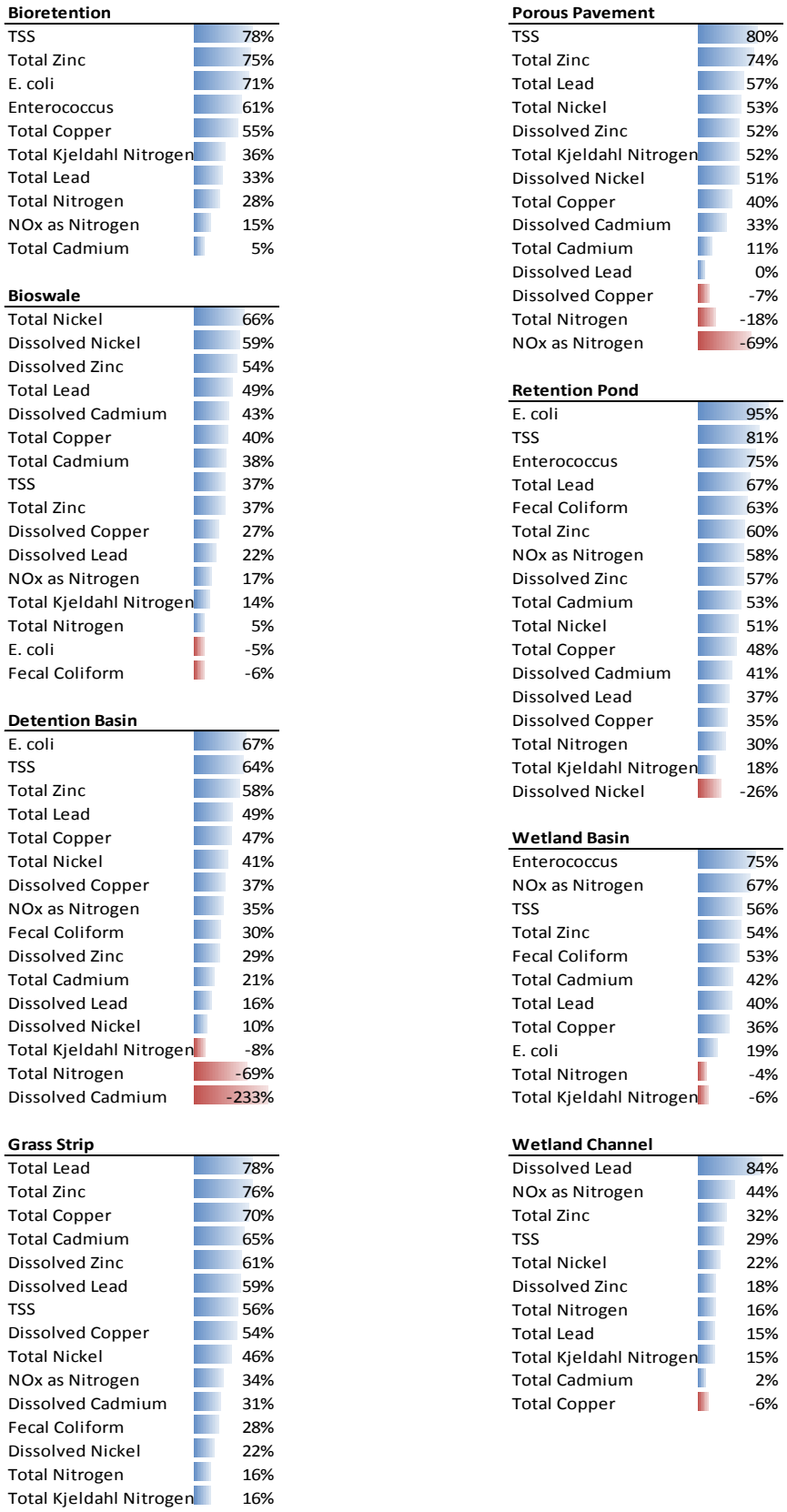
RESULTS

The analysis can be used to evaluate BMPs and support assumptions made in the RAA regarding effluent concentrations from specific BMPs. The required pollutant reductions determined through the RAA will be used to prioritize the BMPs to maximize effectiveness. The results of the BMP Database analysis are presented in a comparison format to easily visualize the pollutant removal efficiencies of each BMP type.

Each pollutant analyzed is a pollutant of concern for the Lower Los Angeles WMP watershed, with the exception of Total Suspended Solids (TSS). The reason for its inclusion is that studies have shown that there is a direct correlation between sediment concentration and various pollutants for which the watersheds are impaired. The data compiled from the BMP Database was used to determine the percent removal of each BMP for each pollutant. Each BMP was ranked in terms of pollutant removal efficiency for each pollutant type (see the following *BMP Pollutant Removal Effectiveness Comparison Charts*). Data for specific pollutants was not available for each BMP; therefore, only available data is presented.

The next analysis included taking the data and grouping the removal efficiencies under each BMP type. The pollutants were then ranked in terms of pollutant removal efficiency for each BMP type (see the *BMP Type Comparison Charts for Pollutant Removal* below). Data for specific pollutants was not available for each BMP; therefore, only available data is presented.

BMP Pollutant Removal Effectiveness Comparison Charts



BMP Type Comparison Charts for Pollutant Removal

Influent/Effluent Summary Statistics for Dissolved Cadmium (ug/L)

BMP Type	In	Out	Percent Removal
Bioswale	0.21	0.12	43%
Retention Pond	0.17	0.1	41%
Porous Pavement	0.06	0.04	33%
Grass Strip	0.13	0.09	31%
Detention Basin	0.15	0.5	-233%

Influent/Effluent Summary Statistics for Total Cadmium (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	0.52	0.18	65%
Retention Pond	0.49	0.23	53%
Wetland Basin	0.31	0.18	42%
Bioswale	0.5	0.31	38%
Detention Basin	0.39	0.31	21%
Porous Pavement	0.28	0.25	11%
Bioretention	0.99	0.94	5%
Wetland Channel	0.5	0.49	2%

Influent/Effluent Summary Statistics for Dissolved Copper (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	11.66	5.4	54%
Detention Basin	5.56	3.52	37%
Retention Pond	6.57	4.24	35%
Bioswale	11.01	8.02	27%
Porous Pavement	5.37	5.75	-7%

Influent/Effluent Summary Statistics for Total Copper (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	24.52	7.3	70%
Bioretention	17	7.67	55%
Retention Pond	9.57	4.99	48%
Detention Basin	10.62	5.67	47%
Porous Pavement	13.07	7.83	40%
Bioswale	10.86	6.54	40%
Wetland Basin	5.61	3.57	36%
Wetland Channel	4.52	4.81	-6%

Influent/Effluent Summary Statistics for E. coli (#/100 mL)

BMP Type	In	Out	Percent Removal
Retention Pond	2800	150	95%
Bioretention	150	44	71%
Detention Basin	1300	429	67%
Wetland Basin	785	632	19%
Bioswale	3990	4190	-5%

Influent/Effluent Summary Statistics for Enterococcus (#/100 mL)

BMP Type	In	Out	Percent Removal
Retention Pond	615	153	75%
Wetland Basin	615	153	75%
Bioretention	605	234	61%

Influent/Effluent Summary Statistics for Fecal Coliform (#/100 mL)

BMP Type	In	Out	Percent Removal
Retention Pond	1920	707	63%
Wetland Basin	13000	6140	53%
Detention Basin	1480	1030	30%
Grass Strip	32000	23200	28%
Bioswale	4720	5000	-6%

Influent/Effluent Summary Statistics for Total Kjeldahl Nitrogen (mg/L)

BMP Type	In	Out	Percent Removal
Porous Pavement	1.66	0.8	52%
Bioretention	0.94	0.6	36%
Retention Pond	1.28	1.05	18%
Grass Strip	1.29	1.09	16%
Wetland Channel	1.45	1.23	15%
Bioswale	0.72	0.62	14%
Wetland Basin	0.95	1.01	-6%
Detention Basin	1.49	1.61	-8%

Influent/Effluent Summary Statistics for Dissolved Lead (µg/L)

BMP Type	In	Out	Percent Removal
Wetland Channel	3.26	0.52	84%
Grass Strip	0.64	0.26	59%
Retention Pond	0.76	0.48	37%
Bioswale	1.39	1.08	22%
Detention Basin	0.79	0.66	16%
Porous Pavement	0.5	0.5	0%

Influent/Effluent Summary Statistics for Total Lead (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	8.83	1.96	78%
Retention Pond	8.48	2.76	67%
Porous Pavement	4.3	1.83	57%
Detention Basin	6.08	3.1	49%
Bioswale	3.93	2.02	49%
Wetland Basin	2.03	1.21	40%
Bioretention	3.76	2.53	33%
Wetland Channel	2.94	2.49	15%

Influent/Effluent Summary Statistics for Dissolved Nickel (µg/L)

BMP Type	In	Out	Percent Removal
Bioswale	4.93	2.04	59%
Porous Pavement****	0.88	0.43	51%
Grass Strip	2.68	2.09	22%
Detention Basin	2.82	2.55	10%
Retention Pond	1.68	2.11	-26%

Influent/Effluent Summary Statistics for Total Nickel (µg/L)

BMP Type	In	Out	Percent Removal
Bioswale	9.26	3.16	66%
Porous Pavement	3.64	1.71	53%
Retention Pond	4.46	2.19	51%
Grass Strip	5.41	2.92	46%
Detention Basin	5.64	3.35	41%
Wetland Channel	2.8	2.18	22%

Influent/Effluent Summary Statistics for Total Nitrogen (mg/L)

BMP Type	In	Out	Percent Removal
Retention Pond	1.83	1.28	30%
Bioretention	1.25	0.9	28%
Wetland Channel	1.59	1.33	16%
Grass Strip	1.34	1.13	16%
Bioswale	0.75	0.71	5%
Wetland Basin	1.14	1.19	-4%
Porous Pavement	1.26	1.49	-18%
Detention Basin	1.4	2.37	-69%

Influent/Effluent Summary Statistics for NOx as Nitrogen (mg/L)

BMP Type	In	Out	Percent Removal
Wetland Basin	0.24	0.08	67%
Retention Pond	0.43	0.18	58%
Wetland Channel	0.34	0.19	44%
Detention Basin	0.55	0.36	35%
Grass Strip	0.41	0.27	34%
Bioswale	0.3	0.25	17%
Bioretention	0.26	0.22	15%
Porous Pavement	0.42	0.71	-69%

Influent/Effluent Summary Statistics for TSS (mg/L)

BMP Type	In	Out	Percent Removal
Retention Pond	70.7	13.5	81%
Porous Pavement	65.3	13.2	80%
Bioretention	37.5	8.3	78%
Detention Basin	66.8	24.2	64%
Grass Strip	43.1	19.1	56%
Wetland Basin	20.4	9.06	56%
Bioswale	21.7	13.6	37%
Wetland Channel	20	14.3	29%

Influent/Effluent Summary Statistics for Dissolved Zinc (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	36.1	14	61%
Retention Pond	22.5	9.6	57%
Bioswale	52.7	24.5	54%
Porous Pavement	13.5	6.5	52%
Detention Basin	15.6	11.08	29%
Wetland Channel	11.6	9.5	18%

Influent/Effluent Summary Statistics for Total Zinc (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	103.3	24.3	76%
Bioretention	73.8	18.3	75%
Porous Pavement	57.6	15	74%
Retention Pond	53.6	21.2	60%
Detention Basin	70	29.7	58%
Wetland Basin	48	22	54%
Bioswale	36.2	22.9	37%
Wetland Channel	23	15.6	32%

RESULTS ANALYSIS SUMMARY

The statistical analysis presented has many applications, including supporting BMP prioritization and the RAA analysis. As future applications are undertaken, the results can be analyzed in more detail. For this analysis, the following observations were discovered:

- Overall, the retention pond returned the best results in terms of pollutant removal efficiency for several pollutants, with more than 60% removal for E. coli, TSS, Enterococcus, total lead, fecal coliform and total zinc.
- Among the constituents analyzed, the percent removals were often the highest for metals, lead and zinc in particular.
- The poorest performance was often observed for nutrients and bacteria, with concentrations increasing for some BMP types. Leaching of nutrients from soils/planting media and resuspension of captured pollutants may be a cause of the increases observed in these BMPs[15].

It is important to note that the majority of pollutant removal associated with stormwater BMPs will be due to infiltration and overall volume reduction. Although this is the case, a small component may be associated with inflow to outflow pollution concentration reduction and the analysis focuses on this percent reduction. Percent reduction is easily understandable and convenient for reporting; therefore, the method seems to be appropriate for this analysis. Refer to the article "Voodoo Hydrology" in the July 2006 article of Stormwater Magazine[16] for further information on caveats to this method. Although the analysis does not cover volume reduction, the RAA analysis has estimated the pollutant reduction necessary to meet compliance.

3.4.3.3 EXISTING TARGETED STRUCTURAL BMPS

The existing structural BMPs in place within the Watershed Group area, with the exception of the Hollydale Regional and Circle Parks project, have been included in the RAA model. Figure 3-16 indicates the locations of existing BMPs. Refer to Chapter 4 for more details.

[15] Stormwater: BMP Effectiveness for Nutrients, Bacteria, Solids, Metals, and Runoff Volume (2012). Retrieved online at: http://www.stormh2o.com/

[16] http://www.stormh2o.com/SW/Editorial/Voodoo_Hydrology_37.aspx

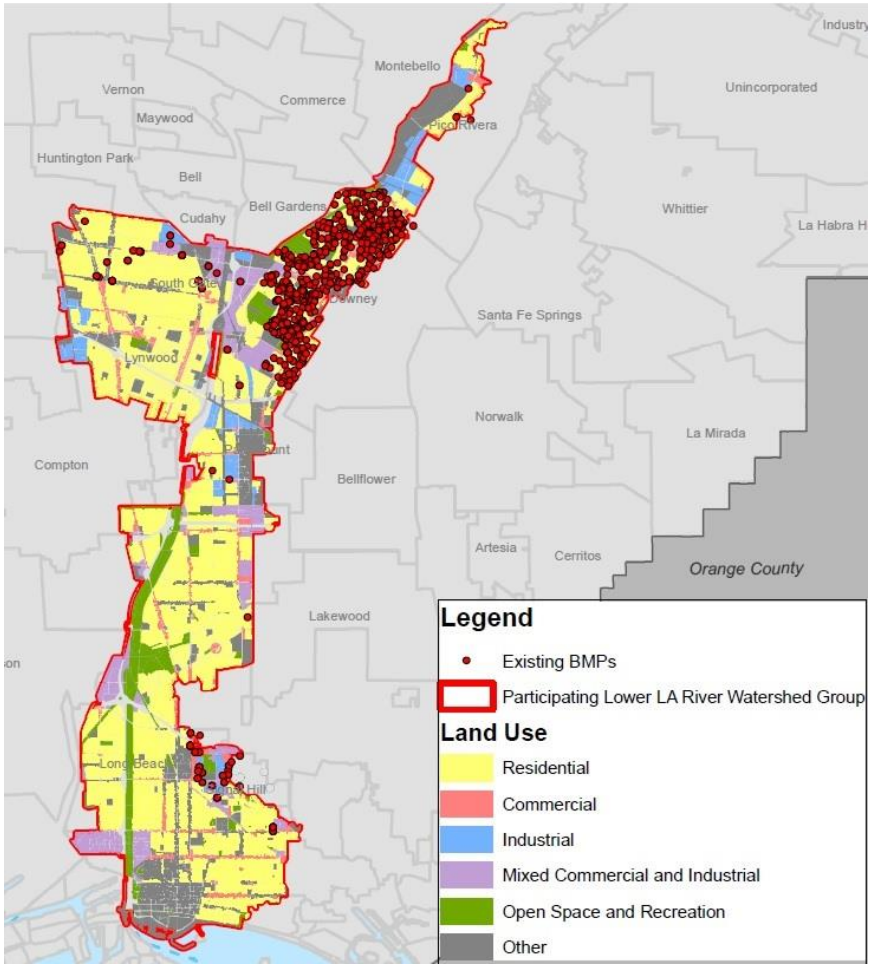


Figure 3-16: Locations of Existing Structural BMPs

A summary of the Hollydale Regional and Circle Parks project is as follows:

HOLLYDALE REGIONAL AND CIRCLE PARKS – STATUS: COMPLETED IN 2013

The Hollydale Regional and Circle Parks were developed adjacent to the Los Angeles River in the city of South Gate in 2013. The parks include vegetated swales which treat stormwater runoff and runon. Since the project was recently completed in 2013, it is expected that the environmental benefits for this project have not yet been observed in past monitoring.

3.4.3.4 PLANNED TARGETED CONTROL MEASURES

The projects listed below have been planned to some extent by the Participating Agencies. A literature review was conducted of existing TMDL Implementation Plans, the existing IRWMP, and other planning documents to collect data. The extent of planning of these projects ranges from a roundtable discussion to being in preliminary phases of design.

CHITTICK FIELD PARK - STATUS: TRASH CAPTURE SYSTEMS INSTALLED

This park is located in the city of Long Beach at 1900 Walnut Avenue. The site is already equipped with a large number of full-capture trash systems. The park is located in a relatively flat area with a large surrounding developed area. The site is approximately 19.9 acres and in periods of heavy rainfall, it already functions as a detention basin.

Additional features under consideration, according to the IRWMP, include replacing the concrete lined "low flow" swales with vegetated swales for biofiltration, construction of a new underground "low flow" pipe network to convey treated water to the basin pump station, and replacing the existing pump station with a new low flow pump station.

Although not yet planned, this location is also seen to have potential for a future regional BMP. Assuming the entire site were enhanced to incorporate infiltration, the maximum area for which stormwater runoff could be diverted to the park is 289 acres, totaling the maximum potential design capture volume to be 23.8 acre-feet. Alternatively, the operations of the pump station will be investigated to determine if the site could be used for enhanced detention (enabling particular pollutants additional time to settle out).

Multi-Agency, Multi-Watershed Project to Incorporate Low Impact Development (LID) BMPs into Major Transportation Corridors in the Gateway Region of Los Angeles

(Gateway Prop 84 Project - **Grant Application Approved**)

This project is a planned regional project within multiple cities to include the cities of Bell Gardens, Downey, Pico Rivera, Paramount, South Gate, and Lynwood. The Gateway Water Management Authority (GWMA) applied for funds through the Prop 84 Grant Round 2 program to put towards this project, which was approved in May 2014. The project is in the design phase.

The project seeks to prevent stormwater contamination of surface waters in three watersheds, to include the Los Angeles River. This will be accomplished by installing LID BMPs to treat stormwater runoff, and its associated pollutants. Table 3-12 lists the BMPs to be implemented within the Cities and Figures 3-17 to 3-23 show the project locations within each city.

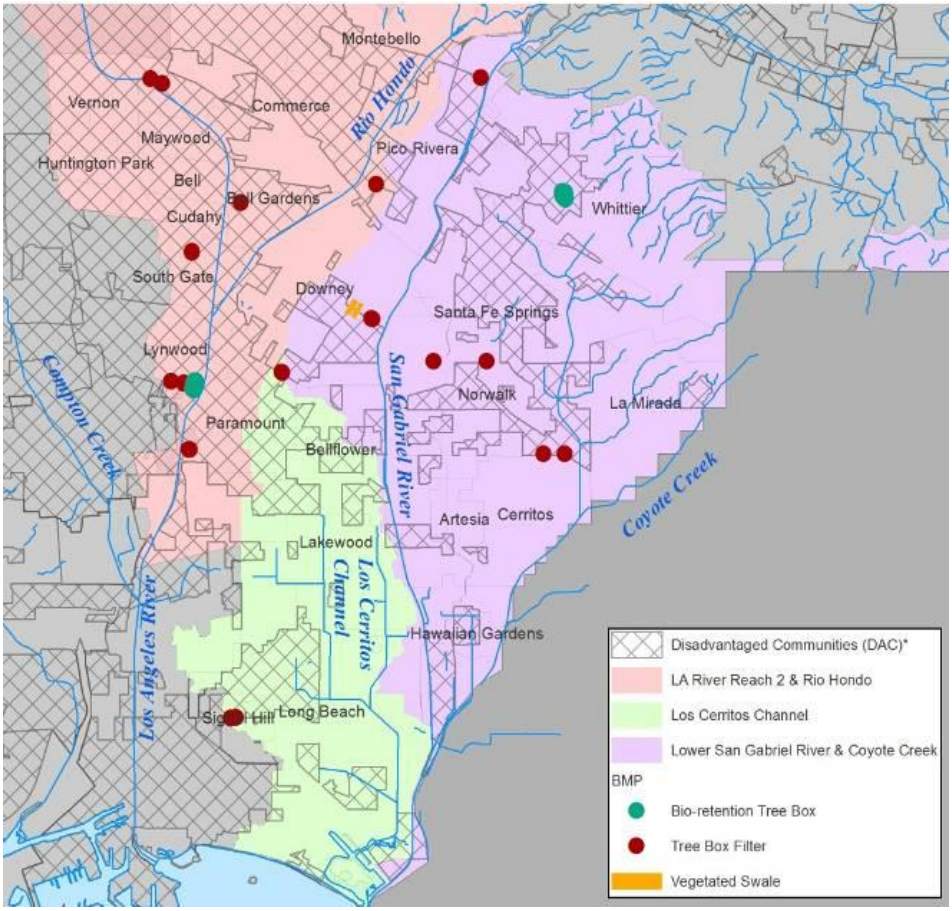


Figure 3-17: BMP Locations within the Gateway Prop 84 Project

Table 3-12: Proposed BMPs within the Gateway Prop 84 Project

City	LID BMPs	Location	Anticipated Treatment Volume[17]
Bell Gardens	(10) Bioretention Tree Wells	Locations to be determined	5,870 cf
	(3) Tree box filters	(1) Clark Street at Atlantic Avenue, (2) Clark Street at Wright Road	21,774 cf
Downey	(2) Tree box filters	(2) Alondra Boulevard west of Hunsaker Avenue	14,516 cf
Pico Rivera	(1) Tree box filters	(1) Slauson Avenue and Paramount Boulevard	7,258 cf
Paramount	(2) Tree box filters	(2) Alondra Boulevard west of Hunsaker Avenue	14,516 cf
South Gate	(2) Tree box filters	(2) Firestone Boulevard and Atlantic Avenue	14,516 cf
Lynwood	(2) Tree box filters	(2) Firestone Boulevard and Atlantic Avenue	14,516 cf

[17] Treatment volume calculations based on a 24-hour, 0.75 in storm, 6x6 tree box filter units and a 1200 LF swale.

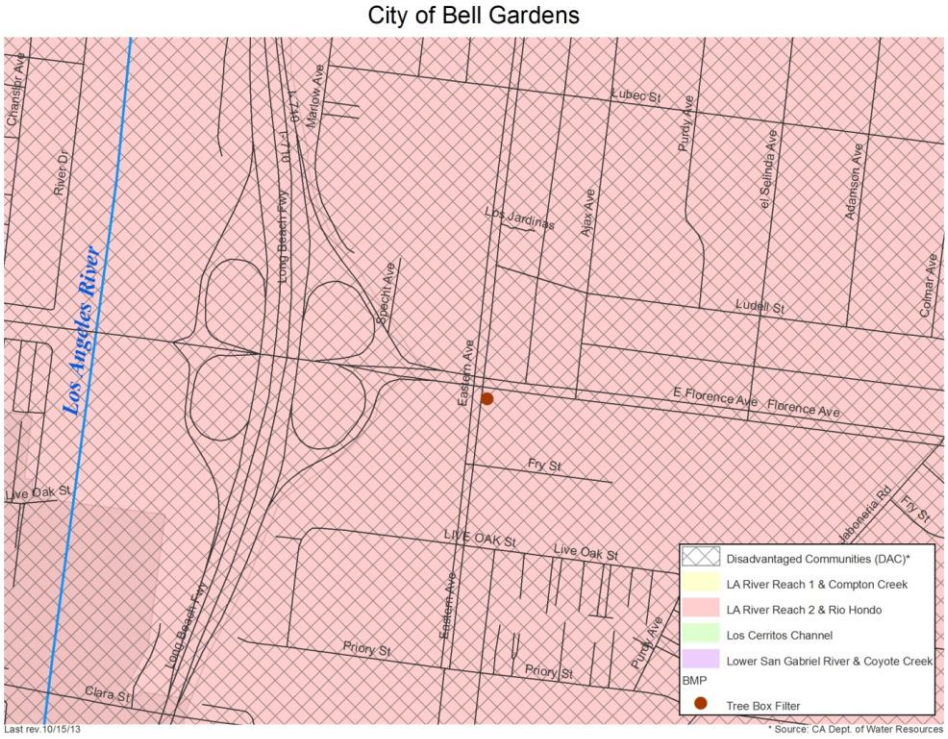


Figure 3-18: Gateway Prop 84 Project BMP locations proposed for the city of Bell Gardens

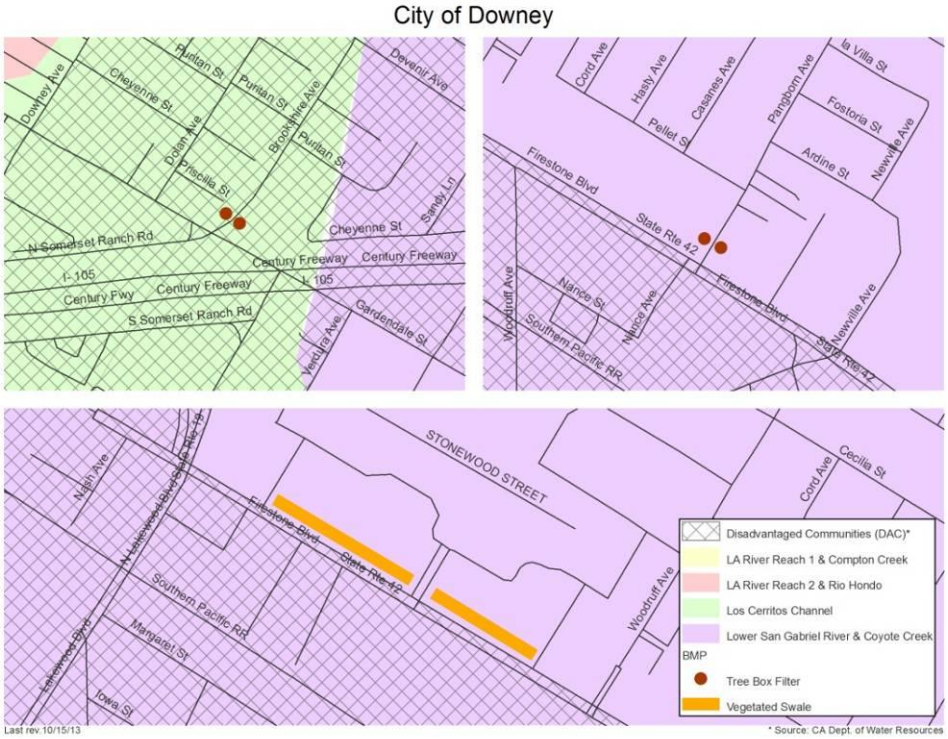


Figure 3-19: Gateway Prop 84 Project BMP locations proposed for the city of Downey

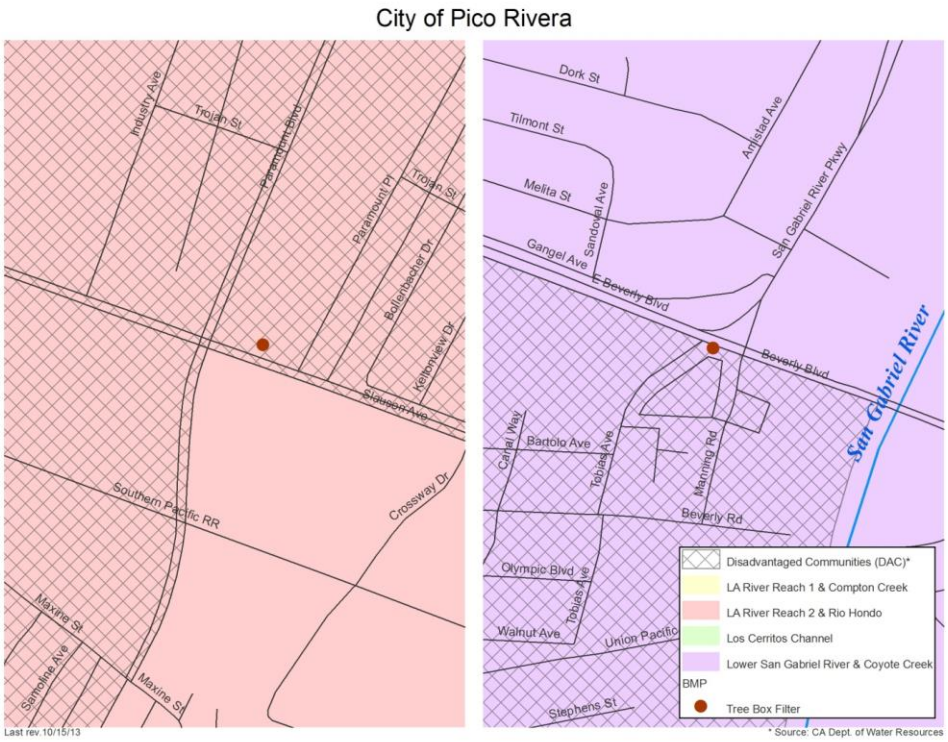


Figure 3-20: Gateway Prop 84 Project BMP locations proposed for the city of Pico Rivera

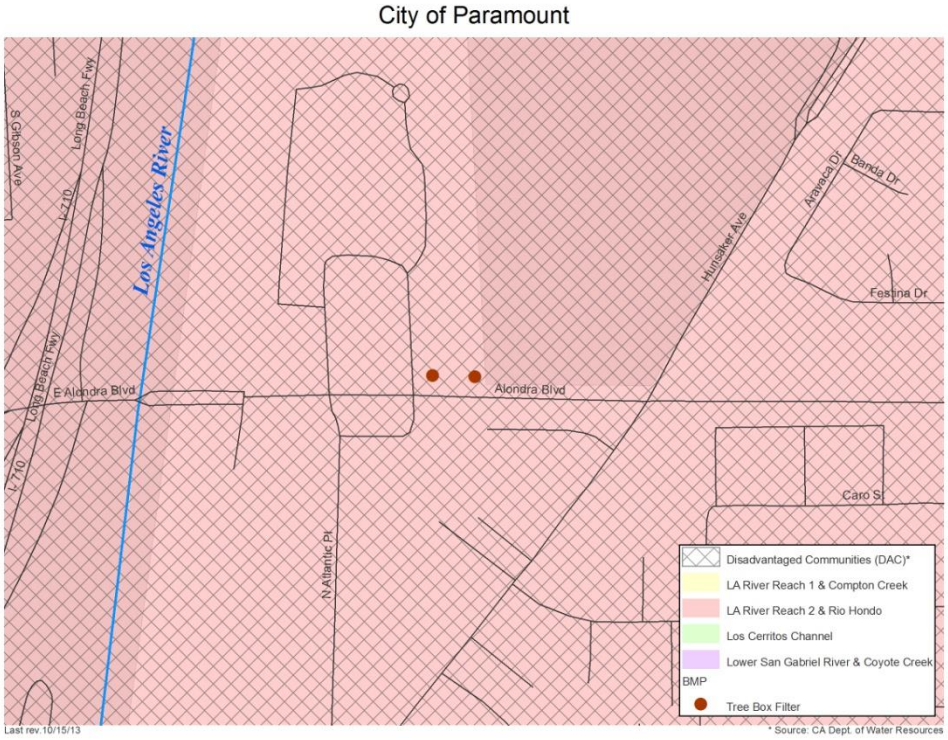


Figure 3-21: Gateway Prop 84 Project BMP locations proposed for the city of Paramount

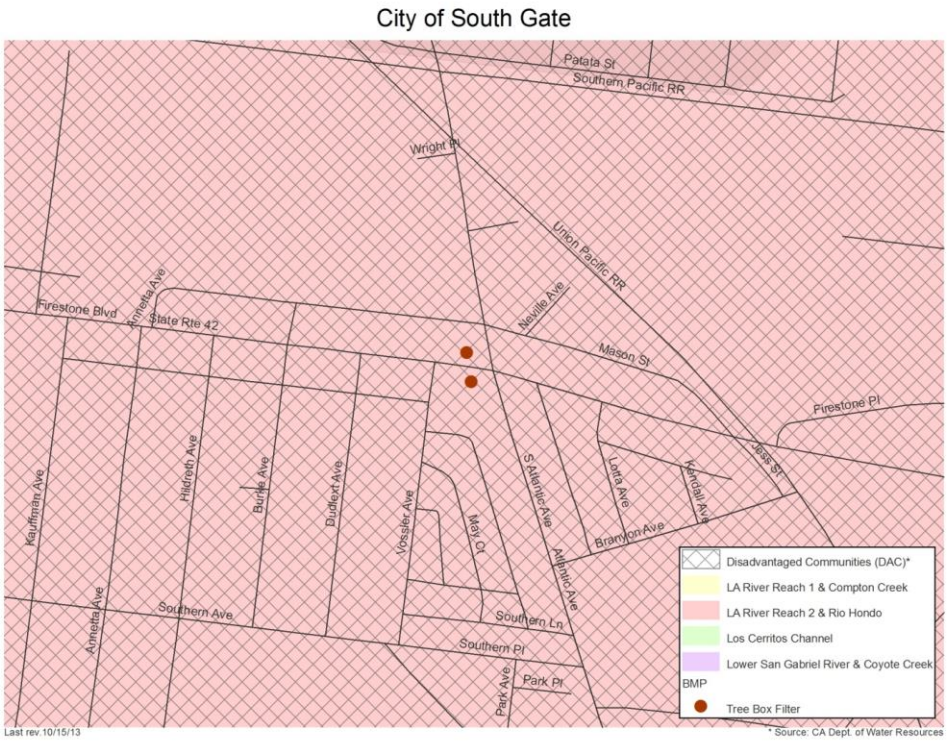


Figure 3-22: Gateway Prop 84 Project BMP locations proposed for the city of South Gate

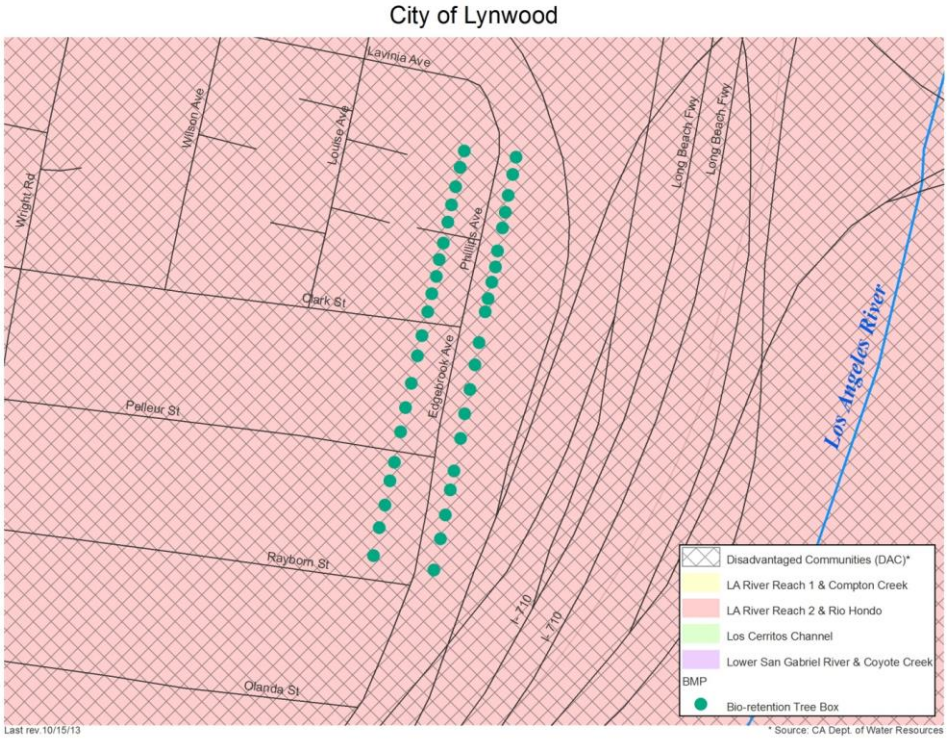


Figure 3-23: Gateway Prop 84 Project BMP locations proposed for the city of Lynwood

IRWMP Projects

The following project descriptions are from the Gateway Integrated Regional Watershed Management Plan (IRWMP). These projects have been discussed in detail with the Gateway Water Management Authority (GWMA) and are likely to be implemented once the required funding is acquired. Further details about each project can be found in the Gateway IRWMP documents.

Long Beach Municipal Urban Stormwater Treatment (MUST)Facility

This project would intercept and treat nonstormwater and initial stormwater (first flush) runoff flows for the cities of Long Beach, Signal Hill, Lynwood, and South Gate. After treatment, water would be recycled for irrigation use along the 710 Freeway and parks along the vicinity of the 710 Freewaywill serve the cities of . The facility will be located along the Drake-Chavez Greenbelt, southeast of the Shoemaker Bridge. The project proposes to treat water from 2,956 drainage acres from Major Basins No 2 & No 4 during Phase 1, 3,770 drainage acres from Major Basin No 3 during Phase 2, and possible additional drainage acres from Major Basin 10 in future expansions. The project would have the capacity to treat approximately 436,000 gallons of nonstormwater per day and store an additional 500,000 gallons. It is possible that further expansion could include capacity to treat and store stormwater from other regional areas. This project will contribute to improving water quality in the Lower Los Angeles River.

Fernwood Water Improvement Park

The Fernwood Water Improvement Park is a multi-benefit project that serves disadvantaged communities in the city of Lynwood while meeting IRWMP water management objectives. The project site is currently an empty 6.5 acre lot owned by the city of Lynwood located on a long stretch along Fernwood Avenue, between Atlantic Avenue and Long Beach Boulevard. The park will feature stormwater improvement elements such as infiltration areas and vegetated swales. The project also includes native shrubs and trees that will increase habitat for birds, butterfly species and mammals.

Construct Bioswales/Landscaping in various locations in Long Beach

This project will construct and/or reconstruct new and existing medians within the city of Long Beach to capture and treat stormwater runoff. The specific locations have not yet been identified; therefore, as this project progresses the RAA results will be taken into consideration in order to place the BMPs in locations with the highest potential for pollutant reduction.

Firestone Boulevard Median Project

This project is located in the city of South Gate and will enhance the Firestone corridor by installing a landscaped median that will utilize recycled water to irrigate the landscape. A reverse swale would also allow for stormwater runoff capture.

Tree Well Dry Weather Runoff and First Flow Stormwater Capture/TMDL Project

This project will be located within the city of South Gate and will consist of the installation of tree wells designed to capture dry weather flows and first storm flows in tree wells along the curb before the flow reaches the storm drain.

Pilot Plant for Treatment of Los Angeles River Water

This project is proposed in the city of Long Beach. This project will provide a skid mounted treatment train capable of treating 20 GPM of water within the Los Angeles River and the engineering support to confirm the effluent will be suitable for potable use. The Pilot Plant is to be installed near West Del Amo Boulevard and Oregon Avenue. The pilot plant will be in operation for 4 months with the option to increase the time of study to 24 months after review of initial data.

LAR Estuary Bacteria TMDL - Southwest Area Low Flow Diversion

This project will construct a system that will divert low stormwater flows from an existing storm drain outfall that services approximately 40% the Los Angeles River watershed located within the city of Signal Hill's boundaries directly into the Alamitos Sanitary Sewer Lift Station for eventual treatment by the Los Angeles County Sanitation District. This project will prevent nonstormwater flows and "first flush" storm flows from ultimately being emptied into the Hamilton Bowl Stormwater Retention facility and ultimately pumped into the Los Angeles River Estuary. This project contributes to the Gateway IRWMP Goal and Objective of protecting and enhancing water quality through the attainment of required TMDL levels in accordance with State Water Quality Control Board MS4 Permit requirements. This project is anticipated to cost approximately $1.7 million with an annual operations and maintenance cost of $200,000 per year.

LAR Estuary Bacteria TMDL - Southeast Area Low Flow Diversion

This project will construct a system that will divert low stormwater flows from an existing storm drain outfall that services approximately 50% the Los Angeles River watershed located within the city of Signal Hill's boundaries directly into the sanitary collection main for eventual treatment by the Los Angeles County Sanitation District. This project will prevent summer nonstormwater flows and "first flush" storm low flows from being emptied into the Hamilton Bowl Stormwater Retention facility and ultimately pumped into the Los Angeles River Estuary. This project contributes to the Gateway IRWMP Goal and Objective of protecting and enhancing water quality through the attainment of required TMDL levels in accordance with State Water Quality Control Board MS4 Permit requirements. This project is anticipated to cost approximately $1.7 million with an annual operations and maintenance cost of $200,000 per year.

Cha'wot Open Space Preservation and Stormwater Runoff Reduction

Located in the city of Signal Hill, this project proposes the purchase of available open space in the northerly hilltop area of Signal Hill to preserve existing nature and wildlife; provide walking, hiking, and recreational opportunities; naturally reduce stormwater runoff by preserving undeveloped open space; reduce the demand for potable water by reducing the amount of land available for development.

The details of this project do not currently incorporate water quality improvement strategies; however, it is recognized as a potential location for regional BMPs.

3.4.3.5 POTENTIAL SITES FOR FUTURE TARGETED CONTROL MEASURES

A preliminary assessment has been performed for the Lower LAR Watershed to determine potential areas to locate regional BMPs. This was done with a preliminary GIS approach by screening areas within 660 feet (1/8 mile) of a waterbody and currently designated as open space as well as other potentially useful zoning designations. The overall size of each site was used to calculate the maximum amount of volume which could be stored at the site and the maximum amount of area that could be diverted to the site assuming the entire site were redeveloped to incorporate infiltration.

The equations used were derived from the Orange County Technical Guidance Document (OC TGD)[18] and can be found below:

$$\mathbf{DCV = CdA_{TRIBUTARY} \times \left(\frac{43560}{12}\right)}$$

Driving Equation No. 1

$$D_{MAX} = K_{DESIGN} T \times \left(\frac{1}{12}\right)$$

Assume K_{DESIGN} = 0.3 in/hr

0.3 in/hr is the lowest infiltration rate where infiltration is deemed feasible per the MS4 Permit.

$$D_{MAX} = 0.3 \times 48 \times \frac{1}{12} = 1.2 \text{ feet}$$

$$A_{BMP} = \frac{DCV}{D_{MAX}}$$

$$\mathbf{A_{TRIBUTARY} = \frac{A_{BMP} \times 1.2}{Cd \times \left(\frac{43560}{12}\right)}}$$

Driving Equation No. 2

$$C = (0.75 \times IMP) + 0.15 = 0.9$$

Assume 100% imperviousness

Assume d=1.1

1.1 inches is the highest depth on the LA County 85th Percentile Isohyetal Map for the watershed.

$$\mathbf{A_{TRIBUTARY} = \frac{A_{BMP} \times 1.2}{0.9 \times 1.1 \times \left(\frac{43560}{12}\right)}}$$

Final Equation No. 1

$$\mathbf{DCV = A_{BMP} \times 1.2}$$

Final Equation No. 2

A_{BMP} has been assumed to be the total site area to determine the maximum tributary area that can be diverted to the site and the maximum volume the site can treat.

Where:

DCV:	Design Capture Volume	$A_{TRIBUTARY}$:	Area Tributary to BMP	T:	Drawdown Time
C:	Runoff Coefficient	D_{MAX}:	Maximum Effective Depth	A_{BMP}:	Footprint Area of BMP
d:	Rainfall Depth	K_{DESIGN}:	Design Infiltration Rate	IMP:	Percent Impervious

[18] Orange County. Technical Guidance Document for the Preparation of Conceptual/Preliminary and/or Project Water Quality Management Plans (WQMPs). May 19, 2011.

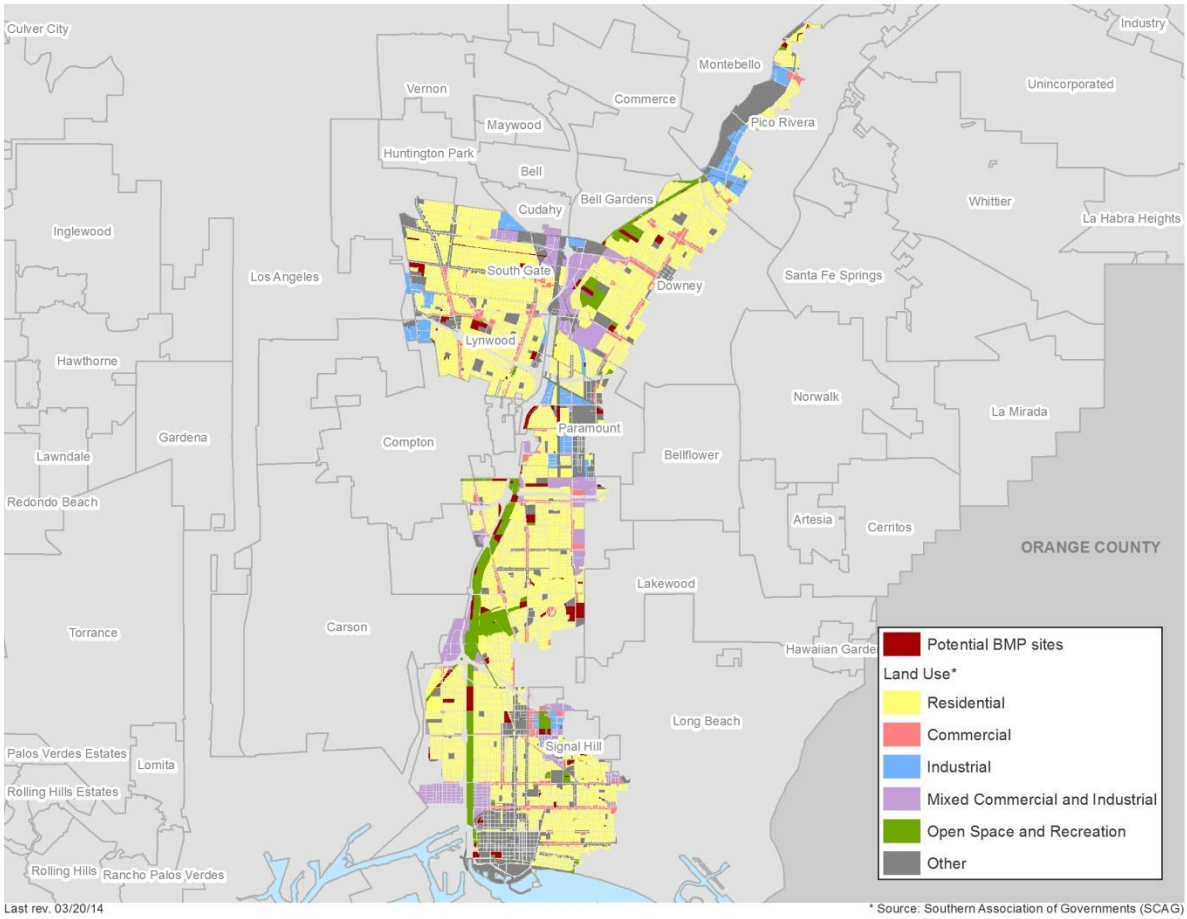


Figure 3-24: Potential Sites for Future Structural BMPs

Figure 3-24 and Table 3-13 indicate the locations of sites potentially available for future regional BMPs. These locations can serve as a starting point during the implementation phase of the WMP. They have been grouped by jurisdiction and listed in order by land use. The land use with the highest accessibility is listed first. Within each land use designation, the sites have been listed from largest to smallest. Note that with regional BMPs there are opportunities for multiple agencies to benefit from the same site. The land uses are ranked as follows:

OPEN SPACE AND RECREATION: Sites designated for open space, parks, and recreational activities were ranked with the highest potential for future regional BMPs. The reasoning being that these types of areas have the highest likeliness to be publically owned and not require land acquisition, generally have a high percentage of landscaped area available, and have a high opportunity for multiple benefits.

EDUCATIONAL USE: Sites designated for educational use were ranked with the second highest potential for future regional BMPs. The reasoning being that these types of areas although not city-

owned could have an easier land acquisition process than privately owned land, generally have a high percentage of landscaped area available, and have a high opportunity for multiple benefits.

GOVERNMENT INSTITUTION[19]: Sites designated for educational use were ranked with the third highest potential for future regional BMPs. This is due to the institution being government owned presenting a higher chance of collaboration than a privately owned facility. Although this may be the case, many government institutions may not be willing to take on maintenance responsibilities which would result in the necessity of land acquisition or maintenance agreements.

GOLF COURSES/COUNTRY CLUBS: Sites designated for golf courses or country clubs were ranked with the fourth highest potential for future regional BMPs. The reasoning being that these types of areas generally have a high percentage of landscaped area available and have a high opportunity for multiple benefits. Although this may be the case, land acquisition for these sites is expected to be a difficult accomplishment.

COMMERCIAL USE: Sites designated for commercial areas were ranked with the fifth highest potential for future regional BMPs. The reasoning being that these types of areas generally have a high percentage of parking area available which could potentially be retrofitted for infiltration opportunities. Although this may be the case, land acquisition for these sites is expected to be a difficult accomplishment.

The available sites will be further assessed to determine the best location for a regional BMP. Note that the sites presented do not represent the only sites available for the Watershed Group. The ultimate site selection process should take into account the following characteristics:

LOCATION IN RELATION TO RAA RESULTS: The RAA provides an estimation of runoff reduction to be provided in each area in order to meet the water quality objectives. The sites should be selected taking this into consideration.

GIS DATA: GIS data should be further analyzed to screen projects based on criteria such as land use, topography, hydrologic features, streets and roads, existing storm drain infrastructure, and storm drain invert depth.

PROJECT BENEFITS: It is preferred that a project contains multiple benefits in order to increase the overall benefit and support for the project. Benefits to take into consideration include, but are not limited to, the following:

- Water quality benefits
- Water supply benefits
- Recreational use
- Multi-agency benefits
- Publically owned

[19] This land use is not in the current potential site list; however, it was included for future reference in the case that additional locations are gathered during the implementation or adaptive management process.

- Storage availability
- Funding available
- Project readiness
- Flood control benefits
- Proximity to pollutant sources or impaired waters
- Adjacent to existing storm drain

PROJECT CONSTRAINTS: Not every project will be feasible; therefore, it is important to take into consideration any constraints that may result in project infeasibility. These constraints include, but are not limited to, the following:

- High groundwater
- Low infiltration rates
- Existing soil contamination/proximity to existing soil contamination
- Brownfields[20]
- Existing groundwater contamination/proximity to existing groundwater contamination
- Potential for soil instability (liquefaction zones, hillside areas)
- Existing private ownership (requires land acquisition)
- Cost Effectiveness
- Historical landmarks

[20] With certain legal exclusions and additions, the term "brownfield site" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant (*Environmental Protection Agency*).

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Downey	Open Space & Recreation	Furman Park	10419 Rives Ave.	33.9534	-118.1375	13.8	200	16.5
		open space	Guatemala Ave.	33.9681	-118.1283	13.4	195	16.1
		Apollo Park	12544 Rives Ave.	33.9267	-118.1546	11.0	160	13.2
		open space	Guatemala Ave.	33.9622	-118.1401	9.1	133	10.9
		open space	Sherry Ave.	33.9592	-118.1459	4.2	62	5.1
		Crawford Park	7000 Dinwiddie St.	33.9523	-118.1575	2.2	32	2.6
	Educational Use	Middle School	Excluded for privacy			22.0	320	26.4
		High School	Excluded for privacy			17.5	254	21.0
		Middle School	Excluded for privacy			14.9	217	17.9
		Elementary School	Excluded for privacy			7.2	105	8.7
		Elementary School	Excluded for privacy			6.4	93	7.7
		Elementary School	Excluded for privacy			6.1	89	7.3
		Elementary School	Excluded for privacy			5.8	85	7.0
		Elementary School	Excluded for privacy			4.8	70	5.8
		Elementary School	Excluded for privacy			2.1	30	2.5
	Golf Courses/ Country Clubs	Golf Course	Excluded for privacy			121.4	1,765	146
		Golf Club	Excluded for privacy			100.0	1,455	120
Lakewood	Open Space & Recreation	Cherry Cove Park	5159 Meadow Wood Ave.	33.8502	-118.1657	3.0	43	3.5
Long Beach	Open Space & Recreation	open space	710 Fwy	33.8669	-118.1958	46.3	674	55.6
		open space	710 Fwy	33.8536	-118.2036	40.9	595	49.1
		Houghton Park	6301 Myrtle Ave.	33.8695	-118.1838	23.3	338	27.9
		Scherer Park	4600 Long Beach Blvd.	33.8436	-118.1865	21.5	313	25.8
		open space	S. Sportsman Dr.	33.8804	-118.1906	16.3	237	19.5
		Veterans Memorial Park	101 E. 28th St.	33.8096	-118.1922	14.3	208	17.2
		open space	E. 208th St.	33.8425	-118.2049	14.2	206	17.0
		open space	Harbor St.	33.8193	-118.2168	14.1	205	16.9

[21] These numbers were generated using the Los Angeles County GIS Data Portal website (http://egis3.lacounty.gov/dataportal/) and the LA County Department of Public Works Spatial Information Library website (http://dpw.lacounty.gov/general/spatiallibrary/index.cfm?agree=agree). All areas may not be usable space for BMP retrofits.

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach	Open Space & Recreation	Hudson Park	2335 Webster Ave.	33.798	-118.2202	12.5	182	15.0
		Admiral Kidd Park	2125 Santa Fe Ave.	33.7958	-118.2156	11.0	160	13.2
		Silverado Park	1545 W. 31st St.	33.8146	-118.2132	10.5	153	12.6
		Wrigley Greenbelt	DeForest Ave. (Willow to 34th)	33.8153	-118.2055	10.0	145	11.9
		Cherry Park	1901 East 45th St.	33.8395	-118.1688	9.9	145	11.9
		open space	Inez St.	33.8796	-118.1796	9.5	138	11.4
		open space	Oregon Ave.	33.842	-118.2007	9.5	138	11.4
		open space	Lime Ave.	33.8796	-118.1836	8.3	120	9.9
		Coolidge Park	352 E. Neece St.	33.8722	-118.195	7.2	104	8.6
		Lincoln Park (Civic Center)	Pacific Ave. & Broadway St.	33.7684	-118.1955	7.0	101	8.4
		Martin Luther King Jr. Park	1950 Lemon Ave.	33.7926	-118.1769	6.8	98	8.1
		Santa Cruz Park	Cedar Ave. to Golden Ave.	33.7683	-118.2032	6.4	92	7.6
		Los Cerritos Park	3750 Del Mar Ave.	33.8267	-118.1994	6.2	90	7.4
		Drake Park	951 Maine Ave.	33.7785	-118.2018	6.0	87	7.1
		open space	E. 69th St.	33.8795	-118.1592	5.7	83	6.9
		Golden Park	Shoreline Dr.	33.7713	-118.2035	5.7	83	6.8
		open space	Baltic Ave.	33.8224	-118.2138	5.7	82	6.8
		Atlantic Plaza Park	1000 Via Wanda	33.8501	-118.1832	5.4	78	6.4
		Bixby Knolls Park	1101 San Antonio Dr.	33.8406	-118.1791	4.3	62	5.1
		Camp	Excluded for privacy	3.6	53	4.4		
		MacArthur Park	1321 Anaheim St.	33.7835	-118.1747	3.3	48	3.9
		open space	E. 72nd St.	33.8842	-118.1871	3.1	45	3.7
		Orizaba Park	1435 Orizaba Ave.	33.7851	-118.1579	2.7	39	3.2
		Jackson Park	1432 Jackson St.	33.8515	-118.1723	2.1	31	2.5
		open space	Caspian Ave.	33.8236	-118.2123	1.6	24	2.0
		Tanaka Park	1400 W. Wardlow Rd.	33.8235	-118.2134	1.4	20	1.7
		open space	Arlington St.	33.821	-118.215	1.2	17	1.4

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach	Open Space & Recreation	McBride Park (Cal Rec Center)	1550 Martin Luther King Ave.	33.7867	-118.1803	1.0	15	1.2
		Rose Park	8th St. & Orizaba Ave.	33.7772	-118.1568	0.8	11	0.9
	Educational Use	High School	Excluded for privacy			16.6	241	19.9
		High School	Excluded for privacy			14.0	204	16.8
		Middle School	Excluded for privacy			10.3	150	12.4
		Middle School	Excluded for privacy			10.2	148	12.2
		High School	Excluded for privacy			9.3	135	11.1
		Elementary School	Excluded for privacy			8.2	119	9.8
		Middle School	Excluded for privacy			8.0	116	9.6
		Elementary School	Excluded for privacy			6.4	92	7.6
		Elementary School	Excluded for privacy			6.3	91	7.5
		Middle School	Excluded for privacy			6.2	90	7.4
		School	Excluded for privacy			5.2	76	6.3
		Elementary School	Excluded for privacy			5.0	73	6.0
		School	Excluded for privacy			4.8	71	5.8
		Elementary School	Excluded for privacy			4.5	66	5.4
		Elementary School	Excluded for privacy			4.1	60	5.0
		Elementary School	Excluded for privacy			3.8	55	4.5
		Elementary School	Excluded for privacy			3.7	54	4.5
		Elementary School	Excluded for privacy			3.6	52	4.3
		Elementary School	Excluded for privacy			3.4	50	4.1
		Middle School	Excluded for privacy			3.1	45	3.8
		School	Excluded for privacy			3.1	45	3.7
		Elementary School	Excluded for privacy			2.9	42	3.5
		Elementary School	Excluded for privacy			2.6	37	3.1
		Elementary School	Excluded for privacy			2.6	37	3.1
		Elementary School	Excluded for privacy			2.4	35	2.9
		Elementary School	Excluded for privacy			2.1	30	2.5
		Middle School	Excluded for privacy			2.0	29	2.4
		Elementary School	Excluded for privacy			1.9	28	2.3

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach	Educational Use	Elementary School	Excluded for privacy			1.8	26	2.1
		School	Excluded for privacy			1.7	25	2.1
		Elementary School	Excluded for privacy			1.7	25	2.0
		Elementary School	Excluded for privacy			1.5	22	1.8
		Elementary School	Excluded for privacy			1.5	22	1.8
		Elementary School	Excluded for privacy			1.2	18	1.5
		High School	Excluded for privacy			1.1	15	1.3
		Academy	Excluded for privacy			0.7	10	0.8
	Golf Course/ Country Club	Country Club	Excluded for privacy			178.9	2,603	215
Lynwood	Open Space & Recreation	Lynwood City Park	11301 Bullis Rd.	33.9276	-118.203	10.0	145	12.0
		Yvonne Burke-John D. Ham Park	11832 Atlantic Ave.	33.9137	-118.1901	8.7	127	10.4
		Lynwood Meadows Park	State St. & Cedar Ave.	33.9227	-118.2189	1.5	21	1.8
		Rose Park	Flower St. & State St.	33.9263	-118.2178	1.5	21	1.7
		park	El Segundo Blvd.	33.9176	-118.2149	1.3	19	1.6
		Carnation Park	Los Flores Blvd. & State St.	33.9322	-118.2162	1.2	18	1.5
		open space	Atlantic Ave.	33.9134	-118.191	0.9	13	1.1
		park	El Segundo Blvd.	33.9177	-118.2135	0.8	12	1.0
	Educational Use	Lugo Park	Cortland St.	33.9185	-118.1828	5.1	74	6.1
		Lynwood High	Excluded for privacy			14.8	215	17.7
		Lynwood Middle	Excluded for privacy			7.6	111	9.1
		Marco Antonio Firebaugh High	Excluded for privacy			6.3	91	7.5
		Chavez Middle	Excluded for privacy			4.1	60	4.9
		Mark Twain Elementary	Excluded for privacy			3.8	55	4.5
		Lindbergh Elementary	Excluded for privacy			3.4	50	4.1
		Abbott Elementary	Excluded for privacy			3.1	46	3.8

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Lynwood	Educational Use	Will Rogers Elementary	Excluded for privacy			3.1	44	3.7
		Rosa Parks Elementary	Excluded for privacy			2.8	40	3.3
		Roosevelt Elementary	Excluded for privacy			2.7	39	3.2
		Hosler Middle	Excluded for privacy			2.5	37	3.0
		Wilson Elementary	Excluded for privacy			2.2	32	2.6
		Marshall Elementary	Excluded for privacy			2.1	31	2.5
		Helen Keller Elementary	Excluded for privacy			2.1	30	2.5
		Vista High	Excluded for privacy			1.9	28	2.3
		Washington Elementary	Excluded for privacy			1.5	21	1.8
		Lugo Elementary	Excluded for privacy			1.3	18	1.5
		Lincoln Elementary	Excluded for privacy			0.9	14	1.1
		Lynwood Community Adult	Excluded for privacy			0.9	13	1.1
	Commercial Use	Plaza	Excluded for privacy			11.89	173	12
Paramount	Open Space & Recreation	Ralph C. Dills Park	6500 San Juan St.	33.9001	-118.1843	14.9	217	17.9
		Paramount Park	14400 Paramount Blvd.	33.9018	-118.159	12.5	182	15.0
		Spane Park	14400 Gundry Ave.	33.9029	-118.1759	4.4	64	5.3
		Village Skate Park	7718 Somerset Blvd.	33.8959	-118.1649	0.7	10	0.9
		Meadows Park	15753 Gundry Ave.	33.8895	-118.1751	0.7	9	0.8
		open space	Somerset Blvd.	33.8965	-118.1837	0.4	5	0.4
	Educational Use	Elementary School	Excluded for privacy			8.1	117	9.7
		School	Excluded for privacy			4.3	62	5.1
		Elementary School	Excluded for privacy			3.3	49	4.0
		Elementary School	Excluded for privacy			3.2	46	3.8
		School	Excluded for privacy			2.8	41	3.4
		School	Excluded for privacy			2.0	30	2.5

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Paramount	Educational Use	High School	Excluded for privacy			1.8	27	2.2
		Elementary School	Excluded for privacy			1.7	25	2.1
		Elementary School	Excluded for privacy			1.5	21	1.8
Pico Rivera	Open Space & Recreation	Rio Hondo Park	8421 San Luis Potosi Pl.	34.0119	-118.0921	11.9	172	14.2
		park	Calico Ave.	34.0175	-118.084	1.4	21	1.7
	Educational Use	open space	Cope Dr.	34.0147	-118.087	3.1	45	3.8
		Elementary School	Excluded for privacy			2.0	29	2.4
Signal Hill	Open Space & Recreation	Signal Hill Park	2175 Cherry Ave.	33.7963	-118.1693	6.9	100	8.2
		Hillbrook Park	1865 Temple Ave.	33.7911	-118.1593	0.5	7	0.6
		Calibrisas Park	2451 California Ave.	33.8017	-118.1809	0.5	7	0.5
		Raymond Arbor Park	1881 Raymond Ave.	33.7912	-118.1647	0.3	5	0.4
	Educational Use	Middle School	Excluded for privacy			7.4	108	8.9
		Elementary School	Excluded for privacy			6.5	95	7.9
		Elementary School	Excluded for privacy			3.9	57	4.7
South Gate	Open Space & Recreation	South Gate Park	4900 Southern Ave.	33.9442	-118.1866	72.8	1,059	87.4
		Circle Park & open space	10129 Garfield Ave.	33.9398	-118.1672	32.3	469	38.7
		Cesar Chavez Park	2541 Southern Ave.	33.9535	-118.2265	4.0	58	4.8
		Hollydale Community Park	12221 Industrial Ave.	33.9158	-118.1642	1.3	19	1.6
		Triangle Park	Southern Ave. & Atlantic Blvd.	33.9459	-118.1805	0.8	11	0.9
		Stanford Park	2715 Illinois Ave.	33.9516	-118.2222	0.7	11	0.9
		Hollydale Regional Park	5400 Monroe Ave.	33.9216	-118.1748	29.7	431	35.6
		Middle School	Excluded for privacy			20.7	301	24.9
		Learning Center	Excluded for privacy			15.1	220	18.1

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
South Gate	Educational Use	High School	Excluded for privacy			11.2	163	13.4
		High School	Excluded for privacy			10.0	145	12.0
		Middle School	Excluded for privacy			7.3	106	8.7
		Middle School	Excluded for privacy			6.0	87	7.2
		Elementary School	Excluded for privacy			3.3	49	4.0
		Elementary School	Excluded for privacy			3.3	48	4.0
		Elementary School	Excluded for privacy			2.6	38	3.2
	Educational Use	Elementary School	Excluded for privacy			2.4	36	2.9
		Elementary School	Excluded for privacy			2.1	30	2.5
		Elementary School	Excluded for privacy			2.0	29	2.4
		Elementary School	Excluded for privacy			1.9	28	2.3
		Elementary School	Excluded for privacy			1.8	26	2.1
		Elementary School	Excluded for privacy			1.3	19	1.6
		Elementary School	Excluded for privacy			1.3	19	1.6
		Elementary School	Excluded for privacy			1.1	16	1.3
		Elementary School	Excluded for privacy			0.9	13	1.1
		Continuation School	Excluded for privacy			0.2	3	0.3

3.4.4 RIGHT-OF-WAY BEST MANAGEMENT PRACTICES

Right-of-way BMPs are systems of multiple distributed BMPs placed within a street right-of-way. These BMPs are designed to reduce the volume of stormwater discharge into the MS4 and treat stormwater runoff from adjacent streets and developments. Common right-of-way BMPs include bioretention, biofiltration, and permeable pavement. See Section 3.3.2 for BMP descriptions. These BMPs can be implemented alone or in conjunction with one another.

A preliminary assessment has been performed to assess areas potentially available for right-of-way BMPs. This was done with a preliminary GIS approach by screening highways, arterial roads, and secondary (collector) roads located in non-residential areas within 200 feet of a catch basin location. The potential locations are indicated with grey circles on Figure 3-25.

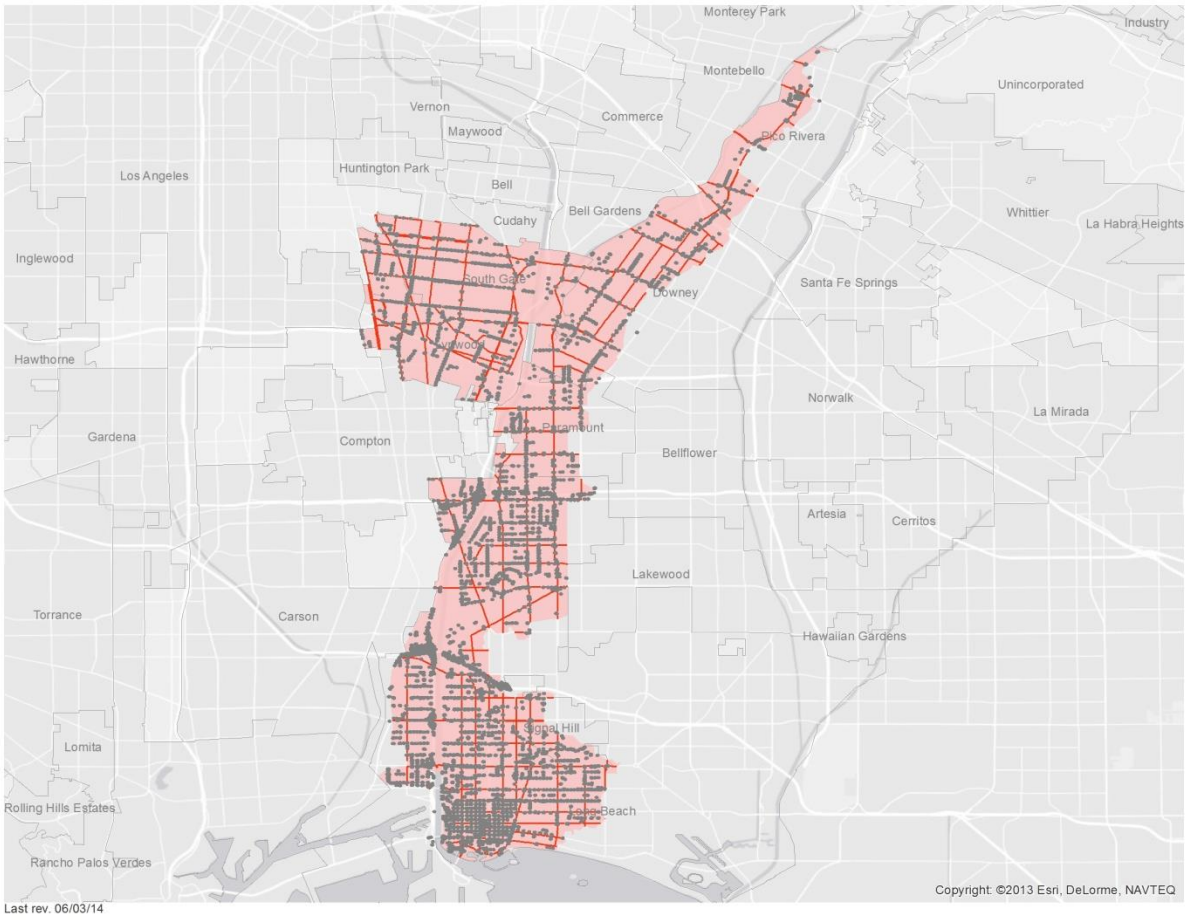


Figure 3-25: Areas potentially available for right-of-way BMPs

4 REASONABLE ASSURANCE ANALYSIS

4.1 EXECUTIVE SUMMARY

A required element the WMP is the Reasonable Assurance Analysis (RAA). The MS4 Permit specifies the RAA use a watershed based computer modeling system to demonstrate:

> *"that the activities and control measures…will achieve applicable WQBELs and/or RWLs with compliance deadlines during the Permit term".*

There are three computer modeling systems approved by the MS4 Permit and the Watershed Management Modeling System (WMMS) was selected to develop this RAA. The Los Angeles County Flood Control District (LACFCD), through a joint effort with U.S. Environmental Protection Agency (USEPA), developed WMMS specifically to support informed decisions associated with managing stormwater.

While the Permits prescribes the RAA as a quantitative demonstration that control measures will be effective, the RAA also promotes a modeling process to identify and prioritize potential control measures to be implemented by the WMP. In other words, the RAA not only demonstrates the cumulative effectiveness of BMPs to be implemented, it also supports their selection. Furthermore, the RAA incorporates the applicable compliance dates and milestones for attainment of the WQBELs and RWLs, and therefore supports BMP scheduling. The ultimate goal of WMMS is to identify cost-effective water quality improvement projects through an integrated, watershed-based approach.

On March 25, 2014, the Los Angeles Regional Water Quality Control Board (Regional Board) issued "RAA Guidelines" (LARWQCB 2014) to provide information and guidance to assist Permittees in development of the RAA. Appendix A-4-1 provides appropriate documentation on the modeling assumptions that meet the RAA Guidelines.

The RAA describes the process for identifying milestones the current and next Permit periods, as well as final milestones to meet applicable TMDLs. Modeling was performed to quantify necessary load reductions to achieve the milestones. Based on these load reduction targets, a pollutant reduction plan was established that outlines the types and sequencing of BMPs for each jurisdiction to achieve milestones throughout the schedule. The RAA provides a detailed list of the capacities needed for BMPs over time, incorporating the existing BMPs and control measures identified in the WMP. These recommendations serve as goals for each jurisdiction to seek opportunities for implementation over time, but strategies may change as opportunities for more cost-effective BMPs are identified throughout the schedule.

The RAA has determined that the metal zinc will be the primary or "limiting" pollutant and that by implementing the structural and non-structural measures in Chapter 3 to reduce zinc, the remaining pollutant reduction targets will be achieved for the Water Quality Priorities defined in Chapter 2. The rationale for this modeling approach is included Section 5.3.1 of the RAA (Appendix 4-1). Over the

entire Lower Los Angeles River Watershed, the RAA projects a need for structural controls to be sized to capture and or treat 803.2 acre -feet.

4.2 REASONABLE ASSURANCE ANALYSIS

The Reasonable Assurance Analysis for the Lower Los Angeles River Watershed is included in Appendix A-4-1. As data is collected through the monitoring program the model will be re-calibrated during the adaptive management process, which will allow for improved simulation of physical processes such as flow volumes and volume retention BMPs.

4.2.1 IRRIGATION REDUCTION

There is sufficient information available to justify a 25% reduction in irrigation through specific controls.

- **"Landscape Water Conservation Programs: Evaluation of Water Budget Based Rate Structures" (1997).**[1] This study was prepared for The Metropolitan Water District of Southern California to evaluate the effects of customer outreach programs and adjustment of water-budget based rate structures on landscape water use. Communities that installed these water conservation programs saw landscape irrigation water use reduced 20-37%.
- **"The Residential Runoff Reduction Study" (2004).**[2] This study was produced for the Municipal Water District of Orange County to determine the effects of certain interventions on water savings. This study used a control or baseline site, an educational only site, and a retrofit site that installed weather-based controller technology and public education. The observed reduction at the retrofit site was 50% from pre- to post-intervention, and a reduction of 71% when comparing to the control group (which had no intervention). The education site also saw a reduction of 21% when compared to the control group.
- **"20x2020 Water Conservation Plan" (2010).**[3] This water conservation plan was prepared by a host of California agencies in response to the Californian Governor's Delta plan initiative that mandates California to have to achieve a 20 percent reduction per capita water use statewide by 2020. This study demonstrated that, for the South Coast specifically (which includes Greater Los Angeles, Long Beach and Orange County), potential conservation savings from current actions—basic measures, such as regulatory activities and reinforcing codes related to plumbing and appliance efficiency—are 3% per capita, or 6 gallons per capita per day (GPCD). Potential conservation savings for "cost effective measures" (such as BMPs and new technologies) are 7% per capita at 80% compliance (13 GPCD at 80% compliance and 17 GPCD at 100% compliance). Total "basic measure" savings are 24 GPCD. Baseline water use level for the South Coast region is 180 GPCD, which means with basic measures in place there is

[1] Pekelney, D., & Chestnutt, T. (1997). Landscape Water Conservation Programs: Evaluation of Water Budget Based Rate Structures. *The Metropolitan Water District of Southern California*. P vi of the Summary.

[2] The Municipal Water District of Orange County & The Irvine Ranch Water District. (2004). The Residential Runoff Reduction Study. *The Municipal Water District of Orange County.* P ES1 and ES6.

[3] California Department of Water Resources, State Water Resources Control Board, California Bay-Delta Authority, California Energy Commission, California Department of Public Health, California Public Utilities Commission, California Air Resources Board, California Urban Water Conservation Council, & U.S. Bureau of Reclamation. (2010). 20x2020 Water Conservation Plan.

potential for 13.3% conservation savings. The study further demonstrates that with additional measures (such as residential weather-based irrigation controllers, landscape practices, recycled water, etc.) potential conservation savings are 29 GPCD, or 16% for the South Coast Region. While this study evaluates the effects of interventions on a *per capita* basis, the results of this study have implications on water reductions and water savings for watersheds as a whole.

- **"Landscape Management for Water Savings" (1998).**[4] This study resulted in a "43% increase in landscape water efficiency (water savings) from 1990-1997" after instituting conservation pricing, financial incentives, and education programs for customers and landscape professionals. The author makes a strong conclusion that most irrigation systems need to be recalibrated to only provide the amount of water necessary for the plants within the landscape to grow. Furthermore, the author provides several specific cases that demonstrate that when water resources are mismanaged by outdated irrigation systems or uninformed landscape professionals, this wastes precious water resources and costs the landscape owners excess money.

In addition, on July 28, 2014, an emergency regulatory action went into effect in response to the ongoing drought conditions within California[5]. This emergency regulatory action prohibits: 1) The application of water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots or structures; 2) The use of a hose to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle or similar; and 3) The application of water to driveways and sidewalks. These mandatory regulations are expected to reduce landscape and water runoff.

The study results show a strong nexus between public education (leading to an increased awareness of water conservation and usage) and a reduction in irrigation use. The Participating Agencies will develop an outreach and education program focusing on water conservation and landscape water use efficiency.

Based on study results and the initiation of regulations aimed to reduce irrigation water use, a 25% reduction of irrigation water utilized in the RAA is considered reasonable and conservative.

As part of the adaptive management process the Participating Agencies will evaluate these assumptions during Program implementation and develop alternate controls if it becomes apparent that the assumption is not supported.

[4] Ash, T. (1998). How to Profit from a Water Efficient Future. In *Landscape Management for Water Savings*. Tustin, CA: Municipal Water District of Orange County. P 8.

[5] Title 23, California Code of Regulations. Government Code Sections 11346.1 and 11349.6. OAL File No. 2014-0718-01 E.

4.3 NON-MODELED CONTROLS

Currently there is insufficient information to accurately model the implementation of the controls listed in Section 3.2.3 through 3.4.1. These non-modeled controls were instead assigned a modest fraction of 10% for their cumulative load reduction. As part of the adaptive management process the Participating Agencies will evaluate this assumption during Program implementation and develop alternate controls if it becomes apparent that the assumption is not supported. However, despite the uncertainty surrounding the specific load reductions for these controls, there is support to suggest that the assumption is in fact a modest one.

Chapter 3 provides qualitative assessments of potential pollutant reductions for new non-modeled, nonstructural and structural controls required by the 2012 MS4 Permit (Sections 3.2.4 and 3.3.1) as well as new non-modeled controls developed as part of this WMP (i.e., the "targeted" control measures of Section 3.4.1). As explained in detail in Sections 3.2.4 and 3.3.1, the number and scope of the new and modified (i.e., enhanced) minimum provisions under the Permit is substantial. Of particular note are the Low Impact Development (LID) provisions—which replace prior SUSMP provisions—for new developments. Potential load reductions from future LID projects were not incorporated into the RAA and as such contribute to the 10% non-modeled assumption. Also, pollutant reductions may be expected from continued, preexisting minimum controls with an educational component, such as public education, inspections of industrial/commercial and construction sites, and illicit discharge detection and elimination. Such programs can benefit from a continued increase in behavior change over time. Finally, the TSS Reduction Program—one of the non-modeled targeted control—does allow for a rough estimate of potential load reductions, as outlined in the following subsection.

4.3.1 TSS REDUCTION PROGRAM QUANTIFICATION

Although expected pollutant reductions resulting from the TSS Reduction Strategy are not modeled empirically within WMMS, a rudimentary quantification of the program's potential effectiveness may be calculated through the application of the Revised Universal Soil Loss Equation (RUSLE). The RUSLE is defined as

$$A = RKLS$$

where

$A =$ Spatially and temporally averaged soil loss per unit area per unit time. The result is expressed in the units elected for K and R.
$R =$ Rainfall-runoff erosivity factor (per unit time, generally one year),
$K =$ Soil erodibility factor (mass per unit area – an area density – generally tons per acre),
$L =$ Slope length factor and
$S =$ Slope steepness factor.

Using local values of R, K and LS obtained through maps available on the State Water Resources Control Board's website for the Construction General Permit[6],

$$R \approx 40\ year^{-1}$$
$$K \approx 0.32\ \frac{tons}{acre}\ \text{and}$$
$$LS \approx 0.45$$

giving

$$A = (40\ year^{-1})\left(0.32\ \frac{tons}{acre}\right)0.45$$
$$A = 5.76\ \frac{tons}{acre\ year}.$$

Following the CGP Risk assessment procedures, 5.76 tons per acre year is within the "low sediment risk" designation.

During the cooperative preparation of the Lower San Gabriel River (SGR), Lower Los Angeles River and Los Cerritos Channel (LCC) WMPs, several participating agencies provided estimates of exposed soil within their jurisdiction that were not related to construction activities. The City of Bellflower, within the adjacent LCC and Lower SGR watersheds, field-verified these estimates which totaled approximately 18 acres or about 0.5% of the City. Following the calculated value for A, this equates to approximately 100 tons of soil loss per year. The City of Signal Hill determined that 104.37 acres of the 531 acres within the city that drain to the LA River consists of undeveloped vacant land (20%)—however this is an anomalous circumstance specific to the City. Applying the 104 acres to Signal Hill and extrapolating the 0.5% to the remaining area of the Lower LA River Watershed (27,194 acres), the soil loss tonnage is

$$M_{TSS} = fWA = (0.005 \cdot 27{,}194\ acres + 104\ acres)\left(5.76\ \frac{tons}{acre\ year}\right)$$
$$M_{TSS} = 240\ acres\left(5.76\ \frac{tons}{acre\ year}\right)$$
$$M_{TSS} \approx 1{,}400\ \frac{tons}{year}$$

where

$M_{TSS} =$ Estimated annual soil loss within the Lower LAR watershed in tons,
$f =$ Estimated fraction of exposed soil (non-construction) within a given urbanized area and
$W =$ Watershed area.

Historical monitoring results from the adjacent LCC Watershed suggest that approximately 1.8 grams of zinc adheres to every kilogram of TSS, so that the zinc discharge M_{Zn} associated with M_{TSS} is

[6] http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

$$M_{Zn} \approx \left(\frac{1.8}{1{,}000}\right) M_{TSS}$$
$$M_{Zn} \approx \left(\frac{1.8}{1{,}000}\right)\left(1{,}400\ \frac{tons}{year}\right)\left(\frac{2{,}000\ lbs}{1\ ton}\right)$$
$$M_{Zn} \approx 5{,}000\ \frac{lbs}{year}\ or\ 2{,}300\ \frac{kg}{year}.$$

The RAA predicts an annual zinc loading of 8,878 kg for the average storm year. Assuming that within the term of the MS4 Permits the TSS Reduction Strategy approaches an effectiveness goal of 10% (230 kg/year), this would equate to a load reduction of **2.6%**. Reductions of this magnitude provide support for the 10% load reduction assumed for non-modeled controls. Further development of the TSS Reduction program is anticipated to meaningfully aid in the achievement of targeted load reductions.

5 COMPLIANCE SCHEDULE

This Chapter provides the compliance schedule for each Participating Agency. The compliance schedule will be used to measure progress toward addressing the highest WQPs and achieving interim and final WQBELs and RWLs. Where deadlines are not specified within the MS4 Permit term, interim milestones are provided. The schedule is expressed as the needed structural BMP capacities over space and time. The Reasonable Assurance Analysis (RAA, Chapter 4) refines the capacity over space to the subwatershed level. The BMP capacities assume a 10% reduction over the MS4 Permit term through implementation of the nonstructural BMPs described in Chapter 3. The following section of this chapter includes the nonstructural BMP schedule.

Meeting the load reductions determined by the RAA results in an aggressive compliance schedule in terms of the technological, operational, and economic factors that affect the design, development, and implementation of the necessary control measures. Notably, as described in Chapter 6, there is currently no funding source to pay for these controls. Assuming finances are available, conversion of available land into a regional BMP is a protracted process that can take several years (not accounting acquisition, when required). As such the Group considers the compliance schedule to be as short as possible.

This is true for all WQPs—by the nature of the limiting pollutant approach, it is expected that each of the remaining WQPs will be controlled at a faster rate than zinc. So the aggressive schedule in place to target zinc provides an equally aggressive schedule to target the remaining WQPs, and as such it is considered to be as short as possible for all WQPs.

5.1 NONSTRUCTURAL BEST MANAGEMENT PRACTICES SCHEDULE

A 10% load reduction is assumed to result from the cumulative effect of nonstructural BMPs. These nonstructural BMPs consist of Minimum Control Measures, Nonstormwater Discharge Measures and Targeted Control Measures (MCMs, NSWD measures and TCMs) as described in Chapter 3.

5.1.1 NONSTRUCTURAL MINIMUM CONTROL MEASURES SCHEDULE

The MCMs will be implemented by the Participating Agencies upon approval of the WMP by the Regional Board Executive Officer or by the implementation dates provided in the MS4 Permit, where applicable. The scope of the MCM programs has expanded significantly from the prior third term MS4 Permit. This change is not entirely unexpected as a period of over ten years separates the adoption of the third and fourth term permits. Consequently significant pollutant reductions are anticipated through effective implementation of the new nonstructural MCMs. In particular, effective implementation of the Development Construction program will compliment the nonstructural TSS Reduction Strategy.

MCM provisions new to the Cities are described in WMP Section 3.2. Guidance documents have been prepared as an optional aid to Cities in MCM development/implementation – see Attachment 3.1.

5.1.2 NONSTRUCTURAL NON STORMWATER DISCHARGE MEASURES SCHEDULE

The NSWD measures will be implemented by the Participating Agencies upon approval of the WMP by the Regional Board Executive Officer or by the implementation dates provided in the MS4 Permit, where applicable. The scope of the NSWD measures has expanded from the prior third term MS4 Permit. In particular, NSWD source investigations are now tied into a robust outfall screening program required by the MS4 Permit Monitoring and Reporting Program and additional conditions have been placed on common exempt NSWDs, such as potable water discharges and irrigation runoff. Consequently significant pollutant reductions are anticipated through the resulting reductions in NSWD flows.

NSWD measures new to the Participating Agencies are described in WMP Section 3.3.

5.1.3 NONSTRUCTURAL TARGETED CONTROL MEASURES SCHEDULE

The specific Participating Agencies implementing each TCM is included in Table 3-5 in Chapter 3. The table also lists whether the TCM is a *planned* or a *potential* control measure. Potential control measures are contingent upon unknown factors such as governing body approval and as such implementation within the MS4 Permit term cannot be guaranteed. Descriptions of each nonstructural TCM are included in WMP Section 3.4.

Uncertainties associated with the targeted nonstructural controls complicate establishment of specific implementation dates. Despite this uncertainty, the Group has made a diligent effort to provide a clear schedule of specific actions within the current and next permit terms in order to achieve target load reductions. In addition, the status of these controls will be included in the annual watershed reports as well as through the adaptive management process in order to assess their progress in attaining targeted load reductions. Table 5-1 lists the nonstructural TCM compliance schedule.

TSS REDUCTION STRATEGY

The expanded start-date ranges for the TSS Reduction Strategy (TCM-TSS-1 to 6) are set to accommodate the time needed to develop, adopt and implement model ordinances. A successfully implemented ordinance from the City of Whittier is also included in this WMP as Appendix A-3-2. The remaining Cities will consider this ordinance as a template for their own TSS Reduction Strategy.

Complete implementation of this Program throughout the watershed is not expected by the end of the MS4 Permit term. However, as discussed in WMP Section 3.4, appreciable pollutant reductions may be realized with only partial implementation.

Table 5-1: Nonstructural TCM Compliance Schedule

Nonstructural TCM	Chapter 3 ID	Effort	Start date	Milestones
Prioritize facility inspections based on WQPs	TCM-ICF-1	J*	7/1/2015	Reprioritize facilities as new water quality data is collected.
Enhance tracking through use of online GIS MS4 Permit database	TCM-MRP-1	J	7/1/2015	Modify database to reflect MS4 Permit provisions by 7/1/2016.
Statewide Trash Amendments (nonstructural measures)**	TCM-PAA-3	J	(Estimate) 7/1/2015	Schedule is listed in draft amendments, est. 10-15 year schedule.
Increased street sweeping frequency or routes	TCM-PAA-4	J	7/1/2015	Report on status with annual report submittal.
Apply for grant funding for stormwater quality projects	TCM-INI-4	W/J	7/1/2014	Suitable grants are pursued when practicable.
Refocused outreach to target audiences and WQPs	TCM-PIP-1	W/J	7/1/2015	Report on status with annual report submittal.
Train staff to facilitate LID and Green Streets implementation	TCM-PLD-1	J	7/1/2014	Complete first round by 7/1/2016. Continue periodic staff training.
LID ordinance for projects below MS4 Permit thresholds	TCM-PLD-2	J	7/1/2014	When practicable, adopt ordinance by end of permit term.
Encourage retrofitting of downspouts	TCM-RET-1	J	7/1/2015	Report on status with annual report submittal.
Prepare guidance documents to aid implementation of MCMs	TCM-SWM-1	W/J	7/1/2014	Develop documents by 7/1/2015. Revise documents as needed.
Exposed soil ordinance	TCM-TSS-1	J	7/1/2015	Develop by 12/28/2015. If practicable adopt by 7/1/2017.
Erosion repair and slope stabilization on private property	TCM-TSS-2	J	7/1/2015	Report on status with annual report submittal.
Private parking lot sweeping ordinance	TCM-TSS-3	J	7/1/2015	When practicable, adopt ordinance by 7/1/2017.
Sweeping of private roads and parking lots	TCM-TSS-4	J	7/1/2015	Enforce TCM-TSS-3 by 12/28/2017.
Erosion repair and slope stabilization on public property	TCM-TSS-6	J	7/1/2015	Report on status with annual report submittal.
Copper reduction through implementation of SB 346	TCM-INI-1	W*	Ongoing	Milestones are independent of participating agency actions.
Lead reduction through implementation of SB 757	TCM-INI-2	W	Ongoing	Milestones are independent of participating agency actions.
Support safer consumer product regs for zinc reduction in tires	TCM-INI-3	W	Ongoing	Report on status with annual report submittal.
Incentives for irrigation reduction practices	TCM-NSW-1	J	Ongoing	Ongoing; no interim or final milestones.
Upgraded sweeping equipment	TCM-PAA-1	J	Ongoing	Report on status with annual report submittal.
(Sanitary) Sewer System Management Plan	TCM-PAA-2	J	Ongoing	Ongoing; no interim or final milestones.
Negotiate with utilities for erosion control within ROW	TCM-TSS-5	W	Ongoing	Report on status with annual report submittal.

* W – Watershed Group effort, J – Jurisdictional effort

** Contingent upon State Water Board's adoption of Trash Amendments

5.2 PLANNED PROJECT - PROPOSITION 84 GRANT AWARD

The cities of Bell Gardens, Downey, Pico Rivera, Paramount, South Gate, and Lynwood are participating in a regional multi-watershed project through the Gateway Water Management Authority (GWMA). This project applied for and was awarded funding though the Proposition 84 Grant. Initiation of this project will begin as soon as the grant contracts and funding are finalized which is expected to be in the fall of 2014. The BMPs include: thirteen (13) tree box filters and ten (10) bioretention tree wells. The project will install LID BMPs along transportation corridors to treat stormwater runoff and its associated pollutants.

With the installation of these LID BMPs, this project is expected to reduce pollutant loads throughout the watershed. The full benefits of this project as it ties into interim and final compliance milestones will be determined during the adaptive management process. The project is currently in the design phase. Project milestones and implementation timeframes are listed below.

Design, Environmental Documentation and Design and Bid Solicitation Process

The Project went through review to determine compliance with the environmental requirements such as those outlined in the California Environmental Quality Act (CEQA) in December 2014.

The Project will begin the process of obtaining necessary permits such as local construction permits and Los Angeles County permits in May 2015. This task is expected to be finalized in July 2015, prior to commencement of construction. All proposed BMPs will be located on public property in the public right of way and therefore, issues obtaining site access are not expected as well as obtaining access agreements and easement deeds will not be required.

During the Project design and bid process, a preliminary engineering analysis will be performed for proposed designs and locations, preparation and review of design drawings and technical specifications. The Participating Agencies will collaborate in reviewing the submitted proposals and construction documents. Once the review process is complete a construction contract will be awarded and finalized by the end of July 2015.

Construction and Implementation

The Project construction and implementation process is expected to begin in August 2015. Construction is anticipated to last for approximately twelve months and completion is expected in August 2016. Associated activities for construction will include mobilization and site preparation, excavation, installation of BMPs and proper coordination with contractors.

5.3 STRUCTURAL BEST MANAGEMENT PRACTICE SCHEDULE

Uncertainties associated with the structural controls complicate establishment of specific implementation dates. Despite this uncertainty the Group has made a diligent effort to provide a clear schedule of specific actions within the current and next permit terms in order to achieve target load reductions.

5.3.1 STRUCTURAL MINIMUM CONTROL MEASURE SCHEDULE

Significant pollutant reductions are anticipated through each City's effective implementation of the new structural LID BMP requirements of the Planning and Land Development Program. These new MCM provisions are described in WMP Section 3.2. Guidance documents have been prepared as an optional aid to Cities in MCM development/implementation – see Attachment 3.1.

The Planning and Land Development Program will be implemented no later than June 28, 2014.

5.3.2 STRUCTURAL TARGETED CONTROL MEASURE SCHEDULE

The RAA (see Chapter 4) demonstrates the cumulative effectiveness of BMPs to be implemented, supports BMP selection, and provides volume reduction goals optimized across the entire watershed. The results are summarized for volume reduction (represented in acre-feet) for interim and final compliance milestones.

The plan depicted in the RAA is considered a potential initial scenario. Through the adaptive management process, the participating agencies may select different types of BMPs (e.g. increase implementation of green streets and reduce implementation of regional BMPs) or substitute alternative BMPs altogether (e.g., implement dry wells instead of green streets).

The wet weather volume reductions necessary for each milestone (31%, 50% and Final) for each City show the combined total estimated BMP volume (acre-feet) for right-of-way (ROW) BMPs and regional Low Impact Development (LID) BMPs on public or private parcels. Specific green streets projects were not investigated during this initial analysis for potential BMPs, therefore, the City-specific summary lists potential regional LID BMPs that *could* be used to achieve the required interim milestones and targets. Since this WMP is a planning-level document, over time the Watershed Group will report and demonstrate that the summative effect of projects implemented add up to the required reductions for interim milestones and final targets.

Dry weather reductions are attained through a combination of non-structural practices and structural BMPs as they are implemented as part of the wet weather attainment of limits. As wet-weather BMPs are implemented, they serve to remove the dry-weather flows thus meeting the compliance set forth to achieve dry-weather reductions.

Where applicable, potential regional LID BMPs have been identified for the 31% and 50% milestones. Interim and final compliance dates identified in the RAA are the primary drivers for the structural targeted control measure schedule. As discussed in Section 3, several structural treatment project have already been completed and there are upcoming projects (e.g. Proposition 84 Grant). These projects constitute significant progress towards the 31% milestone by the 2017 target and the 50% milestone in 2024. Further implementation with feasibility studies of the projects identified within this WMP is subject to the financial strategy (See Chapter 6). Through implementation of the WMP and adaptive management there is the potential for the BMP capacity for the final compliance milestone to change, therefore, potential BMPs for final milestones were not identified.

APPROACH TO IMPLEMENTING STRUCTURAL CONTROLS

The Participating Agencies understand that targeting subsequent load reductions demands that the process of implementing structural controls begin as soon as possible. The initial phase of this process is as follows:

Right-of-Way BMPs (green street principles) - As the Participating Agencies prepare new capital improvement projects throughout their jurisdiction, a review to incorporate green street principles into the project will be done. Additionally, the Strategic Transportation Plan (STP), currently a draft document), prepared by the Gateway Water Management Authority, identifies major transportation corridors slated for significant redevelopment. The STP will require that structural stormwater BMPs be considered and incorporated into these projects where feasible. Implementation of the STP is expected to contribute to the achievement of the required metal reductions by the compliance deadlines.

Schedule: Every two years the adaptive management process will include an assessment of the effectiveness of both 1) right-of-way BMPs incorporated into CIP projects and 2) the STP in contributing toward targeted load reductions.

Regional BMPs - In each jurisdiction, potential Regional BMP locations have been identified and ranked. To maximize efficiency and resources, a feasibility study will be developed to aid in selection of the most effective BMPs. The study will provide criteria for selecting locations for regional BMPs, the process of ground-truthing to concretely determine feasibility, and a schedule that demonstrates implementation of regional BMPs. In conjunction with development of the feasibility study, each Participating Agency will conduct a preliminary site assessment at the highest ranked potential BMP. The preliminary site assessment will include reviewing available plans, and identifying nearby stormdrain systems and drainage areas. Should information acquired during the preliminary assessment suggest the selected potential BMP to be infeasible, additional high ranked potential BMPs in that jurisdiction will be explored. By December 2016, each Participating Agency would have conducted sufficient preliminary site determinations to select a location sufficient for further exploration. Selected sites will be chosen for additional exploration to include field analysis.

Schedule: The preliminary site assessments and feasibility study will be completed by March 2016. Field analysis at selected sites will begin in December 2016.

Even though not all projects can be specified and scheduled at this time, the Participating Agencies are committed to constructing the necessary regional and right-of-way BMPs to meet the determined load reductions per applicable compliance schedules. Through implementation of the WMP and adaptive management there is the potential for the final compliance milestones to change.

Furthermore, the LACFCD will work with the Watershed group in their efforts to address source controls; assess, develop, and pursue funding for structural BMPs, and promote the use of water reuse and infiltration. As regional project scopes are further refined, the LACFCD will contribute to the WMP projects on a case-by-case basis, agreed upon with the Watershed Group.

5.4 POLLUTANT REDUCTION PLAN TO ATTAIN INTERIM & FINAL LIMITS

The following pages describe the pollutant reduction plans for each City for drainage areas within the Los Angeles River. Figure 5-1 is an illustration of the total structural BMP capacity needed to comply with final WQBELs/RWLs within the Lower LAR Watershed.

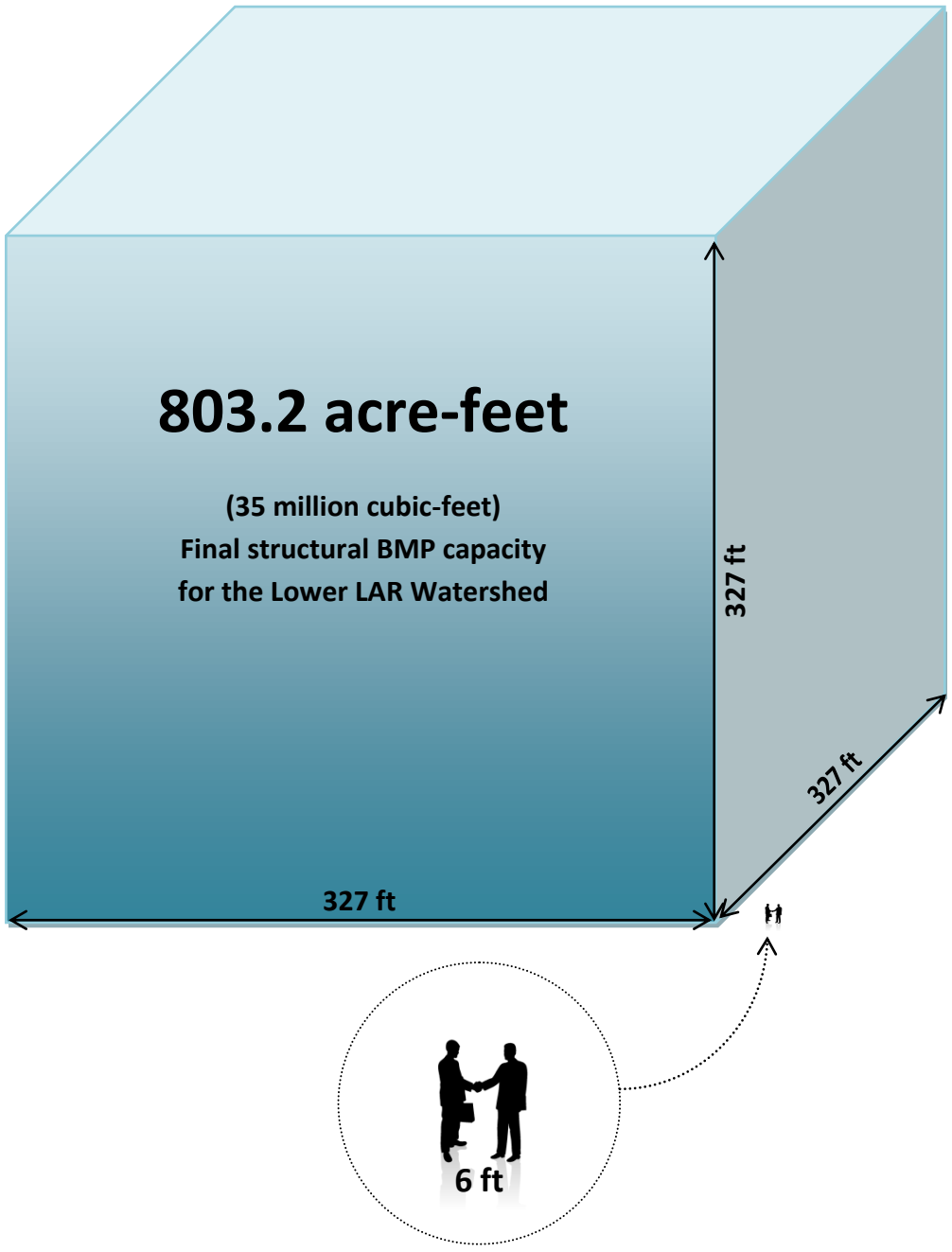


Figure 5-1: The Compliance Cube (total required BMP capacity for the Lower LAR Watershed)

5.4.1 CITY OF DOWNEY

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN*	
		Total Estimated BMP Volume (acre-ft)**	
		Incremental	Cumulative
Downey	31%	20	20
	50%	13.2	33.2
	Final	46.3	79.6

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.
** Values attained after the city's existing distributed BMP volumes totaling 1.9 acre-feet were incorporated.

According to the RAA results, the city of Downey will need to capture and/or treat 20 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 13.2 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 79.6 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Furman Park were transformed into an infiltration BMP, the park would have the potential of retaining 16.5 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 3.5 acre-feet to meet the 31% compliance milestone.

If Apollo Park were converted to an infiltration BMP, the park would have the potential of retaining 13.2 acre-feet of stormwater to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Furman Park	16.5
Right-of-Way BMPs	3.5
Total	20.0
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Apollo Park	13.2
Cumulative Total	33.2

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Downey	68,570	90%	90%	91.6%	---	---

[A] ARS partial capture systems are assigned 86% efficiency.
[B] Percentages are based on number of catch basins and number retrofitted.

5.4.2 CITY OF LAKEWOOD

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Lakewood	31%	1.1	1.1
	50%	0.0	1.1
	Final	0.0	1.1

According to the RAA results, the city of Lakewood will need to capture and/or treat 1.1 acre-feet of stormwater by September 30, 2017 to meet the 31% and 50% interim compliance milestone as well as the final compliance milestone.

To achieve the 31% interim compliance milestone of 1.1 acre-feet, Right-of-Way BMPs could be used.

31% and 50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Right-of-Way BMPs	1.1
Total	1.1

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Lakewood	N/A	67%[C]	67%[C]	100	---	---

[A] ARS partial capture systems are assigned 86% efficiency .

[B] Percentages are based on number of catch basins and number retrofitted.

[C] 67 percent reported due to limitations of the Regional Board's reporting format. Lakewood has 6 catch basins within the Los Angeles River watershed, 2 of the 6 catch basins have ARS and CPS units, the other 4 do not as they drain to a retention basin.

5.4.3 CITY OF LONG BEACH

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN*	
		Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Long Beach	31%	1.0	1.0
	50%	72.5	73.5
	Final	245.7	319.1

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.

According to the RAA results, the city of Long Beach will need to capture and/or treat 1.0 acre-foot of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 73.5 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 319.1 acre-feet by January 11, 2028 to meet the final compliance milestone.

To achieve the 31% interim compliance milestone of 1.0 acre-feet, Right-of-Way BMPs could be used. If Houghton Park, Scherer, and Veterans Memorial Park were transformed into infiltration BMPs, the parks would have the potential of retaining 70.9 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 1.6 acre-feet to meet the 50% compliance milestone. Alternatively, The city of Long Beach's Municipal Urban Stormwater Treatment (MUST) project, being designed to have a potential treatment capacity of approximately 4, 700 acres could be used to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Right-of-Way BMPs	1.0
Total	1.0
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Houghton Park	27.9
Scherer Park	25.8
Veterans Memorial Park	17.2
Right-of-Way BMPs	1.6
Cumulative Total	73.5

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Long Beach	149,759	NR[C]	NR[C]	92%	---	---

[A] ARS partial capture systems are assigned 86% efficiency .

[B] Percentages are based on number of catch basins and number retrofitted.

[C] NR report was not required by the MS4 Permit in effect at that time.

5.4.4 CITY OF LYNWOOD

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Lynwood	31%	34.2	34.2
	50%	16.7	50.9
	Final	44.5	95.4

According to the RAA results, the city of Lynwood will need to capture and/or treat 34.2 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 50.9 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 95.5 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Lynwood City Park and Yvonne Burke-John D. Ham Park were transformed into infiltration BMPs, the parks would have the potential of retaining 22.4 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 11.8 acre-feet to meet the 31% compliance milestone.

If Lynwood Meadows Park and Rose Park were transformed into infiltration BMPs, the parks would have the potential of retaining 2.5 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 13.2 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Lynwood City Park	12.0
Yvonne Burke-John D. Ham Park	10.4
Right-of-Way BMPs	11.8
Total	34.2
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Lynwood Meadows Park	1.8
Rose Park	1.7
Right-of-Way BMPs	13.2
Cumulative Total	50.9

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Lynwood	46,467	92%	92%	96%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted

5.4.5 CITY OF PARAMOUNT

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN*	
		Total Estimated BMP Volume (acre-ft)**	
		Incremental	Cumulative
Paramount	31%	20.9	20.9
	50%	8.5	29.3
	Final	47.2	76.5

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.
** Values attained after the city's existing distributed BMP volumes totaling 7.1 acre-ft were incorporated in the RAA

According to the RAA results, the city of Paramount will need to capture and/or treat 20.9 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 29.3 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 76.5 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Ralph C. Dills Park was transformed into an infiltration BMP, the parks would have the potential of retaining 17.9 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 3.0 acre-feet to meet the 31% compliance milestone.

If Spane Park was transformed into an infiltration BMP, the parks would have potential of retaining 5.3 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 3.2 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Ralph C. Dills Park	17.9
Right-of-Way BMPs	3.0
Total	20.9
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Spane Park	5.3
Right-of-Way BMPs	3.2
Cumulative Total	29.3

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Paramount	44,490	94%	94%	94%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

5.4.6 CITY OF PICO RIVERA

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Pico Rivera	31%	39.4	39.4
	50%	0.0	39.4
	Final	1.8	41.2

According to the RAA results, the city of Pico Rivera will need to capture and/or treat 39.4 acre-feet of stormwater by September 30, 2017 to meet the 31% and 50% interim compliance milestones, and 41.2 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Rio Hondo Park was transformed into an infiltration BMP, the parks would have the potential of retaining 14.2 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 25.2 acre-feet to meet the 31% and 50% compliance milestones.

31% & 50% Interim Compliance Milestones	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Rio Hondo Park	14.2
Right-of-Way BMPs	25.2
Cumulative Total	39.4

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Pico Rivera	22,549	84%	84%	93.7%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

5.4.7 CITY OF SIGNAL HILL

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)*	
		Incremental	Cumulative
Signal Hill	31%	1.2	1.2
	50%	13.8	15.0
	Final	7.1	22.1

*Values attained after the city's existing distributed BMP volumes totaling 0.2 acre-ft were incorporated

According to the RAA results, the city of Signal Hill will need to capture and/or treat 1.2 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 15 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 22.1 acre-feet by January 11, 2028 to meet the final compliance milestone.

Right-of-Way BMPs could be used for the 1.2 acre-feet to meet the 31% compliance milestone. These BMPs could be located within any city-owned street in order to avoid land acquisition.

If Signal Hill Park were transformed into infiltration BMPs, the park would have the potential of retaining 8.2 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 6.8 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Right-of-Way BMPs	1.2
Total	1.2
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Signal Hill Park	8.2
Right-of-Way BMPs	6.8
Cumulative Total	15.0

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Signal Hill	14,220	89%	89%	90.5%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

5.4.8 CITY OF SOUTH GATE

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN*	
		Total Estimated BMP Volume (acre-ft)**	
		Incremental	Cumulative
South Gate	31%	30.6	30.6
	50%	28.4	59.1
	Final	109.1	168.1

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.
** Values attained after the city's existing distributed BMP volumes totaling 4.7 acre-ft were incorporated

According to the RAA results, the city of South Gate will need to capture and/or treat 30.6 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 59.1 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 168.1 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Circle Park was transformed into an infiltration BMP, the park would have the potential of retaining 38.7 acre-feet of stormwater to meet the 31% compliance milestone.

If Cesar Chavez Park and Hollydale Community Park were transformed into infiltration BMPs, the parks would have potential of retaining 6.4 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 14 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Circle Park	38.7
Total	38.7
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Cesar Chavez Park	4.8
Hollydale Community Park	1.6
Right-of-Way BMPs	14.0
Cumulative Total	59.1

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
South Gate	72,333	86%	86%	92.5%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

5.4.9 TRASH TMDL STRATEGY

The Participating Agencies have achieved greater than 90 percent compliance with the Trash TMDL by installing CPS (full capture) devices in catch basins throughout the Los Angeles River and tributaries watershed within their respective jurisdictions. The CPS installation program has been supplemented with automatic retractable screens and trash nets. The remaining catch basins not yet retrofitted with CPS devices are those that, due to physical restrictions, could not be retrofitted without major reconstruction of the catch basins.

The Participating Agencies will continue to implement watershed control measures (WCMs) to achieve the next two milestones of 96.7 and 100 percent and commit to working with the Regional Board in establishing an effective combination of: full capture, partial capture and WCMs that will meet the criteria of "deemed compliance" as will be established by the Executive Officer of the Regional Board or by the Regional Board itself.

5.5 ESTIMATED COSTS OF STRUCTURAL BMPS

Future costs associated with regional and Right-of-Way BMPs were estimated by using costs associated with an existing regional project (Discovery Park) and estimated costs for potential regional projects. Potential regional project costs were obtained from Los Angeles County.[1] Table 5-2 includes the estimated total costs and cost per acre-foot for regional and Right-of-Way BMPs.

The cost estimates only represent permitting, material, construction, and operation and maintenance (O&M) cost - with the exception of Discovery Park which does not take into account O&M costs. The cost of land acquisition, which is estimated to be over $5,000,000 per acre, was not included since initial regional and Right-of-Way BMP projects are planned for public lands. Because of the preliminary nature of the projects, the estimates developed for the proposed BMPs on public property lie between the preliminary/order of magnitude and budget level estimates, with an expected accuracy of about minus 25 percent to plus 40 percent.[2]

Table 5-2: Existing or potential estimated structural BMP cost

Project Name	Total Estimated Cost	BMP Capacity (acre-feet)	Cost Per Acre Foot
Bethune Park	$570,000	0.9	$1,000,000
Enterprise Park	$1,240,000	3.9	$318,000
Reid Park	$1,400,000	0.6	$2,333,000
Belvedere Park	$3,700,000	13.8	$268,000
Discovery Park	$4,500,000 *	8.0	$562,500
Johnson Park	$5,060,000	20.0	$253,000
Charles White Park	$5,300,000	21.0	$252,380
Right-of Way BMPs**	-------	0.25	$250,000

* Cost does not include O&M.

** A specific project was not used for the cost estimate. Instead various projects were averaged.

Cost were derived by assuming approximately two-thirds of the projects implemented will be regional, with the remaining one-third being Right-of-Way projects. Using general assumptions for the projects above, the following costs are anticipated:

- A cost of $2,000,000 per acre foot is anticipated for projects treating less than 1 acre-foot
- A cost of $625,000 per acre foot is anticipated for projects treating between 1 and 10 acre-feet
- A cost of $260,000 per acre foot is anticipated for projects treating more than 10 acre-feet

[1] Multi-Pollutant TMDL Implementation for the Unincorporated County Area of Los Angeles River: Part 2

[2] Multi-Pollutant TMDL Implementation for the Unincorporated County Area of Los Angeles River: Part 2

5.5.1 TOTAL ESTIMATED COSTS OF STRUCTURAL BMPS

The following tables include the total estimated costs of structural BMPs for each City.

CITY OF DOWNEY STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	19.9	19.9	$15,400,000 - $28,830,000
	50%	13.2	33.1	
	Final	45.9	79.2	

CITY OF LAKEWOOD STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	1.1	1.1	$516,000 - $962,500
	50%	0.0	1.1	
	Final	0.0	1.1	

CITY OF LONG BEACH STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	1.0	1.0	$62,230,000 - $116,160,000
	50%	72.5	73.5	
	Final	245.7	319.1	

CITY OF LYNWOOD STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	34.2	34.2	$18,600,000 - $34,770,000
	50%	16.7	50.9	
	Final	44.5	95.5	

CITY OF PARAMOUNT STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft) Incremental	Cumulative	Total Estimated Cost
Los Angeles River	31%	20.8	20.8	$14,900,000 - $27,850,000
	50%	8.5	29.3	
	Final	47.2	76.5	

CITY OF PICO RIVERA STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft) Incremental	Cumulative	Total Estimated Cost
Los Angeles River	31%	39.4	39.4	$8,030,000 - $15,000,000
	50%	0.0	39.4	
	Final	1.8	41.2	

CITY OF SIGNAL HILL STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft) Incremental	Cumulative	Total Estimated Cost
Los Angeles River	31%	1.2	1.2	$4,300,000 - $8,050,000
	50%	13.8	15.0	
	Final	7.1	22.1	

CITY OF SOUTH GATE STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft) Incremental	Cumulative	Total Estimated Cost
Los Angeles River	31%	30.6	30.7	$32,800,000 - $61,200,000
	50%	28.4	59.1	
	Final	109.1	168.1	

6 FINANCIAL STRATEGY

This section outlines the financial strategy to implement the Lower LAR WMP in accordance with the MS4 Permit. The cost estimates provided herein are preliminary and based on the best available information to date. The estimates are also subject to revision as new information becomes available, including as the Watershed Control Measures (WCMs) are refined over the implementation period.

Financing the implementation of the Lower LAR WMP is the greatest challenge confronting the Watershed Group. In the absence of stormwater utility fees, the Participating Agencies have no dedicated revenue stream to pay for implementation of the WMP. In addition to current uncertainties associated with costs and funding, there are multiple uncertainties associated with future risks. The first TMDL compliance dates for the Lower LAR Watershed Group will be the interim metals milestones of 2017, 2024, and the final compliance date of 2028. Thus, there will be many deadlines that must be met despite limited resources. The Watershed Group will need to set priorities and seek funding in order to meet the various compliance deadlines.

Therefore, to address the Lower LAR Water Quality Priorities (WQPs), the Watershed Group is going to pursue a multi-faceted financial strategy to match the multi-faceted Strategy for the Selection and Implementation of WCMs outlined in Chapter 3. In addition, the Watershed Group has coordinated the proposed compliance schedule (see Section 5) with the financial strategy.

The latest Los Angeles and Long Beach MS4 permits have greatly magnified the cost challenges associated with managing stormwater. The absence of a stable stormwater funding mechanism not tied to municipal General Funds is becoming ever more critical. For that reason, the City Manager Committees of the California Contract Cities Association and the League of California Cities, Los Angeles Division, formed a City Managers' Working Group (Working Group) to review stormwater funding options after the LA County proposed Clean Water, Clean Beaches funding initiative failed to move forward. The result was a Stormwater Funding Report that notes, "the Los Angeles region faces critical, very costly, and seriously underfunded stormwater and urban runoff water quality challenges." The Report found that funding stormwater programs is so complex and dynamic, and the water quality improvement measures so costly, that Permittees cannot depend on a single funding option at this time. The City Managers' report includes a variety of recommendations, including: organizational recommendations; education and outreach program recommendations; recommendations for legislation; Clean Water, Clean Beaches recommendations; local funding options; and recommendations for the Regional Water Board[1].

The Watershed Group has considered the recommendations in the Stormwater Funding Report in developing this financial strategy. A critical component of the report is the observation that moving forward with a regional stormwater fee vote (like the LA County Clean Water, Clean Beaches funding initiative) would likely not occur until after June 2015, which means that the first funds would likely not

[1]League of California Cities. (2014). Providing Sustainable Water Quality Funding in Los Angeles County. Prepared By City Managers Working Group. Los Angeles County Division May 21, 2014.

be available until property tax payments are received in 2017. Assuming revenues of approximately $6 million per year available from a funding source based on the proposed Clean Water, Clean Beaches funding initiative, the Watershed Group could expect approximately $60 million to be available over 10 years[2]. However, these amounts may not be sufficient to pay for and maintain expensive stormwater capture and dry-weather low flow diversions to the sanitary sewer if the Watershed Group had to depend on such projects to come into compliance with receiving water limitations (RWLs) and water quality-based effluent limitations (WQBELs) specified in the MS4 Permit.

The Reasonable Assurance Analysis (RAA) for the Lower LAR WMP, indicates that the volume of water required to be captured within the Watershed to comply with RWLs and WQBELs is 803.2 acre-feet.

For cost estimation purposes, this WMP initially assumes that the Lower LAR Watershed could ultimately require the capacity to capture and infiltrate or use 803.2 acre-feet of water. Based on cost estimates for constructing regional and Right-of-Way BMPs, as discussed in Section 5.5, such a requirement could cost the watershed between $157 and $293 million for construction of these facilities (refer to Section 5.5 for more a detailed cost analysis).

The Watershed Group has been involved in the development of the financial strategy recommendations, and proposes to consider the recommendations of the City Managers Working Group to develop long-term solutions to stormwater quality funding. In the meantime, the Watershed Group will focus on the local funding options presented in the Stormwater Funding Report to secure the needed funding for initial implementation of the WMP.

During the early years of implementation, the Permittees anticipate having to depend largely on local fees such as commercial/industrial inspection fees, General Fund expenditures and, potentially, Clean Water State Revolving Fund program financing agreements to fund the implementation of the WCMs. The Watershed Group will seek opportunities to leverage the limited funds available. It will do this by financially supporting the efforts of others, such as the California Stormwater Quality Association (CASQA), to seek State approval of true source control measures such as implementation of the Safer Consumer Product Regulations adopted by the Department of Toxic Substances Control in 2013. The Group will also support programs to increase water conservation, reduce dry-weather discharges to the storm drain system, and reduce TSS during wet weather. Successfully accomplishing these efforts could reduce the money needed in the long term to capture and/or treat stormwater discharges to comply with TMDLs and address other WQPs.

Concurrently, the Watershed Group proposes to work with the California Contract Cities, the Los Angeles Division of the League of California Cities, and others to educate elected officials and voters about the water quality problems facing the region and the need to develop an equitable financing mechanism to fund the programs and facilities necessary to come into compliance with water quality regulations.

[2] Based on numbers derived for Los Cerritos Channel (LCC) during the development of the LCC WMP using expected annual revenue from a pro rata distribution of funds allocated to the Cities in the LCC Watershed and a possible proportional allocation of funds from the Watershed Authority Groups.

Legislative solutions will be necessary to clarify the application of Proposition 218 to fees for the capture and use of stormwater in light of a recent 6th Appellate Court decision and to ensure that any State water bond put on the ballot in fall 2014 contains funding for stormwater quality projects. The Group will also support local and statewide efforts to amend Proposition 218 to have stormwater fees treated in the same manner as water, sewage, and refuse fees. The Watershed Group and/or the Participating Agencies will also seek grants to implement rainwater capture and reuse or capture and infiltrate projects on publicly owned property.

In the long term, financing the WCMs for the Lower LAR Watershed will require establishing dependable revenue streams for local water quality programs. Accomplishing this formidable task will require the cooperation of many entities, including business and environmental organizations and the Regional Board.

7 LEGAL AUTHORITY

MS4 Permit §VI.C.5.b.iv.6 (LA)/ §VII.C.5.h.vi (LB)

This section covers information such as documentation and references/links to water quality ordinances for each participating that demonstrates adequate legal authority to implement and enforce Watershed Control Measures (WCMs) identified in this plan and as required in Section VI.D.5.b.iv.6 of the MS4 Permit. The goal of these WCMs is to create an efficient program that focuses on the watershed priorities by meeting the following objectives:

- Prevent or eliminate non-storm water discharges to the MS4 that are a source of pollutants from the MS4 to receiving waters.
- Implement pollutant controls necessary to achieve all applicable interim and final water quality-based effluent limitations and/or receiving water limitations pursuant to corresponding compliance schedules.
- Ensure that discharges from the MS4 do not cause or contribute to exceedances of receiving water limitations.

The WCMs include the minimum control measures, nonstormwater discharge measures and targeted control measures (i.e. controls to address TMDL and 303(d) listings). As the requirement to incorporate these WCMs is an element of the MS4 Permits, the legal authority to implement them results from each agency's legal authority to implement the NPDES MS4 Permit.

A copy of each participating agency's legal authority certification from their chief legal counsel can be found in Appendix A-7-1. Table 7-1 includes the section that covers water quality ordinance for each agency with a reference link.

Table 7-1 Water quality ordinance language

City	Water Quality Ordinance	Reference
Downey	Article V- Sanitation, Chapter 7, Stormwater and Urban Runoff Pollution and Conveyance Controls	http://qcode.us/codes/downey/
Section 5701. Watershed Management Program - *Notwithstanding other provisions in the Downey Municipal Codes, the MS4 Permit requires the City of Downey to implement the Watershed Management Program (WMP), and any subsequent amendments, are hereby incorporated into this Ordinance by reference. (Added by Ord. 1142, adopted 02-11-03; amended by Ord. 1320, adopted 11-12-13).*		
Lakewood	Article 05 (V) - Sanitation-Health, Chapter 8, Stormwater and Urban Runoff Pollution Control	http://weblink.lakewoodcity.org/weblink8/
5800 - Adoption of the Los Angeles County Stormwater Runoff Pollution Control Ordinance - *Except as otherwise provided in this Chapter, the stormwater runoff pollution control ordinance of the County of Los Angeles contained in Chapter 12.80 of Title 12- Environmental Protection of the Los Angeles County Code relating to control of pollutants carried by stormwater and runoff adopted by the County of Los Angeles on June 9, 1998, is hereby adopted and made a part hereof as though set forth in full. The same shall hereafter constitute the Stormwater and Runoff Pollution Control Ordinance of the City of Lakewood relating to the control of pollutants carried by stormwater and runoff and discharging*		

RB-AR11434

into receiving water of the United Stated.		
Long Beach	Volume II-Title 18-Building and Construction, Chapter 18.61, NPDES and SUSMP Regulations	http://library.municode.com/index.aspx?clientId=16115
18.61.010 Purpose - *The purpose of this chapter is to provide regulations and give legal effect to certain requirements of the National Pollutant Discharge Elimination System (NPDES) permit issued to the City of Long Beach, and the subsequent requirements of the Standard Urban Storm Water Mitigation Plan (SUMSP), mandated by the California Regional Water Quality Control Board, Los Angeles Region (RWQCB). The intent of these regulations is to effectively prohibit non-storm water discharges into the storm drain systems or receiving waters and to require source control BMP to prevent or reduce the discharge of pollutants into storm water to the maximum extent practicable.* *The City of Long Beach is a participant member of this watershed group but is under a different MS4 Permit. Certification of legal authority will be in accordance with its MS4 Permit timeline.*		
LACFCD	Flood Control District Code, Chapter 21 - Stormwater and Runoff Pollution Control	https://library.municode.com/index.aspx?clientId=16274
21.01 - Purpose and Intent - *The purpose and intent of this chapter is to regulate the stormwater and non-stormwater discharges to the facilities of the Los Angeles County Flood Control District for the protection of those facilities, the water quality of the waters in and downstream of those facilities, and the quality of the water that is being stored in water-bearing zones underground.*		
Lynwood	Chapter 14- Water and Sewer, 14-12, Stormwater and Urban Runoff Pollution Control	http://www.codepublishing.com/ca/lynwood/
14-12.3 Purpose and Intent - (b) -*The intent of this Section is to protect and enhance the quality of watercourses, water bodies, and wetlands within the City in a manner consistent with the Federal Clean Water Act, the California Porter-Cologne Water Quality Control Act, and the Municipal NPDES Permit.* *(c) This Section is also intended to provide the legal authority necessary for the City to control discharges to and from those portions of the Municipal Stormwater System over which it has jurisdiction as required by the Municipal NPDES Permit, and thereby comply with the terms of the Municipal NPDES Permit while the CSWMP and the WMAP are being developed by the permittees under the Municipal NPDES Permit, and thereafter to implement the CSWMP and WMAP, or other programs, developed under the Municipal NPDES Permit. (Ord. #1443, §1)*		
Paramount	Chapter 48 - Urban Stormwater Management	http://www.paramountcity.com/code.cfm?task=detail2&ID=20
Sec. 48-2.1. Purpose and intent - *The purpose of this chapter is to protect the health and safety of the residents of the city by protecting the beneficial uses of receiving waters within the city from pollutants carried by storm water and non-storm water discharges. The intent of this chapter is to enhance and protect the water quality of the receiving waters of the city and the United States, consistent with the Act. (Ord. No. 892)* Sec. 48-2.2. Applicability of this chapter - *The provisions of this chapter shall apply to the discharge, deposit or disposal of any storm water and/or runoff to the storm drain system and/or receiving waters within any incorporated area covered by a NPDES municipal storm water permit. (Ord. No. 892)*		
Pico Rivera	Title 16- Environment, Chapter 16.04, Stormwater and Urban Runoff Pollution Prevention	http://qcode.us/codes/picoriver a

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16.01.010 Purpose and Intent (4) - *Reducing pollutant loads in storm water and urban runoff, from land uses and activities identified in the municipal NPDES permit.* *The provisions of this chapter are adopted pursuant to the Federal Water Pollution Control Act, also known as the "Clean Water Act," codified and amended at 33 U.S.C 1251 et seq. The intent of this chapter is to enhance and protect the water quality of the receiving waters of the United States in a manner that is consistent with the Clean Water Act and acts amendatory thereof of supplementary thereto; applicable implementing regulations; the Municipal NPDES permit, and any amendment, revisions, or re-issuance thereof. (Ord. 989 § 1 (part), 2002).*		
Signal Hill	Chapter 12.16- Stormwater/ Urban Runoff	http://www.amlegal.com/library/ca/signalhill.shtml
12.16.020 Purpose and Intent - *The purpose of this chapter is to protect the public health, welfare and safety and to reduce the quantity of pollutants being discharged to the waters of the United States through: (D) The protection and enhancement of the quality of the waters of the United States in a manner consistent with the provisions of the Clean Water Act;*		
South Gate	Title 6 - Health and Sanitation, Section 6.67, Storm Drains	http://codepublishing.com/CA/southgate/
6.67.010 General Provisions, A- Purpose and Intent - *The purpose of this chapter is to protect the public health, welfare and safety and to reduce the quantity of pollutants being discharged to the waters of the United States. This chapter has the following objectives: 4. The protection and enhancement of the quality of the waters of the United States in a manner consistent with the provisions of the Clean Water Act (CWA);*		

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8 COORDINATED INTEGRATED MONITORING PROGRAM

The Participating Agencies have developed a customized coordinated integrated monitoring program (CIMP). The CIMP, based on the provisions set forth in Part IV of the MRP (Attachment E) of the MS4 Permit, assesses progress toward achieving the water quality-based effluent limitations and receiving water limitations per the compliance schedules, and progress toward addressing water quality priorities. The customized monitoring program is designed to address the Primary Objectives detailed in Attachment E, Part II.A of the MS4 Permit and includes the following program elements:

- Receiving Water Monitoring
- Storm Water Outfall Monitoring
- Non-Storm Water Outfall Monitoring
- New Development/Re-Development Effectiveness Tracking
- Regional Studies

The CIMP is included in Appendix A-8-1.

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9 ADAPTIVE MANAGEMENT PROCESS

Adaptive management is the process by which new information about the state of the watershed is incorporated into the WMP. The WMP is adaptively managed following the process described in Permit §IV.C.8. The process is implemented by the participating agencies every two years from the date of WMP approval by the Regional Water Board (or by the Executive Officer on behalf of the Regional Water Board). The purpose of the adaptive management process is to improve the effectiveness of the WMP based on – but not limited to – consideration of the following:

1. Progress toward achieving interim and/or final water quality-based effluent limitations and/or receiving water limitations in §VI.E and Attachments L through R of the MS4 Permit, according to established compliance schedules;
2. Progress toward achieving improved water quality in MS4 discharges and achieving receiving water limitations through implementation of the watershed control measures based on an evaluation of outfall-based monitoring data and receiving water monitoring data;
3. Achievement of interim milestones;
4. Re-evaluation of the water quality priorities identified for the Watershed Management Area (WMA) based on more recent water quality data for discharges from the MS4 and the receiving water(s) and a reassessment of sources of pollutants in MS4 discharges;
5. Availability of new information and data from sources other than the MS4 Permittees' monitoring program(s) within the WMA that informs the effectiveness of the actions implemented by the Permittees;
6. Regional Water Board recommendations; and
7. Recommendations for modifications to the Watershed Management Program solicited through a public participation process.

9.1 MODIFICATIONS

Based on the results of the adaptive management process, the participating agencies may find that modifications of the WMP are necessary to improve effectiveness. Modifications may include new compliance deadlines and interim milestones, with the exception of those compliance deadlines established in a TMDL.

9.1.1 REPORTING

Modifications are reported in the Annual Report, as required pursuant to Part XVIII.A.6 of the Permit Monitoring and Reporting Program (No. CI-6958), and as part of the Report of Waste Discharge (ROWD) required pursuant to Part II.B of Attachment D – Standard Provisions. The background and rational for these modifications are included by addressing the following points:

- Identify the most effective control measures and describe why the measures were effective and how other control measures will be optimized based on past experiences.

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- Identify the least effective control measures and describe why the measures were deemed ineffective and how the control measures will be modified or terminated.
- Identify significant changes to control measures during the prior year and the rationale for the changes.
- Describe all significant changes to control measures anticipated to be made in the next year and the rationale for the changes. Those changes requiring approval of the Regional Water Board or its Executive Officer shall be clearly identified at the beginning of the Annual Report.
- Include a detailed description of control measures to be applied to New Development or Re-development projects disturbing more than 50 acres.
- Provide the status of all multi-year efforts that were not completed in the current year and will continue into the subsequent year(s).

9.1.2 IMPLEMENTATION

Modifications are implemented upon approval by the Regional Water Board Executive Officer or within 60 days of submittal if the Regional Water Board Executive Officer expresses no objections.

9.2 RECEIVING WATER LIMITATIONS

The adaptive management process fulfills the requirements in MS4 Permit §V.A.4 to address continuing exceedances of receiving water limitations.

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10 REPORTING PROGRAM & ASSESSMENT

10.1 ANNUAL REPORT

PERMIT MRP §XV.A (LA/LB)

Each year on or before December 15th, the participating agencies will submit, either jointly or individually, an annual report to the Regional Water Board Executive Officer. The annual report will present a summary of information that will allow the Regional Board to assess implementation and effectiveness of the watershed management program[1].

The reporting process is intended to meet the following objectives:

- Each agency's participation in one or more Watershed Management Programs.
- The impact of each agency's storm water and non-storm water discharges on the receiving water.
- Compliance with receiving water limitations, numeric water quality-based effluent limitations, and non-storm water action levels.
- The effectiveness of control measures in reducing discharges of pollutants from the MS4 to receiving waters.
- Whether the quality of MS4 discharges and the health of receiving waters is improving, staying the same, or declining as a result watershed management program efforts, and/or TMDL implementation measures, or other Minimum Control Measures.
- Whether changes in water quality can be attributed to pollutant controls imposed on new development, re-development, or retrofit projects.

Annual Report will identify data collected and strategies, control measures and assessments implemented for each watershed within the participating agency's jurisdiction. The report will include summaries for each of the following seven sections as required by the MS4 Permit:

1) Stormwater Control Measures - Summary of New Development/Re-development Projects, actions to comply with TMDL provisions
2) Effectiveness Assessment of Stormwater Control Measures - Summary of rainfall data, provide assessment and compare water quality data, summary to whether or not water quality is improving
3) Non-Stormwater Control Measures - Summary of outfalls screening
4) Effectiveness Assessment of Non-Storm Water Control Measures - Summary of the effectiveness of control measures implemented
5) Integrated Monitoring Compliance Report - Report with summary of all identified exceedances of outfall-based stormwater monitoring data, we weather receiving water monitoring data, dry weather receiving water data and non-storm water outfall monitoring data
6) Adaptive Management Strategies - Summary of effective, less effective control measures

[1] Annual reports will cover summary from previous fiscal year beginning June 1st through July 30th.

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7) Supporting Data and Information - Monitoring data summary

The participating agencies will submit annual reports as required by the MS4 Permit. The Regional Board is currently preparing a reporting format. Once available, the reporting form will be incorporated into the WMP as an appendix.

10.1.1 DATA REPORTING

PERMIT MRP §XIV.L (LA/LB)

Analytical data reports will be submitted on a semi-annual basis. Data will be sent electronically to the Regional Water Board's Storm Water site at MS4stormwaterRB4@waterboards.ca.gov. These data reports will summarize:

- Exceedances of applicable WQBELs, receiving water limitations, or any available interim action levels or other aquatic toxicity thresholds.
- Basic information regarding sampling dates, locations, or other pertinent documentation.

10.1.2 CHRONIC TOXICITY REPORTING

PERMIT MRP §XII.K (LA/LB)

Aquatic toxicity monitoring results will be submitted to the Regional Board on an annual basis as part of the integrated monitoring compliance report as well as in the semi-annual basis data report submittal.

10.2 WATERSHED REPORT

PERMIT MRP §XVII.A (LA/LB)

The participating agencies will submit biennial watershed reports as required by the MS4 Permit to the Regional Water Board Executive Officer. This biennial report, which will be included in the annual report in odd years, will include information related to the following sections:

- Watershed Management Area
- Subwatershed (HUC-12) Description
- Permittees Drainage Area within the Subwatershed

Per MS4 Permit § XVII.B, the participating agencies may reference the Watershed Management Program (WMP) in the odd-year report, when the required information is already included or addressed in this WMP, to satisfy baseline information requirements.

The Regional Board is currently preparing a reporting format. Once available, the reporting form will be incorporated into the WMP as an appendix.

10.3 TMDL REPORTING

PERMIT MRP §XIX (LA/LB)

The participating agencies will also submit an annual report to the Regional Water Board Executive Officer regarding progress of TMDL implementation within the watershed.

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The TMDLs that will be addressed in the report are:

- Trash
- Nitrogen Compounds
- Metals
- Bacteria, and
- Harbor Toxics

The Regional Board is currently preparing a reporting format. Once available, the reporting form will be incorporated into the WMP as an appendix.

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Watershed Management Program Appendix 1

A-1-1 Definitions, Acronyms and Abbreviations

DEFINITIONS, ACRONYMS AND ABBREVIATIONS

The following are definitions for terms in this Watershed Management Program:

Bacteria Total Maximum Daily Load (TMDL) Dry Weather: Defined in the Bacteria TMDLs as those days with less than 0.1 inch of rainfall and those days occurring more than 3 days after a rain.

Bacteria Total Maximum Daily Load (TMDL) Wet Weather: Defined in the Bacteria TMDLs as a day with 0.1 inch or more of rain and 3 days following the rain event.

Baseline Waste Load Allocation: The Waste Load Allocation assigned before reductions are required. The progressive reductions in the Waste Load Allocations are based on a percentage of the Baseline Waste Load Allocation. The Baseline Waste Load Allocation for each jurisdiction was calculated based on the annual average amount of trash discharged to the storm drain system from a representative sampling of land use areas, as determined during the Baseline Monitoring Program.

Basin Plan: The Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments.

Beneficial Uses: The existing or potential uses of receiving waters as designated by the Regional Board in the Basin Plan.

Best Management Practices (BMPs): BMPs are practices or physical devices or systems designed to prevent or reduce pollutant loading from and or volume of stormwater or nonstormwater discharges to receiving waters.

Commercial Development: Any development on private land that is not heavy industrial or residential. The category includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities; mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes.

Commercial Malls: Any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers.

Daily Generation Rate (DGR): The estimated amount of trash deposited within a representative drainage area during a 24hour period, derived from the amount of trash collected from streets and catch basins in the area over a 30-day period.

Disturbed Area: An area that is altered as a result of clearing, grading, and/or excavation.

Effluent Limitation: Any restriction imposed on quantities, discharge rates, and concentrations of pollutants, which are discharged from point sources to waters of the U.S.

Environmentally Sensitive Areas (ESAs): An area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments (California Public Resources Code § 30107.5). Areas subject to stormwater mitigation requirements are: areas designated as Significant Ecological Areas by the County of Los Angeles (Los Angeles County Significant Areas

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Study, Los Angeles County Department of Regional Planning (1976) and amendments); an area designated as a Significant Natural Area by the California Department of Fish and Game's Significant Natural Areas Program, provided that area has been field verified by the Department of Fish and Game; an area listed in the Basin Plan as supporting the "Rare, Threatened, or Endangered Species (RARE)" beneficial use; and an area identified by a Permittee as environmentally sensitive.

Estuaries: Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater.

Hillside: Property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes.

Hydrologic Unit Code (HUC): A standardized watershed classification system in which each hydrologic unit is identified by a unique hydrologic unit code (HUC).

Illicit Connection: Any man-made conveyance that is connected to the storm drain system without a permit, excluding roof drains and other similar type connections. Examples include channels, pipelines, conduits, inlets, or outlets that are connected directly to the storm drain system.

Illicit Discharge: Any discharge into the MS4 or from the MS4 into a receiving water that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations.

Industrial/Commercial Facility: Any facility involved and/or used in the production, manufacture, storage, transportation, distribution, exchange or sale of goods and/or commodities, and any facility involved and/or used in providing professional and non-professional services. This category of facilities includes, but is not limited to, any facility defined by either the Standard Industrial Classifications (SIC) or the North American Industry Classification System (NAICS). Facility ownership (federal, state, municipal, private) and profit motive of the facility are not factors in this definition.

Industrial Park: A land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry.

Institutional Controls: Programmatic control measures that do not require construction or structural modifications to the MS4. Examples include street sweeping, public education, and clean out of catch basins that discharge to storm drains.

Integrated Pest Management (IPM): An ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties.

Low Impact Development (LID): LID consists of building and landscape features designed to retain or filter stormwater runoff.

Low Impact Development (LID) Plan: See "SUSMP" definition.

Maximum Extent Practicable (MEP): The process in choosing effective BMPs and rejecting applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs would not be technically feasible, or the cost would be prohibitive.

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National Pollutant Discharge Elimination System (NPDES): The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA §307, 402, 318, and 405.

Natural Drainage System: A natural drainage system is a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

New Development: Land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision.

Nonstormwater Discharge: Any discharge into the MS4 or from the MS4 into a receiving water that is not composed entirely of stormwater.

Not Detected (ND): Sample results which are less than the laboratory's minimum detection level.

Nuisance: Anything that meets all of the following requirements: (1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; (2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.; (3) occurs during, or as a result of, the treatment or disposal of wastes.

Receiving Water: A "water of the United States" into which stormwater runoff is or may be discharged.

Receiving Water Limitation: Any applicable numeric or narrative water quality objective or criterion, or limitation to implement the applicable water quality objective or criterion.

Redevelopment: Land-disturbing activity that results in the creation, addition, or replacement of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of a routine maintenance activity; and land disturbing activities related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

Significant Ecological Areas (SEAs): An area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan.

Source Control BMP: Any schedules of activities, prohibitions of practices, maintenance procedures, managerial practices or operational practices that aim to prevent stormwater pollution by reducing the potential for contamination at the source of pollution.

SUSMP: The Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP shall address the Planning and Land Development conditions and requirements of the MS4 Permit.

Wet Season: The calendar period beginning October 1 through April 15.

Acronym/Abbreviation	Full Phrase/Definition
µg/L	micrograms per Liter
303(d) List	California's Clean Water Act Section 303(d) List
ASBS	Areas of Special Biological Significance
Basin Plan	Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties
BMP	Best Management Practices
Caltrans Permit	The State Board's Caltrans NPDES Permit, Order No. 2012-0011-DWQ
CASQA	California Stormwater Quality Association
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGP	The State Board's Construction General Permit Order No. 2009-0009-DWQ, or as amended.
CIMP	The Lower Los Angeles River Watershed Group Coordinated Integrated Monitoring Program.
Cities	The Lower Los Angeles River Watershed Group participating cities, only.
County	The LACFCD and the LA County DPW
CTR	California Toxics Rule
CWA	Clean Water Act
CWC	California Water Code
DC	Development Construction Program
ELRS	Equivalent Load Reduction Strategy
EPA	United States Environmental Protection Agency
GIS	Geographical Information System
gpd	gallons per day
GWMA	Gateway Water Management Authority
HUC	Hydrologic Unit Code
ICF	Industrial/Commercial Facilities Program
ICID	Illicit Connection and Illicit Discharge Elimination Program
IGP	The State Board's Industrial Storm Water General Permit Order No. 2014-0057-DWQ, or as amended.
INI	Initiatives (as defined in the WMP)
IPM	Integrated Pest Management
JSWMP	Jurisdictional Stormwater Management Program
LA	Load Allocations
LA County DPW	Los Angeles County Department of Public Works
LA MS4 Permit	The Los Angeles Regional Water Quality Control Board Order No. R4-2012-0175, only (excluding LB MS4 and Caltrans Permits).
LACFCD	Los Angeles County Flood Control District
LB MS4 Permit	The Los Angeles Regional Water Quality Control Board Order No. R4-2014-0024, only (excluding LA MS4 and Caltrans Permits).
LID	Low Impact Development
LID Plan	Low Impact Development Plan

Acronym/Abbreviation	Full Phrase/Definition
Lower LAR Watershed	Lower Los Angeles River Watershed
MCM	Minimum Control Measure
MEP	Maximum Extent Practicable
mg/L	milligrams per Liter
MGD	Million Gallons Per Day
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
MS4 Permit	The Los Angeles Regional Water Quality Control Board Order No. R4-2012-0175 and Order No. R4-2014-0024.
NAICS	North American Industry Classification System
NPDES	National Pollutant Discharge Elimination System
NSWD	Nonstormwater Discharge
Ocean Plan	Water Quality Control Plan for Ocean Waters of California
PAA	Public Agency Activities Program
Participating Agencies	The Lower Los Angeles River Watershed Group participating agencies, excluding Caltrans.
PEP	Progressive Enforcement Policy
Permittees	The County of Los Angeles and 85 cities within the coastal watersheds of Los Angeles County
PIP	Public Information and Participation Program
PLD	Planning and Land Development Program
PMP	Pollutant Minimization Plan
POTW	Publicly Owned Treatment Works
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
RAA	Reasonable Assurance Analysis
RAP	Reasonable Assurance Program
REAP	Rain Event Action Plan
Regional Board	California Regional Water Quality Control Board, Los Angeles Region
RP	Responsible Party
SEA	Significant Ecological Area
SIC	Standard Industrial Classification
SMARTS	State Water Resources Control Board's Storm Water Multiple Application and Report Tracking System
SQMP	Stormwater Quality Management Programs
SSO	Sewer Leaks, sanitary sewer overflow
State Board	California State Water Resources Control Board
State Listing Policy	State Board's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List

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Acronym/Abbreviation	Full Phrase/Definition
SUSMP	Standard Urban Stormwater Mitigation Plan
SWPPP	Stormwater Pollution Prevention Plan
SWQDv	Stormwater Quality Design Volume
TAC	Technical Advisory Committee
TCM	Targeted Control Measure
TMDL	Total Maximum Daily Load
TRA	Training
TSS	Total Suspended Solids
WAG	Watershed Authority Group
WDID	Waste Discharge Identification
WLA	Waste Load Allocations
WMP	The Lower Los Angeles River Watershed Group Watershed Management Program
WQBEL	Water Quality Based Effluent Limitations
WQO	Water Quality Objective
WQP	Water Quality Priority
WRP	Water Reclamation Plant

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Watershed Management Program Appendix 2

A-2-1 2010 303(d) List

Lower LA River Watershed 303(d) Listed Segments

REGION NAME	WATER BODY NAME	POLLUTANT	POLLUTANT CATEGORY	COMMENTS INCLUDED ON 303(d) LIST	POTENTIAL SOURCES	SOURCE CATEGORY
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Chlordane (sediment)	Pesticides	Historical use of pesticides and lubricants.	Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	DDT (sediment)	Pesticides	Historical use of pesticides and lubricants.	Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	PCBs (Polychlorinated biphenyls) (sediment)	Other Organics	Historical use of pesticides and lubricants.	Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Sediment Toxicity	Toxicity		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Ammonia	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Ammonia	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Cadmium	Metals/Metalloids		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Copper, Dissolved	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Copper, Dissolved	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Cyanide	Other Inorganics		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Diazinon	Pesticides		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Nutrients (Algae)	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Nutrients (Algae)	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Zinc, Dissolved	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Zinc, Dissolved	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	pH	Miscellaneous		Point Source	Unspecified Point Source

Lower LA River Watershed 303(d) Listed Segments

Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	pH	Miscellaneous		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Ammonia	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Ammonia	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Copper	Metals/Metalloids		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Nutrients (Algae)	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Nutrients (Algae)	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Oil	Nuisance		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Compton Creek	Benthic-Macroinvertebrate Bioassessments	Miscellaneous		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Compton Creek	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Compton Creek	Copper	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Compton Creek	Copper	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Compton Creek	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	pH	Miscellaneous		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	pH	Miscellaneous		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Copper	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Copper	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Toxicity	Toxicity		Nonpoint Source	Unspecified Nonpoint Source

Lower LA River Watershed 303(d) Listed Segments

Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Toxicity	Toxicity		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Zinc	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Zinc	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	pH	Miscellaneous		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	pH	Miscellaneous		Nonpoint Source	Unspecified Nonpoint Source

Watershed Management Program Appendix 2

A-2-2 Mass Emission Station Monitoring Results

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	4.1	11.9	1.9	1.4	0	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.016	0	0.0763	0	0	0.051
pH	Comp	SM4500H B	0-14		8.85	7.01	7.44	7.09	8.44	9.87
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	14.2	8.34	7.6	6.74	8.6	5.04
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20	MPN/100ml	2200000	50000	900000	1300000	22000	500
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	1400000	30000	11000	800000	1100	20
Ratio Fecal Coliform/Total Coliform					0.64	0.6	0.012	0.62	0.05	0.04
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	700000	240000	230000	300000	500	700
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	170000	80000	80000	300000	500	300
General										
Chloride	Comp	EPA300.0	2	mg/L	111	6.73	10.9	13.2	121	108
Fluoride	Comp	EPA300.0	0.1	mg/L	0.48	0.11	0.24	0.15	0.49	0.6
Nitrate	Comp	EPA300.0	0.1	mg/L	29.9	2.99	3.84	2.52	1.45	3.6
Sulfate	Comp	EPA300.0	0.1	mg/L	123.8	9.42	13.8	22.6	147	124
Alkalinity	Comp	EPA310.1	4	mg/L	139	32	55	53.9	213	94
Hardness	Comp	EPA130.2	2	mg/L	210	48	52.8	76	340	230
COD	9i	EPA410.4	10	mg/L	101.9	21.8	93	34	176.3	110.5
TPH	Grab	EPA418.1	1	mg/L	1.6	0	4.3	1.5	0	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	996	133.2	175.1	212	1100	1146
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	572	96	108	146	732	780
Turbidity	Comp	EPA180.1	0.1	NTU	5.33	140	73.7	118.2	1.48	6.19
Total Suspended Solids	Comp	EPA160.2	2	mg/L	11	172	197	1045	105	97
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	10	20	14	10	42	44
MBAS	Comp	EPA425.1	0.05	mg/L	0.127	0	0.104	0.062	0.079	0.138
Total Organic Carbon	Comp	EPA415.1	1	mg/L	14.4	6.51	10.1	5.65	11.3	17.1
BOD	Comp	SM5210B	2	mg/L	65.86	16.2	12.2	7.6	62.9	198
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.684	0.087	0.37	0.181	0.78	0.288
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	0.774	0.441	0.491	0.193	0.809	0.356
NH3-N	Comp	EPA350.3	0.1	mg/L	2.34	0.184	0.373	0	1.47	3.59
Nitrate-N	Comp	SM4110B	0.5	mg/L	6.75	0.675	0.87	0.569	0.327	0.813
Nitrite-N	Comp	SM4110B	0.03	mg/L	0	0	0.63	0	0.609	1.34
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	4	0.135	3.26	12.5	1.98	3.9
Metals										
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	126	118	0	185	0	0
Dissolved Antimony	Comp	EPA200.8	5	ug/l	1.37	1.06	1	0.71	0.69	0.76
Total Antimony	Comp	EPA200.8	5	ug/l	1.37	1.09	1.05	0.86	0.69	0.77
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	2.06	2.61	1.25	0	3.43	0
Total Arsenic	Comp	EPA200.8	5	ug/l	2.06	5.84	1.32	1.48	3.43	0
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0.27	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	0.42	0	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	2.01	0.94	3.1	6.99	3.05	1.24
Total Chromium	Comp	EPA200.8	5	ug/l	3.15	11.8	4.64	9.47	12.5	2.63
Dissolved Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Total Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	14.1	5.21	5.51	7.07	4.77	10.4
Total Copper	Comp	EPA200.8	5	ug/l	25.9	19	12.9	9.56	10	14

RB-AR11455

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Dissolved Iron	Comp	EPA200.8	100	ug/l	0	276	679	0	0	0
Total Iron	Comp	EPA200.8	100	ug/l	306	375	686	404	206	166
Dissolved Lead	Comp	EPA200.8	5	ug/l	0.76	3.1	4.29	0	0.63	0
Total Lead	Comp	EPA200.8	5	ug/l	5.35	9.91	4.62	2.26	1.82	0.97
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	7.22	3.24	7.52	5.54	5.62	6.29
Total Nickel	Comp	EPA200.8	5	ug/l	10	16.1	8.61	6.84	21.8	6.99
Dissolved Selenium	Comp	EPA200.8	5	ug/l	4.07	0	0	0	2.04	0
Total Selenium	Comp	EPA200.8	5	ug/l	4.07	0	0	0	2.04	0
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	45.3	35	74	10	25.1	54
Total Zinc	Comp	EPA200.8	50	ug/l	54	50	83	46	25.1	85
Semi-Volatiles Organics (EPA 625)										
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dichloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dimethylpheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dinitropheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-chloro_3_methylpheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Pentachloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Dimethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0

RB-AR11456

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0	0	0.179	0.05	0.155	0.037

RB-AR11457

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

RB-AR11458

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	0	12	0	1.3	1.6	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.043	0	0.009	0	0	0.009
pH	Comp	SM4500H B	0-14		7.67	6.95	7.64	7.37	6.57	9.36
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	8.6	8.3	9.83	9.58	7.29	16.57
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20	MPN/100ml	1300000	170000	500000	170000	130000	2300
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	300000	80000	300000	80000	80000	40
Ratio Fecal Coliform/Total Coliform					0.23	0.47	0.6	0.47	0.62	0.017
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	500000	300000	240000	90000	300000	40
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	300000	80000	130000	90000	130000	40
General										
Chloride	Comp	EPA300.0	2	mg/L	15.7	4.56	17.5	759	27.2	90
Fluoride	Comp	EPA300.0	0.1	mg/L	0.33	0.11	0.21	0	0	0.3
Nitrate	Comp	EPA300.0	0.1	mg/L	7.03	4.79	5.04	7.06	23.7	14.2
Sulfate	Comp	EPA300.0	0.1	mg/L	20.2	9.17	17.5	12.8	12.1	87
Alkalinity	Comp	EPA310.1	4	mg/L	75	16	44	27.5	16.5	77
Hardness	Comp	EPA130.2	2	mg/L	110	40	119	40	20.8	210
COD	9i	EPA410.4	10	mg/L	101.1	29.9	113	117	25	67.9
TPH	Grab	EPA418.1	1	mg/L	1.1	1.2	1.1	0	1.2	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	395	122.3	209	160	93.3	912
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	224	86	116	98	64	556
Turbidity	Comp	EPA180.1	0.1	NTU	244	82.5	36.5	47.3	58.3	0.72
Total Suspended Solids	Comp	EPA160.2	2	mg/L	266	72	79	305	109	7
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	64	11	4.9	26	1	7
MBAS	Comp	EPA425.1	0.05	mg/L	0.156	0	0.056	0	0	0.055
Total Organic Carbon	Comp	EPA415.1	1	mg/L	27.9	5.11	8.79	4.39	4.74	5.89
BOD	Comp	SM5210B	2	mg/L	66.08	11.3	11.8	16	31.5	76.1
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.471	0.393	0.264	0.253		0.057
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	0.59	0.443	0.276	0.4		0.065
NH3-N	Comp	EPA350.3	0.1	mg/L	1.02	0.124	0	0		0.181
Nitrate-N	Comp	SM4110B	0.5	mg/L	1.59	1.08	1.14	1.29	5.352	3.21
Nitrite-N	Comp	SM4110B	0.03	mg/L	0.816	0	0.12	0	0	0.213
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	1.81	0.322	1.58	3.46	4.08	0.98
Metals										
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	335	182	123	140	484	117
Dissolved Antimony	Comp	EPA200.8	5	ug/l	2.53	0.89	1.16	0.64	0.6	0
Total Antimony	Comp	EPA200.8	5	ug/l	2.7	0.91	1.2	0.65	0.66	0
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	0	1.26	1.11	0	0	0
Total Arsenic	Comp	EPA200.8	5	ug/l	2.41	1.34	1.19	0	0	0
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	0.33	0	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	1.42	0.83	2.23	1.33	2.17	0.66
Total Chromium	Comp	EPA200.8	5	ug/l	3.25	11.8	6.05	5.81	9.44	2.15
Dissolved Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Total Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	19.9	4.43	12.3	4.78	5.9	3.51
Total Copper	Comp	EPA200.8	5	ug/l	34	10.7	19.3	11.6	12.1	5.58

RB-AR11459

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Dissolved Iron	Comp	EPA200.8	100	ug/l	1070	181	283	0	218	0
Total Iron	Comp	EPA200.8	100	ug/l	1070	401	392	564	620	131
Dissolved Lead	Comp	EPA200.8	5	ug/l	2.25	1.46	2.74	0	0	0
Total Lead	Comp	EPA200.8	5	ug/l	20	2.48	2.82	3.14	3.85	0.71
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	7.55	1.63	4.05	2.05	1.51	3.76
Total Nickel	Comp	EPA200.8	5	ug/l	8.04	14.9	9.26	5.89	5.2	4.75
Dissolved Selenium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Selenium	Comp	EPA200.8	5	ug/l	1.27	0	0	0	0	0
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	61.3	29	55	15	19	66
Total Zinc	Comp	EPA200.8	50	ug/l	128	86	68	39	53	76
Semi-Volatiles Organics (EPA 625)										
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dichloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dimethylpheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dinitropheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-chloro_3_methylpheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Pentachloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l		0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l		0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l		0	0	0	0	0
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l		0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l		0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l		0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l		0	0	0	0	0
Dimethyl phthalate	Comp	EPA625	0.5	ug/l		0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l		0	0	0	0	0

RB-AR11460

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l		0	0	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l		0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l		0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l		0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l		0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l		0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l		0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l		0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l		0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l		0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l		0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0.54	0	0.49	0.042	0.065	0

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

RB-AR11462

WEATHER CONDITION					Wet	Wet	Wet	Dry	Dry
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units					
Conventional									
Oil and Grease	Grab	EPA413.1	1	mg/L	0	3.2	4.8	0	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.062	0.02	0.009	0.057	0.036
pH	Comp	SM4500H B	0-14		7.35	6.55	6.3	7.47	7.05
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	2.5	6.6	9.54	9.64	13.48
Indicator Bacteria									
Total Coliform	Grab	SM9230B	20	MPN/100ml	800000	240000	1700000	220000	230
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	170000	240000	1300000	28000	230
Ratio Fecal Coliform/Total Coliform					0.21	1	0.764705882	0.127272727	1
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	500000	300000	170000	8000	700
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	170000	300000	36000	5000	700
General									
Chloride	Comp	EPA300.0	2	mg/L	29	7.58	8.18	131	101
Fluoride	Comp	EPA300.0	0.1	mg/L	0.39	0.19	0	0.51	0.23
Nitrate	Comp	EPA300.0	0.1	mg/L	0	5.1	7.58	12.6	27.5
Sulfate	Comp	EPA300.0	0.1	mg/L	26.9	16	11.3	154	97.4
Alkalinity	Comp	EPA310.1	4	mg/L	79.2	43	34	141	141
Hardness	Comp	EPA130.2	2	mg/L	105	50	42	215	230
COD	9i	EPA410.4	10	mg/L	121	33.5	22.7	80.6	197
TPH	Grab	EPA418.1	1	mg/L	0	0	3.8	0	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	350	153.2	133.8	1095	774
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	216	124	92	620	524
Turbidity	Comp	EPA180.1	0.1	NTU	36.7	81	2.43	1.03	1.96
Total Suspended Solids	Comp	EPA160.2	2	mg/L	1339	355	113	11	6
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	265	89	25	4	3
MBAS	Comp	EPA425.1	0.05	mg/L	0.202	0.12	0.123	0.07	0.07
Total Organic Carbon	Comp	EPA415.1	1	mg/L	45.4	10.8	7.06	13.2	7.05
BOD	Comp	SM5210B	2	mg/L	94.4	25.1	15.5	8.13	80.4
Nutrients									
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.895	0.325	0.254	0.615	0.544
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	1.07	0.38	0.296	8.24	0.64
NH3-N	Comp	EPA350.3	0.1	mg/L	2.8	0	0	0	0
Nitrate-N	Comp	SM4110B	0.5	mg/L	0	1.15	1.71	2.845	6.21
Nitrite-N	Comp	SM4110B	0.03	mg/L	0	0.052	0.03	1.6	0.49
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	4.92	2.08	0.806	3.3	0.978
Metals									
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	14600	117	144	0	0
Dissolved Antimony	Comp	EPA200.8	5	ug/l	1.63	1.45	1.39	0.93	0.85
Total Antimony	Comp	EPA200.8	5	ug/l	7.24	1.5	1.43	0.97	0.88
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	2.01	1.64	1.18	2.81	1.32
Total Arsenic	Comp	EPA200.8	5	ug/l	6.28	1.68	1.27	2.81	1.86
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	4.7	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	2.75	1.6	2.65	13.1	2.83
Total Chromium	Comp	EPA200.8	5	ug/l	35.3	6.12	6.23	26.1	4.78
Dissolved Chromium □6	Comp	EPA200.8	10	ug/l	0	0	0	0	0
Total Chromium □6	Comp	EPA200.8	10	ug/l	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	4.48	7.99	10.6	10	6.73
Total Copper	Comp	EPA200.8	5	ug/l	295	20.7	16.2	19.9	8.65
Dissolved Iron	Comp	EPA200.8	100	ug/l	476	171	144	0	0
Total Iron	Comp	EPA200.8	100	ug/l	28600	412	351	154	106
Dissolved Lead	Comp	EPA200.8	5	ug/l	2.34	2.35	3.22	0.92	0
Total Lead	Comp	EPA200.8	5	ug/l	1070	3.24	3.8	1.61	0.81
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	9.9	5.21	4.11	7.23	5.23
Total Nickel	Comp	EPA200.8	5	ug/l	38.8	6.35	7.3	7.39	7.47
Dissolved Selenium	Comp	EPA200.8	5	ug/l	1.49	0	0	2.48	1.41
Total Selenium	Comp	EPA200.8	5	ug/l	1.84	0	0	2.9	1.87
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	2.91	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	17.4	59	79	22.3	97
Total Zinc	Comp	EPA200.8	50	ug/l	1030	81	104	22.3	133
Semi-Volatiles Organics (EPA 625)									
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0
2,4-dichlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0
2,4-dimethylphenol	Comp	EPA625	2	ug/l	0	0	0	0	0
2,4-dinitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0
4-chloro_3_methylphenol	Comp	EPA625	3	ug/l	0	0	0	0	0
Pentachlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0

RB-AR11463

WEATHER CONDITION						Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units					
Base/Neutral									
Acenaphthene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l	0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l	62	0	24.6	22.1	50.9
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l	0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0.9	0	0
Dimethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	1.6	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l	0	0	0	4.7	0
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l	0	0	5.2	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0
Chlorinated Pesticides									
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0
Polychlorinated Biphenyls									
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Organohosphate Pesticides									
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0	0	0	0	0
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0

RB-AR11464

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units					
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0
Herbicides									
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

RB-AR11465

WEATHER CONDITION					Wet				Dry	
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	2/2/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	0	0	2	1.9	0	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0	0.01	0.01	0	0.025	0.005
pH	Comp	SM4500H B	0-14		7.01	6.49	6.51	6.95	7.72	6.49
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	10.7	7.97	9.58	8.56	10.21	9.64
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20	MPN/100ml	240000	500000	170000	130000	50000	3000
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	130000	500000	50000	17000	50000	1300
Ratio Fecal Coliform/Total Coliform					0.54	1.00	0.29	0.13	1.00	0.43
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	500000	170000	90000	170000	230	2400
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	300000	170000	13000	170000	230	2400
General										
Chloride	Comp	EPA300.0	2	mg/L	39.6	11.8	13.6	6.68	80.1	11.8
Fluoride	Comp	EPA300.0	0.1	mg/L	0.14	0.14	0.1	0	0.21	0.14
Nitrate	Comp	EPA300.0	0.1	mg/L	0	4.06	7.75	4.61	23.3	4.06
Sulfate	Comp	EPA300.0	0.1	mg/L	65.1	12.7	12.4	7.81	86.7	12.7
Alkalinity	Comp	EPA310.1	4	mg/L	116	43	39.6	31.9	99	43
Hardness	Comp	EPA130.2	2	mg/L	175	56	50.4	48	160	56
COD	9i	EPA410.4	10	mg/L	88.2	23.4	31.2	27.4	31.9	23.4
TPH	Grab	EPA418.1	1	mg/L	0	0	1.1	2.5	0	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	485	177.9	174.8	124.1	644	177.9
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	296	134	108	80	418	134
Turbidity	Comp	EPA180.1	0.1	NTU	5.5	74	12.6	102	0.75	74
Total Suspended Solids	Comp	EPA160.2	2	mg/L	1186	317	129	305	91	317
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	342	86	41	74	23	86
MBAS	Comp	EPA425.1	0.05	mg/L	0.195	0.078	0.114	0.092	0.099	0.078
Total Organic Carbon	Comp	EPA415.1	1	mg/L	14.4	7.03	8.42	8.62	8.23	7.03
BOD	Comp	SM5210B	2	mg/L	79.9	8.6	24.1	27.3	22.7	8.6
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.857	0.427	0.327	0.311	0.353	0.427
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	1.03	0.481	0.381	0.355	0.387	0.481
NH3-N	Comp	EPA350.3	0.1	mg/L	3.66	0	0	0.109	0.124	0
Nitrate-N	Comp	SM4110B	0.5	mg/L	0	0.917	1.75	1.04	5.26	0.917
Nitrite-N	Comp	SM4110B	0.03	mg/L	0.113	0.043	0	0	0.304	0.043
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	12.8	7	3.1	2.66	1.554	7
Metals										
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	750	0	0	0	107	0
Dissolved Antimony	Comp	EPA200.8	5	ug/l	1.41	1.09	1.78	1.05	1.62	1.09
Total Antimony	Comp	EPA200.8	5	ug/l	4.81	1.15	1.82	1.08	1.85	1.15
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	1.83	1.35	1.4	1.28	1.01	1.35
Total Arsenic	Comp	EPA200.8	5	ug/l	4.29	1.42	1.46	1.51	1.36	1.42
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	1.42	0	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	3.33	1.38	2.24	1.28	1.51	1.38
Total Chromium	Comp	EPA200.8	5	ug/l	15.5	5.72	2.72	1.9	5.49	5.72
Dissolved Chromium □6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Total Chromium □6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	6.63	8.2	12.1	11.2	12.1	8.2
Total Copper	Comp	EPA200.8	5	ug/l	123	21.2	14	12.4	23.9	21.2
Dissolved Iron	Comp	EPA200.8	100	ug/l	394	0	0	0	0	0
Total Iron	Comp	EPA200.8	100	ug/l	12500	301	174	110	165	301
Dissolved Lead	Comp	EPA200.8	5	ug/l	0.815	1.15	1.85	0.76	1.66	1.15
Total Lead	Comp	EPA200.8	5	ug/l	71.1	2.12	2.48	2.06	2.09	2.12
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	9.77	2.38	4.17	2.26	6.93	2.38
Total Nickel	Comp	EPA200.8	5	ug/l	21.8	4.07	4.96	2.58	11.6	4.07
Dissolved Selenium	Comp	EPA200.8	5	ug/l	1.86	0	0	0	1.04	0
Total Selenium	Comp	EPA200.8	5	ug/l	1.86	0	0	0	1.13	0
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	0.808	0	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	8.97	49	60	34	84	49
Total Zinc	Comp	EPA200.8	50	ug/l	395	68	86	50	87	68
Semi-Volatiles Organics (EPA 625)										
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dichlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dimethylphenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dinitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0

RB-AR11466

WEATHER CONDITION					Wet				Dry	
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	2/2/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units						
4-chloro_3_methylphenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Pentachlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l	48.2	35.6	20.8	0	29.5	35.6
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l	0	1.1	1.4	0	0.9	1.1
Dimethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l	0	0	4.3	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l	0	0	0.3	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0

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WEATHER CONDITION					Wet				Dry	
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	2/2/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units						
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0.202	0	0	0	0	0
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
General Chemistry												
Cyanide	0.01	mg/L	0.004				0.013	1.200	0.009	0.005	0.055	0.024
pH	mg/L			6.5 pH 8.5			6.80	6.56	6.16	6.87	9.40	8.29
TPH	1						0.00	0.00	2.00	1.50	0.00	0.00
Oil and Grease	1	mg/L	75				1.70	0.00	2.20	1.60	0.00	0.00
Total Phenols	0.1	mg/L					0.00	9.60	0.00	0.00	0.00	0.00
Dissolved Oxygen	1	mg/L		5			6.26		7.90	8.30	8.82	11.98
Calcium	1	mg/L					32.10	13.60	12.00	12.00	56.10	80.00
Magnesium	1	mg/L					4.86	3.40	2.43	3.04	13.40	34.00
Potassium	1	mg/L					9.40	2.88	3.12	1.96	11.10	6.96
Sodium	1	mg/L					18.50	13.40	12.30	12.40	95.10	63.00
Bicarbonate	2	mg/L					111.00	37.60	163.70		61.00	0.00
Carbonate	2	mg/L					0.00	0.00	0.00	0.00	66.00	0.00
Chloride	2	mg/L		150			21.30	9.89	6.39	6.28	111.00	60.50
Fluoride	0.1	mg/L		2.2			0.35	0.10	0.12	0.00	0.58	0.41
Sulfate	0.1	mg/L		350			28.90	14.30	10.40	12.30	134.00	181.00
Alkalinity	0.1	mg/L					91.30	30.80	134.20	30.80	105.00	174.00
Hardness	2	mg/L					100.0	48.0	40.0	42.5	195.0	340
COD	10	mg/L					112.70	19.40	41.90	34.95	43.00	62.10
Specific Conductance	1	umhos/cm					291	119	122	126	843	830
Total Dissolved Solids	2	mg/L		1500			186	78	74	74	582	546
Turbidity	0.1	NTU	225				211.00	30.00	1.63	17.60	1.79	1.93
Total Suspended Solids	2	mg/L					1075	551	85	146	23	35
Volatile Suspended Solids	1	mg/L					162	71	39	13	12	13
MBAS	0.05	mg/L					0.64	0.09	0.06	0.00	0.10	0.06
Total Organic Carbon	1	mg/L					38.90	7.35	6.70	7.38	12.10	5.38
BOD	2	mg/L					45.90	24.10	15.50	8.58	53.70	60.90
Nutrients												
Dissolved Phosphorus	0.05	mg/L					0.37	0.17	0.27	0.14	0.21	0.18
Total Phosphorus	0.05	mg/L					0.69	0.24	0.46	0.25	0.49	0.23
Ammonia	0.1	mg/L					4.02	0.00	1.02	0.11	1.11	1.01
NH3-N	0.1	mg/L					3.32	0.00	0.84	0.00	0.91	0.84
Nitrate	0.1	mg/L					0.00	4.77	2.66	3.55	18.10	7.23
Nitrate-N	0.5	mg/L		10			0.00	1.08	0.60	0.80	4.09	1.63
Nitrite-N	0.03	mg/L		1			0.00	0.00	0.04	0.00	1.36	0.56
Kjeldahl-N	0.1	mg/L					12.40	2.94	1.40	1.22	2.44	1.61
Indicator Bacteria												
Total Coliform	20	MPN/100ml		10,000			5,000,000	500,000	1,600,000	900,000	1,300	16,000
Fecal Coliform	20	MPN/100ml		400			240,000	50,000	500,000	160,000	170	16,000
Fecal Streptococcus	20	MPN/100ml					500,000	500,000	220,000	220,000	500	40
Enterococcus	20	MPN/100ml		104			300,000	500,000	220,000	220,000	500	40
Metals												
Dissolved Aluminum	100	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Aluminum	100	ug/l		1000			1,440	5,768	1,790	2,840	0	362
Dissolved Antimony	5	ug/l					2.68	1.25	1.43	0.65	2.11	0.57
Total Antimony	5	ug/l		6			3.25	2.55	1.78	1.14	2.11	0.59
Dissolved Arsenic	5	ug/l					2.71	1.32	1.32	0.00	1.76	1.76
Total Arsenic	5	ug/l	32	50			2.92	3.14	1.76	1.76	1.76	1.99
Dissolved Barium	10	ug/l					41.10	23.90	19.40	19.40	33.90	48.50
Total Barium	10	ug/l					77.90	152.00	50.80	64.80	37.20	56.80
Dissolved Berylium	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Beryllium	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Boron	100	ug/l					560	100	0	0	730	369
Total Boron	100	ug/l					950	1,590	0	199	1,490	618
Dissolved Cadmium	1	ug/l			1.2-3.8	1.6-8.8	0.00	0.00	0.00	0.00	0.00	0.00
Total Cadmium	1	ug/l			1.2-4.2	1.6-9.6	0.50	1.20	0.51	0.49	0.00	0.00

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
Dissolved Chromium	5	ug/l			30.9-113.0	259.1-948.2	2.00	0.76	1.09	0.85	1.60	0.76
Total Chromium	5	ug/l		50	97.7-357.7	819.9-3000.7	6.38	18.50	6.12	6.93	1.60	3.13
Dissolved Chromium □6	10	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Chromium □6	10	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Copper	5	ug/l			4.1-15.9	5.7-25.2	10.80	5.36	8.06	5.79	9.92	6.07
Total Copper	5	ug/l	12		4.3-16.5	5.9-26.2	41.50	50.60	35.20	31.10	25.50	14.50
Dissolved Iron	100	ug/l					452	0	0	159	0	0
Total Iron	100	ug/l					3,020	19,092	2,450	3,620	207	196
Dissolved Lead	5	ug/l			0.9-5.2	23.5-132.5	4.45	0.00	0.00	1.58	0.00	0.00
Total Lead	5	ug/l	8		1.0-7.44	25.4-191.1	33.90	65.00	23.80	23.40	3.60	2.40
Dissolved Manganese	30	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Manganese	30	ug/l					228	220	30	72.40	0.00	0.00
Dissolved Mercury	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Mercury	1	ug/l	0.16	2			0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Nickel	5	ug/l			24.0-91.6	215.7-823.8	15.80	3.30	3.40	2.67	5.34	4.70
Total Nickel	5	ug/l	20	100	24.0-91.8	216.1-825.5	18.30	15.40	8.79	7.59	6.11	5.36
Dissolved Selenium	5	ug/l					0.00	0.00	0.00	0.00	2.84	3.44
Total Selenium	5	ug/l	60	50			0.00	0.00	0.00	0.00	2.84	4.73
Dissolved Silver	1	ug/l				.7-10.9	0.00	0.00	0.00	0.00	0.00	0.00
Total Silver	1	ug/l	80			.8-12.8	0.00	0.71	0.00	0.00	0.00	0.00
Dissolved Thallium	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Thallium	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Zinc	50	ug/l			53.9-206.4	53.9-206.4	72.40	31.80	70.00	34.40	29.90	13.80
Total Zinc	50	ug/l			55.1-211.0	55.1-211.0	135.00	200.00	150.00	107.00	40.80	34.30
Semi-Volatiles												
Acenaphthylene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Acetophenone	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Anthracene	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Antracene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aminobiphenyl	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzidine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(a)anthracene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(b)fluoranthene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(k)flouranthene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(a)pyrene	0.1	ug/l		0.2			0.00	0.00	0.00	0.00	0.00	0.00
Butyl benzyl phthalate	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Bis(2-chloroethyl)ether	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Bis(2-Chloroethoxy) methane	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Bis(2-Ethylhexl) phthalate	1	ug/l					0.00	0.00	0.00	0.00	0.00	24.30
Bis(2-chlorisopropyl) ether	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Bromophenyl phenyl ether	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Chloroaniline	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1-Chloronaphthalene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Chloronaphthalene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Chlorophenyl phenyl ether	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Chrysene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dimethyl phthalate	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
7,12-Dimethyl-benz(a)-anthracene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
alpha,alpha-Dimethylphenethylamine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dibenz(a,j)acridine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dibenzo(a,h)anthracene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,3-Dichlorobenzene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2-Dichlorobenzene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,4-Dichlorobenzene	0.05	ug/l		5			0.00	0.00	0.00	0.00	0.00	0.00
3,3-Dichlorobenzidine	0.05	ug/l		600			0.00	0.00	0.00	0.00	0.00	0.00
Diethyl phthalate	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dimethyl phthalate	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
di-n-Butyl phthalate	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-Dinitrotoluene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,6-Dinitrotoluene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Diphenylamine	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2-Diphenylhydrazine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
di-n-Octyl phthalate	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Ethyl methanesulfonate	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Endrin ketone	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Fluoranthene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Fluorene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Hexachlorobenzene	0.5	ug/l		1			0.00	0.00	0.00	0.00	0.00	0.00
Hexachlorobutadiene	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Hexachloro-cyclopentadiene	3	ug/l		50			0.00	0.00	0.00	0.00	0.00	0.00
Hexachloroethane	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Indeno(1,2,3-cd)pyrene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Isophorone	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Methylcholanthrene	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Methylmethanesulfonate	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Naphthalene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1-Naphthylamine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Naphthylamine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Nitroaniline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
3-Nitroaniline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Nitroaniline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Nitrobenzene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-butyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-dimethyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-diphenyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-di-n-propyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitrosopiperidine	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pentachlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Phenacetin	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Phenanthrene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Picoline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pronamide	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pyrene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2,4,5-Tetra-chlorobenzene	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2,4-Trichlorobenzene	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzoic acid	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-chloro-3-methylphenol	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-chloro_3_methylphenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2- Chlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-dichlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,6-Dichlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-dimethylphenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-dinitrophenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4,6 Dinitro-2-methylphenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Methylphenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Metholphenol	3	ug/l					3.00	0.00	0.00	0.00	0.00	0.00
2-nitrophenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-nitrophenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pentachlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Phenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,3,4,6-Tetrachlorophenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4,5-Trichlorophenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4,6-trichlophenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
PCBs												
Aroclor-1016	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1221	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1232	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1242	0.5	ug/l		0.03	0.014		0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1248	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1254	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1260	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pesticides												
Aldrin	0.05	ug/l				3	0.00	0.00	0.00	0.00	0.00	0.00
alpha-BHC	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
beta-BHC	0.05	ug/l	0.008				0.00	0.00	0.00	0.00	0.00	0.00
delta-BHC	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
gamma-BHC (lindane)	0.05	ug/l		0.2		0.95	0.00	0.00	0.00	0.00	0.00	0.00
Chlordane	0.05	ug/l			0.0043	2.4	0.00	0.00	0.00	0.00	0.00	0.00
4,4'-DDD	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4,4'-DDE	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4,4'-DDT	0.1	ug/l			0.001	1.1	0.00	0.00	0.00	0.00	0.00	0.00
Dieldrin	0.1	ug/l			0.056	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan 1	0.1	ug/l			0.056	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan 2	0.1	ug/l	0.018		0.056	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan sulfate	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Endrin	0.1	ug/l	0.004	2	0.036	0.086	0.00	0.00	0.00	0.00	0.00	0.00
Endrin aldehyde	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Heptachlor	0.05	ug/l		0.01	0.0038	0.52	0.00	0.00	0.00	0.00	0.00	0.00
Heptachlor Epoxide	0.05	ug/l		0.01	0.0038	0.52	0.00	0.00	0.00	0.00	0.00	0.00
Methoxychlor	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Toxaphene	1	ug/l		3	0.0002	0.73	0.00	0.00	0.00	0.00	0.00	0.00
Diazinon	0.01	ug/l		0.08			0.070	0.030	0.083	0.00	0.06	0.00
Chlorpyrifos	0.05	ug/l		0.07			0.00	0.00	0.00	0.00	0.00	0.00
Diuron	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Malathion	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Prometryn	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Simazine	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Atrazine	2	ug/l		3			0.00	0.00	0.00	0.00	0.00	0.00
Cyanazine	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Molinate	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Thiobencarb	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Herbicides												
Carbofuran	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4,5-TP-Silvex	10	ug/l		70			0.00	0.00	0.00	0.00	0.00	0.00
2,4,5-TP	1	ug/l		50			0.00	0.00	0.00	0.00	0.00	0.00
Bentazon	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Glyphosate	25	ug/l		700			0.00	0.00	0.00	0.00	0.00	0.00

[1] CTR values for metals are hardness dependent; higher hardness gives higher WQO

[2] Values of 0 represent that the constituent was not detected above the PQL as defined in the Municipal Stormwater Permit. Results are presented in accordance with Method B of the permit.

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WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0506-01	0506-02	0506-03	0506-04	0506-01	0506-02
DATE					10/17/2005	12/31/2005	01/14/2006	02/17/2006	01/24/2006	04/25/2006
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	2.00	2.50	0	0	0	0
Total Phenols	Grab	EPA420.1	0.10	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.0052	0	0.019	0.035	0.040	0.057
pH	Comp	SM4500H B	0-14		7.32	7.19	7.42	7	8.24	8.29
Dissolved Oxygen	Grab	SM4500O G	1.00	mg/L	6.75	7.46	12.40	8.73	15.53	14.05
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20.00	MPN/100ml	90,000,000	90,000	160,000	160,000	5,000	220,000
Fecal Coliform	Grab	SM9230B	20.00	MPN/100ml	24,000,000	50,000	2,400	16,000	500	9,000
Ratio Fecal Coliform/Total Coliform					0.27	0.56	0.02	0.10	0.10	0.04
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	5,000,000	30,000	16,000	16,000	220	700
Enterococcus	Grab	SM9230B		MPN/100ml	2,400,000	30,000	16,000	16,000	220	500
General										
Chloride	Comp	EPA300.0	2.00	mg/L	7.26	9.97	32.90	31.90	113.00	102.00
Fluoride	Comp	EPA300.0	0.10	mg/L	0.13	0.13	0.26	0.15	0.41	0.42
Nitrate	Comp	EPA300.0	0.10	mg/L	5.88	3.88	5.65	5.92	10.4	11.8
Sulfate	Comp	EPA300.0	0.10	mg/L	13.60	16.80	49.10	45.90	169.00	206.00
Alkalinity	Comp	EPA310.1	4.00	mg/L	40.7	40.7	72.6	84.7	183.7	121
Hardness	Comp	EPA130.2	2.00	mg/L	52.5	45	105	130	290	300
COD	Comp	EPA410.4	10.00	mg/L	66.9	29.7799	74.127	139	65.8	159
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	2.3	3.5	0	0	0	0
Specific Conductance	Comp	EPA120.1	1.00	umhos/cm	149.9	167.2	372	407	988	1214
Total Dissolved Solids	Comp	EPA160.1	2.00	mg/L	104.00	98.00	224.00	248.00	618.00	680.00
Turbidity	Comp	EPA180.1	0.10	NTU	6.49	4.99	2.93	7.33	2.34	0.98
Total Suspended Solids	Comp	EPA160.2	2.00	mg/L	542	238	295	104	18	17
Volatile Suspended Solids	Comp	EPA160.4	1.00	mg/L	99	55	83	40	10	11
MBAS	Comp	EPA425.1	0.05	mg/L	0.5844	0.228	0.146	0.345	0.086	0.107
Total Organic Carbon	Comp	EPA415.1	1.00	mg/L	18.1	11.6	18.7	31.6	9.84	8.57
BOD	Comp	SM5210B	2.00	mg/L	25.9	22.9	36.6	52.5	68.3	48.6
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	0		0	0	0	0
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.057	0.239	0.194	0.437	0.392	0.1
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	0.3411	0.391	0.508	0.851	0.481	0.211
NH3-N	Comp	EPA350.3	0.10	mg/L	0.657	0.61317	0.572	2.77	4.879	1.05
Nitrate - N	Comp	SM4110B	0.50	mg/L	1.33	0.876	1.276	1.337	2.348	2.664
Nitrite - N	Comp	SM4110B	0.03	mg/L	0.134	0.094	0.335	0.371	1.093	1.6039
Kjeidahl-N	Comp	EPA351.4	0.10	mg/L	7.02	1.6156	3.383	11.5	5.88	2.04
Metals										
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	238	108	0	0	0	0
Total Aluminum	Comp	EPA200.8	100.00	ug/L	2,400	675	472	1,860	0	156
Dissolved Antimony	Comp	EPA200.8	5.00	ug/L	1.75	0.68	1.44	2.63	0	0.68
Total Antimony	Comp	EPA200.8	5.00	ug/L	2.76	1.31	2.11	3.19	0.60	0.8
Dissolved Arsenic	Comp	EPA200.8	5.00	ug/L	1.58	0	1.3	1.73	1.12	1.89
Total Arsenic	Comp	EPA200.8	5.00	ug/L	2.34	1.34	1.80	1.88	1.95	2.4
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	22.60	10.60	27.00	38.40	20.10	34.10
Total Barium	Comp	EPA200.8	10.00	ug/L	81.10	17.30	34.40	64.40	34.00	36.10
Dissolved Beryllium	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1.00	ug/L	0.60	0	0	0.47	0	0
Dissolved Chromium	Comp	EPA200.8	5.00	ug/L	0	2.02	2.48	1.8	1.44	4.37
Total Chromium	Comp	EPA200.8	5.00	ug/L	7.18	2.54	2.93	5.02	5.94	6.43
Dissolved Chromium □6	Comp	EPA200.8	10.00	ug/L	0	0	0	0	0	0
Total Chromium □6	Comp	EPA200.8	10.00	ug/L	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5.00	ug/L	10.60	7.18	14.60	10.4	6.76	5.72
Total Copper	Comp	EPA200.8	5.00	ug/L	51.20	12.00	16.40	43.8	8.80	19.3
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	386	0	0	357	0	0
Total Iron	Comp	EPA200.8	100.00	ug/L	3120	204	877	1400	115	284
Dissolved Lead	Comp	EPA200.8	5.00	ug/L	3.86	0	0.64	2.15	0.87	0
Total Lead	Comp	EPA200.8	5.00	ug/L	37.80	1.57	4.59	20.1	1.08	1.72
Dissolved Mercury	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5.00	ug/L	5.22	2.19	5.13	9.14	3.02	5.6
Total Nickel	Comp	EPA200.8	5.00	ug/L	11.80	4.21	7.30	10	5.34	36.5
Dissolved Selenium	Comp	EPA200.8	5.00	ug/L	0	0	1.14	0	2.51	3.08
Total Selenium	Comp	EPA200.8	5.00	ug/L	0	0	1.36	1.06	3.52	4.01
Dissolved Silver	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1.00	ug/L	0.26	0	0.28	0.48	0	0
Dissolved Thallium	Comp	EPA200.8	5.00	ug/L	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5.00	ug/L	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50.00	ug/L	33.00	20.90	75.00	63.5	23.40	21.9
Total Zinc	Comp	EPA200.8	50.00	ug/L	249.00	28.60	129.00	178	34.40	32.5
Semi-Volatiles Organics (EPA 625)										
2-Chlorophenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
Pentachlorophenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
Phenol	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0

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WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0506-01	0506-02	0506-03	0506-04	0506-01	0506-02
DATE					10/17/2005	12/31/2005	01/14/2006	02/17/2006	01/24/2006	04/25/2006
	Sample Type	EPA Method	PQL	Units						
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Benzidine	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Benzo(g,h,i)perylene	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
3,4 Benzofluoranthene	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Bis(2-Chloroethoxy)methane	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Bis(2-Chloroisopropyl)ether	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Bis(2-Chloroethyl)ether	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Bis(2-Ethylhexl)phthalate	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
2-Chloroethyl vinyl ether	Grab	EPA624	2.50	ug/L	0		0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Chrysene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
Dimethyl phthalate	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Fluorene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0.61
Naphthalene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Gamma-BHC (Lindane)	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/L						
gamma-chlordane	Comp	EPA625	0.05	ug/L						
Chlordane	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endosulfan I [alpha]	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endosulfan II [beta]	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endrin	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0

RB-AR11474

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0506-01	0506-02	0506-03	0506-04	0506-01	0506-02
DATE					10/17/2005	12/31/2005	01/14/2006	02/17/2006	01/24/2006	04/25/2006
	Sample Type	EPA Method	PQL	Units						
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/L	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/L	0	0	0	0	0	0
Prometryn	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Atrazine	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Simazine	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Malathion	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25.00	ug/L	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10.00	ug/L	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1.00	ug/L	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

RB-AR11475

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2006-07Event03	2006-07Event07	2006-07Event08	2006-07Event02	2006-07Event15
DATE					12/09/2006	02/19/2007	02/22/2007	11/01/2006	04/09/2007
	Sample Type	EPA Method	PQL	Units					
Conventional									
Oil and Grease	Grab	EPA413.1	1	mg/L	1.100	1.500	-99	-99	-99
Total Phenols	Grab	EPA420.1	0.10	mg/L	-99	-99	-99	-99	-99
Cyanide	Grab	EPA335.2	0.01	mg/L	0.019	0.033	0.047	0.050	0.044
pH	Comp	SM4500H B	0-14		7.400	7.560	7.570	8.000	8.110
Dissolved Oxygen	Grab	SM4500O G	1.00	mg/L	5.780	8.160	8.430	15.580	17.000
Indicator Bacteria									
Total Coliform	Grab	SM9230B	20.00	MPN/100ml	2,800,000.000	1,700,000.000	50,000.000	8,000.000	3,000.000
Fecal Coliform	Grab	SM9230B	20.00	MPN/100ml	240,000.000	22,000.000	17,000.000	20.000	2,400.000
Ratio Fecal Coliform/Total Coliform					0.086	0.013	0.340	0.003	0.800
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	170,000.000	90,000.000	1,300.000	110.000	70.000
Enterococcus	Grab	SM9230B		MPN/100ml	170,000.000	90,000.000	1,300.000	40.000	70.000
General									
Chloride	Comp	EPA300.0	2.00	mg/L	56.200	35.000	36.700	106.000	116.000
Fluoride	Comp	EPA300.0	0.10	mg/L	0.310	0.271	0.250	0.470	0.590
Nitrate	Comp	EPA300.0	0.10	mg/L	3.380	-99	-99	19.800	-99
Sulfate	Comp	EPA300.0	0.10	mg/L	63.100	52.500	53.900	169.000	161.000
Alkalinity	Comp	EPA310.1	4.00	mg/L	157.300	71.500	71.500	185.900	199.100
Hardness	Comp	EPA130.2	2.00	mg/L	220.000	140.000	110.000	305.000	310.000
COD	Comp	EPA410.4	10.00	mg/L	578.000	51.220	42.910	64.240	35.606
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	1.800	1.300	-99	-99	-99
Specific Conductance	Comp	EPA120.1	1.00	umhos/cm	654.000	406.000	434.000	1180.000	1130.000
Total Dissolved Solids	Comp	EPA160.1	2.00	mg/L	374.000	224.000	240.000	644.000	640.000
Turbidity	Comp	EPA180.1	0.10	NTU	6.170	1.610	2.840	5.430	1.720
Total Suspended Solids	Comp	EPA160.2	2.00	mg/L	2162.000	219.000	113.000	67.000	20.000
Volatile Suspended Solids	Comp	EPA160.4	1.00	mg/L	608.000	56.000	25.000	34.000	18.000
MBAS	Comp	EPA425.1	0.05	mg/L	0.430	0.144	0.108	0.081	0.070
Total Organic Carbon	Comp	EPA415.1	1.00	mg/L	51.700	16.900	11.600	8.740	10.700
BOD	Comp	SM5210B	2.00	mg/L	46.400	70.000	17.800	95.400	72.400
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	-99	-99	-99	-99	-99
Nutrients									
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.911	0.290	0.289	0.253	-99
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	2.000	0.574	0.529	0.475	0.240
NH3-N	Comp	EPA350.3	0.10	mg/L	4.040	-99	-99	2.750	0.560
Nitrate - N	Comp	SM4110B	0.50	mg/L	0.760	-99	-99	4.471	-99
Nitrite - N	Comp	SM4110B	0.03	mg/L	0.400	0.122	0.040	1.449	0.560
Kjeidahl-N	Comp	EPA351.4	0.10	mg/L	30.680	4.900	2.320	5.820	3.080
Metals									
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	-99	-99	-99	-99	-99
Total Aluminum	Comp	EPA200.8	100.00	ug/L	10100.000	5200.000	3240.000	108.000	-99
Dissolved Antimony	Comp	EPA200.8	5.00	ug/L	1.590	1.970	1.720	0.880	0.720
Total Antimony	Comp	EPA200.8	5.00	ug/L	6.910	3.370	2.970	0.890	0.760
Dissolved Arsenic	Comp	EPA200.8	5.00	ug/L	1.530	1.480	1.380	2.890	1.610
Total Arsenic	Comp	EPA200.8	5.00	ug/L	7.990	2.800	2.050	3.160	1.760
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	60.000	29.700	29.300	42.600	38.300
Total Barium	Comp	EPA200.8	10.00	ug/L	544.000	106.000	74.700	43.800	42.100
Dissolved Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Dissolved Cadmium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Cadmium	Comp	EPA200.8	1.00	ug/L	5.170	0.940	0.270	-99	-99
Dissolved Chromium	Comp	EPA200.8	5.00	ug/L	3.000	1.810	4.570	4.610	2.370
Total Chromium	Comp	EPA200.8	5.00	ug/L	39.600	8.700	16.300	4.740	2.590
Dissolved Chromium □6	Comp	EPA200.8	10.00	ug/L	-99	-99	0.350	-99	-99
Total Chromium □6	Comp	EPA200.8	10.00	ug/L	-99	-99	0.350	-99	-99
Dissolved Copper	Comp	EPA200.8	5.00	ug/L	5.290	9.600	10.700	7.490	6.540
Total Copper	Comp	EPA200.8	5.00	ug/L	424.000	76.900	48.600	20.000	25.800
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	578.000	-99	-99	-99	-99
Total Iron	Comp	EPA200.8	100.00	ug/L	18500.000	3840.000	2770.000	271.000	-99
Dissolved Lead	Comp	EPA200.8	5.00	ug/L	2.420	-99	1.010	0.830	-99
Total Lead	Comp	EPA200.8	5.00	ug/L	240.000	25.900	19.300	3.170	1.930
Dissolved Mercury	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Mercury	Comp	EPA200.8	1.00	ug/L	0.447	-99	-99	-99	-99
Dissolved Nickel	Comp	EPA200.8	5.00	ug/L	7.710	5.410	4.780	4.890	4.060
Total Nickel	Comp	EPA200.8	5.00	ug/L	45.600	13.200	9.930	5.730	4.820
Dissolved Selenium	Comp	EPA200.8	5.00	ug/L	2.240	-99	-99	6.850	2.300
Total Selenium	Comp	EPA200.8	5.00	ug/L	4.120	1.280	-99	7.160	2.500
Dissolved Silver	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Silver	Comp	EPA200.8	1.00	ug/L	3.510	0.560	-99	-99	-99
Dissolved Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99
Total Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99
Dissolved Zinc	Comp	EPA200.8	50.00	ug/L	74.300	34.300	39.400	26.500	21.300
Total Zinc	Comp	EPA200.8	50.00	ug/L	2590.000	198.000	124.000	40.700	25.600
Semi-Volatiles Organics (EPA 625)									
2-Chlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
2-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
4-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
Pentachlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
Phenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2006-07Event03	2006-07Event07	2006-07Event08	2006-07Event02	2006-07Event15
DATE					12/09/2006	02/19/2007	02/22/2007	11/01/2006	04/09/2007
	Sample Type	EPA Method	PQL	Units					
Base/Neutral									
Acenaphthene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Acenaphthylene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Anthracene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Benzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Benzo(a)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Benzo(g,h,i)perylene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
3,4 Benzofluoranthene	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
Benzo(k)flouranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Bis(2-Chloroethoxy)methane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Bis(2-Chloroisopropyl)ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Bis(2-Chloroethyl)ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Bis(2-Ethylhexl)phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
2-Chloroethyl vinyl ether	Grab	EPA624	2.50	ug/L	-99	-99	-99	-99	-99
2-Chloronaphthalene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Chrysene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
3,3-Dichlorobenzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
Diethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
Dimethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
di-n-Butyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
1,2-Diphenylhydrazine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
di-n-Octyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Fluoranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Fluorene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Hexachlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Hexachloro-cyclopentadiene	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
Hexachloroethane	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Isophorone	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Naphthalene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Nitrobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
N-Nitroso-dimethyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
N-Nitroso-diphenyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
Phenanthrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Pyrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
1,2,4-Trichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
Chlorinated Pesticides									
Aldrin	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
alpha-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
beta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
delta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Gamma-BHC (Lindane)	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
alpha-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
gamma-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Chlordane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4,4'-DDD	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4,4'-DDE	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4,4'-DDT	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Dieldrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endosulfan I [alpha]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endosulfan II [beta]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endosulfan sulfate	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endrin aldehyde	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Heptachlor	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Heptachlor Epoxide	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Toxaphene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Polychlorinated Biphenyls									
Aroclor-1016	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1221	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1232	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1242	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1248	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1254	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1260	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2006-07Event03	2006-07Event07	2006-07Event08	2006-07Event02	2006-07Event15
DATE					12/09/2006	02/19/2007	02/22/2007	11/01/2006	04/09/2007
	Sample Type	EPA Method	PQL	Units					
Organohosphate Pesticides									
Chlorpyrifos	Comp	EPA507	0.05	ug/L	-99	-99	-99	-99	-99
Diazinon	Comp	EPA507	0.01	ug/L	-99	-99	-99	-99	-99
Prometryn	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Atrazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Simazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Cyanazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Malathion	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Herbicides									
Glyphosate	Comp	EPA547	25.00	ug/L	-99	-99	-99	-99	-99
2,4-D	Comp	EPA515.3	10.00	ug/L	-99	-99	-99	-99	-99
2,4,5-TP-SILVEX	Comp	EPA515.3	1.00	ug/L	-99	-99	-99	-99	-99
Other									
Ammonia	Comp	SM4500-NH3 F	0.1	mg/L	4.890	-99	-99	3.330	0.680
Endrin ketone	Comp	EPA625	0.1	ug/L	-99	-99	-99	-99	-99
Methoxychlor	Comp	EPA608	0.5	ug/L	-99	-99	-99	-99	-99

Note:
1) blank cell indicates sample was not analyzed
2) -99 indicates concentration below minimum detection leve
3) PQL = minimum level
4) Highlighted cells show exceedances

WEATHER CONDITION					Wet					Dry	
STATION NO.					S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2007-08Event21	2007-08Event23	2007-08Event29	2007-08Event31	2007-08Event32	2007-08Event27	2007-08Event47
	Sample Type	EPA Method	PQL	Units							
Conventional											
Oil and Grease	Grab	EPA413.1	1	mg/L	1.10		1.60	1.60		-99	-99
Total Phenols	Grab	EPA420.1	0.10	mg/L	-99		0.12	0.11		-99	-99
Cyanide	Grab	EPA335.2	0.01	mg/L	0.0240		0.0130	-99		0.1090	0.0110
pH	Comp	SM4500H B	0-14		7.41	7.01	7.04	6.64	6.85	8.14	8.30
Dissolved Oxygen	Grab	SM4500O G	1.00	mg/L	7.97		8.31	6.04		15.04	15.70
Indicator Bacteria											
Total Coliform	Grab	SM9230B	20.00	MPN/100ml	90000		300000	90000		24000	270
Fecal Coliform	Grab	SM9230B	20.00	MPN/100ml	50000		300000	24000		9000	40
Ratio Fecal Coliform/Total Coliform											
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	17000		240000	220000		110	170
Enterococcus	Grab	SM9230B		MPN/100ml	17000		130000	220000		110	80
General											
Chloride	Comp	EPA300.0	2.00	mg/L	53.70	14.50	16.70	14.50	12.80	122	155
Fluoride	Comp	EPA300.0	0.10	mg/L	0.56	0.1350	0.2350	0.19	0.1690	0.5830	0.5940
Nitrate	Comp	EPA300.0	0.10	mg/L	-99	-99	-99	-99	-99	-99	-99
Sulfate	Comp	EPA300.0	0.10	mg/L	57.10	21	23.20	20.30	18.70	147	228
Alkalinity	Comp	EPA310.1	4.00	mg/L	167.20	53	39	36.30	35.20	171	165
Hardness	Comp	EPA130.2	2.00	mg/L	205	110	65	55	61	290	350
COD	Comp	EPA410.4	10.00	mg/L	123	40.40	72.40	38.50	45.43	119.70	85.60
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	-99		4.75	2.50		-99	-99
Specific Conductance	Comp	EPA120.1	1.00	umhos/cm	711	204	211	199	176	1056	1169
Total Dissolved Solids	Comp	EPA160.1	2.00	mg/L	472	112	122	122	102	694	738
Turbidity	Comp	EPA180.1	0.10	NTU	4.58	5.07	4.15	1.73	6.63	1.42	1.94
Total Suspended Solids	Comp	EPA160.2	2.00	mg/L	1990	975	193	65	124	142	9
Volatile Suspended Solids	Comp	EPA160.4	1.00	mg/L	429	154	49	18	20	35	9
MBAS	Comp	EPA425.1	0.05	mg/L	0.35	0.14	0.22	0.32	0.34	0.07	0.08
Total Organic Carbon	Comp	EPA415.1	1.00	mg/L	57.10	13.50	11.90	7.85	6.88	8.12	13.10
BOD	Comp	SM5210B	2.00	mg/L	128	16.80	27.80	17.40	12.90	25.20	15.40
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	-99		-99	-99		-99	-99
Nutrients											
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.6710	0.4760	0.13	0.31	0.22	0.21	0.25
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	1.72	1.72	0.38	0.32	0.24	0.26	0.31
NH_3-N	Comp	EPA350.3	0.10	mg/L	2.85	0.48	0.75	0.4010	0.4410	-99	1.05
Nitrate - N	Comp	SM4110B	0.50	mg/L	-99	-99	-99	-99	-99	-99	-99
Nitrite - N	Comp	SM4110B	0.03	mg/L	-99	0.03	0.08	0.03	-99	0.09	0.05
Kjeidahl-N	Comp	EPA351.4	0.10	mg/L	19.40	5.60	4.16	2.18	1.33	1.28	3.38
Metals											
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Aluminum	Comp	EPA200.8	100.00	ug/L	7900	21500	2830	895	5560	356	-99
Dissolved Antimony	Comp	EPA200.8	5.00	ug/L	2.70	3.77	2.04	1.47	1.48	0.64	0.75
Total Antimony	Comp	EPA200.8	5.00	ug/L	6.87	8.02	3.81	1.79	3.01	0.85	0.82
Dissolved Arsenic	Comp	EPA200.8	5.00	ug/L	2.20	2.23	1.76	1.24	1.21	1.79	2.10
Total Arsenic	Comp	EPA200.8	5.00	ug/L	6.39	5.60	2.41	1.27	2.06	1.89	2.13
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	59.70	35.60	27.80	20	20.40	41	35.90
Total Barium	Comp	EPA200.8	10.00	ug/L	327	396	84.20	35.50	83.30	54.60	41.20
Dissolved Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Dissolved Cadmium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Cadmium	Comp	EPA200.8	1.00	ug/L	3.69	4.57	0.76	0.27	0.69	0.30	-99
Dissolved Chromium	Comp	EPA200.8	5.00	ug/L	3.46	1.37	1.80	1.31	7.53	2.77	5.78
Total Chromium	Comp	EPA200.8	5.00	ug/L	46.70	37.90	9.16	3.19	21.60	3.72	6.10
Dissolved Chromium □6	Comp	EPA200.8	10.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Chromium □6	Comp	EPA200.8	10.00	ug/L	-99	-99	-99	0.27	8.54	0.25	-99
Dissolved Copper	Comp	EPA200.8	5.00	ug/L	4.86	8.54	18.90	9.64	7.93	6.81	5.80
Total Copper	Comp	EPA200.8	5.00	ug/L	123	255	57.60	25.90	43.80	14.70	21.50
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	857	187	186	-99	-99	-99	-99
Total Iron	Comp	EPA200.8	100.00	ug/L	14000	33200	2750	1300	3450	864	192
Dissolved Lead	Comp	EPA200.8	5.00	ug/L	7.35	5.63	5.70	1.36	1.84	-99	-99
Total Lead	Comp	EPA200.8	5.00	ug/L	142	393	50.20	15.70	50.80	4.68	1.46
Dissolved Mercury	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Mercury	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	0.1620	-99
Dissolved Nickel	Comp	EPA200.8	5.00	ug/L	11.20	4.97	7.61	3.45	3.13	4.13	6.16
Total Nickel	Comp	EPA200.8	5.00	ug/L	35.70	37.10	12.70	4.98	9.89	5.39	6.71
Dissolved Selenium	Comp	EPA200.8	5.00	ug/L	1.29	-99	-99	-99	-99	2.78	3.06
Total Selenium	Comp	EPA200.8	5.00	ug/L	1.82	1.04	-99	-99	-99	3.06	3.29
Dissolved Silver	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Silver	Comp	EPA200.8	1.00	ug/L	1.28	1.69	0.33	-99	0.26	-99	-99
Dissolved Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Dissolved Zinc	Comp	EPA200.8	50.00	ug/L	22.30	51.40	99.10	63.10	60	38.20	41.40
Total Zinc	Comp	EPA200.8	50.00	ug/L	657	1860	270	113	209	80.70	85
Semi-Volatiles Organics (EPA 625)											
2-Chlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99

WEATHER CONDITION					Wet					Dry	
STATION NO.					S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2007-08Event21	2007-08Event23	2007-08Event29	2007-08Event31	2007-08Event32	2007-08Event27	2007-08Event47
	Sample Type	EPA Method	PQL	Units							
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
4-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Pentachlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Phenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Base/Neutral											
Acenaphthene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Acenaphthylene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Anthracene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzo(a)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzo(g,h,i)perylene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
3,4 Benzofluoranthene	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzo(k)flouranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Chloroethoxy)methane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Chloroisopropyl)ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Chloroethyl)ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Ethylhexl)phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
2-Chloroethyl vinyl ether	Grab	EPA624	2.50	ug/L	-99		-99	-99		-99	-99
2-Chloronaphthalene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Chrysene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
1,3-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
1,4-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
3,3-Dichlorobenzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Diethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Dimethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
di-n-Butyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2-Diphenylhydrazine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
di-n-Octyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Fluoranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Fluorene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachloro-cyclopentadiene	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachloroethane	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Isophorone	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Naphthalene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Nitrobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
N-Nitroso-dimethyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
N-Nitroso-diphenyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
Phenanthrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Pyrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2,4-Trichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Chlorinated Pesticides											
Aldrin	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
alpha-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
beta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
delta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Gamma-BHC (Lindane)	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
alpha-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
gamma-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Chlordane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4,4'-DDD	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4,4'-DDE	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4,4'-DDT	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Dieldrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endosulfan I [alpha]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endosulfan II [beta]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endosulfan sulfate	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endrin aldehyde	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Heptachlor	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Heptachlor Epoxide	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Toxaphene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99

WEATHER CONDITION					Wet					Dry	
STATION NO.					S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2007-08Event21	2007-08Event23	2007-08Event29	2007-08Event31	2007-08Event32	2007-08Event27	2007-08Event47
	Sample Type	EPA Method	PQL	Units							
Polychlorinated Biphenyls											
Aroclor-1016	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1221	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1232	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1242	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1248	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1254	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1260	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Organohosphate Pesticides											
Chlorpyrifos	Comp	EPA507	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Diazinon	Comp	EPA507	0.01	ug/L	-99	-99	-99	-99	-99	-99	-99
Prometryn	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Atrazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Simazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Cyanazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Malathion	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Herbicides											
Glyphosate	Comp	EPA547	25.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-D	Comp	EPA515.3	10.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4,5-TP-SILVEX	Comp	EPA515.3	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Other											
Ammonia	Comp	SM4500-NH3 F	0.1	mg/L	3.45	0.58	0.91	0.4850	0.5340	-99	1.27
Endrin ketone	Comp	EPA625	0.1	ug/L	-99	-99	-99	-99	-99	-99	-99
Methoxychlor	Comp	EPA608	0.5	ug/L	-99	-99	-99	-99	-99	-99	-99

Note:

1) blank cell indicates DATA is NOT AVAILABLE

2) PQL = minimum level

3) Highlighted cells show exceedances

4) -99 indicates a reported value cannot be achieved

Mass Emission Monitoring

WEATHER CONDITION					Wet											Dry		
STATION NO.					S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE	Sample	EPA			2008-09Event03	2008-09Event06	2008-09Event09	2008-09Event10	2008-09Event11	2008-09Event18	2008-09Event21	2008-09Event22	2008-09Event23	2008-09Event24	2008-09Event26	2008-09Event15	2008-09Event30	2008-09Event36
DATE	Type	Method	POL[3]	Units	11/04/2008	11/25/2008	12/15/2008	12/21/2008	12/24/2008	01/23/2009	02/05/2009	02/08/2009	02/13/2009	02/16/2009	03/04/2009	01/12/2009	03/23/2009	05/11/2009
Conventional																		
Oil and Grease	Grab	EPA1664A / EPA413.1	1	mg/L	2.9	0.8	1.4				1.2		5.5			-99	0.8	1.2
Total Phenols	Grab	EPA420.1	0.10	mg/L	-99	-99	-99				-99		-99			-99	-99	-99
Cyanide	Grab	SM4500-CNE	0.01	mg/L	0.01	-99	-99				-99		-99			0.008	0.027	-99
pH	Comp	SM4500H B	0.00	NONE	7.51	6.88					7.8		7.02			8.24	9.17	8.91
Dissolved Oxygen	Grab	SM4500 (OG)	1.00	mg/L	6.47	8.88	10.95				9.08		9.78			17.5	13.7	13.5
Indicator Bacteria																		
Total Coliform	Grab	SM9221B/SM9221E	20.00	MPN/100ml	16000000	500000	240000				16000		300000			9000	9000	9000
Fecal Coliform	Grab	SM9221E/SM9221B	20.00	MPN/100ml	16000000	24000	240000				500		16000			1300	230	130
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	9000000	500000	24000				9000		160000			300	-99	2400
Enterococcus	Grab	SM9230B	20.00	MPN/100ml	9000000	240000	24000				9000		160000			130	-99	2400
General																		
Chloride	Comp	SM4110B	2.00	mg/L	57.6	13.2					22.8		18.1			111	111	137
Fluoride	Comp	SM4110B	0.10	mg/L	0.53	0.11					-99		-99			0.79	0.69	0.57
Nitrate	Comp	SM4110B	0.10	mg/L	11.8	4.58					3.82		4.03			7.47	5.34	3.21
Sulfate	Comp	SM4110B	1.00	mg/L	77.9	19.3					33.6		26			150	180	186
Alkalinity	Comp	SM2320B	1.00	mg/L	88	39					41		34			144	140	165
Hardness	Comp	SM2340C	2.00	mg/L	150	80					50		25			235	270	300
COD	Comp	SM5220D	10.00	mg/L	104	55.6					38.9		86.4			64	61.8	104
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	1.87	1.5	0.62				1.25		4.75			-99	-99	-99
Specific Conductance	Comp	SM2510B	1.00	umhos/cm	573	177					243		202			1039	1020	1240
Total Dissolved Solids	Comp	SM2540C	2.00	mg/L	384	114					144		134			674	668	754
Turbidity	Comp	SM2130B	0.10	NTU	4.44	20.1					27.2		11.8			1.62	2.42	1.6
Total Suspended Solids	Comp	SM25400D	1.00	mg/L	374	820		95	93	125	486	136	221	252	686	27	16	18
Volatile Suspended Solids	Comp	SM2540E	1.00	mg/L	87	142					65		47			8	8	7
MBAS	Comp	SM5540-C	0.05	mg/L	0.67	0.24					0.02		0.25			0.17	0.5	0.19
Total Organic Carbon	Comp	SM5310B / EPA415.1		mg/L	22.8	11.1					6.93		7.44			6.88	21.9	8.4
BOD	Comp	SM5210B	2.00	mg/L	30.9	19.8					6.99		14.1			30.5	26.1	34
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	-99	-99	-99				-99		-99			-99	-99	-99
Nutrients																		
Dissolved Phosphorus	Comp	SM4500-PE	0.05	mg/L	0.37	0.3					0.28		0.15			-99	0.23	0.27
Total Phosphorus	Comp	SM4500-PE	0.05	mg/L	0.71	0.42					0.64		0.33			-99	0.27	0.38
NH3-N	Comp	SM4500-NH3 F	0.10	mg/L	0.61	0.73					-99		0.26			0.14	0.52	0.1
Nitrate - N	Comp	SM4110B	0.50	mg/L	2.66	1.03					0.86		0.91			1.69	1.21	0.72
Nitrite - N	Comp	SM4110B	0.03	mg/L	0.07	0.05					-99		-99			0.15	0.14	0.2
Kjeidahl-N	Comp	SM4500-NHorg C	0.10	mg/L	6.48	2.72					0.86		1.33			1.22	2.52	1.48
Metals																		
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	-99	-99					-99		153			-99	-99	-99
Total Aluminum	Comp	EPA200.8	100.00	ug/L	530	1130					1710		1930			39.2	-99	50.3
Dissolved Antimony	Comp	EPA200.8	0.50	ug/L	2.42	1.58					0.86		1.16			0.56	1.52	0.79
Total Antimony	Comp	EPA200.8	0.50	ug/L	4.03	5.55					1.64		2.07			0.67	1.53	0.79
Dissolved Arsenic	Comp	EPA200.8	1.00	ug/L	2.14	1.23					1.01		0.91			1.35	1.86	2.1
Total Arsenic	Comp	EPA200.8	1.00	ug/L	3.58	3.99					2.83		1.47			1.54	1.86	2.18
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	36.2	25.4					21		20.8			36.8	47.2	38.7
Total Barium	Comp	EPA200.8	10.00	ug/L	117	218					146		69			46.7	55.2	45.7
Dissolved Beryllium	Comp	EPA200.8	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Beryllium	Comp	EPA200.8	0.50	ug/L	-99	0.38					0.31		0.13			-99	-99	-99
Dissolved Cadmium	Comp	EPA200.8	0.25	ug/L	0.14	-99					0.12		0.11			0.13	0.16	-99
Total Cadmium	Comp	EPA200.8	0.25	ug/L	0.98	1.93					1		0.47			0.16	0.22	0.18
Dissolved Chromium	Comp	EPA200.8	0.50	ug/L	2.23	1.38					1.67		2.3			1.49	1	3.23
Total Chromium	Comp	EPA200.8	0.50	ug/L	14.4	28.5					20.2		9.09			3.21	1.28	4.51
Dissolved Chromium +6	Comp	EPA218.6	0.25	ug/L	-99	0.3					0.48		0.71			0.39	0.31	-99
Total Chromium +6	Comp	EPA218.6	0.25	ug/L	-99	0.3					0.48		0.71			0.39	0.31	-99
Dissolved Copper	Comp	EPA200.8	0.50	ug/L	14.8	10.6					5.63		9.69			4.78	11.9	4.07
Total Copper	Comp	EPA200.8	0.50	ug/L	63.7	124					34.5		33.4			9.15	20.6	10.5
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	237	178					119		91.3			-99	-99	-99
Total Iron	Comp	EPA200.8	100.00	ug/L	4860	17900					15200		3190			316	113	115
Dissolved Lead	Comp	EPA200.8	0.50	ug/L	3.96	5.2					2.04		2.09			0.29	0.65	0.21
Total Lead	Comp	EPA200.8	0.50	ug/L	51.1	166					29.2		25			1.42	1.38	0.98
Dissolved Mercury	Comp	EPA245.1	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Mercury	Comp	EPA245.1	0.10	ug/L	-99	-99					-99		-99			0.04	-99	-99
Dissolved Nickel	Comp	EPA200.8	1.00	ug/L	8.71	4.05					2.28		2.75			4.78	6.9	5.26
Total Nickel	Comp	EPA200.8	1.00	ug/L	17.1	26.7					15.7		7.48			5.18	7.94	6.11
Dissolved Selenium	Comp	EPA200.8	1.00	ug/L	1.22	-99					-99		-99			2.14	2.61	3.2
Total Selenium	Comp	EPA200.8	1.00	ug/L	1.86	-99					-99		-99			2.34	2.69	3.32
Dissolved Silver	Comp	EPA200.8	0.25	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Silver	Comp	EPA200.8	0.25	ug/L	0.36	0.41					0.19		0.12			-99	-99	-99
Dissolved Thallium	Comp	EPA200.8	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Thallium	Comp	EPA200.8	0.50	ug/L	-99	-99					0.17		-99			-99	-99	-99
Dissolved Zinc	Comp	EPA200.8	10.00	ug/L	38.5	78.3					29.9		57.5			20.3	28.7	13.4
Total Zinc	Comp	EPA200.8	10.00	ug/L	264	936					140		147			43	31.5	25.7
Semi-Volatiles Organics (EPA 625)																		
2-Chlorophenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99

RB-AR11482

Mass Emission Monitoring

WEATHER CONDITION					Wet											Dry		
STATION NO.					S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE	Sample	EPA			2008-09Event03	2008-09Event06	2008-09Event09	2008-09Event10	2008-09Event11	2008-09Event18	2008-09Event21	2008-09Event22	2008-09Event23	2008-09Event24	2008-09Event26	2008-09Event15	2008-09Event30	2008-09Event36
DATE	Type	Method	POL [3]	Units	11/04/2008	11/25/2008	12/15/2008	12/21/2008	12/24/2008	01/23/2009	02/05/2009	02/08/2009	02/13/2009	02/16/2009	03/04/2009	01/12/2009	03/23/2009	05/11/2009
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Pentachlorophenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Phenol	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Base/Neutral																		
Acenaphthene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Acenaphthylene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Anthracene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzidine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzo(a)pyrene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzo(g,h,i)perylene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
3,4 Benzofluoranthene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzo(k)flouranthene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Chloroethoxy)methane	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Chloroisopropyl)ether	Comp	EPA625	2	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Chloroethyl)ether	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Ethylhexl)phthalate	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	-99	-99					-99		-99			-99	-99	-99
2-Chloroethyl vinyl ether	Comp	EPA624	2.50	ug/L	-99	-99	-99				-99		-99			-99	-99	-99
2-Chloronaphthalene	Comp	EPA625	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Chrysene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
1,3-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
1,4-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
3,3-Dichlorobenzidine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Diethyl phthalate	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Dimethyl phthalate	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
di-n-Butyl phthalate	Comp	EPA625	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-Dinitrotoluene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,6-Dinitrotoluene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2-Diphenylhydrazine	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
di-n-Octyl phthalate	Comp	EPA625	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Fluoranthene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Fluorene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachlorobenzene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachloro-cyclopentadiene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachloroethane	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Isophorone	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Naphthalene	Comp	EPA625	0.20	ug/L	-99	-99					-99		-99			-99	-99	-99
Nitrobenzene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
N-Nitroso-dimethyl amine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
N-Nitroso-diphenyl amine	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
N-Nitroso-di-n-propyl amine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Phenanthrene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Pyrene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2,4-Trichlorobenzene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Chlorinated Pesticides																		
Aldrin		EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
alpha-BHC	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
beta-BHC	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
delta-BHC	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Gamma-BHC (Lindane)	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
alpha-chlordane	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
gamma-chlordane	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Chlordane	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
4,4'-DDD	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
4,4'-DDE	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
4,4'-DDT	Comp	EPA608	0.01	ug/L	-99	-99					-99		-99			-99	-99	-99
Dieldrin	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endosulfan I [alpha]	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endosulfan II [beta]	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endosulfan sulfate	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endrin	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endrin aldehyde	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Heptachlor	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99

RB-AR11483

Mass Emission Monitoring

WEATHER CONDITION					Wet											Dry		
STATION NO.					S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE	Sample	EPA			2008-09Event03	2008-09Event06	2008-09Event09	2008-09Event10	2008-09Event11	2008-09Event18	2008-09Event21	2008-09Event22	2008-09Event23	2008-09Event24	2008-09Event26	2008-09Event15	2008-09Event30	2008-09Event36
DATE	Type	Method	PQL [3]	Units	11/04/2008	11/25/2008	12/15/2008	12/21/2008	12/24/2008	01/23/2009	02/05/2009	02/08/2009	02/13/2009	02/16/2009	03/04/2009	01/12/2009	03/23/2009	05/11/2009
Heptachlor Epoxide	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Toxaphene	Comp	EPA608	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Polychlorinated Biphenyls																		
Aroclor-1016	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1221	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1232	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1242	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1248	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1254	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1260	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Organophosphate Pesticides																		
Chlorpyrifos	Comp	EPA507	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Diazinon	Comp	EPA507	0.01	ug/L	-99	-99					-99		-99			-99	-99	-99
Prometryn	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Atrazine	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Simazine	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Cyanazine	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Malathion	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Herbicides																		
Glyphosate	Comp	EPA547	25.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-D	Comp	EPA515.3	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4,5-TP-SILVEX	Comp	EPA515.3	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Other																		
Ammonia	Comp	SM4500-NH3 F	0.1	mg/l	0.74	0.88					-99		0.32			0.16	0.63	0.12
Endrin ketone	Comp	EPA625	1	ug/L	-99	-99					-99		-99			-99	-99	-99
Methoxychlor	Comp	EPA608	0.5	ug/L	-99	-99					-99		-99			-99	-99	-99

Note:
1) blank cell indicates sample was not analyzed
2) -99 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances
5) Wet weather suspension of fecal coliform objective applies to 2008-09Event06, 2008-09Event09, and 2008-09Event21

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Appendix B.2. 2009-2010 Annual Report Mass Emission and Tributary Dry Weather Concentration

Group	Parameter Code	Units	Analysis Method	Los Angeles Wardlow S10 2009-10Event02 07/14/2009	Los Angeles Wardlow S10 2009-10Event12 09/15/2009	Los Angeles Wardlow S10 2009-10Event14 12/01/2009	Los Angeles Wardlow S10 2009-10Event28 03/23/2010
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	20	20	300	300
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	20	230	130	40
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	20	230	130	40
Bacteria	Total Coliform	MPN/100mL	SM9221B	20	20	2,400	800
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	0.01	0.011	0.011	0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	0.002	0.002	0.002	0.002
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	0.05	0.05	0.05	0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	0.006	0.006	0.006	0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Endrin ketone	ug/L	EPA625	0	NS	NS	NS
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	0.003	0.003	0.003	0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	0.24	0.24	0.24	0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	0.003	0.01	0.01	0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	0.04	0.033	0.033	0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	0.005	0.005	0.005	0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	0.005	0.005	0.005	0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	0.04	0.033	0.033	0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.006	0.005	**0.027**	0.01
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	10.2	21.5	15.5	17.4
Conventionals	Oil and Grease	mg/L	EPA1664A	0.4	0.4	1.44	1.44
Conventionals	pH	pH units	SM4500H B	**9.25**	7.97	**8.54**	**9.4**
General	Alkalinity as CaCO3	mg/L	SM2320B	151	151	206	165
General	Ammonia	mg/L	SM4500-NH3 F	0.16	0.218	0.448	0.23
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	24.4	31.5	21.6	24
General	Chemical Oxygen Demand	mg/L	SM5220D	234	71.3	64.5	63.2
General	Chloride	mg/L	SM4110B	131	149	114	118
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.25	0.19	0.39	0.06
General	Fluoride	mg/L	SM4110B	0.43	0.507	0.892	0.479
General	Hardness as CaCO3	mg/L	SM2340C	260	255	300	290
General	Kjeldahl-N	mg/L	SM4500-NHorg C	6.18	1.6	1.98	1.08
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	0.4	0.4	1	0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.01 0.5	0.01 0.5	0.01 0.5	0.01 0.5
General	NH3-N	mg/L	SM4500-NH3 F	0.13	0.18	0.37	0.19
General	Nitrate (NO3)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate (NO3)	mg/L	SM4110B	1.07	5.49	15.7	2.35
General	Nitrate-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate-N	mg/L	SM4110B	0.03 0.5	1.24	3.55	0.53
General	Nitrite (NO2)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	SM4110B	0.03	0.17	0.0502	0.0766
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	0.5	0.21	0.52	0.07
General	Specific Conductance	umhos/cm	SM2510B	1011	1020	1040	980
General	Sulfate	mg/L	EPA300.1	NS	NS	NS	NS
General	Sulfate	mg/L	SM4110B	149	168	134	197
General	Total Dissolved Phosphate	mg/L	AM4500-PE	NS	NS	NS	NS
General	Total Dissolved Solids	mg/L	SM2540C	690	664	696	662
General	Total Organic Carbon	mg/L	SM5310B	14	NS	NS	NS
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	NS	10.9	7.84	20.8
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	0.4	0.4	1.5	1.5
General	Total Phosphate	mg/L	SM4500-PE	NS	NS	NS	NS
General	Total Suspended Solids	mg/L	SM2540D	135	14	110	38
General	Turbidity	NTU	SM2130B	5.5	2.53	4.07	4.48
General	Volatile Suspended Solids	mg/L	SM2540E	66	11	39	15

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Appendix B.2. 2009-2010 Annual Report Mass Emission and Tributary Dry Weather Concentration

Group	Parameter Code	Units	Analysis Method	Los Angeles Wardlow S10 2009-10Event02 07/14/2009	Los Angeles Wardlow S10 2009-10Event12 09/15/2009	Los Angeles Wardlow S10 2009-10Event14 12/01/2009	Los Angeles Wardlow S10 2009-10Event28 03/23/2010
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	0.07	0.067	0.067	0.067
Herbicides	2-4-D	ug/L	EPA515.3	0.015	0.015	0.015	0.015
Herbicides	Glyphosate	ug/L	EPA547	5	5	5	5
Metals	Dissolved Aluminum	ug/L	EPA200.8	50	50	50	50
Metals	Dissolved Antimony	ug/L	EPA200.8	0.82	0.2	0.932	0.887
Metals	Dissolved Arsenic	ug/L	EPA200.8	2.25	2.4	4.31	2.14
Metals	Dissolved Barium	ug/L	EPA200.8	38.3	1	45.2	41.2
Metals	Dissolved Beryllium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	0.1	0.1	0.689	0.275
Metals	Dissolved Chromium	ug/L	EPA200.8	1.54	0.5	2.05	1.57
Metals	Dissolved Chromium 6	ug/L	EPA218.6	0.37	0.25	0.25	0.25
Metals	Dissolved Copper	ug/L	EPA200.8	6.17	0.5	5.25	6.72
Metals	Dissolved Iron	ug/L	EPA200.8	50	50	50	50
Metals	Dissolved Lead	ug/L	EPA200.8	0.55	0.2	1.27	0.2
Metals	Dissolved Mercury	ug/L	EPA245.1	0.1	0.1	0.1	0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	7.27	0.5	4.81	4.5
Metals	Dissolved Selenium	ug/L	EPA200.8	2.6	0.5	5.84	2.67
Metals	Dissolved Silver	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	15.7	1	39.6	27.6
Metals	Aluminum	ug/L	EPA200.8	282	50	1200	1100
Metals	Antimony	ug/L	EPA200.8	0.82	0.948	1.05	1.13
Metals	Arsenic	ug/L	EPA200.8	2.38	2.56	4.31	2.57
Metals	Barium	ug/L	EPA200.8	48.2	44.6	62.4	63.1
Metals	Beryllium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Cadmium	ug/L	EPA200.8	0.1	0.1 0.25	0.783	0.34
Metals	Chromium	ug/L	EPA200.8	1.61	0.807	3.01	2.11
Metals	Chromium 6	ug/L	EPA218.6	0.25	0.25	0.25	0.25
Metals	Copper	ug/L	EPA200.8	13.8	10.5	12.3	16.7
Metals	Iron	ug/L	EPA200.8	556	50 100	979	1170
Metals	Lead	ug/L	EPA200.8	2.64	0.803	8.5	6.07
Metals	Mercury	ug/L	EPA245.1	0.1	0.1	0.1	0.1
Metals	Nickel	ug/L	EPA200.8	8.2	4.84	6.03	6.43
Metals	Selenium	ug/L	EPA200.8	2.75	2.23	**5.94**	2.88
Metals	Silver	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Thallium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Zinc	ug/L	EPA200.8	66.1	108	95.3	75.3
Organophosphate Pesticides	Atrazine	ug/L	EPA507	0.7	0.667	0.667	0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	0.02	0.02	0.02	0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	0.7	0.667	0.667	0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	0.003	0.003	0.003	0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	0.4	0.33	0.67	0.33
Organophosphate Pesticides	Malathion	ug/L	EPA625	NS	NS	NS	NS
Organophosphate Pesticides	Prometryn	ug/L	EPA507	0.7	0.67	0.67	0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	0.7	0.67	0.67	0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	0.065	0.065	0.065	0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	0.4	3.3	3.3	3.3
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	1	1	1	1

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Group	Parameter Code	Units	Analysis Method	Los Angeles Wardlow S10 2009-10Event02 07/14/2009	Los Angeles Wardlow S10 2009-10Event12 09/15/2009	Los Angeles Wardlow S10 2009-10Event14 12/01/2009	Los Angeles Wardlow S10 2009-10Event28 03/23/2010
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	0.03	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	0.2	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	0.2	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	0.2	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	NS	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	3.4	3.33	3.33	3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	0.4	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	0.04	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	0.2	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	1.7	1.67	1.67	9.9
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	0.1	3.33	3.33	3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	0.04	0.033	0.033	0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	0.02	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	0.04	0.033	0.033	0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	0.02	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	0.07	0.067	0.067	0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	0.02	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	0.02	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	3.4	NS	NS	NS
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	3.4	NS	NS	NS

Values reported with a " " are not detected (ND) at the method detection level, and reported as MDL

Values reported with a " " and a " " were detected but not quantified (DNQ) between the method detection limit and reporting limit, they are

QNS = Quantity Not Sufficient

Appendix B.1. 2009-2010 Annual Report Wet Weather Mass Emission and Tributary Stations Concentrations

Group	Parameter Code	Units	Analysis Method	Los Angeles River Wardlow S10 2009-10Event13 10/13/2009	Los Angeles River Wardlow S10 2009-10Event15 12/07/2009	Los Angeles River Wardlow S10 2009-10Event16 12/11/2009	Los Angeles River Wardlow S10 2009-10Event19 01/17/2010
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	**900,000**	230	**300,000**	24,000
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	2,400,000	1,300	900,000	280,000
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	2,400,000	1,300	900,000	280,000
Bacteria	Total Coliform	MPN/100mL	SM9221B	3,000,000	50,000	900,000	5,000,000
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	0.011	0.011	0.011	0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	0.002	0.002	0.002	0.002
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	0.05	0.05	0.05	0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	0.006	0.006	0.006	0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Endrin ketone	ug/L	EPA625	NS	NS	NS	NS
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	0.003	0.003	0.003	0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	0.24	0.24	0.24	0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	0.033	0.033	0.033	0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	0.005	0.005	0.005	0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	0.005	0.005	0.005	0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	0.033	0.033	0.033	0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.005	**0.06**	0.007	0.01
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	7.73	9.13	10.7	8.03
Conventionals	Oil and Grease	mg/L	EPA1664A	1.44	1.44 5	1.44 5	1.44 5
Conventionals	pH	pH units	SM4500H B	7.45	**6.41**	6.66	7.34
General	Alkalinity as CaCO3	mg/L	SM2320B	69	34	41	69
General	Ammonia	mg/L	SM4500-NH3 F	1.91	0.79	0.364	0.446
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	19.3	24.7	9.01	9.61
General	Chemical Oxygen Demand	mg/L	SM5220D	76.4	79.9	154	29.3
General	Chloride	mg/L	SM4110B	22	11.3	7.38	11.4
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.42	0.33	0.24	0.22
General	Fluoride	mg/L	SM4110B	0.247	0.276	0.104	0.164
General	Hardness as CaCO3	mg/L	SM2340C	90	60	50	50
General	Kjeldahl-N	mg/L	SM4500-NHorg C	4.1	1.86	1.07	2
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	1	1	1	0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.7	0.51	0.01 0.5	0.01 0.5
General	NH3-N	mg/L	SM4500-NH3 F	1.58	0.653	0.301	0.369
General	Nitrate (NO3)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate (NO3)	mg/L	SM4110B	2.38	4.62	2.39	3.34
General	Nitrate-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate-N	mg/L	SM4110B	0.5	1.04	0.54	0.754
General	Nitrite (NO2)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	SM4110B	0.01	0.01	0.01	0.01
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	1.13	0.93	0.77	0.23
General	Specific Conductance	umhos/cm	SM2510B	286	153	129	1310
General	Sulfate	mg/L	EPA300.1	NS	NS	NS	NS
General	Sulfate	mg/L	SM4110B	29.9	14.9	12.1	16
General	Total Dissolved Phosphate	mg/L	AM4500-PE	NS	NS	NS	NS
General	Total Dissolved Solids	mg/L	SM2540C	188	106	88	86
General	Total Organic Carbon	mg/L	SM5310B	NS	NS	NS	NS
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	24.5	18.7	6.21	9.7
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	1.5	1.5	1.5 5	1.5 5
General	Total Phosphate	mg/L	SM4500-PE	NS	NS	NS	NS
General	Total Suspended Solids	mg/L	SM2540D	892	446	172	440
General	Turbidity	NTU	SM2130B	5.57	33.4	28.9	36.8
General	Volatile Suspended Solids	mg/L	SM2540E	138	79	70	76
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	0.067	0.067	0.067	0.067
Herbicides	2-4-D	ug/L	EPA515.3	0.015	0.015	0.015	0.015

Appendix B.1. 2009-2010 Annual Report Wet Weather Mass Emission and Tributary Stations Concentrations

Group	Parameter Code	Units	Analysis Method	Los Angeles River Wardlow S10 2009-10Event13 10/13/2009	Los Angeles River Wardlow S10 2009-10Event15 12/07/2009	Los Angeles River Wardlow S10 2009-10Event16 12/11/2009	Los Angeles River Wardlow S10 2009-10Event19 01/17/2010
Herbicides	Glyphosate	ug/L	EPA547	5	5	5	5
Metals	Dissolved Aluminum	ug/L	EPA200.8	50	50	142	50
Metals	Dissolved Antimony	ug/L	EPA200.8	2.63	1.67	1.28	1.15
Metals	Dissolved Arsenic	ug/L	EPA200.8	1.98	1.42	1.03	1.51
Metals	Dissolved Barium	ug/L	EPA200.8	27	22.7	18.2	22.2
Metals	Dissolved Beryllium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Chromium	ug/L	EPA200.8	1.71	1.21	0.894	0.876
Metals	Dissolved Chromium 6	ug/L	EPA218.6	0.25	0.25	0.25	0.25
Metals	Dissolved Copper	ug/L	EPA200.8	**15.6**	**9.45**	6.41	6.06
Metals	Dissolved Iron	ug/L	EPA200.8	219	156	127	131
Metals	Dissolved Lead	ug/L	EPA200.8	2.63	2.8	1.45	1.97
Metals	Dissolved Mercury	ug/L	EPA245.1	0.1	0.1	0.1	0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	7.85	4	2.13	0.5 1
Metals	Dissolved Selenium	ug/L	EPA200.8	1.23	0.5	0.5	1.7
Metals	Dissolved Silver	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	63.2	58.8	58.3	44.5
Metals	Aluminum	ug/L	EPA200.8	136	13500	7350	7650
Metals	Antimony	ug/L	EPA200.8	2.7	5.16	2.58	2.96
Metals	Arsenic	ug/L	EPA200.8	2.01	3.92	2.66	3.26
Metals	Barium	ug/L	EPA200.8	30.6	196	109	150
Metals	Beryllium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Cadmium	ug/L	EPA200.8	0.1	1.41	0.666	1.02
Metals	Chromium	ug/L	EPA200.8	2.25	17.7	9.78	14.3
Metals	Chromium 6	ug/L	EPA218.6	0.25	0.25	0.25	0.25
Metals	Copper	ug/L	EPA200.8	21.5	82.4	47.7	49.2
Metals	Iron	ug/L	EPA200.8	307	15800	10100	11400
Metals	Lead	ug/L	EPA200.8	3.12	97.6	40.8	53.4
Metals	Mercury	ug/L	EPA245.1	0.1	0.1	0.1	0.1
Metals	Nickel	ug/L	EPA200.8	8.77	20.5	11.2	13.3
Metals	Selenium	ug/L	EPA200.8	1.39	0.5	0.5	1.7
Metals	Silver	ug/L	EPA200.8	0.1	0.422	0.1	0.1
Metals	Thallium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Zinc	ug/L	EPA200.8	64.4	492	185	290
Organophosphate Pesticides	Atrazine	ug/L	EPA507	0.667	0.667	0.667	0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	0.02	0.02	0.02	0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	0.667	0.667	0.667	0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	0.003	0.003	0.003	0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	0.67	0.67	0.33	0.33
Organophosphate Pesticides	Malathion	ug/L	EPA625	NS	NS	NS	NS
Organophosphate Pesticides	Prometryn	ug/L	EPA507	0.67	0.67	0.67	0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	0.67	0.67	0.67	0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	0.065	0.065	0.065	0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	3.3	3.3	3.3	3.3
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	0.33	0.33	0.33	0.33

Appendix B.1. 2009-2010 Annual Report Wet Weather Mass Emission and Tributary Stations Concentrations

Group	Parameter Code	Units	Analysis Method	Los Angeles River Wardlow S10 2009-10Event13 10/13/2009	Los Angeles River Wardlow S10 2009-10Event15 12/07/2009	Los Angeles River Wardlow S10 2009-10Event16 12/11/2009	Los Angeles River Wardlow S10 2009-10Event19 01/17/2010
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	3.33	3.33	3.33	3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	1.67	1.67	1.67	8.86
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	3.33	3.33	3.33	3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	0.033	0.033	0.033	0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	0.017	0.017	0.017	0.503
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	0.033	0.033	0.033	0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	0.017	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	0.067	0.067	0.067	0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	0.017	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	0.017	0.017	0.017	0.413

Values reported with a " " are not detected (ND) at the method detection level, and reported as MDL

Values reported with a " " and a " " were detected but not quantified (DNQ) between the method detection limit and reporting limit, they are re

QNS = Quantity Not Sufficient

Exceedance of Water Quality Objective

Not an exceedance due to the High Flow Suspension Basin Plan Amendment (LARQCB 2003).

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	300000*	<20
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	2400	130
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	2400	130
Bacteria	Total Coliform	MPN/100mL	SM9221B	300000	230
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.011	<0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.033	<0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.033	<0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.017	0.018
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	13.2	17.2
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	<1.44
Conventionals	pH	pH units	SM4500H B	8.97*	8.65*
General	Alkalinity as CaCO3	mg/L	SM2320B	138	154
General	Ammonia	mg/L	SM4500-NH3 F	0.375	0.823
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	32.2	12.3
General	Chemical Oxygen Demand	mg/L	SM5220D	47.4	41.5
General	Chloride	mg/L	SM4110B	120	106
General	Dissolved Phosphorus	mg/L	SM4500-PE	<0.05	0.13

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
General	Fluoride	mg/L	SM4110B	0.677	0.573
General	Hardness as CaCO3	mg/L	SM2340C	220	270
General	Kjeldahl-N	mg/L	SM4500-NHorg C	1.38	3.36
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	>0.01&<0.5	>0.01&<0.5
General	NH3-N	mg/L	SM4500-NH3	0.31	0.68
General	Nitrate (NO3)	mg/L	SM4110B	5.65	7.64
General	Nitrate-N	mg/L	SM4110B	1.28	1.72
General	Nitrite-N	mg/L	SM4110B	0.117	<0.01
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	0.06	0.15
General	Specific Conductance	umhos/cm	SM2510B	949	852
General	Sulfate	mg/L	SM4110B	137	162
General	Total Dissolved Solids	mg/L	SM2540C	604	590
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	7.58	16.9
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	<1.5
General	Total Suspended Solids	mg/L	SM2540D	47	63
General	Turbidity	NTU	SM2130B	2.13	2.62
General	Volatile Suspended Solids	mg/L	SM2540E	25	28
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.067	<0.067
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	8.2	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	<50	123
Metals	Dissolved Antimony	ug/L	EPA200.8	0.845	<0.2
Metals	Dissolved Arsenic	ug/L	EPA200.8	<0.2	<0.2
Metals	Dissolved Barium	ug/L	EPA200.8	36.5	<1
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	1.05
Metals	Dissolved Chromium	ug/L	EPA200.8	0.713	<0.5
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	12.7	<0.5
Metals	Dissolved Iron	ug/L	EPA200.8	163	164
Metals	Dissolved Lead	ug/L	EPA200.8	2.1	<0.2
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	4.81	<0.5

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Metals	Dissolved Selenium	ug/L	EPA200.8	2	<0.5
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	66.9	91.6
Metals	Aluminum	ug/L	EPA200.8	337	428
Metals	Antimony	ug/L	EPA200.8	1.14	<0.2
Metals	Arsenic	ug/L	EPA200.8	2.3	<0.2
Metals	Barium	ug/L	EPA200.8	45.8	<1
Metals	Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	<0.1	1.31
Metals	Chromium	ug/L	EPA200.8	3.09	<0.5
Metals	Chromium +6	ug/L	EPA218.6	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	18.8	<0.5
Metals	Iron	ug/L	EPA200.8	448	675
Metals	Lead	ug/L	EPA200.8	2.6	<0.2
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	6.67	<0.5
Metals	Selenium	ug/L	EPA200.8	2.17	<0.5
Metals	Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	75.6	102
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.667	<0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.667	<0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.33	<0.33
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.67	<0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.67	<0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	Phenolics-Total Recoverable	mg/L	EPA625	<0.03	<0.03
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	<2.5	<2.5
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(b)flouranthene	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.067	<0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.33	<3.33

Values reported with a "< "are not detected at the method detection level, and reported as <MDL
Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL
NS = Not Sampled

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	9000000*	500000*	300000*	500000**	3000*
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	240000	900000	9000	1600000	16000
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	240000	900000	9000	1600000	16000
Bacteria	Total Coliform	MPN/100mL	SM9221B	9000000	5000000	300000	9000000	300000
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.011	NS	<0.011	<0.011	<0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	NS	<0.002	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	NS	<0.05	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	NS	<0.006	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	NS	<0.003	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	NS	<0.5	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	NS	<0.24	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.033	NS	<0.033	<0.033	<0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	NS	<0.005	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	NS	<0.005	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.033	NS	<0.033	<0.033	<0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.036*	0.009	0.02	0.005	<0.005
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	11.6	5.48	13.2	9.01	10.5
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	7.29	<1.44	>1.44&<5	>1.44&<5
Conventionals	pH	pH units	SM4500H B	7.02	NS	6.95	6.23*	6.55
General	Alkalinity as CaCO3	mg/L	SM2320B	138	NS	49.5	30.8	41.8
General	Ammonia	mg/L	SM4500-NH3 F	1.89	NS	1.25	0.278	1.55
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	172	NS	12.5	7.94	18.7
General	Chemical Oxygen Demand	mg/L	SM5220D	126	NS	28.1	<10	49
General	Chloride	mg/L	SM4110B	44	NS	21.9	8.35	23.4
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.53	NS	0.23	0.16	0.227
General	Fluoride	mg/L	SM4110B	0.488	NS	0.262	0.157	0.312
General	Hardness as CaCO3	mg/L	SM2340C	140	NS	85	45	75
General	Kjeldahl-N	mg/L	SM4500-NHorg C	3.84	NS	5.08	0.88	15
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4	<0.4	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.96	NS	>0.01&<0.5	>0.01&<0.5	0.6
General	NH3-N	mg/L	SM4500-NH3	1.56	NS	1.03	0.23	1.28
General	Nitrate (NO3)	mg/L	SM4110B	5.06	NS	5.09	2.81	4.25
General	Nitrate-N	mg/L	SM4110B	1.14	NS	1.15	0.634	0.958
General	Nitrite-N	mg/L	SM4110B	0.076	NS	<0.03	<0.01	0.0422
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	0.59	NS	0.34	0.2	0.234
General	Specific Conductance	umhos/cm	SM2510B	456	NS	267	122	234
General	Sulfate	mg/L	SM4110B	50.7	NS	30.2	13.6	36.1
General	Total Dissolved Solids	mg/L	SM2540C	316	NS	182	70	134
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	31	NS	35	37.4	8.6
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	>1.5&<5	<1.5	<1.5	<1.5
General	Total Suspended Solids	mg/L	SM2540D	2280	413	288	243	125

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
General	Turbidity	NTU	SM2130B	26.3	NS	6.73	32	8.91
General	Volatile Suspended Solids	mg/L	SM2540E	463	NS	57	32	60
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.067	NS	<0.067	<0.067	<0.067
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	NS	<0.015	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	8.52	NS	<5	<5	15.4
Metals	Dissolved Aluminum	ug/L	EPA200.8	1280	NS	1160	2250	625
Metals	Dissolved Antimony	ug/L	EPA200.8	<0.2	NS	<0.2	<0.2	<0.2
Metals	Dissolved Arsenic	ug/L	EPA200.8	2.65	NS	2.36	<0.2	<0.2
Metals	Dissolved Barium	ug/L	EPA200.8	189	NS	<1	<1	<1
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Chromium	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	NS	<0.25	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Dissolved Iron	ug/L	EPA200.8	3290	NS	2050	1900	735
Metals	Dissolved Lead	ug/L	EPA200.8	46.8	NS	20.3	20.8	13.2
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	15.2	NS	<0.5	<0.5	<0.5
Metals	Dissolved Selenium	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	346*	NS	194*	129*	183*
Metals	Aluminum	ug/L	EPA200.8	23900	NS	3900	6850	1730
Metals	Antimony	ug/L	EPA200.8	7.72	NS	<0.2	<0.2	<0.2
Metals	Arsenic	ug/L	EPA200.8	7.36	NS	2.91	<0.2	<0.2
Metals	Barium	ug/L	EPA200.8	495	NS	110	<1	<1
Metals	Beryllium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	5.03	NS	<0.1	<0.1	<0.1
Metals	Chromium	ug/L	EPA200.8	34.4	NS	11.7	11.4	<0.5
Metals	Chromium +6	ug/L	EPA218.6	<0.25	NS	<0.25	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	260	NS	52.3	<0.5	<0.5
Metals	Iron	ug/L	EPA200.8	30500	NS	8250	8150	2730
Metals	Lead	ug/L	EPA200.8	213	NS	30.8	33.4	19.8
Metals	Mercury	ug/L	EPA245.1	<0.1	NS	<0.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	42.7	NS	12.7	12.5	<0.5
Metals	Selenium	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Silver	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	1590	NS	316	180	184
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.667	NS	<0.667	<0.667	<0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	NS	<0.02	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.667	NS	<0.667	<0.667	<0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	NS	<0.003	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.33	NS	<0.33	<0.33	<0.33
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.67	NS	<0.67	<0.67	<0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.67	NS	<0.67	<0.67	<0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	Phenolics-Total Recoverable	mg/L	EPA 420.1	<0.03	<0.03	<0.03	<0.03	<0.03
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	<2.5	<2.5	<2.5	<2.5	<2.5
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(b)flouranthene	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.033	NS	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.033	NS	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.067	NS	<0.067	<0.067	<0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33

Values reported with a "< "are not detected at the method detection level, and reported as <MDL
Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL
NS = Not Sampled
*Exceedance of Water Quality Objective
**Not an exceedance due to the High Flow Suspension Basin Plan Amendment (LARQCB 2003).

RB-AR-1499

Appendix B.1. 2011-2012 Wet Weather Concentrations

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	3000000**	**240000***	9000000**	16000**	50000**
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	2200000	50000	1700000	160000	300000
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	2800000	50000	1700000	240000	300000
Bacteria	Total Coliform	MPN/100mL	SM9221B	16000000	900000	16000000	300000	160000
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002	<0.002	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.015	<0.015	<0.015	<0.015	<0.015
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006	<0.006	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003	<0.003	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24	<0.24	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.003	<0.003	<0.003	<0.003	<0.003
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.04	<0.04	<0.04	<0.04	<0.04
Conventionals	Cyanide	mg/L	SM4500-CNE	0.019	0.009	0.016	0.015	0.006
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	7.2	10.2	10.5	9.24	8.71
Conventionals	Oil and Grease	mg/L	EPA1664A	>1.44&<5	>1.44&<5	>1.44&<5	>1.44&<5	>1.44&<5
Conventionals	pH	pH units	SM4500H B	7.34	7.36	7.88	7.11	7.78
General	Alkalinity as $CaCO_3$	mg/L	SM2320B	44	49.5	41.8	42.9	68.2
General	Ammonia	mg/L	SM4500-NH3 D	1.96	0.944	0.387	1.09	0.315
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	28.4	22.4	11.3	19.8	15.9
General	Chemical Oxygen Demand	mg/L	SM5220D	52.5	36	22	25	32
General	Chloride	mg/L	EPA300.0	15.4	19.3	15	10.5	23.1
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.355	0.33	0.22	0.25	0.2
General	Fluoride	mg/L	EPA300.0	0.341	0.29	0.205	0.193	0.244
General	Hardness as $CaCO_3$	mg/L	SM2340C	90	85	60	60	90
General	Kjeldahl-N	mg/L	SM4500-NHorg C	3.88	3.66	1.24	6.56	1.3
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4	<0.4	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.56	0.637	>0.01&<0.5	0.717	0.606
General	NH_3-N	mg/L	SM4500-NH3	1.62	0.78	0.32	0.9	0.26
General	Nitrate (NO_3)	mg/L	EPA300.0	7.39	5.87	4.77	4.1	3.59
General	Nitrate-N	mg/L	EPA300.0	1.67	1.32	1.08	0.926	0.81
General	Nitrite-N	mg/L	EPA300.0	0.151	0.0435	>0.01&<0.03	0.0523	<0.01
General	Phosphorus - Total (as P)	mg/L	SM4500-PE	0.39	0.46	0.24	0.31	0.24
General	Specific Conductance	umhos/cm	SM2510 B	214	248	116	153	252
General	Sulfate	mg/L	EPA300.0	23.9	29.1	20.1	16.5	27.1
General	Total Dissolved Solids	mg/L	SM2540C	176	160	98	100	166
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	23.4	17.9	8.92	10.1	1.56
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	>1.5&<5	<1.5	<1.5	>1.5&<5	<1.5

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
General	Total Suspended Solids	mg/L	SM2540D	458	112	1160	276	704
General	Turbidity	NTU	SM2130B	46.9	11.5	39.1	14.5	13.9
General	Volatile Suspended Solids	mg/L	SM2540E	150	23	197	76	162
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.07	<0.07	<0.07	<0.07	<0.07
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015	<0.015	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	6.5	8.59	<5	14.1	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	3900	600	4750	900	1060
Metals	Dissolved Antimony	ug/L	EPA200.8	2.35	2.08	2.22	1.25	1.62
Metals	Dissolved Arsenic	ug/L	EPA200.8	2.25	1.43	2.21	1.25	1.82
Metals	Dissolved Barium	ug/L	EPA200.8	106	37.9	136	51.8	69.1
Metals	Dissolved Beryllium	ug/L	EPA200.8	>0.1&<0.5	<0.1	>0.1&<0.5	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	1.14	0.303	1.27	0.456	0.612
Metals	Dissolved Chromium	ug/L	EPA200.8	5.94	2.2	7.28	2.34	3.06
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	>0.25&<5	>0.25&<5	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	**56.2***	**25.7***	**57.2***	**27.7***	**36.9***
Metals	Dissolved Iron	ug/L	EPA200.8	3830	770	3500	1190	1630
Metals	Dissolved Lead	ug/L	EPA200.8	**61.5***	11.6	**82***	18	26.1
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	10.2	5.7	10.7	5.31	7.07
Metals	Dissolved Selenium	ug/L	EPA200.8	>0.5&<1	>0.5&<1	>0.5&<1	<0.5	>0.5&<1
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	**471***	**147***	**380***	**189***	**254***
Metals	Aluminum	ug/L	EPA200.8	6850	1830	8700	3000	3330
Metals	Antimony	ug/L	EPA200.8	5.7	3.18	6.04	2.92	3.6
Metals	Arsenic	ug/L	EPA200.8	3.12	1.6	3.71	1.57	2.45
Metals	Barium	ug/L	EPA200.8	163	51.3	216	81.5	100
Metals	Beryllium	ug/L	EPA200.8	>0.1&<0.5	<0.1	>0.1&<0.5	<0.1	>0.1&<0.5
Metals	Cadmium	ug/L	EPA200.8	1.4	0.329	1.43	0.594	0.727
Metals	Chromium	ug/L	EPA200.8	16.2	4.71	21.9	7.18	9.37
Metals	Chromium +6	ug/L	EPA218.6	<0.25	>0.25&<5	>0.25&<5	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	76.6	34.1	75.6	46	52.7
Metals	Iron	ug/L	EPA200.8	10100	2820	16600	4280	5780
Metals	Lead	ug/L	EPA200.8	79.5	15.6	116	23.1	36.4
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	15.8	8.4	19	8.7	11.3
Metals	Selenium	ug/L	EPA200.8	1.21	>0.5&<1	>0.5&<1	>0.5&<1	>0.5&<1
Metals	Silver	ug/L	EPA200.8	0.48	>0.1&<0.25	0.499	>0.1&<0.25	>0.1&<0.25
Metals	Thallium	ug/L	EPA200.8	>0.1&<1	<0.1	>0.1&<1	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	505	188	396	314	322
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02	<0.02	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003	<0.003	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.4	<0.4	<0.4	<0.4	<0.4
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	Phenolics - Total recoverable	mg/L	EPA420.1	<0.03	<0.03	>0.03&<0.1	<0.03	<0.03
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2	<0.2	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2	<0.2	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2	<0.2	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA624	<0.83	<0.83	<0.83	<0.83	<0.83
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.4	<3.4	<3.4	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo[b]fluoranthene	ug/L	EPA625	<3.33	<3.33	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.04	<0.04	<0.04	<0.04	<0.04
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.04	<0.04	<0.04	<0.04	<0.04

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.07	<0.07	<0.07	<0.07	<0.07
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.4	<3.4	<3.4	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.4	<3.4	<3.4	<3.4	<3.4

Values reported with a "< "are not detected at the method detection level, and reported as <MDL

Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL

NS = Not Sampled

*Exceedance of Water Quality Objective

**Not an exceedance due to the High Flow Suspension Basin Plan Amendment (LARQCB 2003).

^Method detection level exceeds the waer quality benchmark.

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	80	130
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	<20	80
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	<20	80
Bacteria	Total Coliform	MPN/100mL	SM9221B	300	500
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.05	<0.05
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.015	<0.015
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.003	<0.003
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.04	<0.04
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.04	<0.04
Conventionals	Cyanide	mg/L	SM4500-CNE	0.007	0.022
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	22.2	18.3
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	<1.44
Conventionals	pH	pH units	SM4500H B	**9.14***	**9.31***
General	Alkalinity as $CaCO_3$	mg/L	SM2320B	105	184
General	Ammonia	mg/L	SM4500-NH3 D	0.303	0.121
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	12	20.8
General	Chemical Oxygen Demand	mg/L	SM5220D	28.8	26
General	Chloride	mg/L	EPA300.0	117	111
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.062	0.2
General	Fluoride	mg/L	EPA300.0	0.672	0.64
General	Hardness as $CaCO_3$	mg/L	SM2340C	190	280
General	Kjeldahl-N	mg/L	SM4500-NHorg C	1.52	1
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	>0.01&<0.5	>0.01&<0.5
General	NH_3-N	mg/L	SM4500-NH3	0.25	0.1
General	Nitrate (NO_3)	mg/L	EPA300.0	2.19	6.89
General	Nitrate-N	mg/L	EPA300.0	>0.03&<0.5	1.55
General	Nitrite-N	mg/L	EPA300.0	0.0517	0.214
General	Phosphorus - Total (as P)	mg/L	SM4500-PE	0.084	0.24
General	Specific Conductance	umhos/cm	SM2510 B	892	942
General	Sulfate	mg/L	EPA300.0	163	151
General	Total Dissolved Solids	mg/L	SM2540C	522	606
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	7.25	8.12

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	<1.5
General	Total Suspended Solids	mg/L	SM2540D	22	12
General	Turbidity	NTU	SM2130B	3.68	1.48
General	Volatile Suspended Solids	mg/L	SM2540E	21	8
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.07	<0.07
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	<5	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	>50&<100	<50
Metals	Dissolved Antimony	ug/L	EPA200.8	0.726	0.866
Metals	Dissolved Arsenic	ug/L	EPA200.8	>0.2&<1	1.23
Metals	Dissolved Barium	ug/L	EPA200.8	37	36
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	>0.1&<0.25
Metals	Dissolved Chromium	ug/L	EPA200.8	0.935	2.03
Metals	Dissolved Chromium +6	ug/L	EPA218.6	>0.25&<5	>0.25&<5
Metals	Dissolved Copper	ug/L	EPA200.8	11.3	9.38
Metals	Dissolved Iron	ug/L	EPA200.8	109	165
Metals	Dissolved Lead	ug/L	EPA200.8	2.3	1.07
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	4.41	3.95
Metals	Dissolved Selenium	ug/L	EPA200.8	2.44	2.21
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	94.4	69.2
Metals	Aluminum	ug/L	EPA200.8	179	107
Metals	Antimony	ug/L	EPA200.8	1.06	1.08
Metals	Arsenic	ug/L	EPA200.8	1.72	1.52
Metals	Barium	ug/L	EPA200.8	45.5	40.8
Metals	Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	>0.1&<0.25	0.343
Metals	Chromium	ug/L	EPA200.8	4.4	3.25
Metals	Chromium +6	ug/L	EPA218.6	>0.25&<5	>0.25&<5
Metals	Copper	ug/L	EPA200.8	13	12.9
Metals	Iron	ug/L	EPA200.8	233	301
Metals	Lead	ug/L	EPA200.8	4.12	1.43
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	6.21	5.47
Metals	Selenium	ug/L	EPA200.8	3.3	2.97
Metals	Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	103	73.2
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.7	<0.7
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.7	<0.7
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.4	<0.4
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.7	<0.7
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.7	<0.7
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	Phenolics - Total recoverable	mg/L	EPA420.1	<0.03	>0.03&<0.1
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA624	<0.83	<0.83
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo[b]fluoranthene	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.04	<0.04
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.02	<0.02

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.04	<0.04
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.07	<0.07
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.4	<3.4

Values reported with a "< "are not detected at the method detection level, and reported as <MDL

Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL

NS = Not Sampled

*Exceedance of Water Quality Objective

Watershed Management Program Appendix 3

A-3-1 MCM Guidance

Public Information and Participation Program

Introduction

Permit §VI.D.5.a (LA)/ §VII.F.1 (LB)

Each participating city is required to develop and implement a Public Information and Participation Program (PIPP) that includes the requirements listed in Permit §VI.D.5.a (LB §VII.F). This document provides guidance that the participating cities can follow to implement a PIPP in compliance with the Permit.

The objectives of the PIPP are to:

- Measurably increase the knowledge of the target audiences about the MS4, the adverse impacts of stormwater pollution on receiving waters and potential solutions to mitigate the impacts.
- Measurably change the waste disposal and stormwater pollution generation behavior of target audiences by developing and encouraging the implementation of appropriate alternatives.
- Involve and engage a diversity of socio-economic groups and ethnic communities in Los Angeles County to participate in mitigating the impacts of stormwater pollution.

PIPP Implementation

Permit §VI.D.5.b (LA)/§VII.F.2 (LB)

The PIPP is implemented using the following approaches:

- By participating in a County-wide PIPP,
- By participating in one or more Watershed Group sponsored PIPPs, and
- individually within its jurisdiction.

Cities participating in a County-wide or Watershed Group PIPP provide contact info for their staff responsible for stormwater public education activities to the designated PIPP coordinator. Changes in contact information are provided within 30 days of the date that the change occurred.

Public Participation

Permit §VI.D.5.c (LA)/§VII.F.3 (LB)

Public Reporting

The means for public reporting of clogged catch basin inlets and illicit discharges/dumping, faded or missing catch basin labels, and general stormwater and non-stormwater pollution prevention information is provided through the use of the countywide 888-CLEAN-LA hotline. In addition, each participating city:

- Includes the reporting information – updated when necessary – in public information and the government pages of the telephone book as they are developed or published.
- Identifies staff or departments who will serve as the contact person(s) and will make this information available on its website.
- Provides current, updated hotline contact information to the general public within its jurisdiction.

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Events

Events are organized to target residents and population subgroups. The purpose of the events is to educate and involve the community in stormwater and non-stormwater pollution prevention activities, such as education seminars, clean-ups, and community catch basin stenciling.

Residential Outreach Program

Permit §VI.D.5.d (LA)/§VII.F.4 (LB)

With the exception of item 5, which is no longer an element of the countywide PIP Program, each city implements the following activities for the Residential Outreach Program as part of a countywide program:

1. Conduct stormwater pollution prevention public service announcements and advertising campaigns
2. Prepare public education materials that include information on the proper handling (i.e., disposal, storage and/or use) of:
    a. Vehicle waste fluids
    b. Household waste materials (i.e., trash and household hazardous waste, including personal care products and pharmaceuticals)
    c. Construction waste materials
    d. Pesticides and fertilizers (including integrated pest management (IPM) practices to promote reduced use of pesticides)
    e. Green waste (including lawn clippings and leaves)
    f. Animal wastes
3. Distribute activity specific stormwater pollution prevention public education materials at the following points of purchase:
    a. Automotive parts stores
    b. Home improvement centers / lumber yards / hardware stores/paint stores
    c. Landscaping / gardening centers
    d. Pet shops / feed stores
4. Maintain stormwater websites or provide links to stormwater websites via each participating city's website. This includes educational material and opportunities for the public to participate in stormwater pollution prevention and clean-up activities listed in Part VI.D.4 of the Permit.
5. Provide independent, parochial, and public schools within each participating city's jurisdiction with materials to educate school children (K-12) on stormwater pollution. Material may include videos, live presentations and other information. A useful source of materials to work with, or leverage, is other statewide agencies and associations. These associations include the State Water Board's "Erase the Waste" educational program and the California Environmental Education Interagency Network (CEEIN) to implement this requirement.
6. When implementing the above activities, use effective strategies to educate and involve ethnic communities in stormwater pollution prevention through culturally effective methods.

Industrial/Commercial Facilities Program

Each participating city is required to implement an industrial/commercial facilities program that includes the provisions listed in Permit § VI.D.6 (LB §VII.G). This document provides guidance that the participating cities can follow to implement an industrial/commercial facilities program in compliance with the Permit.

Introduction

Permit § VI.D.6.a (LA)/ §VII.G.1 (LB)

The Industrial/Commercial Facilities Program is designed to prevent illicit discharges into the MS4 and receiving waters, reduce industrial/commercial discharges of stormwater to the maximum extent practicable, and prevent industrial/commercial discharges from the MS4 from causing or contributing to a violation of receiving water limitations. The program consists of the following components:

- Track,
- Educate,
- Inspect and
- Ensure compliance with municipal ordinances at industrial/commercial facilities determined to be critical sources of pollutants in stormwater.

Track Critical Industrial/Commercial Sources

Permit § VI.D.6.b (LA)/ §VII.G.2 (LB)

The critical sources to be tracked are listed in Table ICF-1.

Table ICF-1: Critical Sources

Facility Category	Facility	
Commercial Facilities	Restaurants	
	Automotive service facilities (including those located at automotive dealerships)	
	Retail Gasoline Outlets	
	Nurseries and Nursery Centers (Merchant Wholesalers, Nondurable Goods, and Retail Trade)	
Industrial Facilities	USEPA "Phase I" Facilities[1]	
	Other federally-mandated facilities[2]	Municipal landfills
		Hazardous waste treatment, disposal, and recovery facilities
		Industrial facilities subject to § 313 "Toxic Release Inventory" reporting requirements of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)[3]
General Facilities	All other commercial or industrial facilities determined to potentially contribute a substantial pollutant load to the MS4.	

[1] as specified in 40 CFR §122.26(b)(14)(i)-(xi)
[2] as specified in 40 CFR §122.26(d)(2)(iv)(C)
[3] 42 U.S.C. § 11023

Critical source facilities are tracked in an electronic database management system. The information stored for each critical source in the inventory is listed in Table ICF-2.

Table ICF-2: Inventory Information for Critical Sources

Information Category		Information
General	Name	Facility Name
	Location	Facility address
		Facility latitude and longitude coordinates
		Receiving water
	Contact	Owner/operator name
		Mailing address
		Phone number
		Email (if available)
Business Type		Standard Industrial Classification (SIC) code and/or North American Industry Classification System (NAICS) code
		Narrative description of the activities performed and/or principal products produced
Water quality		Status of exposure of materials to stormwater
		Pollutants generated by facility activities (A-ICF-1)
		Identification of whether the facility is tributary to a waterbody segment with impairments[4] for pollutants that are also generated by the facility.
Prioritization		High, medium or low. The default priority is medium.
NPDES Permit		For applicable facilities, identify coverage under the State Water Board's General NPDES Permit for the Discharge of Stormwater Associated with Industrial Activities (Industrial General Permit) or other individual or general NPDES permits or any waiver issued by the Regional or State Water Board pertaining to stormwater discharges.
		For Industrial General Permit facilities, identify whether the facility has filed a No Exposure Certification with the State Water Board.

Update Inventory

The critical sources inventory is updated at least annually. The update is accomplished through the collection of new information from sources such as field activities and readily available inter/intra-agency records (e.g. business licenses, pretreatment permits, sanitary sewer connection permits and the State Water Resources Control Board's Storm Water Multiple Application and Report Tracking System (SMARTS)).

[4] CWA § 303(d) listed or subject to a TMDL

Prioritization

Prioritizing facilities by their potential water quality impact provides an excellent opportunity to optimize the effectiveness of the Industrial/Commercial Facilities Program. The three inventory fields under the "Water Quality" category of Table ICF-2 provide information that allows for such a facility prioritization. Based on these fields, the following tables establish a method to prioritize all industrial/commercial facilities into three graded tiers – High, Medium and Low. The City may follow an alternative prioritization method provided it is based on water quality impact and results in a similar three-tiered scheme. In order to maintain a minimum inspection frequency equivalent to the mandates of the MS4 Permit, a condition must be applied to the prioritization process. This condition is explained on the following page.

Prioritization factors

Factor	Description
A	Status of exposure of materials and industrial/commercial activities to stormwater
B	Identification of whether the facility is tributary to a waterbody segment with impairments[5] for pollutants that are also generated by the facility
C	Other factors determined by the City, such as size of facility, presence of exposed soil or history of stormwater violations

Utilizing these factors, follow steps 1, 2 and 3 below:

1. Collect necessary information to evaluate factors

Factor	Initial method	Subsequent method
A	Satellite imagery	Results of stormwater inspection
B	Cross reference Table 4 or Table 5* with tributary TMDL/ 303(d) pollutants	Cross reference inspection results with tributary TMDL/ 303(d) pollutants
C	Varies	

* See pages 9 and 10 of Appendix A-3-1 ICF (guidance for the Industrial/Commercial Facilities Program)

2. Evaluate factors

Factor	Result	Score
	Low or no exposure	0
A	Moderate exposure	½
	Significant exposure	1
B	No**	0
	Yes***	1
	Low	0
C	Medium	½
	High	1

** No pollutant generation/impairment matches

*** ≥ 1 pollutant generation/impairment matches

3. Prioritize facilities

		C Score		
		0	**½**	**1**
A×B Score	**0**	Low	Medium	High
	½	Medium	High	High
	1	High	High	High

This method serves only as a guide to prioritization. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C.

Figure ICF-1: Industrial/Commercial Facility Prioritization Scheme

Step 3 may also be expressed by the relationships $A \cdot B + C \geq 1 \rightarrow$ High, $1 > A \cdot B + C > 0 \rightarrow$ Medium and $A \cdot B + C = 0 \rightarrow$ Low. The purpose of multiplying A and B is to scale the impact of the presence of the

[5] CWA §303(d) listed or subject to a TMDL

pollutants at a facility (B) by the likelihood that they will be discharged to the MS4 (A). Factor C quantifies water quality concerns that are independent of A or B and as such is incorporated through addition. The purpose of this numerical approach is to provide consistency to the prioritization process. It is intended solely as a guide. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C as listed in Figure ICF-1.

Prioritization Condition

The facility prioritization impacts the inspection frequency. In fact the main objective of prioritizing the facilities is to adjust the inspection schedule to focus efforts on water quality priorities. The intent is not to reduce the total number of inspections. In order to maintain a total number of inspections in line with the expectations of the MS4 Permit (i.e. result in the same number of average inspections per year as a semi-quinquennial frequency), one additional condition must be imposed:

The total number of low priority facilities is less than or equal to 3 times the number of high priority facilities.

Prioritization condition

Prioritization Frequency

The default priority for a facility is Medium. Facilities will be reprioritized as necessary following the results of routine inspections. The City may also use any readily available information that clarifies potential water quality impacts (e.g., satellite imagery) in order to prioritize a facility before the initial inspection. Reprioritization may also be conducted at any time as new water quality based information on a facility becomes available. During reprioritization, the ratio of low priority to high priority facilities will remain at 3:1 or lower. Figure ICF-2 is a flowchart of the prioritization process.

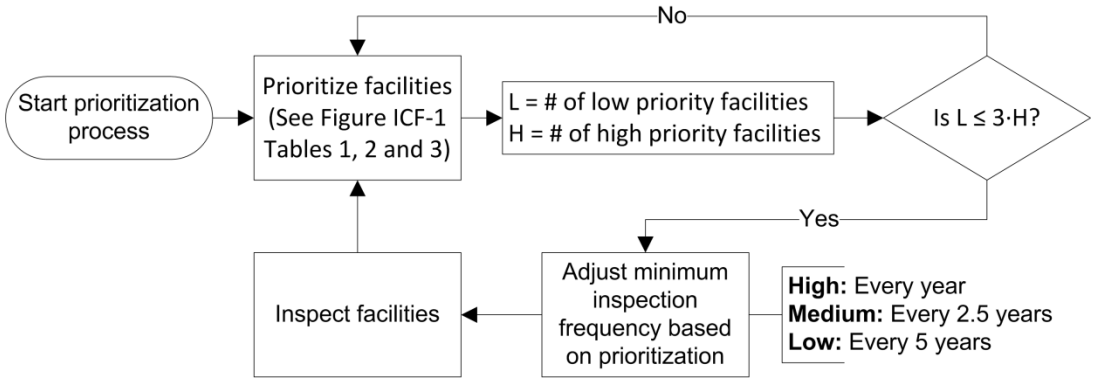


Figure ICF-2: Prioritization Process

Educate Industrial/Commercial Sources

Permit § VI.D.6.c (LA)/ §VII.G.3 (LB)

At least once during the five-year period of the MS4 Permit, the owner/operator of each of the inventoried critical sources is notified of the BMP requirements applicable to the facility/source.

Business Assistance Program

The Business Assistance Program provides technical information to businesses to facilitate their efforts to reduce the discharge of pollutants in stormwater. Assistance is targeted to select business sectors or

small businesses upon a determination that their activities may be contributing substantial pollutant loads to the MS4 or receiving water. Assistance may include technical guidance and provision of educational materials. The Program includes at least one of the following components:

- **Technical Guidance** – Provide on-site technical assistance, telephone, or e-mail consultation regarding the responsibilities of businesses to reduce the discharge of pollutants, procedural requirements, and available guidance documents. Guidance methods include but are not limited to:
    - Technical guidance through the critical source inspection program. During an inspection the inspector provides to the business owner/operator 1) on-site technical assistance and 2) contact information for continued consultation. The inspector may also refer staff to relevant fact sheets from the *CASQA Industrial and Commercial BMP Handbook*.
    - Technical guidance initiated with businesses through an informational letter, email, webpage or social media. The notice provides contact information of relevant stormwater staff for business assistance as well as hyperlinks to available guidance documents such as the *CASQA Industrial and Commercial BMP Handbook*.
- **Educational Materials** – Distribute stormwater pollution prevention educational materials to operators of 1) auto repair shops, car wash facilities, restaurants and 2) mobile sources including automobile/equipment repair, washing, or detailing, power washing services, mobile carpet, drape, or upholstery cleaning services, swimming pool, water softener, and spa services, portable sanitary services and commercial applicators and distributors of pesticides, herbicides and fertilizers, if present. Material sources and distribution methods include but are not limited to:
    - Distribution method – The presence of these businesses within an agency's jurisdiction may be determined through business licenses or other readily available inter/intra-agency records.
    - Material sources – Educational materials are available at USEPA's Nonpoint Source (NPS) Outreach Toolbox at http://cfpub.epa.gov/npstbx/index.html. The toolbox is a database of nationwide public education materials that is intended for use by state and local campaigns. The toolbox contains a variety of resources to help develop an effective and targeted outreach campaign.

Inspect Critical Industrial/Commercial Sources

Modified from Permit §VI.D.6.d-e (LA)/ §VII.G.4-5(LB)

Frequency of Inspections

Following the facility prioritization method described in this guidance document, the City will inspect high priority facilities annually, medium priority facilities semi-quinquennially (once every 2.5 years) and low priority facilities quinquennially (once every five years). The frequencies may be altered by the exclusions defined in the following section. The prioritization condition on Page ICF-4 ensures at least the same average number of inspections conducted per year as the semi-quinquennial frequency defined in the MS4 Permit.

The City will conduct the first compliance inspection of industrial/commercial facilities within one year of the approval of the Watershed Management Program by the Executive Officer. There will be a minimum interval of six months between the first and the second mandatory compliance inspections.

Exclusions to the Frequency of Industrial Inspections

Exclusion of Facilities Previously Inspected by the Regional Water Board

The State Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS) database[6] is reviewed at defined intervals to determine if an industrial facility has recently been inspected by the Regional Water Board. The first interval is two years after the effective date of the MS4 Permit (LA: December 28, 2014, LB: March 28,, 2016) and the second interval is four years after the effective date (LA: December 28, 2016, LB: March 28, 2018). If it is determined through the review that the Regional Water Board conducted an inspection of a facility within the prior 24 month period, then the facility does not require an inspection.

No Exposure Verification

The initial inspection identifies those facilities that have filed a No Exposure Certification with the State Water Board. Three to four years after the effective date of the MS4 Permit, a second inspection is performed for at least 25% of the facilities identified to have filed a No Exposure Certification. The purpose of this inspection is to verify the continuity of the no exposure status.

Scope of Inspections

A template inspection form is included as Attachment ICF-A.

Scope of Commercial Inspections

Commercial critical source facilities are inspected to confirm that stormwater and non-stormwater BMPs are effectively implemented in compliance with municipal ordinances. At each facility, inspectors verify that the operator is implementing effective source control BMPs for each corresponding activity. The implementation of additional BMPs is required where stormwater from the MS4 discharges to a significant ecological area (SEA), a water body subject to TMDL provisions[7], or a CWA §303(d) listed impaired water body. For those BMPs that are not adequately protective of water quality standards, additional site-specific controls may be required.

Scope of Mandatory Industrial Facility Inspections

At each industrial critical source the inspector confirms that the facility

- Has a current Waste Discharge Identification (WDID) number for coverage under the Industrial General Permit, and that a Storm Water Pollution Prevention Plan (SWPPP) is available on-site; or
- Has applied for, and has received a current No Exposure Certification for facilities subject to this requirement;
- Is effectively implementing BMPs in compliance with municipal ordinances. Facilities must implement the source control BMPs identified in Table ICF-3, unless the pollutant generating activity does not occur. Additional BMPs must be implemented where stormwater from the MS4

[6] SMARTS is accessible at https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp
[7] As described in Part VI.E of the MS4 Permit

discharges to a water body subject to TMDL Provisions in Part VI.E of the MS4 Permit, or a CWA § 303(d) listed impaired water body. If the specified BMPs are not adequately protective of water quality standards, additional site-specific controls may be required. For critical sources that discharge to MS4s that discharge to SEAs, operators must implement additional pollutant-specific controls to reduce pollutants in stormwater runoff that are causing or contributing to exceedances of water quality standards.

- Applicable industrial facilities identified as not having either a current WDID or No Exposure Certification are notified that they must obtain coverage under the Industrial General Permit and will be referred to the Regional Water Board per the Progressive Enforcement Policy procedures identified in Part VI.D.2 of the MS4 Permit.

Source Control BMPs

Permit § VI.D.6.f (LA)/ §VII.G.6 (LB)

Effective source control BMPs for the activities listed in Table ICF-3 are implemented at commercial and industrial facilities, unless the pollutant generating activity does not occur:

Significant Ecological Areas (SEAs)

Permit § VI.D.6.g (LA)/ §VII.H (LB)

For critical sources that discharge to MS4s that discharge to SEAs, each Permittee will require operators to implement additional pollutant-specific controls to reduce pollutants in stormwater runoff that are causing or contributing to exceedances of water quality standards.

Progressive Enforcement

Permit § VI.D.6.h (LA)/ §VII.I (LB)

Each Permittee will implement its Progressive Enforcement Policy to ensure that Industrial / Commercial facilities are brought into compliance with all stormwater requirements within a reasonable time period. See Part VI.D.2 of the MS4 Permit for requirements for the development and implementation of a Progressive Enforcement Policy.

Table ICF-3: Source Control BMPs at Commercial and Industrial Facilities

Pollutant-Generating Activity	BMP Description	BMP Fact Sheet*
Unauthorized Non-Storm water Discharges	Effective elimination of non-stormwater discharges	SC-10
Accidental Spills/ Leaks	Implementation of effective spills/ leaks prevention and response procedures	SC-11
Vehicle/ Equipment Fueling	Implementation of effective fueling source control devices and practices	SC-20
Vehicle/ Equipment Cleaning	Implementation of effective equipment/vehicle cleaning practices and appropriate wash water management practices	SC-21
Vehicle/ Equipment Repair	Implementation of effective vehicle/ equipment repair practices and source control devices	SC-22
Outdoor Liquid Storage	Implementation of effective outdoor liquid storage source controls and practices	SC-31
Outdoor Equipment Operations	Implementation of effective outdoor equipment source control devices and practices	SC-32
Outdoor Storage of Raw Materials	Implementation of effective source control practices and structural devices	SC-33
Storage and Handling of Solid Waste	Implementation of effective solid waste storage/ handling practices and appropriate control measures	SC-34
Building and Grounds Maintenance	Implementation of effective facility maintenance practices	SC-41
Parking/ Storage Area Maintenance	Implementation of effective parking/ storage area designs and housekeeping/ maintenance practices	SC-43
Stormwater Conveyance System Maintenance	Implementation of proper conveyance system operation and maintenance protocols	SC-44
Pollutant-Generating Activity	**BMP Description from Regional Water Board Resolution No. 98-08**	
Sidewalk Washing	1. Remove trash, debris, and free standing oil/grease spills/leaks (use absorbent material, if necessary) from the area before washing; and 2. Use high pressure, low volume spray washing using only potable water with no cleaning agents at an average usage of 0.006 gallons per square feet of sidewalk area.	
Street Washing	Collect and divert wash water to the sanitary sewer – publically owned treatment works (POTW). Note: POTW approval may be needed.	

* Source: CASQA Industrial and Commercial Stormwater BMP Handbook, 2003

Table ICF-4: Potential Pollutants from Industrial Activities*

Activity or Facility Type	Potential Pollutants								
	Sediments	Nutrients	Metals	Organics and Toxicants**	Floatable Materials	Oxygen-Demanding Substances	Oil and Grease	Bacteria	Pesticides
Vehicle & Equipment Fueling			X	X					
Vehicle & Equipment Washing and Steam Cleaning	X	X	X	X		X	X		
Vehicle & Equipment Maintenance and Repair			X	X			X		
Outdoor Loading & Unloading of Materials	X	X	X	X	X	X	X		
Outdoor Container Storage of Liquids		X	X	X		X	X		X
Outdoor Process Equipment Operations and Maintenance	X		X	X			X		
Outdoor Storage of Raw Materials, Products, and Byproducts	X	X	X	X	X	X	X		
Waste Handling & Disposal			X	X	X	X	X	X	
Contaminated or Erodible Surface Areas	X	X	X	X	X	X	X	X	
Building and Grounds Maintenance	X	X	X		X	X		X	X
Building Repair, Remodeling, and Construction	X		X		X	X			
Parking/Storage Area Maintenance			X	X	X		X		

* Source: CASQA Industrial and Commercial Stormwater BMP Handbook, 2003

** This includes all toxic pollutants other than pesticides

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Table ICF-5: Potential Pollutants by Industrial/Commercial Facility Type*

Activity or Facility Type	Potential Pollutants								
	Sediments	Nutrients	Metals	Organics and Toxicants**	Floatable Materials	Oxygen-Demanding Substances	Oil and Grease	Bacteria	Pesticides
Vehicle mechanical repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Airplane mechanical repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Boat mechanical repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Equipment repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Automobile and other vehicle body repair or painting			X	X			X		
Mobile automobile or other vehicle washing	X	X	X			X	X		
Automobile (or other vehicle) parking lots and storage			X		X		X		
Retail or wholesale fueling			X	X	X		X		
Pest control services									X
Eating or drinking establishments		X		X	X	X	X	X	X
Mobile carpet, drape or furniture cleaning	X			X					
Cement mixing or cutting	X								
Masonry	X								
Painting and coating			X	X			X		
Botanical or zoological gardens and exhibits	X	X			X	X		X	X
Landscaping	X	X			X	X		X	X
Nurseries and greenhouses	X	X			X	X		X	X
Golf courses, parks and other recreational areas/facilities	X	X			X	X		X	X
Cemeteries	X	X			X	X		X	X
Pool and fountain cleaning		X	X	X	X	X		X	
Marinas			X	X	X	X	X	X	
Port-a-Potty servicing		X			X	X		X	

* Source: Orange County Drainage Area Management Plan, 2003

** This includes all toxic pollutants other than pesticides

Planning and Land Development Program

The Cities are required to implement a Planning and Land Development program that includes the provisions listed in the MS4 Permit (LA MS4 Permit §VI.D.7, LB MS4 Permit §VII.J). This document provides guidance that the participating cities can follow to implement a Planning and Land Development program in compliance with the MS4 Permit.

Introduction *Permit §VI.D.7.a (LA)/§VII.J.1 (LB)*

The Planning and Land Development Program for all New Development and Redevelopment projects subject to the MS4 Permit includes measures to:

- Lessen the water quality impacts of development by using smart growth practices such as compact development, directing development towards existing communities via infill or redevelopment, and safeguarding of environmentally sensitive areas.
- Minimize the adverse impacts from stormwater runoff on the biological integrity of Natural Drainage Systems and the beneficial uses of water bodies in accordance with requirements under CEQA (Cal. Pub. Resources Code §21000 et seq.).
- Minimize the percentage of impervious surfaces on land developments by minimizing soil compaction during construction, designing projects to minimize the impervious area footprint, and employing Low Impact Development (LID) design principles to mimic pre-development hydrology through infiltration, evapotranspiration and rainfall harvest and use.
- Maintain existing riparian buffers and enhance riparian buffers when possible.
- Minimize pollutant loadings from impervious surfaces such as roof tops, parking lots, and roadways through the use of properly designed, technically appropriate BMPs (including Source Control BMPs such as good housekeeping practices), LID Strategies, and Treatment Control BMPs.
- Properly select, design and maintain LID and Hydromodification Control BMPs to address pollutants that are likely to be generated, reduce changes to pre-development hydrology, assure long-term function, and avoid the breeding of vectors.[1]
- Prioritize the selection of BMPs to remove stormwater pollutants, reduce stormwater runoff volume, and beneficially use stormwater to support an integrated approach to protecting water quality and managing water resources in the following order of preference:
    - On-site infiltration, bioretention and/or rainfall harvest and use.
    - On-site biofiltration, off-site groundwater replenishment, and/or off-site retrofit.

[1] Treatment BMPs when designed to drain within 96 hours of the end of rainfall minimize the potential for the breeding of vectors. See California Department of Public Health *Best Management Practices for Mosquito Control in California* (2012) at http://www.westnile.ca.gov/resources.php

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Applicability *Permit §VI.D.7.b (LA)/§VII.J.2-3 (LB)*

New Development Projects

The New Development and Redevelopment categories below will require a Standard Urban Stormwater Mitigation Plan (SUSMP), also known as a Low Impact Development (LID) Plan, containing stormwater mitigation measures in compliance with MS4 Permit requirements. Development projects subject to conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s), are listed below:

1. All development projects (including single family hillside homes) equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area
2. Industrial parks with 10,000 square feet or more of surface area
3. Commercial malls with 10,000 square feet or more surface area
4. Retail gasoline outlets with 5,000 square feet or more of surface area
5. Restaurants (SIC 5812) with 5,000 square feet or more of surface area
6. Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces
7. Automotive service facilities (SIC 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) with 5,000 square feet or more of surface area
8. Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA), where the development will:
    a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and
    b. Create 2,500 square feet or more of impervious surface area
9. Redevelopment projects in subject categories that meet Redevelopment thresholds identified below

Redevelopment Projects

Redevelopment projects subject to agency conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s), are:

1. Land-disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on development categories identified above.
2. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.
3. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire

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development.

4. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency Redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.
5. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

Special Provisions

1. Street and road construction of 10,000 square feet or more of impervious surface area
    a. These projects will follow an approved green streets manual to the maximum extent practicable. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects. The Cities will require a Standard Urban Mitigation Plan (SUSMP), also known as a Low Impact Development (LID) Plan, containing stormwater mitigation measures in compliance with the approved green streets manual requirements.
2. Single family hillside homes will require a less extensive plan. To the extent that an agency may lawfully impose conditions, mitigation measures or other requirements on the development or construction of a single-family home in a hillside area as defined in the applicable agency's Code and Ordinances, the Cities will require that during the construction of a single-family hillside home, the following measures are implemented:
    a. Conserve natural areas
    b. Protect slopes and channels
    c. Provide storm drain system stenciling and signage
    d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability
    e. Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

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New Development/ Redevelopment Project Performance Criteria *Permit §VI.D.7.c (LA)/§VII.J.4 (LB)*

Integrated Water Quality/Flow Reduction/Resources Management Criteria

All New Development and Redevelopment projects identified above will control pollutants, pollutant loads, and runoff volume emanating from the project site by: (1) minimizing the impervious surface area and (2) controlling runoff from impervious surfaces through infiltration, bioretention and/or rainfall harvest and use.

Projects will retain on-site the Stormwater Quality Design Volume (SWQDv) defined as the runoff from the 0.75-inch, 24-hour rain event or the 85th percentile, 24-hour rain event, as determined from the Los Angeles County 85th percentile precipitation isohyetal map[2], *whichever is greater*. Exceptions include technical infeasibility, opportunity for regional groundwater replenishment, local ordinance equivalence, or hydromodification, as described in the sections below.

When evaluating the potential for on-site retention, the Cities will consider the maximum potential for evapotranspiration from green roofs and rainfall harvest and use.

Alternative Compliance for Technical Infeasibility or Opportunity for Regional Groundwater Replenishment

In instances of technical infeasibility or where a project has been determined to provide an opportunity to replenish regional groundwater supplies at an offsite location, the Cities may allow projects to comply with the MS4 Permit through the alternative compliance measures as described below:

1. To demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use, and that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect. Conditions where technical infeasibility may result including those indicated in

[2] Found at <http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf>

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2. Table PLD- **1** below. To utilize alternative compliance measures to replenish groundwater at an offsite location, the project applicant will demonstrate *(i)* why it is not advantageous to replenish groundwater at the project site, *(ii)* that groundwater can be used for beneficial purposes at the offsite location, and *(iii)* that the alternative measures will also provide equal or greater water quality benefits to the receiving surface water than the Water Quality/Flow Reduction/Resource Management Criteria.

Table PLD- 1: Technical Infeasibility Criteria

1.	The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv on-site.
2.	Locations where seasonal high groundwater is within 5 to 10 feet of the surface,
3.	Locations within 100 feet of a groundwater well used for drinking water,
4.	Brownfield development sites where infiltration poses a risk of causing pollutant mobilization,
5.	Other locations where pollutant mobilization is a documented concern. Pollutant mobilization is considered a documented concern at or near properties that are contaminated or store hazardous substances underground.
6.	Locations with potential geotechnical hazards
7.	Smart growth and infill or Redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the on-site volume retention requirement.

Alternative Compliance Measures

When a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site, or is proposing an alternative offsite project to replenish regional groundwater supplies, the agency will require one of the following mitigation options:

1. On-site Biofiltration

   If using biofiltration due to demonstrated technical infeasibility, then the project must biofiltrate 1.5 times the portion of the SWQDv that is not reliably retained on-site, as calculated by Equation 1 below.

   $$B_v = 1.5 * [SWQD_v - R_V]$$ *Equation 1*

   Where:

   Bv = biofiltration volume

   SWQDv = the stormwater runoff from a 0.75 inch, 24-hour storm or the 85th percentile storm[3], *whichever is greater*.

   Rv = volume reliably retained on-site

   The MS4 Permit does not mention flowrate based biotreatment BMPs; however, proprietary biotreatment systems are often sized using flowrate rather than volume. Additionally, in cases where a pump is needed prior to entering the biotreatment BMP, the system requires sizing based on the controlled flow from the pump. Therefore, if it is infeasible to size a biotreatment BMP with volume-based calculations, the flowrate may be substituted in lieu of volume. Similarly, the flow rate must be determined using the design storm of 0.75 inch, 24-hour storm event or the 85th percentile storm[1], whichever is greater.

   Conditions for On-site Biofiltration include the following:

   a. Biofiltration systems will meet the design specifications provided in Attachment H to the MS4 Permit unless otherwise approved by the Regional Water Board Executive Officer.

[3] Found at <http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf>

b. Biofiltration systems discharging to a receiving water that is included on the Clean Water Act section 303(d) list of impaired water quality-limited water bodies due to nitrogen compounds or related effects will be designed and maintained to achieve enhanced nitrogen removal capability. See Attachment H of the MS4 Permit for design criteria for underdrain placement to achieve enhanced nitrogen removal.

2. Offsite Infiltration

Offsite infiltration when implemented will use infiltration or bioretention BMPs to intercept a volume of stormwater runoff equal to the SWQDv, less the volume of stormwater runoff reliably retained on-site, at an approved offsite project and provide pollutant reduction (treatment) of the stormwater runoff discharged from the project site in accordance with the Water Quality Mitigation Criteria. The required offsite mitigation volume will be calculated by Equation 2 below.

$$M_v = 1.0 * [SWQD_v - R_v] \qquad \textit{Equation 2}$$

Where:

M_v = mitigation volume

$SWQD_v$ = runoff from the 0.75 inch, 24-hour storm event or the 85th percentile storm[4], *whichever is greater*

R_v = the volume of stormwater runoff reliably retained on-site.

3. Groundwater Replenishment Projects

Regional projects to replenish regional groundwater supplies at offsite locations may be proposed, provided the groundwater supply has a designated beneficial use in the Basin Plan. Regional groundwater replenishment projects must use infiltration, groundwater replenishment, or bioretention BMPs to intercept a volume of stormwater runoff equal to the SWQDv for New Development and Redevelopment projects, subject to conditioning and approval for the design and implementation of post-construction controls, within the approved project area. The projects must provide pollutant reduction (treatment) of the stormwater runoff discharged from development projects, within the project area, subject to conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution in accordance with the Water Quality Mitigation Criteria.

Regional groundwater replenishment projects being implemented in lieu of onsite controls will mitigate the volume as calculated using Equation 2 above.

Regional groundwater replenishment projects will be located in the same sub-watershed (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) as the New Development or Redevelopment projects which did not implement on-site retention BMPs. Locations outside of the HUC-12 but within the HUC-10 subwatershed area may be considered if there are no opportunities within the HUC-12 subwatershed or if greater pollutant reductions and/or groundwater

[4] Found at <http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf>

replenishment can be achieved at a location within the expanded HUC-10 subwatershed. *The use of a mitigation, groundwater replenishment, or retrofit project outside of the HUC-12 subwatershed is subject to the approval of the Executive Officer of the Regional Water Board*.

4. Offsite Project -Retrofit Existing Development

   Use infiltration, bioretention, rainfall harvest and use and/or biofiltration BMPs to retrofit an existing development, with similar land uses as the New Development or land uses associated with comparable or higher stormwater runoff event mean concentrations (EMCs) than the new development. Comparison of EMCs for different land uses will be based on published data from studies performed in southern California. The retrofit plan will be designed and constructed to:

   a. Intercept a volume of stormwater runoff equal to the mitigation volume (Mv) as described above in Equation 2, except biofiltration BMPs will be designed to meet the biofiltration volume or flowrate as described in Equation 1, and

   b. Provide pollutant reduction (treatment) of the stormwater runoff from the project site as described in the Water Quality Mitigation Criteria.

5. Conditions for Offsite Projects

   Project applicants seeking to utilize these alternative compliance provisions may propose other offsite projects, which the agency in which the project is located may approve if they meet the requirements of this subpart.

   a. Location of offsite projects. Offsite projects will be located in the same sub-watershed (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) as the New Development or Redevelopment project. Locations outside of the HUC-12 but within the HUC-10 subwatershed area may be considered if there are no opportunities within the HUC-12 subwatershed or if greater pollutant reductions and/or groundwater replenishment can be achieved at a location within the expanded HUC-10 subwatershed. *The use of a mitigation, groundwater replenishment, or retrofit project outside of the HUC-12 subwatershed is subject to the approval of the Executive Officer of the Regional Water Board.*

   b. Project applicant must demonstrate that equal benefits to groundwater recharge can be met on the project site.

   c. A prioritized list of potential offsite mitigation, groundwater replenishment and/or retrofit projects will be developed within each agency, and when feasible, the mitigation will be directed to the highest priority project within the same HUC-12 or if approved by the Regional Water Board Executive Officer, the HUC-10 drainage area, as the New Development project.

   d. Infiltration/bioretention will be the preferred LID BMP for offsite mitigation or groundwater replenishment projects. Offsite retrofit projects may include green streets, parking lot retrofits, green roofs, and rainfall harvest and use. Biofiltration BMPs may be considered for retrofit projects when infiltration, bioretention or rainfall harvest and use is technically infeasible.

   e. The agency in which the project is located will develop a schedule for the completion of offsite projects, including milestone dates to identify, fund, design, and construct the projects. Offsite

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projects will be completed as soon as possible, and at the latest, within 4 years of the certificate of occupancy for the first project that contributed funds toward the construction of the offsite project, unless a longer period is otherwise authorized by the Executive Officer of the Regional Water Board. For public offsite projects, the agency in which the project is located must provide in their annual reports a summary of total offsite project funds raised to date and a description (including location, general design concept, volume of water expected to be retained, and total estimated budget) of all pending public offsite projects. Funding sufficient to address the offsite volume must be transferred to the agency (for public offsite mitigation projects) or to an escrow account (for private offsite mitigation projects) within one year of the initiation of construction.

f. Offsite projects must be approved by the agency in which the project is located and may be subject to approval by the Regional Water Board Executive Officer, if a third-party petitions the Executive Officer to review the project. Offsite projects will be publicly noticed on the Regional Water Board's website for 30 days prior to approval.

g. The project applicant must perform the offsite projects as approved by either the agency or the Regional Water Board Executive Officer or provide sufficient funding for public or private offsite projects to achieve the equivalent mitigation stormwater volume.

6. Regional Stormwater Mitigation Program

An agency or agency group may apply to the Regional Water Board for approval of a regional or sub-regional stormwater mitigation program to substitute in part or wholly for New and Redevelopment requirements for the area covered by the regional or sub-regional stormwater mitigation program. Upon review and a determination by the Regional Water Board Executive Officer that the proposal is technically valid and appropriate, the Regional Water Board may consider for approval such a program if its implementation meets all of the following requirements:

a. Retains the runoff from the 85th percentile, 24-hour rain event or the 0.75 inch, 24-hour rain event, whichever is greater;

b. Results in improved stormwater quality;

c. Protects stream habitat;

d. Promotes cooperative problem solving by diverse interests;

e. Is fiscally sustainable and has secure funding; and

f. Is completed in five years including the construction and start-up of treatment facilities.

7. Water Quality Mitigation Criteria

All New Development and Redevelopment projects that have been approved for offsite mitigation or groundwater replenishment projects will also provide treatment of stormwater runoff from the project site. These projects will design and implement post-construction stormwater BMPs and control measures to reduce pollutant loading as necessary to:

a. Meet the pollutant specific benchmarks listed in Table PLD2 at the treatment systems outlet or prior to the discharge to the MS4, and

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b. Ensure that the discharge does not cause or contribute to an exceedance of water quality standards at the agency's downstream MS4 outfall.

The project proponent may be allowed to install flow-through modular treatment systems including sand filters, or other proprietary BMP treatment systems with a demonstrated efficiency at least equivalent to a sand filter. The sizing of the flow through treatment device will be based on a rainfall intensity of 0.2 inches per hour, or the one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, *whichever is greater*.

Table PLD- 2: Benchmarks Applicable to New Development Treatment BMPs.

Conventional Pollutants					
Pollutant	Suspended Solids mg/L	Total P mg/L	Total N mg/L	TKN mg/L	
Effluent Concentration	14	0.13	1.28	1.09	
Metals					
Pollutant	Total Cd µg/L	Total Cu µg/L	Total Cr µg/L	Total Pb µg/L	Total Zn µg/L
Effluent Concentration	0.3	6	2.8	2.5	23

New developments and redevelopments will not cause or contribute to an exceedance of applicable water quality-based effluent limitations established in the MS4 Permit pursuant to Total Maximum Daily Loads (TMDLs).

8. Hydromodification (Flow/ Volume/ Duration) Control Criteria

All New Development and Redevelopment projects located within natural drainage systems will implement hydrologic control measures, to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. The purpose of the hydrologic controls is to minimize changes in post-development hydrologic stormwater runoff discharge rates, velocities, and duration. This will be achieved by maintaining the project's pre-project stormwater runoff flow rates and durations.

Description

Hydromodification control in natural drainage systems will be achieved by maintaining the Erosion Potential (Ep) in streams at a value of 1, unless an alternative value can be shown to be protective of the natural drainage systems from erosion, incision, and sedimentation that can occur as a result of flow increases from impervious surfaces and prevent damage to stream habitat in natural drainage system tributaries[5]. Hydromodification mitigation approaches should meet the criteria below:

a. Hydromodification control may include one, or a combination of on-site, regional or sub-regional hydromodification control BMPs, LID strategies, or stream and riparian buffer restoration measures. Any in-stream restoration measure shall not adversely affect the beneficial uses of the natural drainage systems.

b. Natural drainage systems that are subject to the hydromodification assessments and controls,

[5] See Attachment J of the MS4 Permit, "*Determination of Erosion Potential*"

as described in this section, include all drainages that have not been improved (e.g., channelized or armored with concrete, shotcrete, or rip-rap) or drainage systems that are tributary to a natural drainage system, except as provided in Exemptions to Hydromodification Controls, see below. The clearing or dredging of a natural drainage system does not constitute an "improvement."

c. Until the State Water Board or the Regional Water Board adopts a final Hydromodification Policy or criteria, the Hydromodification Control Criteria described in this section will be implemented to control the potential adverse impacts of changes in hydrology that may result from New Development and Redevelopment projects located within natural drainage systems.

Exemptions to Hydromodification Controls

New Development and Redevelopment projects may be exempt from implementation of hydromodification controls where assessments of downstream channel conditions and proposed discharge hydrology indicate that adverse hydromodification effects to beneficial uses of Natural Drainage Systems are unlikely. Conditions for exemptions include the following:

a. Projects involving replacement, maintenance or repair of an agency's existing flood control facility, storm drain, or transportation network.

b. Redevelopment Projects in the center of urban areas that do not increase the effective impervious area or decrease the infiltration capacity of pervious areas compared to the pre-project conditions.

c. Projects that have any increased discharge directly or via a storm drain to a sump, lake, area under tidal influence, into a waterway that has a 100-year peak flow (Q100) of 25,000 cfs or more, or other receiving water that is not susceptible to hydromodification impacts.

d. Projects that discharge directly or via a storm drain into concrete or otherwise engineered (not natural) channels (e.g., channelized or armored with rip rap, shotcrete, etc.), which, in turn, discharge into receiving water that is not susceptible to hydromodification impacts.

e. LID BMPs implemented on single family homes are sufficient to comply with hydromodification criteria.

Hydromodification Control Criteria

The Hydromodification Control Criteria to protect natural drainage systems are as follows:

a. Except for exemptions described above, projects disturbing an area greater than 1 acre but less than 50 acres within natural drainage systems will be presumed to meet pre-development hydrology if one of the following demonstrations is made:

    i. The project is designed to retain on-site, through infiltration, evapotranspiration, and/or harvest and use, the stormwater volume from the runoff of the 95th percentile, 24-hour storm, or

ii. The runoff flow rate, volume, and velocity for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour rainfall event and the duration for the post-development condition is not less than the pre-development condition for the 2-year, 24-hour rainfall event. This condition may be substantiated by simple screening models, including those described in Hydromodification Effects on Flow Peaks and Durations in Southern California Urbanizing Watersheds (Hawley et al., 2011) or other models acceptable to the Executive Officer of the Regional Water Board, or

The MS4 Permit states projects will meet Hydromodification Control Criteria if "*The...duration for the post-development condition **do[es] not exceed** the pre-development condition for the 2-year, 24-hour rainfall event*." The runoff duration (Tc) is generally associated with longer values resulting in lower concern for hydromodification impacts. Implementation of LID BMPs generally results in runoff not immediately (or not at all) discharging from the site, increasing the time of concentration. Thus, the interpretation presented herein is that Hydromodification Control Criteria would be met if the runoff duration for the post-development condition is **not less than** the pre-development condition for the 2-year, 24-hour rainfall event.

iii. The Erosion Potential (Ep) in the receiving water channel will approximate 1, as determined by a Hydromodification Analysis Study and the equation presented in Attachment J of the MS4 Permit. Alternatively, agencies can opt to use other work equations to calculate Erosion Potential with Executive Officer approval.

b. Projects disturbing 50 acres or more within natural drainage systems will be presumed to meet pre-development hydrology based on the successful demonstration of one of the following conditions:

i. The site infiltrates on-site at least the runoff from a 2-year, 24hour storm event, or

ii. The runoff flow rate, volume, and velocity for the post-development condition does not exceed the pre-development condition for the 2-year, 24-hour rainfall event and the duration for the post-development condition is not less than the pre-development condition for the 2-year, 24-hour rainfall event. These conditions must be substantiated by hydrologic modeling acceptable to the Regional Water Board Executive Officer, or

iii. The Erosion Potential (Ep) in the receiving water channel will approximate 1, as determined by a Hydromodification Analysis Study and the equation presented in Attachment J of the MS4 Permit.

Alternative Hydromodification Criteria

The requirement for Hydromodification Controls will be satisfied by implementing the hydromodification requirements in the County of Los Angeles Low Impact Development Manual (2009) for all projects disturbing an area greater than 1 acre within natural drainage systems.

3. Watershed Equivalence

Regardless of the methods through which applicants implement alternative compliance measures,

the subwatershed-wide (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) result of all development must be at least the same level of water quality protection as would have been achieved if all projects utilizing these alternative compliance provisions had complied with the Integrated Water Quality/Flow Reduction/Resource Management Criteria, described herein.

4. Annual Report

   Annual Reports will be provided to the Regional Water Board to include a list of mitigation project descriptions and estimated pollutant and flow reduction analyses (compiled from design specifications submitted by project applicants, as approved. Within 4 years of the MS4 Permit adoption, the Annual Reports will include a comparison of the expected aggregate results of alternative compliance projects to the results that would otherwise have been achieved by retaining on site the SWQDv.

Implementation *Permit §VI.D.7.d (LA)/§VII.J.5 (LB)*

Local Ordinance Equivalence

Alternative requirements in the local ordinances for the agencies of this WMP will provide equal or greater reduction in stormwater discharge pollutant loading and volume as would have been obtained through strict conformance with the Integrated Water Quality/Flow Reduction Resources Management Criteria, Alternative Compliance Measures for Technical Infeasibility, or Opportunity for Regional Groundwater Replenishment sections herein and, if applicable, the Hydromodification (Flow/Volume Duration) Control Criteria section herein.

Project Coordination

A process for effective approval of post-construction stormwater control measures will be developed to include:

a. Detailed LID site design and BMP review including review of BMP sizing calculations, BMP pollutant removal performance, and municipal approval; and

b. An established structure for communication and delineated authority between and among municipal departments that have jurisdiction over project review, plan approval, and project construction through memoranda of understanding or an equivalent agreement.

Maintenance Agreement and Transfer

Prior to issuing approval for final occupancy, the Cities will require that all New Development and Redevelopment projects subject to post-construction BMP requirements, with the exception of simple LID BMPs implemented on single family residences, provide an operation and maintenance plan, monitoring plan, where required, and verification of ongoing maintenance provisions for LID practices, Treatment Control BMPs, and Hydromodification Control BMPs including but not limited to: final map conditions, legal agreements, covenants, conditions or restrictions, CEQA mitigation requirements, conditional use permits, and/ or other legally binding maintenance agreements (see Attachments PLD-A and PLD-B for MCA and MCA Termination sample templates, respectively). Agencies will require maintenance records be kept on site.

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Verification at a minimum will include the developer's signed statement accepting responsibility for maintenance until the responsibility is legally transferred; and either:

a. A signed statement from the public entity assuming responsibility for BMP maintenance; or

b. Written conditions in the sales or lease agreement, which require the property owner or tenant to assume responsibility for BMP maintenance and conduct a maintenance inspection at least once a year; or

c. Written text in project covenants, conditions, and restrictions (CCRs) for residential properties assigning BMP maintenance responsibilities to the Home Owners Association; or

d. Any other legally enforceable agreement or mechanism that assigns responsibility for the maintenance of BMPs.

All development projects subject to post-construction BMP requirements will provide a plan for the operation and maintenance of all structural and treatment controls. The plan will be submitted for examination of relevance to keeping the BMPs in proper working order. Where BMPs are transferred to agency for ownership and maintenance, the plan will also include all relevant costs for upkeep of BMPs in the transfer. Operation and Maintenance plans for private BMPs will be kept on-site for periodic review by agency inspectors.

A tracking system and an inspection and enforcement program will be maintained for New Development and Redevelopment post-construction stormwater as shown in Table PLC-3. Enforcement action will be taken per the established Progressive Enforcement Policy as appropriate based on the results of the inspection. See Section for requirements for the development and implementation of a Progressive Enforcement Policy (Appendix A-3-1_PEP).

Table PLD-3: Tracking, Inspection, and Enforcement Program Components

Program	Description	Components	
GIS or other Electronic System	A GIS or other electronic system will be implemented for tracking projects that have been conditioned for post-construction BMPs.	– Municipal Project ID – State WDID No. – Project Acreage – BMP Type and Description – BMP Location (coordinates) – Date of Maintenance Agreement – Date of Acceptance	– Maintenance Records – Inspection Date and Summary – Corrective Action – Date Certificate of Occupancy Issued – Replacement or Repair Date
Inspections[6]	Inspect all development sites upon completion of construction and prior to the issuance of occupancy	Proper installation of: – LID measures, – Structural BMPs,	

[6] The inspection may be combined with other inspections provided it is conducted by trained personnel.

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	certificates.	– Treatment control BMPs, and – Hydromodification control BMPs.
Operation and Maintenance[7]	Verify proper operation and maintenance of post-construction BMPs. Inspection at least once every 2 years after project completion.	– Follow a Post-construction BMP Maintenance Inspection checklist (See Attachment PLD-C) – Assess operation and maintenance conditions relating to post-construction BMPs, including BMP repair, replacement, or re-vegetation.

Plan Certification

Each SUSMP/LID Plan should contain proper certifications. The following approach is suggested for SUSMP/LID Plan submittals:

- Form signed by the property owner/applicant stating the category in which the project falls under to easily define the NPDES requirements (see Attachment PLD-D for Form PC sample template).
- Form signed by the property owner/applicant certifying that the BMPs will be implemented, monitored, and maintained per SUSMP/LID Plan requirements (see Attachment PLD-E for Form P1 sample template).
- Form signed and stamped by a California registered civil engineer stating the proposed structural BMPs and certifying the methods and requirements are in compliance with the MS4 Permit requirements (see Attachment PLD-F for Form P2 sample template).

[7] For post-construction BMPs operated and maintained by parties other than the agency in which the BMP(s) is located, the agency will require the other parties to document proper maintenance and operations.

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Development Construction Program

The Cities are required to develop, implement and enforce a construction program that includes the provisions listed in MS4 Permit §VI.D.8 (LB §VII.K). This document provides guidance to assist the Cities in implementing a construction program in compliance with the MS4 Permit.

Objectives

Permit §VI.D.8.a (LA)/§VII.K.1 (LB)

The objectives of the construction program are to:

- Prevent illicit construction-related discharges of pollutants into the MS4 and receiving waters.
- Implement and maintain structural and non-structural BMPs to reduce pollutants in stormwater runoff from construction sites.
- Reduce construction site discharges of pollutants to the MS4 to the MEP.
- Prevent construction site discharges to the MS4 from causing or contributing to a violation of water quality standards.

Erosion and Sediment Control Ordinance

Permit §VI.D.8.b (LA)/ §VII.K.1 (LB)

The construction program requires an established, enforceable erosion and sediment control ordinance for all construction sites that disturb soil.

Applicability

Permit §VI.D.8.c (LA)/ §VII.K.1.v (LB)

The construction program addresses construction activity as defined in Table DC-1.

Table DC-1: Definitions

Construction Activity	
Definition	Any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that results in land disturbance.
Examples	Grading, vegetation clearing, soil compaction, paving, repaving and linear underground/overhead projects (LUPs) that result in land disturbance.
Exclusions	Emergency construction required to immediately protect public health and safety, *routine maintenance* as defined below and agricultural activities.
Routine Maintenance (construction program exclusion)	
Definition	Projects required to maintain the integrity of structures, including but not limited to the following:
Examples	Maintaining the original line and grade, hydraulic capacity, or original purpose of the facility.
	Performing restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.
	Performing road shoulder work, regrading dirt/gravel roadways/shoulders and cleaning out ditches.
	Update existing lines (includes replacing with new materials or pipe) and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
	Repair leaks
Exclusion	New lines (i.e. not associated with existing facilities and not part of a project to update or replace existing lines) or facilities constructed to comply with applicable codes, standards and regulations.

The greater part of the construction program is dedicated to construction sites that disturb one acre or more of soil (with the exception of agricultural activities). This coincides with the size threshold for coverage under the State Water Resources Control Board's NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. The program provisions exclusive to sites less than one acre are addressed first.

Construction Sites Less than One Acre

Permit §VI.D.8.d (LA)/§VII.K.1.vi (LB)

BMPs (< 1 acre)

Through the use of the erosion and sediment control ordinance and/or building permit, construction sites are required have in place an effective combination of erosion and sediment control BMPs from Table DC-2 to prevent erosion and sediment loss and the discharge of construction wastes.

Table DC-2: Applicable Set of BMPs for All Construction Sites

BMP Type	BMP
Erosion Controls	Scheduling
	Preservation of Existing Vegetation
Sediment Controls	Silt Fence
	Sand Bag Barrier
	Stabilized Construction Site Entrance/Exit
Nonstormwater Management	Water Conservation Practices
	Dewatering Operations
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management
	Concrete Waste Management
	Sanitary/Septic Waste Management

Inventory (< 1 acre)

All construction sites with soil disturbing activities that require a permit, regardless of size, are identified and stored in an inventory. Existing permit databases or other tracking systems may be used to file this information. The list of permitted sites is provided to the Regional Water Board upon request.

Inspections (< 1 acre)

Construction sites are inspected on as needed based on the evaluation of the factors that are a threat to water quality. In evaluating the threat to water quality, the following factors are considered: soil erosion potential, site slope, project size and type, sensitivity of receiving water bodies, proximity to receiving water bodies, nonstormwater discharges, past record of noncompliance by the operators of the construction site and any water quality issues relevant to the particular MS4.

Enforcement (< 1 acre)

The Progressive Enforcement Policy (MS4 Permit §VI.D.2) is implemented to ensure that construction sites are brought into compliance with the erosion and sediment control ordinance within a reasonable time period.

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Construction Sites One Acre or Greater

Operators of public and private construction sites within a city's jurisdiction are required to select, install, implement, and maintain BMPs that comply with the erosion and sediment control ordinance.

Construction Site Inventory / Electronic Tracking System *Permit §VI.D.8.g (LA)/§VII.K.1.ix (LB)*

An electronic system is used to inventory all issued grading permits, encroachment permits, demolition permits, building permits, or construction permits (and any other municipal authorization to move soil and/ or construct or destruct that involves land disturbance). A database management system or GIS system is recommended. This inventory is continuously updated as new sites are permitted and sites are completed. The inventory / tracking system contains at a minimum the items listed in Table DC-3.

Table DC-3: Inventory Information for Constructions Sites

Information Type		Information
General	Name	Project Name
	Location	Site address and/or latitude and longitude coordinates
		Receiving water
	Contact	Names of owner and contractor
		Mailing addresses of owner and contractor
		Phone numbers of owner and contractor
		Emails (if available) of owner and contractor
Status		Start and end dates
		Permit approval date and anticipated completion date
		Erosion and Sediment Control Plan (ESCP) approval date
		Status of NOI submittal and CGP coverage
		Current construction phase (where feasible)
Size		Size of project and area of disturbance
Water quality		Proximity to waterbodies listed as impaired[1] by sediment related pollutants
		Proximity to waterbodies for which a sediment-related TMDL has been adopted and approved by USEPA
		Status as a significant threat to water quality (based on a consideration of factors listed in Appendix 1 to the CGP)
Inspection		Inspection frequency
Post construction		List of post-construction structural BMPs subject to O&M requirements

Construction Plan Review and Approval Procedures *Permit §VI.D.8.h (LA)/§VII.K.1.x (LB)*

Plan review procedures are developed and implemented such that the following minimum requirements are met:

- Prior to issuing a grading or building permit, each operator of a construction activity within the city's jurisdiction of which the project is located is required to prepare and submit an ESCP prior to the disturbance of land for review and written approval. The construction site operator is prohibited from commencing construction activity prior to receipt of written approval by the city of which the project is located. An ESCP is not approved unless it contains appropriate site-

[1] CWA §303(d) listed or subject to a TMDL

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specific construction site BMPs that meet the minimum requirements of the erosion and sediment control ordinance.

- ESCPs must include the elements of a Storm Water Pollution Prevention Plan (SWPPP). SWPPPs prepared in accordance with the requirements of the Construction General Permit can be accepted as ESCPs.
- At a minimum, the ESCP must address the following elements:
    - Methods to minimize the footprint of the disturbed area and to prevent soil compaction outside of the disturbed area.
    - Methods used to protect native vegetation and trees.
    - Sediment/Erosion Control.
    - Controls to prevent tracking on and off the site.
    - Nonstormwater controls (e.g., vehicle washing, dewatering, etc.).
    - Materials Management (delivery and storage).
    - Spill Prevention and Control.
    - Waste Management (e.g., concrete washout/waste management; sanitary waste management).
    - Identification of site Risk Level as identified per the requirements in Appendix 1 of the Construction General Permit.
- The ESCP must include the rationale for the selection and design of the proposed BMPs, including quantifying the expected soil loss from different BMPs.
- The ESCP must be developed and certified by a Qualified SWPPP Developer (QSD).
- All structural BMPs must be designed by a licensed California Engineer.
- The landowner or the landowner's agent must sign a statement on the ESCP as follows (see Attachment DC-A for sample OC-1 template):

  "I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law."

- Prior to issuing a grading or building permit, the city of which the project is located verifies that the construction site operators have existing coverage under applicable permits, including, but not limited to the State Water Board's Construction General Permit, and State Water Board 401 Water Quality Certification.
- A checklist is used to conduct and document review of each ESCP (see Attachment DC-B for the ESCP Checklist sample template).

BMP Implementation Level *Permit §VI.D.8.i (LA)/§VII.K.1.xi (LB)*

The Cities will implement technical standards for the selection, installation and maintenance of construction BMPs for all construction sites within its jurisdiction.

The BMP technical standards require:

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- The use of BMPs that are tailored to the risks posed by the project. Sites are ranked from Low Risk (Risk 1) to High Risk (Risk 3). Project risks are calculated based on the potential for erosion from the site and the sensitivity of the receiving water body. Receiving water bodies that are listed on the Clean Water Act (CWA) Section 303(d) list for sediment or siltation are considered High Risk. Likewise, water bodies with designated beneficial uses of SPWN, COLD, and MIGR are also considered High Risk. The combined (sediment/receiving water) site risk is calculated using the methods provided in Appendix 1 of the Construction General Permit. At a minimum, the BMP technical standards include requirements for High Risk sites as defined in Table DC-7.
- The use of BMPs for all construction sites, sites equal or greater to 1 acre, and for paving projects per Table DC-6 and Table DC-8.
- Detailed installation designs and cut sheets for use within ESCPs.
- Maintenance expectations for each BMP, or category of BMPs, as appropriate.

Permittees are encouraged to adopt respective BMPs from latest versions of the California BMP Handbook, Construction or Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual and addenda. Alternatively, Permittees are authorized to develop or adopt equivalent BMP standards consistent for Southern California and for the range of activities presented in Tables DC-5 through DC-8.

The local BMP technical standards are readily available to the development community and are clearly referenced within the Cities' stormwater or development services websites, ordinances, permit approval processes and/or ESCP review forms. The local BMP technical standards are also readily available to the Regional Water Board upon request.

Local BMP technical standards are available for the BMPs listed in Tables DC-5 through DC-8.

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Table DC-4: Minimum Set of BMPs for All Construction Sites

BMP Type	BMP
Erosion Controls	Scheduling
	Preservation of Existing Vegetation
Sediment Controls	Silt Fence
	Sand Bag Barrier
	Stabilized Construction Site Entrance/Exit
Nonstormwater Management	Water Conservation Practices
	Dewatering Operations
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management
	Concrete Waste Management
	Sanitary/Septic Waste Management

Table DC-5: Additional BMPs Applicable to Construction Sites Disturbing 1 Acre or More

BMP Type	BMP
Erosion Controls	Hydraulic Mulch
	Hydroseeding
	Soil Binders
	Straw Mulch
	Geotextiles and Mats
	Wood Mulching
Sediment Controls	Fiber Rolls
	Gravel Bag Berm
	Street Sweeping and/ or Vacuum
	Storm Drain Inlet Protection
	Scheduling
	Check Dam
Additional Controls	Wind Erosion Controls
	Stabilized Construction Entrance/ Exit
	Stabilized Construction Roadway
	Entrance/ Exit Tire Wash
Non-Storm Management	Vehicle and Equipment Washing
	Vehicle and Equipment Fueling
	Vehicle and Equipment Maintenance
Waste Management	Material Delivery and Storage
	Spill Prevention and Control

Table DC-6: Additional Enhanced BMPs for High Risk Sites

BMP Type	BMP
Erosion Controls	Hydraulic Mulch
	Hydroseeding
	Soil Binders
	Straw Mulch
	Geotextiles and Mats
	Wood Mulching
	Slope Drains
Sediment Controls	Silt Fence
	Fiber Rolls
	Sediment Basin
	Check Dam
	Gravel Bag Berm
	Street Sweeping and/or Vacuum
	Sand Bag Barrier
	Storm Drain Inlet Protection
Additional Controls	Wind Erosion Controls
	Stabilized Construction Entrance/Exit
	Stabilized Construction Roadway
	Entrance/Exit Tire Wash
	Advanced Treatment Systems*
Nonstormwater Management	Water Conservation Practices
	Dewatering Operations (Ground water dewatering only under NPDES Permit No. CAG994004)
	Vehicle and Equipment Washing
	Vehicle and Equipment Fueling
	Vehicle and Equipment Maintenance
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management

*Applies to public roadway projects.

Table DC-7: Minimum Required BMPs for Roadway Paving or Repair Operation (For Private or Public Projects)

#	BMP
1.	Restrict paving and repaving activity to exclude periods of rainfall or predicted rainfall unless required by emergency conditions.
2.	Install gravel bags and filter fabric or other equivalent inlet protection at all susceptible storm drain inlets and at manholes to prevent spills of paving products and tack coat.
3.	Prevent the discharge of release agents including soybean oil, other oils, or diesel to the stormwater drainage system or receiving waters.
4.	Minimize non stormwater runoff from water use for the roller and for evaporative cooling of the asphalt.
5.	Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage and dispose of properly.
6.	Collect liquid waste in a container, with a secure lid, for transport to a maintenance facility to be reused, recycled or disposed of properly.
7.	Collect solid waste by vacuuming or sweeping and securing in an appropriate container for transport to a maintenance facility to be reused, recycled or disposed of properly.
8.	Cover the "cold-mix" asphalt (i.e., pre-mixed aggregate and asphalt binder) with protective sheeting during a rainstorm.
9.	Cover loads with tarp before haul-off to a storage site, and do not overload trucks.
10.	Minimize airborne dust by using water spray or other approved dust suppressant during grinding.
11.	Avoid stockpiling soil, sand, sediment, asphalt material and asphalt grindings materials or rubble in or near stormwater drainage system or receiving waters.
12.	Protect stockpiles with a cover or sediment barriers during a rain.

Construction Site Inspection *Permit §VI.D.8.j (LA)/§VII.K.1.xii (LB)*

The Cities' legal authority is used to implement procedures for inspecting public and private construction sites. The inspection procedures are implemented as follows:

Inspection Frequency

- Inspect the public and private construction sites as specified in Table DC-8.
- All phases of construction are inspected as follows:
    - Prior to Land Disturbance – Prior to allowing an operator to commence land disturbance, each Permittee shall perform an inspection to ensure all necessary erosion and sediment structural and non-structural BMP materials and procedures are available per the erosion and sediment control plan.
    - During Active Construction, including Land Development[2] and Vertical Construction[3] – In accordance with the frequencies specified in Table DC-8, inspections are performed to ensure all necessary erosion and sediment structural and non-structural BMP materials and procedures are available per the erosion and sediment control plan throughout the construction process.
    - Final Landscaping / Site Stabilization[4] – At the conclusion of the project and as a condition of approving and/or issuing a Certificate of Occupancy, the constructed site is inspected to ensure that all graded areas have reached final stabilization and that all

[2] Activities include cuts and fills, rough and finished grading; alluvium removals; canyon cleanouts; rock undercuts; keyway excavations; stockpiling of select material for capping operations; and excavation and street paving, lot grading, curbs, gutters and sidewalks, public utilities, public water facilities including fire hydrants, public sanitary sewer systems, storm sewer system and/or other drainage improvement.
[3] The build out of structures from foundations to roofing, including rough landscaping.
[4] All soil disturbing activities at each individual parcel within the site have been completed.

trash, debris, and construction materials, and temporary erosion and sediment BMPs are removed.

- Based on the required frequencies above, each construction project is inspected a minimum of three times.

Table DC-8: Inspection Frequencies for Sites One Acre or Greater

Site	Inspection Frequency Shall Occur
All sites 1 acre or larger that discharge to a tributary listed by the state as an impaired water for sediment or turbidity under the CWA §303(d)	(1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA[5], (2) within 48 hours of a ½-inch rain event and at (3) least once every two weeks
Other sites 1 acre or more determined to be a significant threat to water quality[6]	
All other construction sites with 1 acre or more of soil disturbance not meeting the criteria above	At least monthly

Inspection Standard Operating Procedures

Standard operating procedures are implemented, and revised as necessary, that identify the inspection procedures followed by the Cities' inspectors (see Attachment DC-C for suggested standard operating procedures). Inspections of construction sites – and the standard operating procedures – include, but are not limited to:

1. Verification of active coverage under the Construction General Permit for sites disturbing 1 acre or more, or that are part of a planned development that will disturb 1 acre or more and a process for referring non-filers to the Regional Water Board.
2. Review of the applicable ESCP and inspection of the construction site to determine whether all BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions (see Attachment DC-B for the ESCP Checklist sample template).
3. Assessment of the appropriateness of the planned and installed BMPs and their effectiveness.
4. Visual observation and record keeping of nonstormwater discharges, potential illicit discharges and connections, and potential discharge of pollutants in stormwater runoff.
5. Development of a written or electronic inspection report generated from an inspection checklist used in the field (see Attachment DC-D and DC-E for the Large Site and Small Site[7] Inspection Forms, respectively).
6. Tracking of the number of inspections for the inventoried construction sites throughout the reporting period to verify that the sites are inspected at the minimum frequencies listed in Table DC-8.

Enforcement *Permit §VI.D.8.k (LA)/§VII.K.1.xiii (LB)*

The Progressive Enforcement Policy is implemented to ensure that construction sites are brought into compliance with all stormwater requirements within a reasonable time period.

[5] www.srh.noaa.gov/forecast

[6] In evaluating the threat to water quality, the following factors shall be considered: soil erosion potential; site slope; project size and type; sensitivity of receiving water bodies; proximity to receiving water bodies; nonstormwater discharges; past record of non-compliance by the operators of the construction site; and any water quality issues relevant to the particular MS4.

[7] A "large site" refers to a site greater than or equal to 1 acre while a "small site" refers to a site less than one acre.

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Permittee Staff Training *Permit §VI.D.8.l(LA)/§VII.K.1.xiv(LB)*

Staff whose primary job duties are related to implementing the construction stormwater program are adequately trained.

The Cities may conduct in-house training or contract with consultants. Training is provided to the following staff positions of the MS4:

- Plan Reviewers and Permitting Staff – Staff and consultants are trained as qualified individuals, knowledgeable in the technical review of local erosion and sediment control ordinance, local BMP technical standards, ESCP requirements, and the key objectives of the State Water Board QSD program. The training is provided either internally to staff or staff is required to obtain QSD certification.
- Erosion Sediment Control/Stormwater Inspectors – Inspectors are either 1) knowledgeable in inspection procedures consistent with the State Water Board sponsored program QSD, 2) a Qualified SWPPP Practitioner (QSP) or 3) a designated person on staff trained in the key objectives of the QSD/QSP programs supervises inspection operations. The training is provided either provided internally to staff or staff is required to obtain QSD/QSP certification. Each inspector is knowledgeable of the local BMP technical standards and ESCP requirements.
- Third-Party Plan Reviewers, Permitting Staff, and Inspectors – If outside parties are utilized to conduct inspections and/or review plans, these staff are trained per the requirements listed above. Outside contractors can self-certify, providing they certify they have received all applicable training required in MS4 Permit §VI.D.8 and have documentation to that effect.

Public Agency Activities Program

Each participating city is required to develop and implement a program for public agency facilities and activities that includes the requirements listed in MS4 Permit §VI.D.9 (LB §VII.L). This document provides guidance to assist the Cities in implementing a public agency activities program in compliance with the MS4 Permit.

Objectives

Permit §VI.D.9.a (LA)/§VII.L.1 (LB)

The objectives of the Public Agency Activities program are to:

- Minimize stormwater pollution impacts from Permittee-owned or operated facilities.
- Minimize stormwater pollution impacts from public agency activities.
- Identify opportunities to reduce stormwater pollution impacts from areas of existing development.

MS4 Permit requirements for Public Agency Facilities and Activities consist of the following components which will be discussed in more detail in the sections below:

- Public Construction Activities Management
- Public Facility Inventory
- Inventory of Existing Development for Retrofitting Opportunities
- Public Facility and Activity Management
- Vehicle and Equipment Wash Areas
- Landscape, Park, and Recreational Facilities Management
- Storm Drain Operation and Maintenance
- Streets, Roads, and Parking Facilities Maintenance
- Emergency Procedures
- Municipal Employee and Contractor Training

1. Public Construction Activities Management

Permit §VI.D.9.b (LA)/§VII.L.2 (LB)

Each participating city is required to develop and implement a Development Construction Program that meets the requirements the Development Construction Section of this WMP, and Part VI.D.8 of the LA MS4 Permit at municipally owned or operated (i.e., public or Permittee sponsored) construction projects. In addition, each participating city is required to develop and implement a Planning and Land Development Program that meets the requirements in the Planning and Land Development Section of this WMP, and the MS4 Permit at municipally owned or operated (i.e., public or Permittee sponsored) construction projects.

2. Public Facility Inventory

Permit §VI.D.9.c (LA)/§VII.L.3 (LB)

The Public Agency Activities Program requires the maintenance of an inventory of all Permittee-owned or operated (i.e., public) facilities that are potential sources of stormwater pollution. The incorporation of facility information into a GIS is recommended. Sources that are tracked include but are not limited to the following:

- Animal control facilities
- Chemical storage facilities
- Composting facilities

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- Equipment storage and maintenance facilities (including landscape maintenance-related operations)
- Fueling or fuel storage facilities (including municipal airports)
- Hazardous waste disposal facilities
- Hazardous waste handling and transfer facilities
- Incinerators
- Landfills
- Materials storage yards
- Pesticide storage facilities
- Fire stations
- Public restrooms
- Public parking lots
- Public golf courses
- Public swimming pools
- Public parks
- Public works yards
- Public marinas
- Recycling facilities
- Solid waste handling and transfer facilities
- Vehicle storage and maintenance yards
- Stormwater management facilities (e.g., detention basins)
- All other Permittee-owned or operated facilities or activities that are determined to contribute a substantial pollutant load to the MS4.

The following minimum fields of information are included in the inventory for each Permittee-owned or operated facility:

- Name of facility
- Name of facility manager and contact information
- Address of facility (physical and mailing)
- A narrative description of activities performed and potential pollution sources.
- Coverage under the Industrial General Permit or other individual or general NPDES permits or any applicable waiver issued by the Regional or State Water Board pertaining to stormwater discharges.

The inventory is updated at least once during the 5-year MS4 Permit term. The update are accomplished through collection of new information obtained through field activities or through other readily available inter and intra-agency informational databases (e.g., property management, land-use approvals, accounting and depreciation ledger account, and similar information).

3. Inventory of Existing Development for Retrofit Opportunities

Permit §VI.D.9.d (LA)/§VII.L.4 (LB)

The Public Agency Activities Program requires the development of an inventory of retrofitting opportunities. Retrofit opportunities are identified within the public right-of-way or in coordination with a TMDL implementation plan(s). The goals of the existing development retrofitting inventory are to address the impacts of existing development through regional or sub-regional retrofit projects that

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reduce the discharges of stormwater pollutants into the MS4 and prevent discharges from the MS4 from causing or contributing to a violation of water quality standards as defined in the MS4 Permit.

Existing areas of development are screened to identify candidate areas for retrofitting using watershed models or other screening level tools. The areas of existing development identified during the screening process are then evaluated and ranked to prioritize retrofitting candidates. Criteria for this evaluation may include, but is not limited to the following:

- Feasibility, including general private and public land availability;
- Cost effectiveness;
- Pollutant removal effectiveness;
- Tributary area potentially treated;
- Maintenance requirements;
- Landowner cooperation;
- Neighborhood acceptance;
- Aesthetic qualities;
- Efficacy at addressing concern; and
- Potential improvements to public health and safety.

The results of this evaluation are considered in the following programs:

- Highly feasible projects expected to benefit water quality are given a high priority to implement source control and treatment control BMPs in the WMP.
- High priority retrofit projects are considered as candidates for off-site mitigation projects per LA MS4 Permit §VI.D.7.c.iii(4)(d) (LB §VII.J.4.iii(4)).
- Where feasible, the existing development retrofit program is coordinated with flood control projects and other infrastructure improvement programs per LA MS4 Permit §VI.D.9.e.ii(2) (LB §VII.L.5.ii(2)).

Site specific retrofit projects are encouraged through cooperation with private landowners. The following practices are considered in cooperating with private landowners to retrofit existing development:

- Demonstration retrofit projects;
- Retrofits on public land and easements that treat runoff from private
- developments;
- Education and outreach;
- Subsidies for retrofit projects;
- Requiring retrofit projects as enforcement, mitigation or ordinance compliance;
- Public and private partnerships;
- Fees for existing discharges to the MS4 and reduction of fees for retrofit implementation.

4. Public Facility and Activity Management

Permit §VI.D.9.e (LA)/§VII.L.5 (LB)

4.1. Industrial General Permitted Facilities

Permit §VI.D.9.e.i & §VI.D.9.e.v (LA)/§VII.L.5.i (LB)

All Permittee owned or operated facilities where industrial activities are conducted that require coverage are required to obtain coverage under the Industrial General Permit by submitting a Notice of Intent (NOI) to the State Water Resources Control Board (State Board) and preparing a Stormwater

Pollution Prevention Plan (SWPPP). Facilities that may require coverage are listed by category in 40 Code of Federal Regulations (CFR) Section 122.26(b)(14), and include:

- Facilities subject to stormwater effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards (40 CFR Subchapter N)
- Manufacturing facilities
- Mining and oil and gas facilities
- Hazardous waste treatment, storage, or disposal facilities
- Landfills, land application sites, and open dumps that receive industrial waste
- Recycling facilities
- Steam electric generating facilities
- Transportation facilities
- Sewage treatment plants
- Certain facilities if materials are exposed to stormwater

Municipally owned or operated facilities that have obtained coverage under the IGP implement and maintain BMPs consistent with the associated SWPPP, and are therefore not required to implement and maintain the activity specific BMPs as described in the sections below.

4.2. Flood Management Projects *Permit §VI.D.9.e.ii (LA)/§VII.L.5.ii (LB)*

The following measures are implemented for municipally owned or operated flood management projects:

- Procedures are developed to assess the impacts of flood management projects on the water quality of receiving water bodies;
- Existing structural flood control facilities area evaluated to determine if retrofitting the facility to provide additional pollutant removal from stormwater is feasible.

4.3. Contracted Public Agency Activities *Permit §VI.D.9.e.iv (LA)/§VII.L.5.iv (LB)*

Any contractors hired to conduct Public Agency Activities, including, but not limited to the following must be contractually obligated to implement and maintain the activity specific BMPs outlined in the sections below:

- Storm and/or sanitary sewer system inspection and repair,
- Street sweeping,
- Trash pick-up and disposal, and
- Street and right-of-way construction and repair

It is the responsibility of each Permittee to ensure that these BMPs are being properly implemented and maintained through oversight of contracted activities. Example contractor/lessor contract language is provided in attachment PA-A.

4.4. BMPS for Municipal Activities

Permit §VI.D.9.e.iii & Permit §VI.D.9.e.vi (LA)/§VII.L.5.iii & VII.L.5.vi (LB)

Municipal maintenance and field staff are the ones responsible for implementing effective source control BMPs[1], such as those described in Table PA-1 (or an equivalent set of BMPs) when such activities occur at municipally owned or operated facilities and field operations (i.e. project sites). These sites include, but are not limited to the facility types identified in the Public Facility Inventory, and at any area that includes the activities described in Table PA-1, or that have the potential to discharge pollutants in stormwater. The Caltrans Stormwater Quality Handbook Maintenance Staff Guide (Caltrans Handbook)[2] is an additional resource that describes BMPs to prevent the stormwater-related pollutants most likely to come from common maintenance facility operations and field activities. It provides a straightforward working-level approach to implementing BMPs for common maintenance activities by categorizing these activities into Families, and associating each Family with certain types of BMPs in Activity Cut Sheets. The activities described in Sections 5-10 below are representative of typical municipal operations, and correspond to the activities and BMPs listed in Table PA-1. Where appropriate, each section will identify the appropriate Maintenance Activity Family and corresponding Caltrans Activity Cut Sheets from this table for ease of reference.

Although Table PA-1 and the CalTrans Handbook are excellent references for selecting BMPs for some of the most common municipal activities, they may not represent a comprehensive inventory of activities encountered by maintenance staff and field personnel. Likewise, for those BMPs that are not adequately protective of water quality standards, additional site-specific BMPS may be needed. For example, the implementation of additional BMPs is required where stormwater from the storm drain system discharges to a water body subject to a TMDL, a Clean Water Act §303(d) listed water body, or a significant ecological area (SEA). Attachment PA-B contains a map of SEAs in LA County and Attachment K of the LA MS4 Permit contains a matrix of Permittees and TMDLs.

[1] BMP is defined by the California Stormwater Quality Association as "*any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution*". Source Control BMPs are operational practices that prevent pollution by reducing potential pollutants at the source. They typically do not require maintenance or construction, and may consist of programmatic controls such as street sweeping. Treatment Control BMPs are methods of treatment to remove pollutants from stormwater, and can include constructed treatment devices such as an infiltration basin.

[2] The handbook is available at http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/management_ar_rwp/CTSW-RT-02-057.pdf and may also be found by entering the words "Caltrans Stormwater Quality Handbook Maintenance Staff Guide" in a web search engine.

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Table PA-1: General and Activity Specific BMPs and Their Associated Caltrans Handbook Activity Cut Sheet

Maintenance Activity Family	BMP	Caltrans Activity Cut Sheet Number
General BMPs	Scheduling and Planning	B-4
	Spill Prevention and Control	
	Sanitary/Septic Waste Management	
	Material Use	
	Safer Alternative Products	
	Vehicle/Equipment Cleaning, Fueling and Maintenance	
	Illicit Connection Detection, Reporting and Removal	
	Illegal Spill Discharge Control	
	Maintenance Facility Housekeeping Practices	
Flexible Pavement	Asphalt Cement Crack and Joint Grinding/ Sealing	B-9
	Asphalt Paving	B-10
	Structural Pavement Failure (Digouts) Grinding and Paving	B-11
	Emergency Pothole Repairs	B-13
	Sealing Operations	B-14
Rigid Pavement	Portland Cement Crack and Joint Sealing	B-15
	Mudjacking and Drilling	B-16
	Concrete Slab and Spall Repair	B-17
Slope/ Drains/ Vegetation	Shoulder Grading	B-19
	Nonlandscaped Chemical Vegetation Control	B-21
	Nonlandscaped Mechanical Vegetation Control/Mowing	B-23
	Nonlandscaped Tree and Shrub Pruning, Removal	B-24
	Fence Repair	B-25
	Drainage Ditch and Channel Maintenance	B-26
	Drain and Culvert Maintenance	B-28
	Curb and Sidewalk Repair	B-30
Litter/ Debris/ Graffiti	Sweeping Operations	B-32
	Litter and Debris Removal	B-33
	Emergency Response and Cleanup Practices	B-34
	Graffiti Removal	B-36
Landscaping	Chemical Vegetation Control	B-37
	Manual Vegetation Control	B-39
	Landscaped Mechanical Vegetation Control/ Mowing	B-40
	Landscaped Tree and Shrub Pruning, Removal	B-41
	Irrigation Line Repairs	B-42
	Irrigation (Watering), Potable and Nonpotable	B-43
Environmental	Storm Drain Stenciling	B-44
	Roadside Slope Inspection	B-45
	Roadside Stabilization	B-46
	Stormwater Treatment Devices	B-48
	Traction Sand Trap Devices	B-49
Public Facilities	Public Facilities	B-50
Bridges	Welding and Grinding	B-52
	Sandblasting, Wet Blast with Sand Injection, Hydroblasting	B-54
	Painting	B-56
	Bridge Repairs	B-57
Other Structures	Pump Station Cleaning	B-59
	Tube and Tunnel Maintenance and Repair	B-61
	Tow Truck Operations	B-63
	Toll Booth Lane Scrubbing Operations	B-64
Electrical &	Sawcutting for Loop Installation	B-65
Traffic Guidance	Thermoplastic Striping and Marking	B-67
	Paint Striping and Marking	B-68
	Raised/ Recessed Pavement Marker Application/Removal	B-70

	Sign Repair and Maintenance	B-71
	Median Barrier and Guard Rail Repair	B-73
	Emergency Vehicle Energy Attenuation Repair	B-75
Storm Maintenance	Minor Slides and Slipouts Cleanup/ Repair	B-78
Management and Support	Building and Grounds Maintenance	B-80
	Storage of Hazardous Materials (Working Stock)	B-82
	Material Storage Control (Hazardous Waste)	B-84
	Outdoor Storage of Raw Materials	B-85
	Vehicle and Equipment Fueling	B-86
	Vehicle and Equipment Cleaning	B-87
	Vehicle and Equipment Maintenance and Repair	B-88
	Aboveground and Underground Tank Leak and Spill Control	B-90

5. Vehicle and Equipment Wash Areas

Permit §VI.D.9.f (LA)/§VII.L.6 (LB)

This section corresponds to Maintenance Activity Family Management and Support and corresponding Caltrans Activity Cut Sheet B-87.

Vehicle and equipment cleaning at a municipal facility may introduce a number of potential pollutants into the storm drain system. Municipal maintenance and field staff are responsible for implementing and maintaining the activity specific BMPs listed in Table PA-1 for all fixed vehicle and equipment washing; including fire fighting and emergency response vehicles. In addition, maintenance and field staff are responsible for preventing discharges of wash water from entering the storm drain system. Table PA-2 shows the potential pollutants associated with vehicle and equipment cleaning.

Table PA-2: Potential Pollutants Generated from Cleaning Activities

Activity	**Potential Pollutants**					
Vehicle and Equipment Cleaning	Sediment	Nutrients	Trash	Metals	Oil & Grease	Organics

Discharges of wash waters to the storm drain system are prevented by implementing the following measures at existing facilities with vehicle or equipment wash areas:

- Wash water is self-contained and hauled away for proper disposal offsite.
- Wash areas are equipped with a clarifier, or an alternative pre-treatment device, and water is plumbed to the sanitary sewer in accordance with applicable waste water provider regulations.
- Wastewater from all new vehicle and equipment wash facilities, or redeveloped or replaced existing facilities is prevented from discharging to the MS4 by equipping the facility with a clarifier, or an alternative pre-treatment device, and plumbing water to the sanitary sewer in accordance with applicable waste water provider regulations, or by self-containing all water water/wash water and hauling to a point of legal disposal.

6. Landscape, Park, and Recreational Facilities Management

Permit §VI.D.9.g (LA)/ §VII.L.7 (LB)

This section corresponds to multiple Activity Cut Sheets within the Slope/Drains/Vegetation, Landscape, Environmental, and Management and Support Families.

Maintenance practices at parks and recreational facilities generally include fertilizer and pesticide applications, vegetation maintenance and disposal, irrigation, swimming pool chemical maintenance and draining, and trash and debris management. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. Municipal maintenance and field staff are responsible for implementing and maintaining the activity specific BMPs listed in Table PA-1for all public right-of-

ways, flood control facilities and open channels, lakes and reservoirs, and landscape, park, and recreational facilities and activites. Table PA-3 shows the potential pollutants associated with recreational facilities..

Table PA-3: Potential Pollutants Generated from Recreational Facilities

Activity	Potential Pollutants				
Vehicle and Equipment Cleaning	Sediment	Nutrients	Trash	Bacteria	Pesticides

6.1 Model Integrated Pest Management Program

Permit §VI.D.9.g.ii & VI.D.9.g.iii (LA)/§VII.L.7.ii & VII.L.7.iii (LB)

An IPM policy is in place to minimize pesticide and fertilizer use, and encourage the use of IPM techniques for Public Agency facilities and activities. The attached IPM Program template (Attachment PA-C), adapted from the Orange County Drainage Area Management Plan (DAMP) IPM Policy developed by the University of California, Division of Agriculture and Natural Resources, provides an example of an effective IPM program. This IPM Program template is based on regulations, management guidelines, and research-based recommendations established by federal, state and local agencies and universities with particular expertise in pest management.

As part of the IPM policy, a commitment and schedule to reduce the use of pesticides that cause impairment t of surface waters is implemented through the following procedures:

- An inventory of all pesticides used by municipal departments, divisions, and operational units is prepared and updated annually.
- Pesticides used by staff and hired contractors are quantified.
- The use of IPM alternatives is demonstrated, where feasible, to reduce pesticide use.

Municipal maintenance and field staff applying pesticides are certified in the appropriate category by the California Department of Pesticide Regulation, or are under the direct supervision of a pesticide applicator certified in the appropriate category.

7. Storm Drain Operation and Maintenance

Permit §VI.D.9.h (LA)/ §VII.L.8 (LB)

This section corresponds to the Litter/Debris/Graffiti Family: Litter and Debris Removal Cut Sheet, pg. B-33, and the Environmental Family: Storm Drain Stenciling Cut Sheet, pg. B-44

The storm drain system functions primarily to collect and convey surface runoff to receiving waters during storms in order to prevent flooding. It is a common municipal activity to maintain the storm drain system so that it functions hydraulically as intended during storms. Municipal maintenance and field staff are responsible for implementing and maintaining the activity specific BMPs listed in Table PA-1 for storm drain operation and maintenance, and ensuring that all material removed from the MS4 does not reenter the system by dewatering solid material in a contained area and disposing of liquid material in accordance with any of the following measures:

- Self-containing and hauling off for legal disposal; or
- Applying to the land without runoff; or
- Equipping with a clarifier or alternative pre-treatment device and plumbing to the sanitary sewer in accordance with applicable waste water provider regulations.

Table PA-4 shows potential pollutants generated during storm drain operation and maintenance.

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Table PA-4: Potential Pollutants Generated from Storm Drain Operation and Maintenance

Activity	Potential Pollutants								
	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances
Inspection and Cleaning of Conveyance Structures	×	×	×		×		×		×
Controlling Illicit Connections and Discharges	×	×	×	×	×	×	×	×	×
Controlling Illegal Dumping	×	×	×	×	×	×	×	×	×
Maintenance of Inlet and Outlet Structures	×		×		×	×			

7.1 Catch Basin Cleaning

Permit §VI.D.9.h.iii (LA)/ §VII.L.8.iii (LB)

There is no preferred method for cleaning catch basins as long as the method used is successful in removing accumulated sediment and debris. The methods used are determined in the field with the goal of minimizing the amount of escaped material, and preventing this material from entering the storm drain system. A template catch basin cleaning log is provided in Attachment PA-D.

7.1.1 Catch Basins Cleaning in Areas not Subject to a Trash TMDL

In areas that are not subject to a trash TMDL, catch basin inlets are prioritized based on the amount of trash generated, and inspected according to the schedule in Table PA-5.

Table PA-5: Inspection Frequencies for Catch Basin Inlets

Trash Generating Frequency	Priority	Inspection Frequency
Consistently generates the highest volumes of trash and/or debris	A	A minimum of three times during the wet season (October-April) and once during the dry season every year
Consistently generates moderate volumes of trash and/or debris	B	A minimum of once during the wet season and once during the dry season every year
Generates low volumes of trash and/or debris	C	A minimum of once per year

An inventory of catch basins is maintained and updated regularly. This inventory includes the following components:

- GPS coordinates of each catch basin
- Priorities for inspection
- Rationale or data to support catch basin priority designations
- Inspection and cleaning records

Catch basins are cleaned as necessary based on the inspections conducted. At a minimum, catch basins determined to be at least 25% full of trash are cleaned out.

7.1.2 Catch Basin Cleaning in Areas Subject to a Trash TMDL

In areas subject to a Trash TMDL, all applicable provisions of LA MS4 Permit Section VI.E (LB Part Part VIII) in conformance with the appropriate TMDL implementation schedule, are implemented. This includes an effective combination of full capture, partial capture, institutional controls, or minimum frequency of assessment and collection as described in LA MS4 Permit Section VI.E (LB Part Part VIII).

7.2 Catch Basin Labels and Open Channel Signage

Permit §VI.D.9.h.vi (LA)/ §VII.L.8.vi (LB)

All municipally owned storm drain inlets are labeled with a "No Dumping, Drains to Ocean" message, and inspected for legibility prior to the wet season (October-April) every year. Catch basins with illegible labels are recorded and re-stenciled or re-labeled within 180 days of inspection. In addition, signs referencing local code(s) that prohibit littering and illegal dumping are posted at designated public access points to open channels, creeks, urban lakes, and other relevant water bodies.

7.3 Trash Management

Permit §VI.D.9.h.iv-v & Permit §VI.D.9.h.vii (LA)/§VII.L.8.iv-v (LB)

The following Trash Management BMPs described below are employed to mitigate the impacts of anthropogenic trash on receiving waters.

7.3.1 Trash Management at Public Events

The following measures are implemented for any event in the public right of way or wherever it is foreseeable that substantial quantities of trash and litter may be generated, including events located in areas that are subject to a trash TMDL:

- Proper management of trash and litter generated; and
- Arrangement for temporary screens to be placed on catch basins; or
- Provide clean out of catch basins, trash receptacles, and grounds in the event area within one business day subsequent to the event.

7.3.2 Trash Receptacles

Covered trash receptacles are located in areas identified as high trash generation areas and maintained and cleaned out as necessary to prevent trash overflow. Examples of areas that may be considered high trash generating areas include:

- High vehicle or pedestrian traffic areas
- Commercial areas
- Industrial areas
- Construction areas
- High density residential areas
- Areas adjacent to vacant lots

7.3.3 Additional Trash Management Practices

In areas that are not subject to a trash TMDL, additional trash management practices will be employed no later than five years after the effective date of the LA MS4 Permit (4 years after the effective date of the LB MS4 Permit). Trash excluders or equivalent devices must be installed on or in catch basins or outfalls to prevent the discharge of trash to the MS4 or receiving waters, unless the installation of such BMP(s) alone will cause flooding (not due to lack of maintenance). Alternatively, additional trash BMPs

that provide substantially equivalent removal of trash may be implemented. Additional BMPs may include, but are not limited to:

- Increased street sweeping
- Adding trash cans near trash generation sites
- Prompt enforcement of trash accumulation
- Increased trash collection on public property
- Increased litter prevention messages or trash nets within the MS4

The BMPs chosen will provide equivalent trash removal performance as excluders, and will be demonstrated though the annual report. When outfall trash capture is provided, revision of the schedule for inspection and cleanout of catch basins will also be reported in the annual report.

The State Water Resources Control Board (State Water Board) is considering the adoption of amendments to the Water Quality Control Plans for Ocean Waters of California and for the Inland Surface Water, Enclosed Bays, and Estuaries of California for Trash (Trash Amendments) citing a strong need for statewide consistency in trash management. The proposed Trash Amendments will include five elements: (1) Water Quality Objective, (2) Prohibition of Discharge, (3) Implementation, (4) Compliance Schedule, and (5) Monitoring, which will outline NPDES Permittee requirements for trash management. The development of the Trash Amendments will continue to be monitored, and any additional required trash management practices in areas not subject to a trash TMDL will be implemented per the guidance provided by these amendments.

7.4 Storm Drain Maintenance

Permit §VI.D.9.h.viii (LA)/ §VII.L.8.viii (LB)

The following BMPs constitute the Storm Drain Maintenance Program:

- Municipally-owned open channels and drainage structures are visually inspected for debris at least annually.
- Trash and debris from is removed from open channel storm drains a minimum of once per year, before the storm season.
- The discharge of contaminants is minimized during MS4 maintenance and clean outs;
- Material removed is properly disposed of by containing and hauling away for legal disposal

7.5 Infiltration from Sanitary Sewer to MS4/Preventive Maintenance

Permit §VI.D.9.h.ix (LA)/§VII.L.8.ix (LB)

Thorough, routine, preventive surveys and maintenance of both municipally owned and operated Storm Drain Systems as well as Sanitary Sewer Systems infiltration and seepage of contaminants from the sanitary sewer system into the storm drain system is prevented. Sanitary Sewer System routine preventative maintenance is described in the Sewer System Management Plan (SSMP), which is a component of the Statewide General Waste Discharge Requirements (WDR) for Sanitary Sewer Systems.

Where necessary, controls implemented to limit infiltration of seepage from sanitary sewers to the MS4 include:

- Adequate plan checking for construction and new development;
- Incident response training for its municipal employees that identify sanitary sewer spills;
- Code enforcement inspections;
- MS4 maintenance and inspections;
- Interagency coordination with sewer agencies; and

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- Proper education of its municipal staff and contractors conducting field operations on the MS4 or its municipal sanitary sewer (if applicable).

7.6 Permittee Owned Treatment Control BMPs *Permit §VI.D.9.h.x (LA)/§VII.L.8.x (LB)*

All municipally owned treatment control BMPs, including post-construction BMPs, are regularly inspected and maintained to ensure their proper operation.
Any residual water generated during BMP maintenance is disposed of using one of the following procedures:

- Hauled away and legally disposed of; or
- Applied to the land without runoff; or
- Discharged to the sanitary sewer system; or
- Treated or filtered to remove bacteria, sediments, nutrients, and meet the limitations set in Table PA-6 below prior to discharge to the storm drain system.

Table PA-6: Discharge Limitations for Dewatering Treatment BMPs

Parameter	Units	Limitation
Total Suspended Solids	Mg/L	100
Turbidity	NTU	50
Oil and Grease	Mg/L	10

8. Streets, Roads, and Parking Facilities Maintenance

Permit §VI.D.9.i(LA)/§VII.L.9 (LB)

This section corresponds to multiple Activity Cut Sheets within the Flexible Pavement, Rigid Pavement, Litter/Debris/Graffiti, Traffic Guidance, and Management and Support Families.

Streets and roads may collect litter and debris from nearby activities, as well as from vehicular traffic. They also require routine maintenance that may generate waste materials. Table PA-7 shows potential pollutants generated from street, road, and parking facilities maintenance.

Table PA-7: Potential Pollutants Generated from Street, Road, and Parking Facility Maintenance

Activity	Potential Pollutants						
	Sediment	Trash	Metals	Bacteria	Oil & Grease	Organics	Oxygen Demanding Substances
Street and Road Maintenance	×	×	×		×	×	
Parking Facility Maintenance	×	×	×	×	×	×	×

8.1 Street Sweeping *Permit §VI.D.9.i.i-ii(LA)/§VII.L.9.i-ii (LB)*

Streets and/or street segments are swept according to the following designations:

- Priority A: Streets and/or street segments that are designated as consistently generating the highest volumes of trash and/or debris should be swept at least two times per month.
- Priority B: Streets and/or street segments that are designated as consistently generating moderate volumes of trash and/or debris should be swept at least once per month.
- Priority C: Streets and/or street segments that are designated as generating low volumes of trash and/or debris shall be swept as necessary but in no case less than once per year.

8.2 Road Reconstruction *Permit §VI.D.9.iii (LA)/§VII.L.9.iii (LB)*

Projects that include roadbed or street paving, repaving, patching, digouts, or resurfacing roadbed surfaces implement the following BMPS:

- Restricting paving and repaving activities to exclude periods of rainfall or predicted rainfall unless required by emergency conditions.
- Installing sand bags or gravel bags and filter fabric at all susceptible storm drain inlets and at manholes to prevent spills of paving products and tack coat;
- Preventing the discharge of release agents including soybean oil, other oils, or diesel into the MS4 or receiving waters.
- Preventing non-stormwater runoff from water use for the roller and for evaporative cooling of the asphalt.
- Cleaning equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage and dispose of properly.
- Collecting liquid waste in a container, with a secure lid, for transport to a maintenance facility to be reused, recycled or disposed of properly.
- Collecting solid waste by vacuuming or sweeping and securing in an appropriate container for transport to a maintenance facility to be reused, recycled or disposed of properly.
- Covering the “cold-mix” asphalt (i.e., pre-mixed aggregate and asphalt binder) with protective sheeting during a rainstorm.
- Covering loads with tarp before haul-off to a storage site, and not overloading trucks.
- Minimizing airborne dust by using water spray during grinding.
- Avoiding the stockpiling of soil, sand, sediment, asphalt material and asphalt grindings materials or rubble in or near MS4 or receiving waters.
- Protecting stockpiles with a cover or sediment barriers during a rain.

8.3 Parking Facilities Maintenance *Permit §VI.D.9.iv (LA)/ §VII.L.9.iv (LB)*

Municipally owned parking lots that are uncovered and exposed to stormwater are kept clear of debris and excessive oil buildup by inspecting lots at least 2 times per month and cleaning at least once per month.

9. Emergency Procedures *Permit §VI.D.9.j (LA)/ §VII.L.10 (LB)*

Participating Agencies may conduct repairs of essential public service systems and infrastructure in emergency situations with a self-waiver of the provisions of the MS4 Permit as follows:

- Cities will abide by all other regulatory requirements, including notification to other agencies as appropriate.
- Where the self-waiver has been invoked, Cities will submit to the Regional Water Board Executive Officer a statement of the occurrence of the emergency, an explanation of the

circumstances, and the measures that were implemented to reduce the threat to water quality, no later than 30 business days after the situation of emergency has passed.

Minor repairs of essential public service systems and infrastructure in emergency situations (that can be completed in less than one week) are not subject to the notification provisions. Appropriate BMPs to reduce the threat to water quality will be implemented.

10. Municipal Employee and Contractor Training *Permit §VI.D.9.k (LA)/Permit §VII.L.11 (LB)*

An annual training program on the requirements of the overall stormwater management program is implemented for all municipal field staff whose interactions, jobs, and activities affect stormwater quality prior to June 30 every year. The Cities also ensure that contractors performing privatized/contracted municipal services have appropriate training in the stormwater management program. The goals of the annual training are to:

- Promote a clear understanding of the potential for municipal activities to pollute stormwater
- Identify opportunities to require, implement, and maintain appropriate BMPs in their line of work

In addition to the annual stormwater program training, the Cities implement an annual training program to train all of their employees and contractors who use or have the potential to use pesticides or fertilizers (whether or not they normally apply these as part of their work). Training programs address:

- The potential for pesticide-related surface water toxicity
- Proper use, handling, and disposal of pesticides
- Least toxic methods of pest prevention and control, including IPM
- Reduction of pesticide use

Outside contractors can self-certify, providing they certify they have received all applicable training required in the MS4 Permit and have documentation to that effect.

Illicit Connections & Illicit Discharges Elimination Program

Each participating city is required to develop and implement an Illicit Connections & Illicit Discharge Elimination (IC/ID) Program that includes the requirements listed in Permit §VI.D.10.a (LB §VII.M). This document provides guidance to assist the Cities in implementing an IC/ID program in compliance with the Permit.

Introduction *Permit §VI.D.10.a (LA)/§VII.M.1 (LB)*

Illicit connections and illicit discharges (IC/IDs) as defined in Table ICID-1 are potential significant sources of pollutants into and from the MS4. The Illicit Connection and Illicit Discharge (IC/ID) Program provides a comprehensive process for detecting, investigating and eliminating IC/IDs in an efficient and timely manner. The program consists of the following components:

- Procedures for conducting source investigations for IC/IDs
- Procedures for eliminating the source of IC/IDs
- Procedures for public reporting of illicit discharges
- Spill response plan and
- IC/ID education and training for City staff.

The purpose of this program is to effectively prohibit illicit discharges into the MS4.

Table ICID-1: IC/IDs Defined

Prohibition	Definition	Examples
Illicit Connections	Any man-made conveyance that is connected to the MS4 without a permit, excluding roof drains and other similar type connections.	Unpermitted channels, pipelines, conduits, inlets or outlets that are connected directly to the MS4.
Illicit Discharges	Any discharge into the MS4 or from the MS4 into a receiving water that is prohibited under local, state, or federal statutes, ordinances, codes or regulations. This includes any non-stormwater discharge, except those authorized in MS4 Permit §III.A.10.2.	Sanitary wastewater, Vehicle wash water, wash-down from grease traps, motor oil, antifreeze and fuel spills into or from the MS4.

Legal Authority

Adequate Legal Authority is required to prohibit IC/IDs to the MS4 and enable enforcement capabilities to eliminate the sources of IC/IDs.

Illicit Discharge Source Investigation and Elimination *Permit §VI.D.10.b (LA)/ §VII.M.2 (LB)*

The purpose of the IC/ID Program is accomplished in part by developing clear, step-by-step written procedures for conducting investigations of illicit discharges.

Investigation

Standardized procedures for conducting investigations to identify the source of all suspected illicit discharges are included in as an attachment (Illicit Discharge Investigation and Elimination Guidance). Procedures include the following:

- **Initiation** – Investigate the source of all observed discharges. After becoming aware of an illicit discharge, conduct an investigation to identify and locate the source within 72 hours.
- **Prioritization** – Investigate illicit discharges suspected of being sanitary sewage and/or significantly contaminated first.
- **Tracking** – Track all investigations and document the information listed in Table ICID-2.

Table ICID-2: Recorded Information for Illicit Discharge Investigations

Item	Information
1	Date(s) the illicit discharge was observed
2	Results of the investigation
3	Follow-up of the investigation
4	Date the investigation was closed

Elimination

Standardized procedures to eliminate illicit discharges once the sources are located are included as an attachment. Procedures include the following:

- **Notification** – Immediately notify the responsible party (RP)/parties of the problem and require the responsible party to initiate all necessary corrective actions to eliminate the illicit discharge.
    - If it is determined that an illicit discharge originates within an upstream jurisdiction, notify the upstream jurisdiction and the Regional Board. The Notification is conducted within 30 days of determination and information is collected regarding combined efforts to identify the source.
- **Spill response** – The Spill Response Plan is implemented when the source for illicit discharges cannot be traced to a suspected RP. Permanent solutions to such discharges are described in the following section (Flow Diversion).
- **Follow-up** – Conduct and document follow-up investigations upon notification that an illicit discharge has been eliminated to verify that it has been satisfactorily eliminated and cleaned-up.
- **Enforcement** – Enforcement procedures are included in the Progressive Enforcement Policy. The Progressive Enforcement Policy includes a list of enforcement actions.

Progressive Enforcement Policy

The Progressive Enforcement Policy is implemented to ensure that illicit discharges/ illicit connections are eliminated within a reasonable time period. The procedures are followed when the source of the nature of the discharges is known. Procedures typically include:

- Written warnings for minor violations
- Formal notice of violation with specific actions and time frames for compliance
- Compensation from the RP for any costs related to remediation, inspection, investigation, clean-up and oversight activities
- Cease and desist orders

- Civil penalties (infractions), or referral for criminal penalties or further legal action.

Flow Diversion

In the event that an ongoing illicit discharge cannot be eliminated (following the full execution of legal authority and in accordance with the Progressive Enforcement Policy) or the RPs cannot be identified, the discharge is either treated or diverted to the sanitary sewer. In either instance, the Regional Board is notified within 30 days of such determination. Notification includes the following information:

- Written plan that describes the efforts that have been undertaken to eliminate the discharge.
- Description of actions to be undertaken.
- Anticipated cost and
- Schedule for completion.

Identification and Response to Illicit Connections *Permit §VI.D.10.c (LA)/§VII.M.3 (LB)*

Illicit connections can be concentrated sources of pollutants either through direct discharge or infiltration of sewage or other prohibited discharges into the MS4. To reduce this source of pollutants, the following program is implemented for the identification of illicit connections. Key components of this program include investigating and responding in order to actively prevent and eliminate illicit connections.

Investigation

Standardized procedures for identifying illicit connections are included as an attachment (Illicit Connection Investigation Guidance). Procedures include the following:

- **Initiation** – Investigate within 21 days from the discovery or upon receiving a report of a suspected illicit connection. The elements of the investigation are listed in Table ICID-3.
- **Tracking** – Track all investigations and document the information listed in Table ICID-3.

Response

If the source investigation concludes that a connection to the MS4 is both 1) permitted or documented and 2) discharging only stormwater or nonstormwater allowed under WMP NSWD SECTION or other individual or general NPDES Permits/WDRs, then the investigation is closed and no further action is taken. Upon confirmation of a connection to the MS4 is illicit, one of two options is taken:

1. **Permit or document the connection.** The permitted or documented connection may only discharge stormwater and nonstormwater allowed under WMP NSWD SECTION or other individual or general NPDES Permits/WDRs. Retaining a record of the connection and its investigation qualifies as documentation.
2. **Eliminate the connection.** The connection is eliminated within 180 days of completion of the investigation, using formal enforcement authority if necessary.

Table ICID-3: Recorded Information for Illicit Connection Investigations

Item	Information
1	Any relevant illicit discharge information from Table ICID-2
2	Source of the connection
3	Nature and volume of the discharge through the connection
4	RP for the connection (if identified)
5	Response including any formal enforcement taken

Public Reporting of Non-Stormwater Discharges and Spills *Permit §VI.D.10.d (LA)/§VII.M.4 (LB)*

Central Point of Contact

Public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s through a central contact point are promoted, publicized, and facilitated. This includes phone numbers and an internet site for complaints and spill reporting. The reporting hotline is provided to staff to leverage the field staff that has direct contact with the MS4 in detecting and eliminating illicit discharges.

The LACFCD, in collaboration with the County, provides the central point of contact and through the 888-CLEAN-LA reporting hotline and internet site.

Open Channels

Signage is posted adjacent to open channels (see MS4 Permit IV.D.9.h.vi.(4)). The signage includes information regarding dumping prohibitions and public reporting of illicit discharges.

Complaints

Written procedures are maintained that document how complaint calls are received, and tracked to ensure that all complaints are adequately addressed in the attached form (Record Keeping & Documentation). Following the adaptive management process outlined in the MS4 Permit, the procedures are periodically evaluated to determine whether changes or updates are needed to ensure that the procedures accurately document the employed methods. After the evaluation, any identified changes will be made to the procedures.

Documentation is maintained for all complaint calls. This includes recording the location of the reported spill or IC/ ID and the actions undertaken in response the complaint, including referrals to other agencies.

Spill Response Plan *Permit §VI.D.10.e (LA)/§VII.M.5 (LB)*

A spill response plan (Attachment ICID-E) is implemented for all sewage and other spills that may discharge into its MS4. The spill response plan identifies agencies responsible for spill response and cleanup, telephone numbers and e-mail address for contacts, and contains the following:

- **Agency Coordination** – Coordinate with spill response teams throughout all appropriate departments, programs and agencies so that maximum water quality protection is provided.
- **Spill Response** – Respond to spills for containment within 4 hours of becoming aware of the

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spill, except where such spills occur on private property, in which case respond within 2 hours of gaining legal access to the property. Initiate investigation of all public and employee spill complaints within one business day of receiving the complaint to assess validity.

- **Reporting** – Spills that may endanger health or the environment are reported to appropriate public health agencies and the California Emergency Management Agency (Cal EMA).

Illicit Connection and Illicit Discharge Education and Training *Permit §VI.D.10.f (LA)/§VII.M.6 (LB)*

A training program regarding the identification of IC/IDs is implemented for all municipal field staff, who, as part of their normal job responsibilities (e.g., street sweeping, storm drain maintenance, collection system maintenance, road maintenance), may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. Contact information, including the procedure for reporting an illicit discharge, is readily available to field staff.

Applicable Staff

Table ICID-4 is a list of field programs where program staff may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. Appropriate field staff, supervising staff and contractors involved in these programs require training in IC/ID identification and reporting following the schedule provided in Table ICID-5.

Contracted Staff

Contractors that provide these municipal services may attend city training or certify to the participating city and retain documentation that staff has received applicable training. Otherwise this provision is accomplished through a contractual requirement for contracted staff to receive the training.

Table ICID-4: Municipal Field Programs

Main Field Program Types	Sub-Category Types/Activities
Lake Management	Fertilizer & Pesticide Management
	Mowing, Trimming/Weeding, Planting
	Managing Landscape Waste
	Controlling Litter
	Erosion Control
	Controlling Illegal Dumping
	Bacteria Control
	Monitoring
Landscape Maintenance	Mowing, Trimming/Weeding, Planting
	Irrigation
	Fertilizer & Pesticide
	Managing Landscape Waste
	Erosion Control
Roads, Streets, and Highways Operations and Maintenance	Sweeping & Cleaning
	Street Repair & Maintenance
	Bridge & Structure Maintenance
Fountains, Plazas, and Sidewalk Maintenance and Cleaning	Surface Cleaning
	Graffiti Cleaning
	Sidewalk Repair
	Controlling Litter
	Fountain Maintenance
Solid Waste Handling	Solid Waste Collection
	Waste Reduction & Recycling
	Hazardous Waste Collection
	Litter Control
Water and Sewer Utility O&M	Water Line Maintenance
	Sanitary Sewer Maintenance
	Spill/Leak/Overflow Control
Fire Department Activities	Emergency/Post-Emergency Fire Fighting Activities
	Fire Fighting Training
	Fire Station Activities

Training Schedule

The training schedule for all applicable staff is listed in Table ICID-5.

Table ICID-5: IC/ID Program Training Schedule

Category	Schedule
Current Staff	Twice during the term of the MS4 Permit
New Staff	Within 180 days of starting employment

Training Elements

The IC/ID elements addressed by the training program are listed in Table ICID-6.

Table ICID-6: Minimum IC/ID Training Program Elements

Item	Information
1	IC/ID identification, including definitions and examples
2	Investigation
3	Elimination
4	Clean-up
5	Reporting
6	Documentation

Documentation

Documentation of training program activities and training modules are retained and made available for review by the Regional Board.

PROGRESSIVE ENFORCEMENT POLICY

2014

Stormwater Enforcement Guide

Insert City Seal

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PROGRESSIVE ENFORCEMENT POLICY

STORMWATER ENFORCEMENT GUIDE

INTRODUCTION

This Stormwater Progressive Enforcement Policy (PEP) provides procedures to enforce provisions of the Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4 Order No. R4-2012-0175. Pursuant to Section VI.D.2.a of the Order, Permittees are required to develop and implement a PEP to ensure that (1) regulated Industrial/ Commercial facilities, (2) construction sites, (3) development and redevelopment sites with post-construction controls, and (4) illicit discharges are each brought into compliance with all storm water and non-storm water requirements. The PEP provides the City with a guidance for enforcing the MS4 Permit Provisions and identifies enforcement procedures designed to encourage a timely response.

PROGRESSIVE ENFORCEMENT

Progressive enforcement is an escalating series of actions that allows for the efficient and effective use of enforcement. In some situations, an informal response (written warning/inspection report) is sufficient to inform the responsible party that there is a deficiency and to require the responsible party to return to compliance. If violations continue, the enforcement response should be quickly escalated to increasingly more formal and serious actions until compliance is achieved. Progressive enforcement is not appropriate in all circumstances. For example, where there is a situation needing immediate response, immediate issuance of a cleanup and abatement order may be appropriate.

COMPLIANCE CRITERIA

The City conducts on-site compliance inspections and conducts investigations, in response to complaints, under their authority provided in their municipal code and ordinances to verify compliance. Typical noncompliance issues related to stormwater may include:

- Prohibited discharges to the storm drain system.
- Site's existing condition is likely to result in exposure of pollutants to stormwater contact and possible pollutant discharge to the storm drain system such as:
    - Poor housekeeping activities that results in pollutant exposure.
    - Unattended spills and leaks.
    - Uncovered or improperly stored wastes, materials, or other items of concern.
    - Open waste receptacles such as tallow bins, compactors, and trash bins.
    - Leaky or contaminated equipment stored or used outdoors.
    - Track-out of dirt and sediment or other materials to street or outdoor areas.
- Illicit connections to the storm drain system.
- Best Management Practices (BMPs) are not in place to address pollutant generating activities, which may include erosion and sediment controls and post construction controls.

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Complaint Response

The City may receive complaints regarding stormwater ordinance from their staff members, public, local agencies, or the Regional Water Board. The City initiates, within one business day,[1] investigation of complaints from facilities within its jurisdiction. The initial investigation includes, at minimum, a limited inspection of the facility to confirm validity of the complaint and to determine if the facility is in compliance with municipal storm water ordinance and, if necessary, to oversee corrective action. Emergency complaints are investigated immediately.

PROGRESSIVE ENFORCEMENT GUIDELINES

Informal Enforcement

The City implements professional judgment regarding the circumstances surrounding an enforcement action and chooses to resolve routine noncompliance quickly and efficiently through informal means that are not accompanied by sanctions (e.g., civil charges or penalties). When deemed appropriate, the City employs the procedures described below to correct noncompliance informally.

Written Warning/ Inspection Report

Under circumstances where an inspection reveals routine noncompliance that can be corrected within a reasonably short time, staff may choose to issue a written warning/inspection report that describes the minor deficiencies/violations and includes a schedule for correcting the noncompliance[2]. The purpose of the written warning is to give the responsible party an opportunity to comply voluntarily and thus avoid sanctions that might be imposed by an escalated enforcement response.

For residential zones, the City employs an informal enforcement process and escalates to formal enforcement actions for those residents that do not comply with stormwater regulations.

Formal Enforcement / Administrative Enforcement

In the event that the City determines, based on an inspection or illicit discharge investigation conducted, that a responsible party has failed to adequately comply with the informal enforcement process within the required timeframe, the City may initiate administrative enforcement actions or will implement enforcement actions as established through authority in its municipal code. The City's goal is to achieve compliance through an extensive inspection program, educational outreach efforts and, if necessary, the initiation of appropriate enforcement action(s). The goal of any enforcement action is to: (1) return the facility to compliance in a timely manner; (2) eliminate economic benefit realized by the noncompliant facility; and (3) punish violators and prevent future noncompliance.

Notice of Violations

Under circumstances where the responsible party has failed to comply with the informal enforcement process or where the violations are significant, the City may choose to issue a Notice of Violation (NOV). The purpose of an NOV is to inform the responsible party of the observed violations, the applicable stormwater municipal codes that the responsible party has failed to comply with and the

[1] The City may comply with the Permit by taking initial steps (such as logging, prioritizing, and tasking) to "initiate" the ingestigation within that one business day. However, the Regional Water Board would expect that the initial investigation, including a site visit, to occur within four business days (per MS4 Order No.R4-2012-0175 Section VI.D.2.b)
[2] The City may choose to issue/write inspection report on site or provide to the responsible party at a later time.

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potential consequences of failing to correct the violations. The NOV also gives the responsible party an opportunity to correct the violations described in the NOV within a specified time. Under circumstances where the responsible party fails to adequately respond to the NOV by failing to address or correct the violations noted in the NOV, the severity of the enforcement response will continue to escalate as described below.

Failure to Return to Compliance/ Second Notice of Violation

The City's municipal code stormwater ordinance authorizes assessment of administrative penalties which can be carried out by issuing a Failure to Return to Compliance Notice or second NOV . The second NOV is a stronger enforcement option which may be used in circumstances where the responsible party has failed to comply with the requirements as indicated on the first NOV.

Cease and Desist Order

In the event the City's municipal code stormwater ordinance authorizes a Cease and Desist Order (CDO), the City may issue a CDO, as an alternative to the second NOV, when immediate action by the responsible party is necessary to eliminate a continuing or threatened serious violation of the stormwater ordinance.

Misdemeanors

The City's may escalate enforcement when evidence of noncompliance indicates that the violator of the stormwater ordinance has acted intentionally with intent to cause, allow to continue or conceal a discharge in violation of the ordinance.

Issuance of Citation/Infractions

At the discretion of the City's, and as established through authority in its municipal code, the City may issue citations and/or infractions.

Cost Recovery

In the event that a complaint response or violation requires clean-up and or extensive investigation, the City has the authority, as established in the municipal code, to require the responsible party to reimburse the city or County for all costs incurred by the related violation. Cost recovery fees that may be collected include, but are not limited to, investigation, enforcement, compliance assistance, damage, control, and clean-up.

Abatement

When a responsible party fails to cease or control a nuisance condition that results in or is likely to result in further or continuing violations, the City's may request abatement of conditions on private property if necessary, or in the event of imminent danger to public safely or the environment, the City itself may abate the nuisance condition.

Permit Revocation

Sites violating the stormwater permit may be subject to permit revocation procedures as authorized in the City's municipal code.

City's/District Attorney

Severe or continuing violations should be referred to the City's or District Attorney for consideration of criminal charges.

TIMEFRAMES FOR CORRECTING DEFICIENCIES/VIOLATIONS

Depending upon the nature of the deficiencies/violations observed, City's may specify compliance deadlines for the responsible party in the inspection report or NOV.

- Prohibited discharges: discharges are to be stopped immediately and up to two weeks. The City may require the responsible party to provide a written description of correction, long-term compliance plan.
- Illicit connection: discharge via the illicit connection are to be stopped immediately and up to two weeks. The City may require the responsible party to provide proof that connection was permanently terminated. Re-inspection typically is required.
- Pollutant exposure/prohibited conditions violations: Up to two weeks to correct violations. The City may require the responsible party to provide proof of compliance for the observed violations.

EXTENSIONS OF COMPLIANCE DEADLINES

There are instances when a responsible party is not able to comply with requirements within the time frame specified. The City may grant a reasonable extension to the responsible party if the City determines that an extension is warranted, as follows:

- A request for extension must be received in writing (mail, e-mail, fax, hand delivered, etc.) by the City no later than the last day of the initial specified compliance deadline date.
- The extension request must explain why the extension is needed and warranted, as well as include a summary of actions taken to date by the responsible party to comply with requirements of the NOV.
- No more time is provided than should reasonably be needed for the responsible party to competently correct the noted deficiencies/violations. The City grants shorter extensions during the wet season.

Appropriate reasons to grant an extension may include, but are not limited to:

- Confirmed delays due to contractor or other service provider outside of responsible party's control.
- Extensive corrections involving work that would conceivably take longer than the time frame provided.
- In general, extensions should not be granted to allow the continuation of unauthorized non-storwater discharges.

The City may require an action plan or statement to be submitted by the responsible party within the initial compliance time frame, as a condition of granting an extension. The action plan or statement should specify the corrections that are to be made and specify an anticipated time frame for completion. The action plan or statement should be signed and dated by the responsible party.

REFERRALS TO THE REGIONAL BOARD

The City may refer violations of its municipal storm water ordinance and/or California Water Code section 13260 by industrial and commercial facilities and construction site operators to the Regional Water Board provided that the City has made a good faith effort of applying enforcement procedures to achieve compliance with its own ordinance. At a minimum, the City's good faith effort must be documented with:

- Two follow-up inspections, and
- Two warning letters or notices of violation.

Referral of Violations of the General Industrial/Construction Permits

For those facilities or site operators in violation of municipal stormwater ordinances and subject to the Industrial and/or Construction General Permits (IGP/CGP), the City may escalate referral of such violations to the Regional Water Board (promptly via telephone or electronically) after one inspection and one written notice of violation (copied to the Regional Water Board) to the facility or site operator regarding the violation. In making such referrals, the City shall include, at a minimum, the following documentation:[3]

- Name of the facility or site,
- Operator of the facility or site,
- Owner of the facility or site,
- WDID Number (if applicable),
- Records of communication with the facility/site operator regarding the violation, which shall include at least one inspection report,
- The written notice of violation (copied to the Regional Water Board),
- For industrial sites, the industrial activity being conducted at the facility that is subject to the Industrial General Permit, and
- For construction sites, site acreage and Risk Factor rating.

RECORDS RETENTION

City shall maintain records, per their existing record retention policies, and make them available on request to the Regional Water Board, including inspection reports, warning letters, notices of violations, and other enforcement records, demonstrating a good faith effort to bring facilities into compliance.[4]

[3] Pursuant to Order No. R4-2012-0175 Section VI.D.2.a.v
[4] Pursuant to Order No. R4-2012-0175 Section VI.D.2.a.iii

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Sources

Los Angeles County Stormwater Quality Management Program (2001)

Orange County Municipal Storm Water Drainage Area Management Plan (2003)

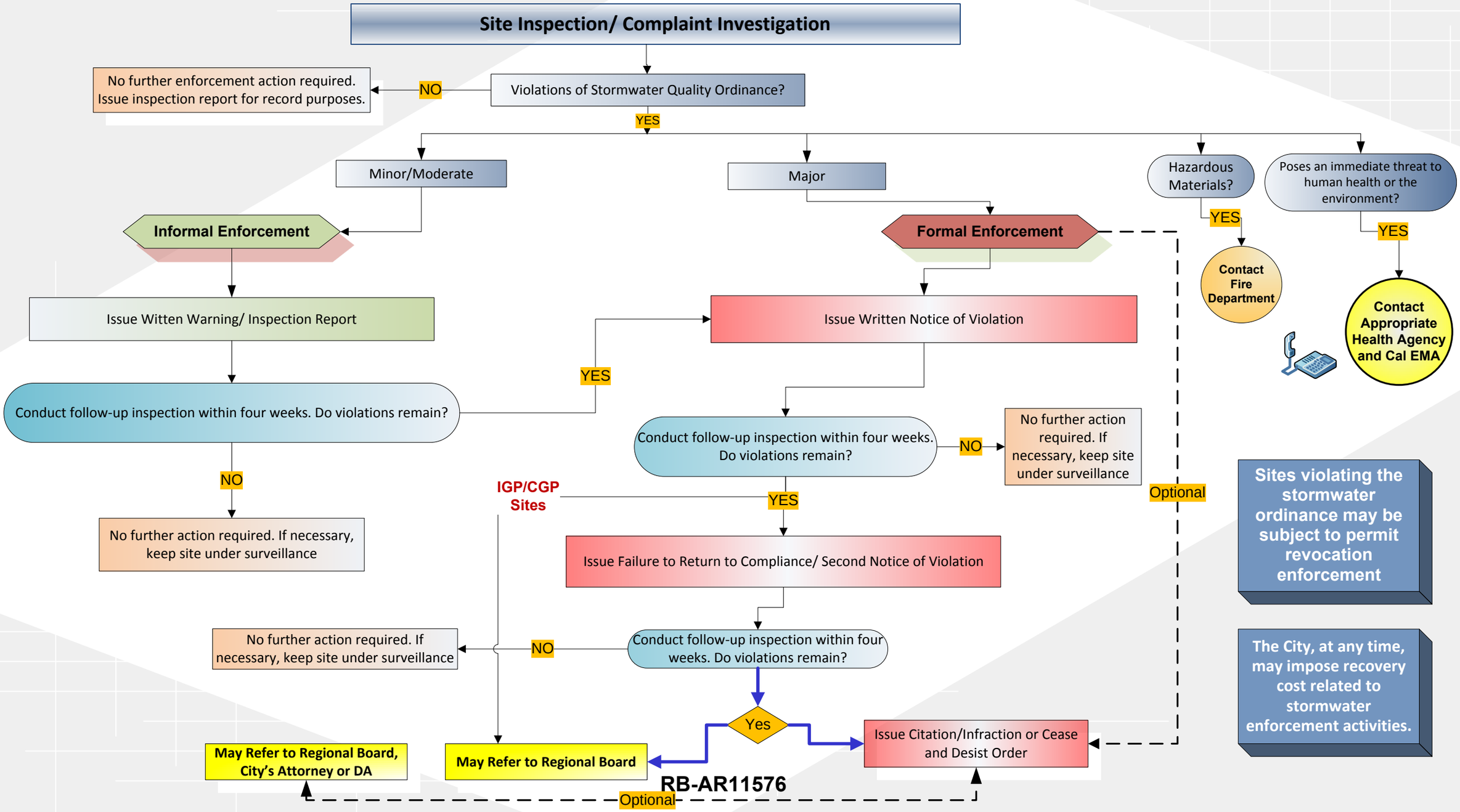
Sacramento County Environmental Management Department. Inspection & Enforcement Policy - Commercial/Industrial Stormwater Compliance Program (2012).

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Deficiencies/ Violation Degrees

Minor	Moderate	Major
Typically involves conditions that threaten to result in pollutant discharge to the storm system and/or waterways, if not corrected. The immediate threat to human health or the environment is low. **Examples:** **1.** Unattended automotive fluid drips and spills likely to result in moderate discharges to the storm drain system. **2.** Discharge of a moderate amount of car body wet sanding effluent from a single vehicle to outdoor pavement that has not yet impacted the storm drain system. **3.** Unattended spilled restaurant grease on outdoor pavement. Spill appears to be recent, is less than a quart, has not yet impacted the storm drain system and poor housekeeping do not appear to be habitual. **4.** Oily, uncovered engines, or other oily, possibly leaky items stored outside. **5.** Open and missing dumpster and tallow bin lids.	Typically involves less significant pollutant discharges to the storm system and/or receiving waters or conditions that threaten to result in minor to moderate pollutant discharges to the storm system and/or receiving waters. May include small or incidental discharges of hazardous or toxic substances. The violation does not present a major threat to human health and safety, but is likely to result in degradation of receiving water quality. **Examples:** **1.** Discharge of moderate amounts of automotive fluids to storm drain system results from neglected spills and poor housekeeping. **2.** Discharge of moderate amount (less than 20 gallons of diluted effluent) of auto body wet sanding effluent to storm drain system. **3.** More than a quart of spilled restaurant grease on outdoor pavement is neglected, possibly getting tracked out of trash enclosure. Neglect appears to be habitual but so far, impact to storm drain is moderate. **4.** Moderate amount of Oil/fluids leaking from improperly stored engines and parts discharge to storm drain system. **5.** Repeat minor violations may be considered moderate.	Includes significant pollutant discharges to the storm system and/or receiving waters as well as creation of conditions that threaten imminent discharge of significant pollutants to the storm system and/or receiving waters. This also includes, but is not limited to, significant discharges of hazardous or toxic substances. Major violations have the potential to present a major threat to human health or safety and/or the environment. The intent of the violator should be considered: Patterns of willful disregard for safety and the environment, recalcitrance, and repeat violations should contribute to designation of a violation as major, but are not necessary. **Examples:** **1.** Intentional discharge of waste oil to the storm drain. **2.** Discharge of significant volumes of auto body wet sanding effluent to storm drain from work on multiple vehicles, as practice. Especially where repeat violations or evidence of habitual discharge is evident. **3.** Significant amount of spilled restaurant grease is intentionally washed into storm drain, especially if hazardous degreasing agent is used. **4.** Significant amount of Oil/fluids leaking from improperly stored engines and parts discharge to storm drain system, especially if repeat violation. **5.** Repeat moderate violations may be considered major.

PROGRESSIVE ENFORCEMENT FLOW CHART



Watershed Management Program Appendix 3

Attachments to MCM Guidance

Insert City Seal

CITY STORMWATER PROGRAM INDUSTRIAL/COMMERCIAL FACILITY INSPECTION REPORT

Facility:	Address:
Contact:	Title:
Email:	Phone:
Inspector:	Date:
Inspection Type: ☐ Routine ☐ Follow-up ☐ Response to Complaint	BMP materials provided and explained: ☐ Yes ☐ No
SIC/NAICS code and/or business type:	

Industrial Facilities Only

(1) Covered under IGP (WDID is current) or other NPDES Permit: ☐ Yes ☐ No	(2) NEC filed: ☐ Yes ☐ No	SWPPP on-site: ☐ Yes ☐ No
If (1) and (2) above are "No", notified contact of need for IGP coverage and will refer facility to Regional Board: ☐ Yes ☐ No		

CHECKLIST FOR STORMWATER BMP (BEST MANAGEMENT PRACTICE) COMPLIANCE

	BMP	Yes	No	N/A
Vehicle & Equipment Maintenance	**Fueling** - Effective fueling source control devices & practices	☐	☐	☐
	Cleaning – Effective cleaning practices & wash water management practices	☐	☐	☐
	Repair – Effective repair practices & source control devices	☐	☐	☐
Equipment Operations	**Outdoor equipment operations** – Effective source control devices & practices	☐	☐	☐
Storage & Handling	**Outdoor liquids** – Effective source controls & practices	☐	☐	☐
	Outdoor raw materials – Effective source control practices & structural devices	☐	☐	☐
	Solid waste – Effective storage & handling practices & appropriate control measures	☐	☐	☐
Facility Maintenance	**Building & grounds maintenance** – Effective maintenance practices	☐	☐	☐
	Parking & storage area maintenance – Effective designs & housekeeping/maintenance practices	☐	☐	☐
	Stormwater conveyance system maintenance – Proper operation & maintenance protocols	☐	☐	☐
	Sidewalk washing – Remove debris & free standing oil/grease. Use high pressure/low volume spray washing with potable water, no cleaning agents & average rate of 0.006 gal/ft^2.	☐	☐	☐
Spills, Leaks & Discharges	**Accidental spills/leaks** – Effective spill/leak prevention & response procedures	☐	☐	☐
	Unauthorized nonstormwater discharges – Effective elimination	☐	☐	☐

COMMENTS AND CORRECTIVE ACTIONS (IF REQUIRED)
Include description of activities performed and/or principal products produced

ENFORCEMENT: ☐ **None required** ☐ **Corrective Action Notice (complete section below)** ☐ **Other (see comments)**

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If corrective actions have been noted above, then the responsible party (facility owner, occupant or person responsible) is in noncompliance with the City's Stormwater Quality Ordinance. The responsible party may be subject to enforcement actions under this ordinance if the corrective actions are not implemented by:

_____
Corrective Action Due Date

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____	_____	_____
Site Representative Signature	Printed Name	Date

Recording requested by and mail to:

Name: City of [Insert City]
Department of Public Works
ATTN: Director of Public Works

Address: [Insert City Address Line1]
[Insert City Address Line2]

Insert City Seal

********** Space Above This Line For Recorder's Use **********

MASTER COVENANT AND AGREEMENT

REGARDING ON-SITE BMP MAINTENANCE

The undersigned hereby certifies I am (we are) the owner(s) of the hereinafter legally described real property located in the City of [Insert City], County of Los Angeles, State of California (please give legal description: assessor's ID, tract no., lot no., etc.):

_____

Site Address _____

Owner(s) do hereby covenant and agree to and with the City of [Insert City]to maintain all on-site structural Best Management Practices (BMPs) in accordance with the Site Map and the Operations & Maintenance (O&M) Plan set forth in Attachment 1 hereto and incorporated herein by this reference. The specific structural BMPs are listed as follows:

_____

_____

Owner(s) shall maintain the listed drainage devices above on the property indicated and as shown on plans permitted by the City of [Insert City]in a good and functional condition to safeguard the property owners and adjoining properties from damage and pollution.

Owner(s) hereby consent to inspection of the Property by an inspector authorized by the City Manager, or his or her designee, for the purpose for verifying compliance with the provisions of this Agreement.

Owner(s) shall provide printed educational materials with any sale of the property which provide information on what stormwater management facilities are present, the type(s) and location(s) of maintenance signs that are required, and how the necessary maintenance can be performed.

Owner(s) shall provide actual notice of this Agreement and its terms to any respective successor(s) in interest to the Property prior to transfer of said interest to such successor(s) in interest. This covenant and agreement shall run with the land and shall be binding upon any future owners, encumbrances, their successors, heirs or assigns and shall continue in effect until the City of [Insert City] approves its termination.

_____ _____
(Print Name of Property Owner) (Print Name of Property Owner)

_____ _____
(Signature of Property Owner) (Signature of Property Owner)

Dated this _____ day of _____ 20 _____.

********** Space Below This Line For Notary's Use **********

ALL PURPOSE ACKNOWLEDGEMENT

State of _____ }
}
County of _____ }

On _____ before me, _____ personally appeared
(Insert Name of Notary Public and Title)
_____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf on which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

Recording requested by and mail to:

Name: City of [Insert City]
Public Works Department
ATTN: Director of Public Works

Address: [Insert City Address Line1]
[Insert City Address Line2]

Insert City Seal

********** Space Above This Line For Recorder's Use **********

MASTER TERMINATION OF COVENANT AND AGREEMENT

REGARDING ON-SITE BMP MAINTENANCE

The undersigned hereby certifies I am (we are) the owner(s) of the hereinafter legally described real property located in the City of [Insert City], County of Los Angeles, State of California (please give legal description: assessor's ID, tract no, lot not, etc.):

_____

Site Address _____

We do hereby, with approval of the City of [Insert City], Engineering Division, terminate the covenant and agreement entered into with the City of [Insert City]as recorded on the _____ day of _____20_____, as Document No.

_____

_____

This covenant and agreement is terminated for the reason that:

_____

_____

_____ _____
(Print Name of Property Owner) (Print Name of Property Owner)

_____ _____
(Signature of Property Owner) (Signature of Property Owner)

Dated this _____ day of _____ 20 _____.

Termination approved by: _____ Date: _____
(Authorized City Representative)

********** Space Below This Line For Notary's Use **********

ALL PURPOSE ACKNOWLEDGEMENT

State of _____ }
}
County of _____ }

On _____ before me, _____ personally appeared
(Insert Name of Notary Public and Title)
_____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf on which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

Insert City Seal

City of [Insert City]NPDES Program

POST-CONSTRUCTION BMP VERIFICATION & INSPECTION FORM

PROJECT INFORMATION	
Facility/Project Name:	Inspection Date:
Address:	Inspector:
Contact Name:	Contact Phone:

Project Category

☐ Priority Project ☐ Small Site LID Project ☐ Single Family Residence ☐ Green Street
☐ Public Project ☐ Private Project

Project Type:

☐ Commercial ☐ Industrial ☐ Residential ☐ Multi-Use
☐ Road/Street ☐ Parking Lot ☐ Automotive repair ☐ Restaurant ☐ Other:

Operation/Maintenance:

☐ Reviewed ☐ Not Reviewed ☐ Not Available
Preparer's Name: Preparer's Title:
Address: City: Zip: Phone:

Inspection Type

☐ Prior to Certificate of Occupancy ☐ Special Investigation ☐ Response to Complaint
☐ Routine Inspection (Annual) ☐ Follow-up Inspection

CHECKLIST FOR ROUTINE SOURCE CONTROL BMPs

Requirement	No. of BMPs (if Applicable)	BMP in place per approved LID Plan/SUSMP?	Corrective Action Required
Storm Drain System Stenciling/Signage		☐ Yes ☐ No	☐ Yes ☐ No
Outdoor Material Storage Areas		☐ Yes ☐ No	☐ Yes ☐ No
Trash Storage Areas		☐ Yes ☐ No	☐ Yes ☐ No
Efficient Irrigation Systems & Landscape Design		☐ Yes ☐ No	☐ Yes ☐ No
Protect Slopes & Channels		☐ Yes ☐ No	☐ Yes ☐ No
Loading Dock Areas		☐ Yes ☐ No	☐ Yes ☐ No
Maintenance Bays		☐ Yes ☐ No	☐ Yes ☐ No
Vehicle Wash Areas		☐ Yes ☐ No	☐ Yes ☐ No
Outdoor Process Areas		☐ Yes ☐ No	☐ Yes ☐ No
Equipment Wash Areas		☐ Yes ☐ No	☐ Yes ☐ No
Fueling Areas		☐ Yes ☐ No	☐ Yes ☐ No
Hillside Landscaping		☐ Yes ☐ No	☐ Yes ☐ No
Wash-water Controls for Food Prep Areas		☐ Yes ☐ No	☐ Yes ☐ No
Community Car Wash Racks		☐ Yes ☐ No	☐ Yes ☐ No

CHECKLIST FOR STRUCTURAL BMPs

Requirement	No. of BMPs (if Applicable)	BMP in place per approved LID Plan/SUSMP?	Corrective Action Required
Infiltration Trench/Basin		☐ Yes ☐ No	☐ Yes ☐ No
Infiltration Well/Dry Well		☐ Yes ☐ No	☐ Yes ☐ No
Detention Basin		☐ Yes ☐ No	☐ Yes ☐ No
Porous Pavement		☐ Yes ☐ No	☐ Yes ☐ No
Bio-infiltration		☐ Yes ☐ No	☐ Yes ☐ No
Vegetated Swale		☐ Yes ☐ No	☐ Yes ☐ No
Bio-filtration		☐ Yes ☐ No	☐ Yes ☐ No
Proprietary Control Measure (describe):		☐ Yes ☐ No	☐ Yes ☐ No
Media Filtration		☐ Yes ☐ No	☐ Yes ☐ No
Filter Insert		☐ Yes ☐ No	☐ Yes ☐ No
Regional or Watershed BMPs		☐ Yes ☐ No	☐ Yes ☐ No
Other (describe):		☐ Yes ☐ No	☐ Yes ☐ No

INSPECTION RESULTS:

- ☐ Visible / No Apparent Problems
- ☐ BMP Failure
- ☐ Significant Engineering / Design Flaws
- ☐ Unauthorized Modifications
- ☐ BMP Missing / Removed / Not Located
- ☐ Trash / Debris Exceeding Cap. (bypass)
- ☐ Evidence of Pollution / Dumping
- ☐ Vector Control Issues (Mosquitoes)
- ☐ Inadequate Maintenance

DESCRIPTION OF CORRECTIVE ACTION(S) REQUIRED:

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If any corrective actions have been noted above, then based on this verification inspection, you are in noncompliance with Municipal Code Chapter [-]. You must implement the required corrective action(s) by:

_____
Corrective Action Due Date

After this date, your facility will be re-inspected to verify that all necessary corrective measures have been taken. FAILURE TO IMPLEMENT THE CORRECTIVE ACTION(S) WILL SUBJECT YOU TO ELEVATED ENCORCEMENT, WHICH CAN INCLUDE INFRACTION OR MISDEMEANOR PENALTIES.

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____	_____	_____
Contact Signature	Printed Name	Date

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STORMWATER PLANNING PROGRAM PRIORITY PROJECT CHECKLIST

FORM PC

Project Name	Owner Name	Developer Name
Project Address	Owner Address	Developer Address
Plan Check #	Owner Phone	Developer Phone

TYPE OF PROJECT

Does the proposed project fall into one of the following categories? Please check Yes/No	YES	NO
PRIORITY PROJECTS		
1. A new project equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious* surface area		
2. A new industrial park with 10,000 square feet or more of surface area		
3. A new commercial mall with 10,000 square feet or more surface area		
4. A new retail gasoline outlet with 5,000 square feet or more of surface area		
5. A new restaurant (SIC 5812) with 5,000 square feet or more of surface area		
6. A new parking lot with either 5,000 ft^2 or more of impervious* surface or with 25 or more parking spaces		
7. A new automotive service facility (SIC 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) with 5,000 square feet or more of surface area		
8. Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA)*, where the development will: a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and b. Create 2,500 square feet or more of impervious surface area		
9. Redevelopment*		
SPECIAL PROVISION PROJECTS		
10. Green street* project		
11. Single family hillside* home		

If checked YES, numerical criteria will apply to items 1,2,6-9 and items 3-5 (for project areas of 5,000 ft^2 or more of surface area.) If any of the boxes are checked YES, this project will require the preparation of a Low Impact Development (LID) Plan and a Maintenance Agreement Transfer*

* Defined on back.

Applicant Name

Applicant Signature

Applicant Title

Date

DEFINITIONS:

Impervious are those surfaces that do not allow stormwater runoff to percolate into the ground. Typical impervious surfaces include: concrete, asphalt, roofing materials, etc. However, some specially designed concrete/asphalt do allow water to percolate (pervious).

Hillside means property where the slope is 25% or greater and where grading contemplates cut or fill slopes. Single family hillside homes will require a less extensive plan. During the construction of a single-family hillside home, the following measures are implemented:

a. Conserve natural areas

b. Protect slopes and channels

c. Provide storm drain system stenciling and signage

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability

e. Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

Green Streets means any street and road construction of 10,000 square feet or more of impervious surface area

a. These projects will follow an approved green streets manual to the maximum extent practicable. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects. Stormwater mitigation measures must be in compliance with the approved green streets manual requirements.

Redevelopment means land-disturbing activities that result in the creation, addition, or replacement of 5,000 ft^2 or more of impervious surface area on an already developed site.

Redevelopment does not include routine maintenance activities that are conducted to maintain the original line and grade, hydraulic capacity, or original purpose of facility, nor does it include modifications to existing single family structures, or emergency construction activities required to immediately protect public health and safety.

Significant Ecological Area means an area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and would be disturbed or degraded by human activities and developments. Also, an area designated by the City as approved by the Regional Water Quality Control Board.

Maintenance Agreement and Transfer: All developments subject to LID and site specific plan requirements provide verification of maintenance provisions for Structural and Treatment Control BMPs, including but not limited to legal agreements, covenants, CEQA mitigation requirements, and/or conditional use permits. Verification at a minimum shall include:

- The developer's and/or owner's signed statement accepting responsibility for maintenance until the responsibility is legally transferred; and
- A signed statement from the public entity assuming responsibility for Structural or Treatment Control BMP maintenance and conduct a maintenance inspection at least once a year; or
- Written conditions in the sales or lease agreement, which requires the recipient to assume responsibility for maintenance and conduct a maintenance inspection at least once a year; or
- Written text in project conditions, covenants and restrictions (CCRs) for residential properties assigning maintenance responsibilities to the Home Owners Association for maintenance of the Structural and Treatment Control BMPs; or
- Any other legally enforceable agreement that assigns responsibility for the maintenance of post-construction Structural or Treatment Control BMPs.

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STORMWATER PLANNING PROGRAM
PRIORITY DEVELOPMENT & REDEVELOPMENT PROJECTS
PLAN CHECK # _____

FORM P1

Project Name _____ Project Location _____	**GENERAL PROJECT CERTIFICATION**
Company Name _____ Address _____ Contact Name / Title _____ Phone / FAX / Email _____	*A completed original of this form must accompany all LID Plan submittals.*

Best Management Practices (BMPs) have been incorporated into the design/maintenance/construction of this project to accomplish the following:

1. Minimize impacts from stormwater runoff on the biological integrity of Natural Drainage Systems and water bodies in accordance with requirements under CEQA (Cal. Pub. Resources Code § 21100), CWC § 13369, CWA § 319, CWA § 402(p), CWA § 404, CZARA § 6217(g), ESA § 7, and local government ordinances.
2. Maximize the percentage of pervious surfaces to allow more percolation of stormwater into the ground.
3. Minimize the amount of stormwater directed to impermeable surfaces and to the MS4.
4. Minimize pollution emanating from parking lots through the use of appropriate Treatment Control BMPs and good housekeeping practices.
5. Minimize breeding of Vectors
6. Reduce pollutant loads in stormwater from the development site.

I certify that this Low Impact Development Plan and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered/evaluated the information submitted.

Post Construction / Maintenance Certification

As the responsible party, I certify that the proposed BMPs will be implemented, monitored and maintained to ensure their continued effectiveness. In the event of a property transfer, the new owner/lessee will be notified of the BMPs in use at this site and I will include written conditions in the sales or lease agreement, which requires the new owner (or lessee) to assume responsibility for maintenance and conduct a maintenance inspection at least once a year. The information contained herein is, to the best of my knowledge and belief, true, accurate, and complete.

In consideration of the execution of City of [Insert City] approval of the proposed Low Impact Development (LID) Plan including any proposed treatment system, the applicant hereby agrees to indemnify, save and keep the City of [Insert City], its officers, agents and employees free and harmless from and against any and all claims for injury, damage, loss, liability, cost and expense of any nature whatsoever, which the City of [Insert City], its officers, agents, or employees may suffer, sustain, incur, pay out as a result of any and all actions, suits, proceedings, claims and demands which may be brought, made, or filed against the City of [Insert City], its officers, agents or employees by reason of or arising out of, or in any manner connected with any and all operations permitted by this approval. This indemnification extends to further agree that the City of [Insert City]is not responsible for any additional requirements or restrictions due to changes in regulations, policies or enforcement practices of the California Regional Water Quality Control Board, or any other applicable regulatory agencies.

Property Owner Name	Property Owner Signature
Applicant Title	Date

PLANNING BEST MANAGEMENT PRACTICES

BMP Name	BMP Identification Number and Name	✓ if to be used
Car Wash Facility	SC-21: Vehicle and Equipment Cleaning	
Constructed Wetlands	MP-20: Wetlands	
Control of Impervious Runoff	-N/A-	
Efficient Irrigation	-N/A-	
Energy Dissipaters	EC-10: Velocity Dissipation Devices	
Extended Detention Basins	TC-22: Extended Detention Basin	
Infiltration Basins	TC-11: Infiltration Basins	
Infiltration Trenches	TC-10: Infiltration Trenches	
Inlet Trash Racks	-N/A-	
Landscape Design	EC-2: Preservation of Existing Vegetation EC-4: Hydro seeding EC-6 & EC-8: Straw & Wood Mulching	
Linings for Urban Runoff Conveyance Channels	-N/A-	
Materials Management	SC-30: Outdoor Loading/Unloading	
Media Filtration	TC-40: Media Filter	
Motor Fuel Concrete Dispensing Areas	SC-20: Vehicle and Equipment Fueling	
Motor Fuel Dispensing Area Canopy	SC-20: Vehicle and Equipment Fueling	
Water Quality Inlets	TC-50: Water Quality Inlet	
Outdoor Storage	SC-31: Outdoor Liquid Container Storage SC-33: Outdoor Storage of Raw Materials	
Porous Pavement and/or Alternative Surfaces	-N/A-	
Protect Slopes and Channels	EC-11: Slope Drains EC-12: Streambank Stabilization	
Self-Contained Areas for Vehicle or Equipment Washing, Steam Cleaning, Maintenance, Repair, or Material Processing	SC-21: Vehicle and Equipment Cleaning SC-22: Vehicle and Equipment Repair SC-32: Outdoor Equipment Operations	
Storm Drain System Stenciling and Signage	SC-34: Waste Handling and Disposal (Signage Section)	
Trash Container Areas	SC-34: Waste Handling and Disposal	
Vegetated Swales and Strips	TC-32: Bioretention	
Wet Ponds	TC-20: Wet Ponds	
Other:	• • • • •	

Please refer to the California Storm Water Best Management Practice Handbooks for more information.

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STORMWATER TREATMENT CERTIFICATION

FORM P2

SITE NAME and ADDRESS

_____

_____

_____

_____

_____

Plan Check #_____

Planning #_____

APPROXIMATE PROJECT CHARACTERISTICS

Roofed Area	_____	ft^2
Roadway/Parking Area (exposed)	_____	ft^2
Landscaped/Vegetation	_____	ft^2
Other Ground Level Impervious Areas (Ex: Outdoor work or storage areas)	_____	ft^2
Other: _____	_____	ft^2
TOTAL	_____	ft^2

STRUCTURAL/TREATMENT BMPs

(attach additional sheets as necessary) or see back

Area Designation (must correspond with plans)	**Tributary Area** (ft^2)	**Average Impervious Factor**	**Estimated Flow Rate or Volume***	**Anticipated Potential Pollutants**	**Type of BMP** (include size, make, and model, if any)	**BMP Location** (briefly describe)	**Design Treatment Flow Rate or Volume Capacity**

By stamping this form, I acknowledge that each treatment BMP is provided with adequate bypass or overflow so as not to contribute to localized flooding or soil instability.

*Flow rates and volumes based on the 0.75 inch, 24-hour rain event or the 85th percentile, 24-hour rain event, whichever is greater.

I certify that I am a Professional Civil Engineer registered in the State of California, and that the treatment methods and capacities herein comply with the requirements established by the California Regional Water Quality Control Board, Los Angeles Region, and the State Water Resources Control Board for Low Impact Development (LID) Plans.

Affix Registered Engineer Wet Ink Stamp Here:

Print Name _____ **Signature** _____ **Date** _____

STRUCTURAL/TREATMENT BMPs

(attach additional sheets as necessary)

Area Designation (must correspond with plans)	**Tributary Area** (ft^2)	**Average Impervious Factor**	**Estimated Flow Rate or Volume***	**Anticipated Potential Pollutants**	**Type of BMP** (include size, make, and model, if any)	**BMP Location** (briefly describe)	**Design Treatment Flow Rate or Volume Capacity**

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OWNER'S CERTIFICATION
MINIMUM BMPS FOR ALL CONSTRUCTION SITES

FORM OC1

PLAN CHECK #_____

Project Name	_____	BUILDING/GRADING PERMIT NUMBER	
Project Location	_____		
Owner Name	_____	Contractor Name	_____
Address	_____	Address	_____
Phone	_____	Phone	_____
FAX/Email	_____	FAX/Email	_____

The National Pollutant Discharge Elimination System (NPDES) is the portion of the Clean Water Act that applies to the protection of receiving waters. Under permits from the Los Angeles Regional Water Quality Control Board (RWQCB), certain activities are subject to RWQCB enforcement. To meet the requirements of the Los Angeles County Municipal Stormwater Permit (CAS004001), minimum requirements for sediment control, erosion control and construction activities must be implemented on each project site. Minimum requirements include:

- **EROSION CONTROL:** Erosion from slopes and channels shall be controlled by implementing an effective combination of BMPs, such as the limiting of grading activities during the wet season; inspecting graded areas during rain events; planting and maintenance of vegetation on slopes; and covering erosion susceptible slopes.
- **SEDIMENT CONTROL:** Eroded sediments from areas disturbed by construction and from stockpiles of soil shall be retained on site to minimize sediment transport from the site to streets, drainage facilities and/or adjacent properties via runoff, vehicle tracking or wind.
- **NON-STORMWATER MANAGEMENT:** Non-stormwater runoff from equipment and vehicle washing and any other activity shall be contained at the project site.
- **WASTE MANAGEMENT:** Construction related materials, wastes, spills or residues shall be retained on site to minimize transport from the site to streets, drainage facilities or adjoining properties by wind or runoff. Runoff from equipment and vehicle washing shall be contained at construction sites unless treated to remove sediment and pollutants.

Examples of Minimum BMPs include: (1) Soil piles must be covered with tarps or plastic, (2) leaking equipment must be repaired immediately, (3) refueling must be conducted away from catch basins, (4) catch basins must be protected when working nearby, (5) vacuum all concrete saw cutting, (6) never wash concrete waste into the street, (7) keep the site clean, sweep the gutters at the end of each working day and keep a trash receptacle on site.

As the architect/engineer of record, I have selected appropriate BMPs to effectively minimize the negative impacts of this project's construction activities on stormwater quality. The project owner and contractor are aware that the selected BMPs shall be installed, monitored, and maintained to ensure their effectiveness. The BMPs not selected for implementation are redundant or deemed not applicable to the proposed construction activity.

Architect/Engineer of Record Name	Architect/Engineer of Record Signature
Title	Date

I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law.

Landowner or Landowner's Agent Name	Landowner or Landowner's Agent Signature
Title	Date

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EROSION AND SEDIMENT CONTROL PLAN (ESCP) REVIEW CHECKLIST

These requirements apply to all activities involving soil disturbance with the exception of agricultural activities. Applicable activities include but are not limited to grading, vegetation clearing, soil compaction, paving, re-paving and linear underground/overhead projects (LUPs).

Prior to issuing a grading or building permit, each operator of a construction activity within its jurisdiction must prepare and submit an ESCP prior to the disturbance of land.

Contact Name:	Tracking #:
Contact Title:	Site Name:
Company Name:	Site Address:
Mailing Address:	Type of Facility:
City, State, Zip:	Submittal Date:
Phone Number:	Plan Return Date:
Fax Number:	Disturbed Area:

First Review
ESCP Received on:

Review Completed on:

Second Review
ESCP Received on:

Review Completed on:

Third Review
ESCP Received on:

Review Completed on:

Fourth Review
ESCP Received on:

Review Completed on:

Fifth Review
ESCP Received on:

Review Completed on:

Sixth Review
ESCP Received on:

Review Completed on:

ESCP REQUIREMENT	SATISFACTION			COMMENTS
	YES	NO	N/A	
General Information				
Contact information (e.g., name, address, phone, email, etc.) provided for the owner and contractor.	☐	☐	☐	
Basic site information including location, status, size of the project and area of disturbance is provided.	☐	☐	☐	
Proof of existing coverage under applicable permits, including, but not limited to the State Water Board's Construction General Permit, and State Water Board 401 Water Quality Certification.	☐	☐	☐	
Meets the minimum requirements of the jurisdictional erosion and sediment control ordinance.	☐	☐	☐	
Includes the elements of a Storm Water Pollution Prevention Plan (SWPPP) prepared in accordance with the requirements of the Construction General Permit.	☐	☐	☐	
Developed and certified by a Qualified SWPPP Developer (QSD).	☐	☐	☐	
Identifies the proximity all water bodies, water bodies listed as impaired by sediment-related pollutants, and water bodies for which a sediment-related TMDL has been adopted and approved by the USEPA.	☐	☐	☐	
Identifies any significant threat to water quality status, based on consideration of factors listed in Appendix 1 to the Construction General Permit.	☐	☐	☐	
The project start date and anticipated completion date is provided.	☐	☐	☐	
Includes Identification of site Risk Level as identified per the requirements in Appendix 1 of the Construction General Permit.	☐	☐	☐	
Contains a language signed by the landowner or the landowner's agent stating as follows: *"I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law."*	☐	☐	☐	

ESCP REQUIREMENT	SATISFACTION			COMMENTS
	YES	NO	N/A	
Best Management Practices				
All structural BMPs are designed by a licensed California Engineer.	☐	☐	☐	
Includes Sediment/Erosion Control.	☐	☐	☐	
Includes controls to prevent tracking on and off the site.	☐	☐	☐	
Includes non-stormwater controls (e.g., vehicle washing, dewatering, etc.).	☐	☐	☐	
Includes Materials Management (delivery and storage).	☐	☐	☐	
Includes Spill Prevention and Control.	☐	☐	☐	
Includes Waste Management (e.g., concrete washout/waste management; sanitary waste management).	☐	☐	☐	
Includes methods to minimize the footprint of the disturbed area and to prevent soil compaction outside of the disturbed area.	☐	☐	☐	
Includes methods used to protect native vegetation and trees.	☐	☐	☐	
Includes the rationale for the selection and design of the proposed BMPs, including quantifying the expected soil loss from different BMPs.	☐	☐	☐	
Post-Construction Structural BMPs subject to Operation and Maintenance Requirements are identified.	☐	☐	☐	
Site Plan				
Full sized plans showing the site with all proposed BMPs and water quality notes have been signed and stamped with wet ink application by the appropriate individual.	☐	☐	☐	
Plan includes a title block containing at least the project name, address, and owner.	☐	☐	☐	
All figures, maps, plot plans, etc. have a legend, including a North arrow and scale.	☐	☐	☐	
All facilities are labeled for the intended function.	☐	☐	☐	
All areas of outdoor activity are labeled.	☐	☐	☐	
All structural BMPs are indicated.	☐	☐	☐	
Drainage flow information depicted.	☐	☐	☐	
Project location shown.	☐	☐	☐	
Site boundary indicated.	☐	☐	☐	

Agency Standard Operating Procedures

Each agency will use the suggested language below to develop, implement, and revise as necessary agency-specific Standard Operating Procedures (SOPs) that identify the procedures each agency will follow.

CGP Coverage Verification

- Verification of active coverage under the Construction General Permit for sites disturbing 1 acre or more, or that are part of a planned development that will disturb 1 acre or more and a process for referring non-filers to the Regional Water Board.

Prior to releasing any permits relating to and/or allowing for construction activities on a site resulting in one (1) acre or more of soil disturbance, a Notice of Intent (NOI), a Storm Water Pollution Prevention Plan (SWPPP), and all other Permit Registration Documents (PRDs) must be filed with the Regional Water Resources Control Board (Regional Board) through the State Water Board's Storm water Multi-Application and Report Tracking System (SMARTS) website and a Waste Discharge ID (WDID) number must be obtained from the Regional Board. This requirement will be included as a condition of approval. In cases where construction activities have commenced on a qualifying site and the project has not yet filed all PRDs (along with an explanation for filing late) with the Regional Board, a Notice of Violation (NOV) will be sent to the responsible person. Any work orders released will be stopped and fines may be enforced. The Regional Board will be notified of the discharger's non-compliance. Work will not be allowed to commence until the NOI has been accepted by the Regional Board and WDID number issued.

ESCP Review

- Review of the applicable ESCP and inspection of the construction site to determine whether all BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions.

Prior to issuing a grading or building permit, each operator of a construction activity within its jurisdiction must prepare and submit an Erosion and Sediment Control Plan (ESCP) prior to the disturbance of land. The ESCP Requirement Checklist will be used to ensure required information is submitted by the responsible person. These requirements apply to all activities involving soil disturbance with the exception of agricultural activities. Applicable activities include but are not limited to grading, vegetation clearing, soil compaction, paving, re-paving and linear underground/overhead projects (LUPs).

BMP Assessment

- Assessment of the appropriateness of the planned and installed BMPs and their effectiveness.

Prior to releasing any permits relating to and/or allowing for construction activities on a site resulting in one (1) acre or more of soil disturbance a Qualified SWPPP Practitioner (QSP) must be identified by the developer. Prior to beginning any construction activities, the QSP must review the ESCP and determine if the following requirements are being met:

1. Erosion and sediment controls are incorporated to provide effective reduction or elimination of sediment related pollutants in stormwater discharges and authorized non-stormwater discharges from the site.

2. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water.
3. Non-stormwater control BMPs are selected to control sediment on the construction site.
4. Materials and waste management pollution control BMPs are incorporated to minimize stormwater contact with construction materials, wastes and service areas; and to prevent materials and wastes from being discharged off-site.

If the QSP identifies potential problematic areas of the ESCP, a revision to the ESCP must be submitted for review and approval.

Once the BMPs are installed, inspections must be conducted at the frequency identified in the Watershed Management Program (WMP). All BMPs not functioning as intended must be repaired, replaced, or changed to a more effective BMP. Inspection and maintenance procedures must be in accordance with the CASQA handbook.

Discharge Reporting

- Visual observation and record keeping of non-stormwater discharges, potential illicit discharges and connections, and potential discharge of pollutants in stormwater runoff.

Any non-stormwater discharges, potential illicit discharges and connections, and potential discharge of pollutants in stormwater runoff will be tracked and kept on record.

Public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s within this jurisdiction will be conducted. Multiple modes of communication are in place to allow for complaints and spill reporting. When a complaint is received it will be documented and tracked to ensure that all complaints are adequately addressed.

A Spill Response Plan will be implemented for all sewage and other spills that may discharge into the MS4 within this jurisdiction. Coordination with spill response teams will be observed throughout all appropriate departments, programs, and agencies so that maximum water quality protection is provided. All spill complaints will be investigated within one business day of receiving the complaint and a response to spills for containment will be conducted within 4 hours of becoming aware of the spill, except where such spills occur on private property, in which case the response should be within 2 hours of gaining legal access to the property. Spills that may endanger health or the environment will be reported to appropriate public health agencies and the Office of Emergency Services (OES).

A training program regarding the identification of illicit connections/illicit discharges (IC/IDs) for all municipal field staff, who, as part of their normal job responsibilities (e.g., street sweeping, storm drain maintenance, collection system maintenance, road maintenance), may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4 will be provided.

Construction Inspection Reporting and Tracking

- Development of a written or electronic inspection report generated from an inspection checklist used in the field.
- Tracking of the number of inspections for the inventoried construction sites throughout the reporting period to verify that the sites are inspected at the minimum frequencies required.

Inspections will be conducted at a frequency listed in the Watershed Management Program (WMP). Inspection checklists and/or reports will be utilized to determine and keep record of whether or not all

BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions. These checklists/reports will be retained for at least three (3) years following NOT approval.

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(CITY NAME) STORMWATER INSPECTION REPORT FOR CONSTRUCTION SITES

SITES ONE ACRE OR GREATER

Project Name:		Address:	
Area disturbed:		WDID:	SWPPP on-site: ☐ Yes ☐ No
Risk level: ☐ Low (Risk 1) ☐ Medium (Risk 2) ☐ High (Risk 3)		Erosion & Sediment Control Plan (ESCP) on-site: ☐ Yes ☐ No	
Phase: ☐ Prior to Land Disturbance ☐ Active construction ☐ Site stabilization			
Developer/Contractor:		Phone number:	
Contact:		Title:	
Inspector:		Date:	
Inspection: ☐ Routine (monthly and for each phase of construction) ☐ Follow-up ☐ Response to complaint		*For sites discharging to a waterbody impaired for sediment/turbidity*[i] ☐ *Routine biweekly* ☐ *Predicted rainfall* ☐ *Recent rainfall*	

CHECKLIST FOR STORMWATER BMP (BEST MANAGEMENT PRACTICE) COMPLIANCE

PHASE 1 AND 2: PRIOR TO LAND DISTURBANCE AND DURING ACTIVE CONSTRUCTION

	Comment	Yes	No	N/A
Erosion Control	1. Erosion controls are implemented in accordance with the ESCP	☐	☐	☐
	2. Erosion observed	☐	☐	☐
Sediment Control	3. Sediment controls are implemented in accordance with the ESCP	☐	☐	☐
	4. Sediment discharge observed	☐	☐	☐
Additional Controls	5. Tracking controls (tire washout, stabilized entrances, exits and roadways) are implemented in accordance with the ESCP	☐	☐	☐
	6. Sediment in roads observed	☐	☐	☐
	7. Wind erosion controls are implemented in accordance with the ESCP	☐	☐	☐
	8. Wind erosion observed	☐	☐	☐
Waste Management	9. Effective material delivery and storage practices are implemented	☐	☐	☐
	10. Spill prevention and control practices are implemented	☐	☐	☐
	11. Stockpile controls are implemented in accordance with the ESCP	☐	☐	☐
	12. Solid waste controls are implemented in accordance with the ESCP	☐	☐	☐
Nonstormwater Management	13. Vehicle and equipment washing, fueling and maintenance controls are implemented in accordance with the ESCP	☐	☐	☐
	14. Nonstormwater discharges observed	☐	☐	☐
	15. Dewatering operations covered under NPDES Permit CAG994004	☐	☐	☐
	16. Water conservation practices are implemented	☐	☐	☐

PHASE 3: FINAL LANDSCAPING/SITE STABILIZATION

Comment	Yes	No	N/A	Comment	Yes	No	N/A
1. Graded areas have reached final stabilization	☐	☐	☐	3. Temporary erosion and sediment BMPs are removed	☐	☐	☐
2. Trash, debris and construction materials are removed	☐	☐	☐	4. Post-construction BMPs are installed	☐	☐	☐

COMMENTS AND CORRECTIVE ACTIONS (IF REQUIRED):

ENFORCEMENT: ☐ **None required** ☐ **Corrective Action Notice (complete section below)** ☐ **Other (see comments)**

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If corrective actions have been noted above, then the responsible party (facility owner, occupant or person responsible) is in noncompliance with the City's Stormwater Quality Ordinance. The responsible party may be subject to enforcement actions under this program if the corrective actions are not implemented by:

_____
Corrective Action Due Date

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____ Site Representative Signature

_____ Printed Name

_____ Date

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[i] For sites discharging to a tributary listed by the state as an impaired waterbody for sediment or turbidity under CWA § 303(d), or determined to be a threat to water quality, inspections must be conducted (1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA and (2) within 48 hours of a ½-inch rain event and (3) at least once every two weeks.

Insert City Seal

CITY STORMWATER QUALITY PROGRAM
CONSTRUCTION SITE INSPECTION REPORT

FOR SITES LESS THAN ONE ACRE

Project:	Address:
Contact:	Title:
Contractor:	Phone:
Inspector:	Date:

CHECKLIST FOR STORMWATER BMP (BEST MANAGEMENT PRACTICE) COMPLIANCE

	Question	Yes	No	N/A
Erosion Control	1. Effective erosion controls implemented.	☐	☐	☐
	2. Erosion observed.	☐	☐	☐
Sediment Control	3. Effective sediment controls implemented.	☐	☐	☐
	4. Sediment discharge observed.	☐	☐	☐
Non-Stormwater Management	5. Water conservation practices are implemented.	☐	☐	☐
	6. Dewatering operations covered under NPDES Permit CAG994004	☐	☐	☐
Waste Management	7. Effective material delivery/storage practices and spill prevention/control practices are implemented.	☐	☐	☐
	8. Effective waste management controls are implemented.	☐	☐	☐

COMMENTS AND CORRECTIVE ACTIONS (IF REQUIRED):

ENFORCEMENT: ☐ **None required** ☐ **Corrective Action Notice (complete section below)** ☐ **Other (see comments)**

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If corrective actions have been noted above, then the responsible party (facility owner, occupant or person responsible) is in noncompliance with the City's Stormwater Quality Ordinance. The responsible party may be subject to enforcement actions under this program if the corrective actions are not implemented by:

_____
Corrective Action Due Date

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____ Site Representative Signature

_____ Printed Name

_____ Date

RB-AR11598

Example Lease Language for Fixed Facilities

The following is example language that can be inserted into municipal leases:

The Los Angeles Regional Water Quality Control Board (RWQCB) has issued permits which govern stormwater and non-stormwater discharges resulting from municipal activities performed by or for the Coastal Watersheds of Los Angeles County, including the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the coastal watersheds of Los Angeles County with the exception of Long Beach (collectively referred to as Permittees). The RWQCB Permit is a National Pollutant Discharge Elimination System (NPDES) Permit No. R4-2023-0175. A Copy of the RWQCB Permit is available for review.

In order to comply with the Permit requirements, the Permittees have developed a Watershed Management Program (WMP) which contains Public Agency Facilities and Activities Maintenance Procedures (Maintenance Procedures) with Best Management Practices (BMPs) adopted from the Caltrans Storm Water Quality Handbook Maintenance Staff Guide (Caltrans Handbook) that parties leasing municipally owned properties must adhere to. These Maintenance Procedures contain pollution prevention and source control techniques to minimize the impact of those activities upon dry-weather urban runoff, stormwater runoff, and receiving water quality.

Activities performed at the facility leased under this agreement shall conform to the RWQCB NPDES Permit, the WMP, and the CalTrans Handbook, and must be performed as described within all applicable Maintenance Procedures. The holder of this agreement shall fully understand the Maintenance Procedures applicable to activities conducted at the facility leased under this agreement prior to conducting them and maintain copies of the Maintenance Procedures at the leased facility throughout the agreement duration. The applicable Maintenance Procedures are included as Exhibit ___ of this agreement.

Evaluation of activities subject to WMP requirements performed at the facility leased under this agreement will be conducted by the city to verify compliance with Maintenance Procedures, and may be required through lessor self-evaluation as determined by the city.

Example Contract Language for Field Programs

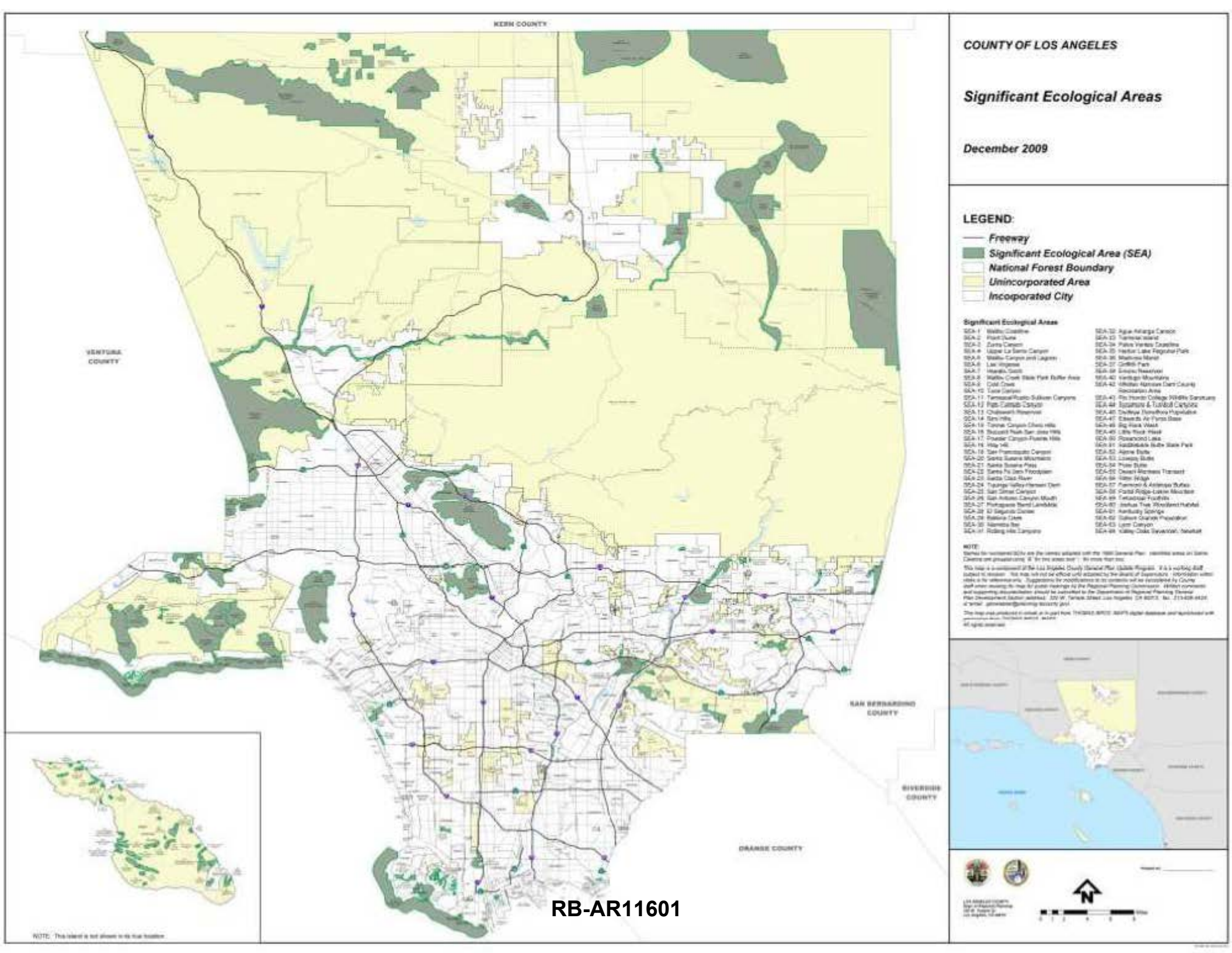
The following is example language that can be inserted into municipal field program contracts:

The Los Angeles Regional Water Quality Control Board (RWQCB) has issued permits which govern stormwater and non-stormwater discharges resulting from municipal activities performed by or for the Coastal Watersheds of Los Angeles County, including the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the coastal watersheds of Los Angeles County with the exception of Long Beach (collectively referred to as Permittees). The RWQCB Permit is a National Pollutant Discharge Elimination System (NPDES) Permit No. R4-2023-0175. A Copy of the RWQCB Permit is available for review.

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Work performed under this CONTRACT shall conform to the RWQCB NPDES Permit, the WMP, and the CalTrans Handbook, and must be performed as described within all applicable Maintenance Procedures. The CONTRACTOR shall fully understand the Maintenance Procedures applicable to activities that are being conducted under this CONTRACT prior to conducting them and maintain copies of the Maintenance Procedures throughout the CONTRACT duration. The applicable Model Maintenance Procedures are included as Exhibit ___ of this CONTRACT.

Evaluation of activities subject to WMP requirements performed under this CONTRACT will be conducted to verify compliance with the Maintenance Procedures, and may be required through CONTRACTOR self-evaluation as determined by the city.


KERN COUNTY
VENTURA COUNTY
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
ORANGE COUNTY
NOTE: This island is not shown in its true location.
COUNTY OF LOS ANGELES
Significant Ecological Areas
December 2009
LEGEND:
Freeway
Significant Ecological Area (SEA)
National Forest Boundary
Unincorporated Area
Incoporated City
Significant Ecological Areas
SEA-1 Malibu Coastline
SEA-2 Point Dume
SEA-3 Zuma Canyon
SEA-4 Upper La Sierra Canyon
SEA-5 Malibu Canyon and Lagoon
SEA-6 Las Virgenes
SEA-7 Hidden Valley
SEA-8 Malibu Creek State Park Buffer Area
SEA-9 Cold Creek
SEA-10 Liano Canyon
SEA-11 Tarmaquel/Pacific Sullivan Canyons
SEA-12 Palo Comado Canyon
SEA-13 Chatsworth Reservoir
SEA-14 Simi Hills
SEA-15 Towsley Canyon-Oliveo Hills
SEA-16 Rockpile Road-San Jose Hills
SEA-17 Powder Canyon-Puente Hills
SEA-18 Whittier Hills
SEA-19 San Francisquito Canyon
SEA-20 Santa Susana Mountains
SEA-21 Santa Susana Pass
SEA-22 Santa Fe Dam Floodplain
SEA-23 Santa Clara River
SEA-24 Tujunga Valley-Hansen Dam
SEA-25 San Gabriel Canyon
SEA-26 San Antonio Canyon Mouth
SEA-27 Portuguese Bend/Landslide
SEA-28 El Segundo Dunes
SEA-29 Ballona Creek
SEA-30 Alamitos Bay
SEA-31 Rolling Hills Canyons
SEA-32 Agua Amarga Canyon
SEA-33 Torrance Island
SEA-34 Palos Verdes Coastline
SEA-35 Harbor Lake Regional Park
SEA-36 Madrona Marsh
SEA-37 Griffith Park
SEA-38 Encino Reservoir
SEA-40 Verdugo Mountains
SEA-42 Whittier Narrows Dam/County Recreation Area
SEA-43 Rio Hondo College Wildlife Sanctuary
SEA-44 Sycamore & Turnbull Canyons
SEA-45 Dalliwar Dorothea Pupukahini
SEA-47 Edwards Air Force Base
SEA-48 Big Rock Wash
SEA-49 Little Rock Wash
SEA-50 Rosamond Lake
SEA-51 Saddleback Butte State Park
SEA-52 Alpine Butte
SEA-53 Lovejoy Buttes
SEA-54 Piute Buttes
SEA-55 Desert Wilderness Transect
SEA-56 Kiler Ridge
SEA-57 Fremont & Antelope Buttes
SEA-58 Portal Ridge-Liebre Mountain
SEA-59 Tehachapi Foothills
SEA-60 Joshua Tree Woodland Habitat
SEA-61 Kentucky Springs
SEA-62 Sullivan Grande Precipitation
SEA-63 Lyon Canyon
SEA-64 Valley-Oaks Savannah, Newhall
NOTE:
RB-AR11601

2014

Integrated Pest Management Program



Developed for the City of

_____

RB-AR11602

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INTEGRATED PEST MANAGEMENT (IPM) PROGRAM IMPLEMENTATION GUIDELINES[1] FOR THE CITY OF _____

General IPM Policy

For the past few decades, the trend in pest management has been to increasingly rely on synthetic chemical pesticides. This management strategy results in the increased use of dangerous chemicals, an increase in the number of pests that can become resistant to the pesticides, as well as lead to new organisms becoming pests. Additionally, some pesticides used for terrestrial pest management have been found in waterways causing problems in the aquatic environment.

Pest control managers are now moving away from their reliance on pesticides and toward an integrated approach that combines limited pesticide use with more environmentally friendly pest control techniques. This system is known as integrated pest management (IPM), a strategy that focuses on the long-term prevention of pests through a combination of techniques, including preventative, cultural, mechanical, environmental, biological, and chemical control tactics (**Figure 1**). Multiple IPM techniques can be utilized simultaneously to control pest populations in the most effective manner possible.

A comprehensive IPM Program and Approach allows for primary focus on pollution prevention by monitoring and preventing pests as well as minimizing heavy pest infestations, which reduces the need for chemicals and/or multiple applications. The goal of the IPM Program is not to eliminate all pests, but to keep their populations at tolerable levels. In an IPM program, pesticides should be applied only when it is determined that pests are approaching damaging levels. Because this requires early detection of the pests, IPM programs utilize monitoring techniques and economic thresholds to determine when to implement control strategies. If possible, a person should be trained and assigned to scout the sites on a regular basis. Pesticides may be part of an IPM program, but they should preferably be used only after pests exceed established thresholds and applied only to the affected area (in the case of disease prevention, some modifications may be allowed). In general, all pest control strategies should be those that are least disruptive to biological control organisms (natural enemies), least hazardous to humans and the environment (including non-target organisms), and have the best likelihood of long-term effectiveness.

[1]Adapted from the Orange County Drainage Area Management Plan Integrated Pest Management Policy Developed by the University of California, Division of Agriculture and Natural Resources

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IPM practices are encouraged over the sole use of pesticides as the primary means of pest management (**Table 1**). As a part of their Municipal Activities Program, public agencies and their contractors evaluate the ability to use non-chemical IPM techniques before intensive use of pesticides. This IPM Program template outlines baseline IPM procedures that are required by the Los Angeles County Municipal Separate Storm System Permit (MS4 Permit)[2] along with additional optional IPM techniques that can be employed to implement an effective IPM program.

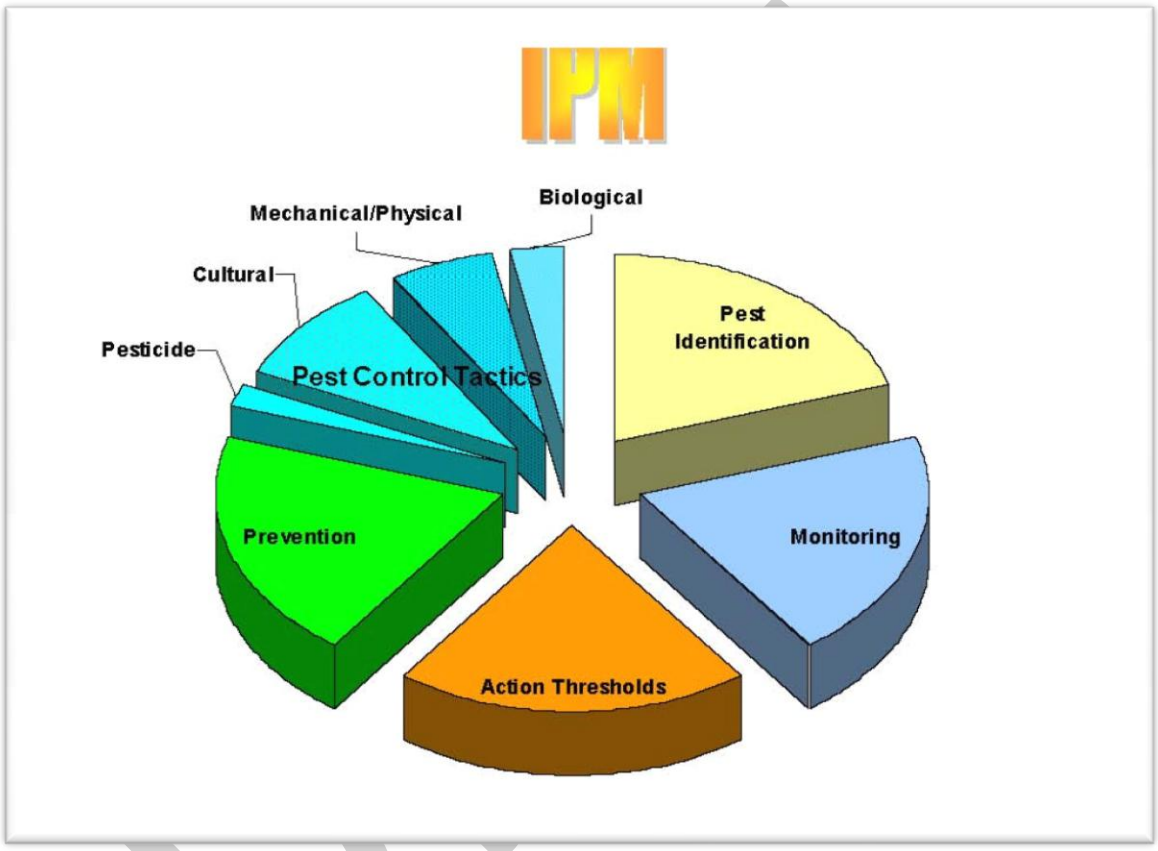


Figure 1 Components of an Integrated Pest Management Program

[2]California Regional Water Quality Control Board Los Angeles Region. 2012. Order No. R4-2012-0175 NPDES Permit No. CAS004001 Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4.

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Table 1 Advantages and Disadvantages of a Pesticide-Based Program Versus An IPM-Based Pest Control Program

Pesticide Based Pest Control		IPM Based Pest Control	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Quick suppression of pests	Not long-term	Long-term control	It may take longer to see results
	Pest control is reactive	Can be proactive in pest control actions.	Must establish thresholds
	Loss of natural controls. Often get outbreaks of other pests	Reduces disruption of natural enemies	
		Pesticides can be used (only used as a last resort)	Must have knowledge of pesticides and their effects on other organisms.
Labor is only for spraying	Extra work in cleanup	Staff becomes more knowledgeable of pests and injury symptoms	Labor is required for monitoring and regular scouting Training is required to identify pests and natural enemies
Not much preparation or follow-up needed	Need a PCA recommendation	Pest management is more organized	Must maintain a record-keeping system.
	Pesticide safety issues for applicators, public, animals More pesticides in environment Contamination of water bodies from runoff	Less exposure to pesticides Safer to the environment Reduces contamination from runoff	

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Implementation Guidelines

Enter Designated IPM Coordinator or IPM Contact Information in Box Below:

IPM Coordinator: Contact Info:

Personnel responsible for the care and maintenance of facilities under the City of _____ agree to implement a suite of basic integrated pest management procedures to meet MS4 Permit requirements[3]. The fundamental basis for the IPM program must include the following as outlined in Permit Part VI.D.9.g:

1. **Pesticides are to be used if monitoring indicates they are needed, and pesticides are applied according to applicable permits and established guidelines.**
2. **Treatments are made with the goal of removing only the target organism.**
3. **Pest controls are selected and applied in a manner that minimizes risks to human health, beneficial non-target organisms, and the environment.**
4. **The use of pesticides, including Organophosphates and Pyrethroids, does not threaten water quality.**
5. **Partnerships with other agencies and organizations are established to encourage the use of IPM.**
6. **A standardized protocol is to be used for the routine and non-routine application of pesticides (including pre-emergents), and fertilizers.**
7. **There is to be no application of pesticides or fertilizers (1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA34, (2) within 48 hours of a ½-inch rain event, or (3) when water is flowing off the area where the application is to occur. This requirement does not apply to the application of aquatic pesticides or pesticides which require water for activation.**
8. **No banned or unregistered pesticides are stored or applied.**
9. **All staff applying pesticides are certified in the appropriate category by the California Department of Pesticide Regulation, or are under the direct supervision of a pesticide applicator certified in the appropriate category.**
10. **Procedures to encourage the retention and planting of native vegetation to**

[3] In addition to MS4 Permit compliance, there are extensive federal and state laws and regulations that all public agencies must be in compliance with at all times, including the California Food and Agricultural Code (FAC) and the California Code of Regulations, Title 3 (3CCR).

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reduce water, pesticide and fertilizer needs are implemented; and

11. **Pesticides and fertilizers are stored indoors or under cover on paved surfaces, or use secondary containment.**
    a. **The use, storage, and handling of hazardous materials are reduced to decrease the potential for spills.**
    b. **Storage areas are regularly inspected.**

In order to implement the above required minimum practices, the following section describes components of an effective IPM Program that can be employed:

- Pest and Symptom Identification
- Prevention
- Monitoring
- Injury Levels and Action Thresholds
- Pest Control Tactics

A number of useful IPM techniques are outlined under each component and further described in Appendix A. These techniques are known to be effective and methods can be selected from each component as necessary to achieve the IPM goals and meet MS4 Permit requirements.

Additional information on the latest IPM techniques including management of new pests in the landscape can be obtained from local UC Cooperative Extension Advisors, UC IPM Regional Advisor, or the Statewide UC IPM Web Site at www.ipm.ucdavis.edu.

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Components of an Effective IPM Program

An IPM program is a long-term, multi-faceted system to manage pests (**Figure 1**). Use of pesticides is a short-term solution to pest problems, and should be used only when the other components fail to maintain the pests or their damage below an acceptable level. Successful IPM practitioners are knowledgeable about the biology of the plants and pests, and successful IPM programs primarily use combinations of cultural practices as well as a combination of physical, mechanical and biological controls.

Pest Identification

It is important to learn to identify all stages of common pests at each site. For example, if you can identify weed seedlings, you can control them before they become larger and more difficult to control and before they flower, disseminating seeds throughout the site. It is also important to be sure that a pest is actually causing the problem. Often damage such as wilting is attributed to root disease but may actually be caused by under watering or wind damage. Appendix A lists specific techniques that can be employed to identify pests.

Prevention

Good pest prevention practices are critical to any IPM program, and can be very effective in reducing pest incidence. Numerous practices can be used to prevent pest incidence and reduce pest population buildup such as the use of resistant varieties, good sanitary practices and proper plant culture. Examples of prevention include choosing an appropriate location for planting, making sure the root system is able to grow adequately and selecting plants that are compatible with the site's environment. Appendix A lists specific techniques that can be employed to achieve pest prevention.

Monitoring

The basis of an effective IPM Program is the development and use of a regular monitoring or scouting program. Monitoring involves examining plants and surrounding areas for pests, examining tools such as sticky traps for insect pests and quantitatively or qualitatively measuring the pest population size or injury. This information can be used to determine if pest populations are increasing, decreasing, or staying the same and to determine when to use a control tactic. Weather and other environmental conditions may also play a factor in whether a pest outbreak may occur so it is important to monitor temperature and soil moisture as well.

It is important to use a systematic approach when monitoring, for example you should examine leaves of a similar age each time you check for pests, rather than looking at the older leaves on some plants and younger ones on others. Randomly looking at a plant and its leaves does not allow you to track changes in pest population or damage over time.

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It is important to establish and maintain a record-keeping system to evaluate and improve your IPM program. Records should include information such as date of examination, pests found, size and extent of the infestation, location of the infestation, control options utilized, effectiveness of the control options, labor and material costs. Appendix A lists specific techniques that can be employed to in the monitoring of pests.

Injury Levels and Action Thresholds

In order to have a way to determine when a control measure should be taken, injury levels and action thresholds must be set for each pest. An injury level is the level of unacceptable damage. For example, the injury level for a leaf-feeding beetle may be set at 30% of the leaves being damaged. Action thresholds are the set of conditions required to trigger a control action. An example of this would be finding an average of 5 or more beetles on 10 shrubs in a location. Action thresholds are set from previous experience or published recommendations and based on expected injury levels. Injury levels are often set by the public's comments. Appendix A lists specific techniques that can be employed to determine injury levels and action thresholds.

Pest Control Tactics

Integrated pest management programs use a variety of pest control tactics in a compatible manner that minimizes adverse effects to the environment. A combination of several control tactics is usually more effective in minimizing pest damage than any single control method. The type of control that an agency selects will likely vary on a case-by-case basis due to the varying site conditions.

The primary pest control tactics to choose from include:

- Cultural
- Mechanical/Physical
- Biological
- Pesticide

Appendix A lists specific pest control techniques that can be employed.

Cultural Controls

Cultural controls are modifications of normal plant care activities that reduce or prevent pests. In addition to those methods used in the pest preventions, other cultural control methods include adjusting the frequency and amount of irrigation, fertilization, and mowing height. For example, spider mite infestations are worse on water-stressed plants, over-fertilization may cause succulent growth which then encourages aphids, too low of a mowing height may thin turf and allow weeds to become established.

Mechanical/Physical Controls

Mechanical control tactics involve the use of manual labor and machinery to reduce or

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eliminate pest problems using methods such as handpicking, physical barriers, or machinery to reduce pest abundance indirectly. Examples include hand-pulling or hoeing and applying mulch to control weeds, using trap boards for snails and slugs, and use of traps for gophers.

The use of physical manipulations that indirectly control or prevent pests by altering temperature, light, and humidity can be effective in controlling pests. Although in outdoor situations these tactics are difficult to use for most pests, they can be effective in controlling birds and mammals if their habitat can be modified such that they do not choose to live or roost in the area. Examples include removing garbage in a timely manner and using netting or wire to prevent bird from roosting.

Biological Controls

Biological control practices use living organisms to reduce pest populations. These organisms are often also referred to as beneficials, natural enemies or biocontrols. They act to keep pest populations low enough to prevent significant economic damage. Biocontrols include pathogens, parasites, predators, competitive species, and antagonistic organisms. Beneficial organisms can occur naturally or can be purchased and released.

The most common organisms used for biological control in landscapes are predators, parasites, pathogens and herbivores.

- Predators are organisms that eat their prey (e.g. Ladybugs).
- Parasites spend part or all of their life cycle associated with their host. Common parasites lay their eggs in or on their host and then the eggs hatch, the larvae feed on the host, killing it (e.g. Tiny stingless wasps for aphids and whiteflies).
- Pathogens are microscopic organisms, such as bacteria, viruses, and fungi that cause diseases in pest insects, mites, nematodes, or weeds (e.g. Bacillus thuringiensis or BT).
- Herbivores are insects or animals that feed on plants. These are effective for weed control. Biocontrols for weeds eat seeds, leaves, or tunnel into plant stems (e.g. goats and some seed and stem borers).

In order to conserve naturally occurring beneficials, broad-spectrum pesticides should be avoided since the use of these types of pesticides may result in secondary pest outbreak due to the mortality of natural enemies that may be keeping other pests under control (Figure 2).

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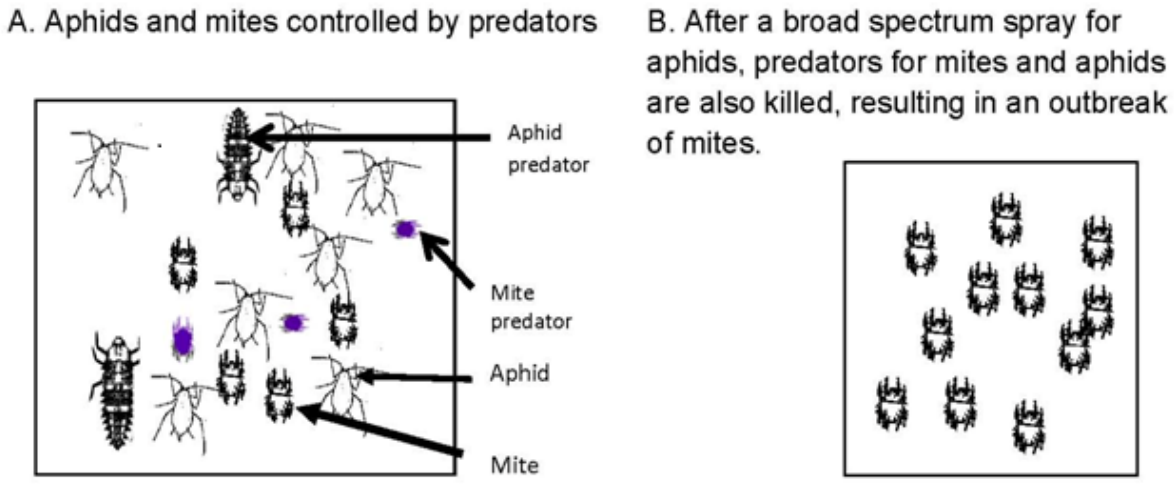


Figure 2 Example of Secondary Pest Outbreak Caused By Use of a Broad Spectrum Insecticide

Pesticide Controls

Any substance used for defoliating plants, regulating plant growth or preventing, destroying, repelling or mitigating any pest, is a pesticide. Insecticides, miticides, herbicides, fungicides, rodenticides and molluscides are all pesticides. Anything with an EPA or DPR registration number on the label is a non-exempt pesticide.

Pesticides should only be used when other methods fail to provide adequate control of pests and just before pest populations cause unacceptable damage. The overuse of pesticides can cause beneficial organisms to be killed and pest resistance to develop. When pesticides must be used, considerations should be made for how to use them most successfully. Avoid pesticides that are broad-spectrum and relatively persistent since these are the ones that can cause the most environmental damage and increase the likelihood of pesticide resistance. Always choose the most specific but least toxic to non-target organisms method.

In addition, considerations should be given to the proximity to water bodies, irrigation schedules, weather (rain or wind), etc. that are secondary factors that may result in the pesticide being moved off-site into the environment. Consideration should be made of the temporary loss of use of an area (application in a park may result in the area being sectioned off).

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Appendix A: Optional IPM Techniques to Integrate into IPM Program

The following practices are generally accepted to be effective IPM techniques. These procedures increase the long-term prevention and suppression of pest problems (insects, weeds, diseases, and vertebrates) with the minimum impact on human health, the environment, and non-target organisms. Emphasis is placed on improving cultural practices to prevent problems and utilize alternative control measures instead of broad spectrum pesticides. The following IPM techniques are divided into the following categories:

- General Pesticide Management Practices
- Pest and Symptom Identification
- Prevention
- Monitoring
- Injury Levels and Action Thresholds
- Pest Control Tactics

GENERAL PESTICIDE MANAGEMENT PRACTICES

- Maintain a complete inventory of all pesticides used and the use sites. This inventory should be updated annually.
- If pesticides are necessary, CAUTION-labeled pesticides should be considered before more toxic alternatives.
- Ensure that no banned or unregulated pesticides are stored or applied.
- Restricted use pesticides should only be used when no other alternatives are practical.
- Only small quantities of pesticides should be purchased eliminating the need for stockpiling.
- MSDSs should be regularly updated to reflect new pesticides or label changes to pesticides in storage.
- Pesticides should be used only according to label instructions.
- Weather conditions that could affect application should be considered. For example, wind conditions affect spray drift; rain may wash pesticide off of leaves.
- Pesticides should not be applied where there is a high chance of movement into water bodies; for example, they should not be applied near wetlands, streams, lakes, ponds or storm drains unless it is for an approved maintenance activity.
- In most cases, empty pesticide containers should be triple-rinsed before disposal. Particular information on the proper disposal of the pesticide and its container can be found on the label.

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- Pesticide equipment and containers should not be cleaned or rinsed in the vicinity of storm drains or other open water areas.
- Pesticides should be stored in covered areas with cement floors and in areas insulated from temperature extremes.
- Chemicals and equipment should be secured during transportation to prevent tipping or excess jarring.
- Pesticides should be transported completely isolated from people, food and clothing, for example, in the bed of the truck rather than in the passenger compartment.
- Pesticide equipment, storage containers and transportation vehicles should be inspected frequently.
- A plan for dealing with pesticide spills and accidents should be developed.
- Unless their safety is compromised, workers should immediately clean up any chemical spills according to label instructions and notify the appropriate supervisors and agencies.
- Pesticide applications on public property, which take place on school grounds, parks, or other public rights-of-way where public exposure is possible, should be posted with warning signs. The specific criteria for the signage can be found in FAC, section 12978. Pesticide applications by the Department of Transportation on public highway rights-of-way are exempt.

PEST AND SYMPTOM IDENTIFICATION

Insects, Mites, and Snails and Slugs

- Field personnel should be trained to recognize basic pests found in the landscape in the following groups: insects, mites, and mollusks.
- A licensed Pest Control Adviser can be on staff or hired to properly identify a pest and the symptoms caused by the pest.
- Field personnel can be trained to utilize disease life cycles to apply treatments when the organism can be controlled most effectively.
- Field personnel can be trained to distinguish between beneficial insects and actual pests found in the landscape (e.g. parasitizing wasps).
- Unknown samples can be submitted to the Orange County Agricultural Commissioner for identification by the county entomologist or plant pathologist.
- Abiotic or nonliving factors (wind, sunburn, air pollution, etc…) should be considered as possible causes of observed symptoms as well as biotic (living) factors.

Weeds

- Field personnel can be trained to identify common weeds in the landscape.
- Field personnel can be trained to utilize weed life cycles to properly control

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weeds such as controlling crabgrass utilizing a pre-emergent herbicide applied in mid-January.
- A licensed Pest Control Adviser can be on staff or contracted to properly identify the pest.

Diseases

- Field personnel can be trained to recognize common diseases or their signs/symptoms in the landscape.
- Field personnel can be trained to utilize disease life cycles to apply treatments when the organism can be controlled most effectively.
- Field personnel can be trained to recognize the difference between biotic and abiotic problems.
- Field personnel can be trained to understand how common diseases are spread throughout the landscape.
- Disease signs and symptoms can be sampled and submitted to the Orange County Agricultural Commissioner for identification by the county plant pathologist.
- A licensed Pest Control Adviser can be on staff or contracted to properly identify the pest.
- Photographs of disease signs and symptoms can be taken and compared to reference guides such as UC IPM's *Pests of Landscape Trees and Shrubs*.

Vertebrates

- Field personnel can be trained to recognize vertebrate pests and the damage they cause in the landscape.
- Field personnel can be trained to utilize vertebrate behavior to properly control the pest most effectively.
- Field personnel can be trained in vertebrate baiting and trapping.
- A licensed Pest Control Adviser can be on staff or contracted to properly identify vertebrate pest.

PREVENTION

Landscape Design Procedures

- Drainage, soil characteristics, water quality and availability should be considered during plant selection.
- Sun exposure, heat, and high temperature conditions should be considered during plant selection.
- Plant material should be selected based on adaptability to local climate conditions, such as those conditions common to a Mediterranean climate.
- Adequate space should be allowed for root growth, especially trees.

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- Nursery stock should be inspected and rejected if not healthy (injuries, diseased, circling roots/potbound, poor staking and/or pruning).
- Pest resistant species and cultivars should be selected.
- Plants with similar growth characteristics and irrigation requirements should be grouped together.
- Landscape design should match available irrigation technology to avoid excess water use and to minimize surface runoff.

Site Preparation and Planting Procedures

- Soil drainage properties can be assessed and compacted soils improved prior to planting.
- A soil analysis can be conducted to determine the chemical and physical properties of the existing soil and then appropriate amendments such as organic matter can be added.
- Irrigation should be installed as designed in order to avoid poor uniformity once plants are in place.
- Proper planting procedures should be followed for particular plant species to avoid planting too deeply or too shallow.
- Nursery tree stakes can be removed at planting and replaced with staking that allows trunk to flex; removing these stakes after 1 to 1.5 years.
- A soil probe or other soil moisture measurement device can be utilized to monitor soil moisture levels in existing root ball and surrounding soil during establishment period.

Water Management

- Plants should be examined weekly for symptoms of water stress and to assist in determining irrigation scheduling.
- Soil moisture can be monitored with a soil probe or soil moisture sensors to assist in scheduling irrigation.
- Evapotranspiration (ET) data or 'smart' clock technology can be utilized to schedule irrigation.
- Cyclic irrigation (short-multiple run times) can be employed to minimize surface runoff.
- Low precipitation sprinklers or low-volume systems can be utilized to reduce surface runoff.
- Systems should be inspected monthly to check for leaks, broken pipes, and clogged or broken sprinkler heads.
- Adjust sprinklers to avoid application of water directly to the trunk of trees (can promote disease) or on to concrete surfaces where it can enter storm drains.
- A hotline, email, or other dedicated method can be established for citizens to

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report leaks and broken sprinkler heads

Fertilizing Procedures

- To avoid nutrient losses below the root zone, fertilize only when plants are actively growing.
- Fertilizer should not be applied within 48 hours of a rain event to avoid losses below the root zone and in surface runoff.
- Soil analyses can be conducted in order to determine existing nutrient levels in the soil prior to fertilizing.
- Turf grass fertilizer maintenance schedules can be based on UC recommendations found online at UC Guide for Healthy Lawns: http://www.ipm.ucdavis.edu/TOOLS/TURF/MAINTAIN/fertilize.html
- Sports turf grass fertilizer maintenance guidelines can be based on UC recommendations found in *Establishing and Maintaining the Natural Turf Athletic Field (UCR ANR Publication Number: 21617)*.
- Overfertilization, especially of trees and shrubs, should be avoided to ensure plant growth is not excessively succulent making it more susceptible to pest infestations.
- Off-target fertilizer applications or spills should be cleaned up immediately by sweeping up and applying to landscape or turf or replacing in spreader or bag to ensure material does not enter storm drains.

Pruning Procedures

- Damaged or diseased wood should be regularly pruned from landscape plants.
- Trees should be pruned according to standards set forth by a professional tree care organization such as the International Society of Arboriculture.
- Plants too large for a space should be replaced instead of pruning them severely.
- Unnecessary pruning should be avoided as wounds are entry sites for decay and disease organisms.
- The age and species of the plant should be taken into account when determining the time of year to prune. For example, eucalyptus should be pruned in December and January when long-horned beetles are not active.
- Tree height reduction should be discouraged. When deemed necessary by a licensed arborist, the crown reduction method approved by a professional tree care organization should be utilized. Topping should not be done to reduce tree size.

MONITORING FOR PESTS AND PROBLEMS

Insect/Mollusk Monitoring Procedures

- Monthly visual inspections of plants for insects, mites, snail and slug damage,

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and recording results is an effective method for tracking changes and easy recall of data.

- Yellow sticky traps can be utilized to assess populations of insects.
- Insects can be dislodged from plants by shaking over a collection surface usually consisting of a clipboard with a white sheet of paper.
- If available for a particular insect, pheromone-baited traps can be utilized.
- Soil-dwelling turf insects can be brought to the surface for monitoring by flushing a specific area of soil (i.e. 2' x 2' grid) with plain water or a soapy water mixture.
- The amount of honeydew (aphids) and frass (caterpillars) present can be utilized as an indicator of population levels.

Weed Monitoring Procedures

- Landscapes can be inspected at least 4 times a year (early winter, early spring, summer and early fall) for weeds in order to determine if and when a weed problem exists.
- Site surveys can be utilized to record the location, date, and severity of weed problem for an effective method of tracking changes and easy recall of data.
    - The number of weeds encountered at periodic intervals (e.g. every 1 to 2 feet) can be counted and recorded along a straight line transecting a landscaped, area or within a selected area, for example 4 sq. ft. samples done in random places in a bed or turf area.

Disease Monitoring Procedures

- Landscapes should be regularly checked for conditions, such as overwatering and injuries, which promote disease.
- Landscapes should checked monthly for disease symptoms and signs. Disease prone plants should be checked more frequently.
- Landscape inspections should note date when disease signs and symptoms were first noticed and the current environmental conditions and soil moisture levels as an effective method of tracking changes and easy recall of data.

Vertebrate Monitoring Procedures

- Landscapes can be regularly inspected for vertebrate presence either by damage caused by animal, actual animal sightings, and/or droppings.
- Records can be kept of the absence or presence of actual vertebrates, the damage caused, and/or the presence or absence of droppings.
- Maps can be created and updated at least twice a year, recording areas of high vertebrate damage or signs (such as gopher mounds).

INJURY LEVELS AND ACTION THRESHOLDS

Insect/Mollusk Thresholds and Guidelines

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- Insect tolerance levels can be established based on the public's acceptance of damage to the landscape or a certain level of nuisance pests (i.e. ants), the actual plant species in the landscape, and long-term monitoring and knowledge of pests causing the damage.
- Thresholds can be based on levels where reasonable control of the pest can be achieved with minimum impact on the environment.
- Insect monitoring records can be utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of aphids on a rose garden at City Hall is low, while in a native shrub border it might be considerably higher.

Weed Thresholds and Guidelines

- Weed tolerance levels can be established based on public safety or the public's acceptance and the resources available to manage the landscape at that level.
- Weed monitoring records can be utilized to rank the percentage of the landscape area infested (none, light, moderate, heavy, or very heavy) with weeds.
- Public areas can be ranked according to high, medium, or low level of weed control and management conducted according to levels set for each rank (see Appendix B)

Disease Thresholds and Guidelines

- Disease tolerance levels can be established based on the public's acceptance and the resources available to manage the landscape at the level required.
- Disease monitoring records can be utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of powdery mildew on roses at City Hall is much lower than the threshold for its presence on Euonymus in a parking lot at a city sports park.

Vertebrate Thresholds and Guidelines

- Vertebrate tolerance levels can be established based on public safety, the public's acceptance and the resources available to manage the landscape at the level required.
- Vertebrate monitoring records can be utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of gopher mounds in a sport field is zero, while in a native shrub border it might be two before a trapping strategy is implemented.

PEST CONTROL TACTICS

Insect/Mollusk Management Methods

Cultural/Mechanical/Physical Control Methods

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- Sticky barriers can be applied to trunks of trees and large shrubs to prevent ants and other wingless invertebrates from plant canopies.
- Small insect infestations can be removed by pruning infested plant parts.
- Copper bands can be installed around base of trees or planting areas where snail and slug infestations are prevalent.
- Plant canopies can be thinned to increase light penetration to expose certain soft-bodied insects (soft-scale) as well as snails and slugs to heat.
- Strong streams of water can be used to dislodge insects such as aphids and whiteflies, from leaves.
- The use of plants that snails and slugs use for shelter should be avoided.
- Avoid irrigating between 5pm and 5am when moisture remains on plant material for several hours.

Biological Control Methods

- Persistent broad-spectrum pesticides should be avoided, especially if biological control of an insect has been established by UC researchers. Examples include parasitoid wasps controlling Eugenia Psyllids, Giant Whitefly, and Ash Whitefly.
- Natural predators (beneficial insects) can be augmented with purchases of additional predators from commercially available resources.

Pesticide Control Methods

- The most selective, rather than broad-spectrum, pesticide should be used.
- If available for controlling a particular insect, biological and botanical pesticides should be selected.
- Insecticidal soaps can be utilized to control infestations of soft-bodied insects such as aphids, thrips, and immature scales.
- Horticultural oils (neem oil and narrow-range refined oils) can be utilized to control infestations of soft-bodied immature and adult insects such as aphids, scales, and whiteflies.
- Pesticides should only utilized when the potential for impacts to the environment, especially water quality, are minimized.
- Equipment should be calibrated prior to the application of the insecticide to avoid excess material being applied to the landscape environment.
- Applicators should be trained to not apply pesticides to hard surfaces and to not allow any pesticide to enter the storm drain system.
- Spot treatments should be utilized rather than broadcast methods.
- Insecticide/fertilizer combinations should only used if it is appropriate timing for BOTH the insecticide application and the fertilizer application.

Weed Management Methods

Cultural, Mechanical, and Physical Control Methods

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- Timers can be set to avoid overwatering as weeds establish in areas where soil moisture is excessive.
- Drainage can be managed to avoid wet areas.
- Weeds can be removed from a site prior to planting.
- Mower height can be adjusted to turf species and time of year.
- Mower should be washed after mowing a weedy site.
- Hand-pulling, mowing, trimmers/brushcutters, flaming, hoeing, and rototilling around landscape plants should be the main methods utilized to control annual weeds and young perennial weeds.
- Soil solarization can be utilized to control some annual and perennial weed species.
- Bare soil areas can be covered with a thick layer of mulch to suppress weeds and conserve soil moisture.
- Soil, mulch, and plant material should be weed-free before it is introduced into the landscape.

Pesticide Control Methods

- Spot treatments can be utilized rather than broadcast methods.
- Herbicide/fertilizer combinations should only used if it is appropriate timing for BOTH the herbicide application and the fertilizer application.
- Herbicides should be utilized according to established thresholds (see Appendix B).
- Organically acceptable herbicides (shown to be effective through science-based research) should be used where appropriate.
- Herbicides can be applied to the stage of weed growth most susceptible to the chemical.
- Equipment should be calibrated prior to the application of the herbicide to avoid excess material being applied to the landscape environment.

Disease Management Methods

Cultural, Mechanical, and Physical Control Methods

- Localized areas of diseased plants should be pruned out and disposed of.
- Pathogen-infested plant parts can be removed from the soil surface area to reduce certain pathogens (e.g. Camellia Petal Blight).
- Pruning tools can be sterilized (e.g. a diluted bleach solution) between plants to prevent the spread of pathogen to other plants.
- Proper irrigation and fertilization can be maintained to prevent plant stress, waterlogging, and subsequent susceptibility to disease.
- Soil solarization can be utilized to control soil pathogens in annual beds where it

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is most effective.

- Mulch can be kept at least 6" from base of plants to avoid excessive moisture around crown possibly resulting in crown rots and is no deeper than 4"
- Disease-prone plants can be replaced with non-susceptible species.

Pesticide Control Methods

- Preventative fungicides and bactericides should only used where diseases can be predicted from environmental conditions and applied prior to infection or the appearance of symptoms.
- Synthetic fungicides should be used sparingly in the landscape and only in high visibility areas in order to minimize development of resistance.
- Organic fungicides and bactericides should be utilized in combination with cultural, mechanical, and physical control methods in order to improve their effectiveness.
- Copper-based fungicides should only be utilized in situations where its entry into surface runoff and storm drains is virtually impossible and after consultation with PCA and IPM coordinator.
- Mycopesticides, commercially available beneficial microorganisms, should be used where appropriate.
- Fungicides classes can be rotated to avoid resistance.

Vertebrate Management Methods

Cultural and Physical Control Methods

- Groundcovers can be maintained such that they do not harbor rats.
    - Shrubs pruned at least 1 foot from the ground (rats).
    - Sources of drinking water removed (leaky faucets, puddles).
    - Trash cans have lids and are emptied daily (rats).
    - Screens or other barriers installed under structures that have a space between soil and floor (rabbits).
- Habitat modification, based on pest biology can be used to reduce shelter. Trapping can be used for gophers when safe and practical.
- Kill traps used for ground squirrels and rabbits, should be checked daily, and put in places not accessible by children or non-target animals.
- Gas cartridges can be used for ground squirrels according to UC recommendations.

Pesticide Control Methods

- Anti-coagulant baits can be used and applied according to label and UC recommendations.
- Bait should be applied in a manner that non-target animals do not have access to

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it.

- Restricted use pesticides should only be applied by or under the direct supervision of an individual with a qualified applicators certificate (QAC). To receive a QAC, a person must take a test administered by Department of Pesticide Regulation (DPR). To obtain test materials, test schedules, and an application, see http://www.cdpr.ca.gov/docs/license/liccert.htm.

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Appendix B

Ranking public areas for weeds (or other pest) management:

Areas ranked as **HIGH** may include areas that the public sees and expects to be well-maintained. Examples are entrances to public buildings such as city hall and libraries.

These areas are allowed to use pesticides based on established thresholds.

Areas ranked as **MEDIUM** may include areas the public sees but does not expect a high level of maintenance. Examples are landscaped areas away from the entrance, recreational and picnic areas. These areas can tolerate a higher lever of weeds.

*These areas are allowed to use pesticides but the threshold is much higher and pesticides are used infrequently and only after consultation with IPM coordinato*r.

Areas ranked as **LOW** may include areas the public rarely sees or does not expect a high level of maintenance. Examples are medians, landscaped areas in parking lots, wildlands. These areas can tolerate a higher lever of weeds.

These areas are not allowed to use pesticides except in extreme cases and only after consultation with IPM coordinator.

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Example Catch Basin Cleaning Log

Catch Basin Cleaning Log			
Date	Location	Number of Catch Basins Cleaned	Total Amount Removed
Notes:			

Example of Completed Catch Basin Cleaning Log

Catch Basin Cleaning Log			
Date	Location	Number of Catch Basins Cleaned	Total Amount Removed
7/1/13	Street #1	20	55 cu. ft.
	Intersection #1	10	
	Street #2	5	
Notes:			

Drainage Inlet/Catch Basin Information		
Location		
Street:	Cross Street:	Side (N,S,E,W)
Distance:	Direction (N,S,E,W):	Inlet #:
Map #:	Grid:	
Condition		
Length of Opening:	Height of Opening:	Stencil Legible (Y/N):
Bicycle Bars (Y/N):	Grate Size:	Inlet Protection Bar (Y/N):
Treatment Control BMP (Y/N):	Type of BMP:	
Repairs Required:		

Illicit Connection Investigations Guidance

Field Screening Techniques

If evidence of an illicit discharge is detected, as described in Section 2, and the source does not appear to be evident or above ground, investigations will be conducted to determine if the discharge is being conveyed through an illicit connection. A good source of information includes *Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems* (EPA/600/R-92/238.1993, Pitt et al). General guidance follows below. These techniques can also be used if a Permittee elects to survey sections of their system for illicit connections.

Document Research

Maps of drainage facilities can be reviewed to locate upstream connections and drainage basins as an initial step to locate potential illicit connections. Other records, such as connection permits and discharge permits, can also be reviewed to determine if legal connections may be the source.

Physical Inspections

Catch basins, manholes and other facilities that can be safely investigated from the surface should be physically checked for evidence of connections. This may be a hard pipe connection, or could be a hose or other conveyance that directs a discharge into the storm drain facility. Identification of connections that exhibit evidence of suspected illicit discharges during routine site inspection (e.g., industrial, commercial or construction). Investigation is conducted to determine if the discharge is being conveyed through an illicit connection when evidence of illicit discharge is detected, and the source does not appear to be evident or above ground.

Facilities that are large enough for personnel to enter can also be physically inspected, however, entry into facilities requires strict adherence to health and safety procedures, including confined space entry procedures. In general, a space is “confined” if it is not intended for human occupancy, has limited openings for entry or exit, and has insufficient natural or mechanical ventilation. Information on safety procedures can be found in many documents, including the *Occupational Safety and Health Guidance Manual*, National Institute for Occupational Safety and Health; *OSHA Safety and Health Standards 29 CFR 1910 (General Industry)*, US Department of Labor, and *Title 8 of the California Code of Regulations, General Industry Safety Order*.

Dye Tests

Dye tests can reveal illicit connections in areas where storm drain flows are unexplained and the Permittee has access to suspect facilities. Typical dye tests consist of the addition of fluorescent dye to a floor drain or waste line from a domestic, commercial or industrial process, followed by monitoring for the dye in downstream storm drains. Permittees should conduct dye testing facility by facility (in each area where unexplained flow exists) until all facilities in the area are tested.

Smoke Tests

Smoke tests can reveal if illicit connections exist, and can reveal their source. Storm drains are sealed via sandbags or other sealing devices (plugs, etc.) and smoking incendiary devices are ignited upstream of the seal. Simultaneous inspections inside area facilities should reveal illicit connections even in the

absence of flow. As illicit discharges are intermittent, smoke tests offer real advantages over other types of illicit discharge source identification methods. However, as many legitimate connections to a storm drain may exist (roof drains, street drains, etc.) smoke may be observed extensively. This may cause some illicit connections to be missed, and create a problem with area businesses and residents as excessive smoke begins to enter private property.

T.V. Inspections

T.V. inspections can reveal if illicit connections exist, but cannot be used to view up the connection to determine the source. Robotized or otherwise mobile television cameras allow visual inspection of storm drains (pipes) too small or dangerous for personnel to enter. Although an excellent method of identifying and documenting illicit connections, T.V. inspections have high costs unless the equipment is already owned or can be borrowed from neighboring agencies.

Guidance Source

Los Angeles County Model Stormwater Quality Management Program, 2003.

Illicit Discharge Investigation and Elimination Guidance

Introduction

Once illicit discharges/disposal are detected and identified, they must be eliminated. Sometimes the source of the spill or discharge/disposal is apparent. The incident can be removed through voluntary cleanup/termination or enforcement procedures, and steps can be taken to prevent its recurrence. These prevention methods can include education and outreach materials for residents and businesses, preventive maintenance practices for infrastructure, vehicles and equipment or additional enforcement.

When the source of the discharge is not apparent, further investigation will be necessary to eliminate it and prevent it from recurring. The following discusses methods that can be used to document the incident, determine the nature of the material, and investigate the source.

Advance Planning

An effective investigation program requires good advance planning. Sufficient staff should be trained to conduct investigations so that qualified staff are available whenever investigations are necessary. Staff should become familiar with illicit discharge investigation and sampling procedures. General guidance follows below to assist with overall planning, but should not be considered complete for proper sampling quality assurance purposes.

Equipment

Appropriate equipment for field investigations may include:

Table 1: Typical Equipment for Investigations

Equipment Type	Equipment
General	Inspection checklist
	Field data log book
	Camera
	Tape measure
	Storm drain system map
	Flashlight
Flow measurement	Ping pong ball or other light floatable
	Stopwatch
Laboratory	Graduated container
	Temperature/pH/conductivity (EC) probe
	Field test kits (e.g., Lamotte test kit)
	12 1-liter amber glass sample bottles
	12 1-liter HDPE sample bottles
	Cooler with ice for sample preservation
	Gloves
	Splash goggles/safety glasses
	Deionized water in wash bottle
First Aid	First aid kit

Data Collection

Before entering the field, the inspection crew should locate information such as the following on a storm drain/street map for areas that will be investigated:

- All known or suspected pollutant generating activities
- Locations of NPDES dischargers
- All locations where storm drains enter open channels
- Catch basins and storm drain manholes

Visual Observation

Visual observation of the storm drain system and/or of activities on the surface can provide information on the source of illicit discharges. It is the simplest method to begin with and the least costly. Evidence of illicit discharges may only consist of visual observations because most illicit discharges are intermittent and will probably not be flowing when inspected. A field inspection crew should investigate the surface drainage system in the vicinity of suspected illicit discharges. This may include accessible areas in the public right-of-way adjacent to residences and businesses, catch basins, open channels near known points of discharge, and upstream manholes.

Photos of visual observations should be taken to aid subsequent data analysis and follow up planning. The following types of visual observations should be recorded on an investigation checklist, such as the one attached:

- Location
- General site description
- Amount, appearance of discharge/disposal
- Stains
- Structural cracking and corrosion
- Vegetative growth
- Nearby facilities with poor outside housekeeping practices
- Pipes/hoses connected to/directed toward drainage system

If the source of the discharge is determined, appropriate methods should be used to eliminate it through voluntary cleanup/termination or enforcement procedures, and steps should be taken to prevent its recurrence.

Sampling and Testing

If flow is observed, and the source of the discharge is not apparent, the crew should collect a sample and measure flow. Several tests should be conducted to determine the nature of the material. This can be compared to records of local facilities and possible pollutant generating activities as an aid in determining the possible sources of the flow.

The sample should be measured for pH, temperature and conductivity (EC). If any of these parameters are abnormal, or strong odors or flow discoloration are detected, the sample should be analyzed. This can be done with a field test kit, which will detect the presence of copper, phenols, detergents, and chlorine. Findings should be recorded on the inspection checklist.

If visual observations are abnormal and/or the field tests detect high concentrations of any constituent, the crew should consider collecting samples for laboratory analysis. The laboratory can usually supply properly cleaned sample bottles and specify either amber glass or plastic (HDPE) bottles depending on the analyses required. If there is enough flow, the field crew should fill several of each type of bottle to obtain enough sample volume for a range of analyses. If there is a limited quantity or sampling is difficult, the field crew should collect as much sample as possible so that the laboratory can run a limited set of analyses. The samples should be placed in a cooler filled with ice and transported to the lab(s) on the same day. Arrangements should be made prior to the field inspection with an analytical laboratory capable of performing the required analyses.

The laboratory analyses run on each sample should be carefully considered. Given the potential high cost for laboratory work, it is prudent to limit the number of analytical parameters (or analytes) tested for each sample. Tests may be selected based on the findings of indicator analyses, visual observations, field tests, and information collected about the types of materials processed, stored and/or spilled within each drainage area.

Guidance Source

Los Angeles County Model Stormwater Quality Management Program, 2003.

Insert City Seal

ILLICIT CONNECTION/ ILLICIT DISCHARGE INVESTIGATION REPORT

Response Time:
☐ 1-6 hrs. ☐ 13 hrs. ☐ 24 hrs. ☐ 48 hrs.

RESPONSE

Date:	Time:	Inspector:

INVESTIGATION

Location/ Address:

Reason for Investigation: ☐ Complaint ☐ Discharge/Spill Response ☐ Visual Monitoring
☐ Other: _____

Type of Material: ☐ Hazardous ☐ Wastewater ☐ Oil/Grease ☐ Soil/ Sediment ☐ Trash ☐ Sewage
☐ Fuel (Gas/Diesel) ☐ Chemicals ☐ Other _____

Estimated Quantity: ☐ Gallons ☐ Lbs.

Entered Storm Drain System: ☐ Yes ☐ No Storm Drain Location: _____	Entered Receiving Waters: ☐ Yes ☐ No Name of Receiving Water: _____

Observations

Field Testing: ☐ Yes ☐ No Details:	Sample Collected: ☐ Yes ☐ No Details:

Direct/ Constructed Connections Found: ☐ Yes ☐ No
Details:

RESPONSIBLE PARTY

Name:

Address:	Phone/ email:

Repeat Violation? ☐ Yes ☐ No

OUTREACH MATERIAL

Outreach Material Distributed: ☐ None ☐ General Information ☐ BMP Brochure ☐ Other _____

ENFORCEMENT

Enforcement: ☐ None ☐ Written Warning ☐ Notice of Violation ☐ Citation/Infraction ☐ Cease and Desist Order

Other Actions

FOLLOW-UP VISIT

Date:	Time:	Inspector:
Discharge Stopped? ☐ Yes ☐ No		Proper Clean-Up Action Taken: ☐ Yes ☐ No

Further Action Required: ☐ Yes ☐ No
Details:

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ILLICIT CONNECTION/ ILLICIT DISCHARGE REPORTING & RESPONSE

Received by:	
Date:	Time Received:

REPORTING PARTY	
Name:	Anonymous: ☐ Yes ☐ No
Address:	Phone/email:

INCIDENT	
Date:	Time:
Location/ Address:	
Land Use: ☐ Residential ☐ Commercial ☐ Industrial ☐ Public	
Type of Material: ☐ Hazardous ☐ Wastewater ☐ Oil/Grease ☐ Sediment ☐ Trash ☐ Other _____ ☐ Unknown	
Estimated Quantity: ☐ Gallons ☐ Lbs.	
Entered Storm Drain System/ Receiving Waters? ☐ Yes ☐ No	
Description / Details	
Agencies Contacted: ☐ Office of Emergency Services ☐ HazMat Team ☐ LA County ☐ Regional Board ☐ Other	
Source Investigation Conducted? ☐ Yes ☐ No	Source Identified? ☐ Yes ☐ No
Direct/ Constructed Connections Found? ☐ Yes ☐ No	

ALLEGED RESPONSIBLE PARTY	
Name:	
Address:	Phone/ email:
Vehicle License No:	

ACTION & CLOSURE	
Referred to:	Date:
Department:	Phone/ email:
Actions Taken/ Details	

Date Closed:

Spill Prevention Coordination

Procedures

This attachment discusses spill prevention coordination procedures that identify:

- Divisions or sections responsible for responding to reports of spills
- General and specific spill response procedures including responsible division or section
- Spill response training activities
- Activities conducted to improve spill response procedures and equipment

Divisions or Sections Responsible for Responding to Reports of Spills

Identify the divisions or sections responsible for responding to reports of spills and note divisions or sections that respond to specific types of spills such as hazardous materials spills or sewage spills. Also indicate the specific field staff who respond to spills and the level of support they provide to lead emergency response agencies and source of spill investigations.

General and Specific Spill Response Procedures

Describe or reference general spill response procedures involved in responding to complaints and identifying spills through inspections. Include the spill response process from the spill identification stage through clean up and report preparation. Copies of the forms and reports prepared to document spills should also be included. Specific procedures for hazardous materials spills, floods, and sewage spills should be referenced. Contractor support for spill events, if applicable, should also be noted.

Spill Response Training Activities

Provide an overview of all spill response training that is conducted within the various divisions and sections of the agencies.

Activities to Improve Spill Response Procedures and Equipment

List all activities conducted within the implementing agency to improve spill response procedures and update equipment. Explain how improvements are identified, prioritized, and implemented. Include a schedule of how often spill response procedures and equipment are evaluate.

Spill Investigation, Containment and Cleanup

Investigation

Depending on the location of the spill and the type of material, the appropriate department/ agency should be notified. This may include:

- Storm drain maintenance, if the spill reaches the storm drain system
- Street and road maintenance, if the spill is in the public right-of-ways
- Sewer system maintenance, if the material is from the sewage system
- Industrial waste inspection, if the material is from industrial facilities
- Fire Departments/"first responders," if the material may be hazardous
- Contractors for hazardous materials, if the material is hazardous

These departments/agencies should determine the nature of the material and the extent of the spill. If any agency determines there is a chance that the spill involves hazardous materials, then the local Administering Agency will be notified. An example of spill investigation procedures is depicted in Figure D-1. Reporting procedures for hazardous substances are discussed further in Section 5 of this Illicit Connection/Illicit Discharge Elimination model program.

Containment and Cleanup

Once the nature and extent of the spill is determined, the appropriate departments and field superintendents will be notified to contain and clean up the spill. The three types of cleanup scenarios are (1) hazardous, (2) wastewater, and (3) other non-hazardous materials.

Hazardous

Handling procedures regarding releases of hazardous or potentially hazardous substances into the environment are covered in a number of federal and state regulations, including: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); Superfund Amendments and Reauthorization Act (SARA); Resource Conservation and Recovery Act (RCRA); and multiple bills codified under Division 20 of the California Health and Safety Code. These procedures are well established and are practiced by local hazardous materials response teams - generally a local Fire Department.

Material determined to be hazardous will be contained by the appropriate hazardous material response team. The team will contact an approved contractor for cleanup. Details are contained in the local *Emergency Response Procedures* manual.

Wastewater

Field crews responding to a sewage spill or overflow should contain the spill to prevent entry of the sewage into the storm drain system or natural watercourse. This will involve a coordinated effort between the sewer, street, and storm drain maintenance crews.

To the maximum extent possible, sewage should be prevented from entering the storm drain system by covering or blocking storm drain inlets and catch basins or by containing or diverting the overflow away from open channels and other storm drain fixtures (using sandbags, inflatable dams, etc.).

In the event that raw sewage enters a storm drain catch basin, where possible the sewage should be vacuumed or pumped out of the catch basin. If a sewage overflow enters a storm drain channel, where possible the downstream channel area should be blocked, flushed with potable water and the captured water pumped to a nearby sewer manhole. Any time a sewage spill enters the storm drain system and has the potential to reach coastal waterways, the local agency and L.A. County Dept. of Health Services, Bureau of Environmental Protection must be notified (323) 881-4147.

Once the spill is contained, it should be removed and the area disinfected. Every effort should be made to ensure that the disinfectant is not discharged to the storm drain system, using methods such as those described above.

Other Non-hazardous Materials

Non-hazardous materials should generally be removed by appropriate crews with knowledge of or jurisdiction over the location of the spill, as indicated in Section D.1. Because the situations and materials will vary widely, procedures will vary as well.

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All materials should be prevented from entering waterways to the maximum extent possible. Many materials in sufficient quantities can deplete the oxygen level in receiving waters, or smother benthic communities. Typical examples of these materials include landscape waste, milk, flour, and many other organic liquids and solids or fine powders. These materials should generally be removed by first collecting and/or sweeping up all solids and disposing them in a landfill or other approved location. Liquids should be diverted to an area away from waterways where they may be removed with a vacuum truck or can soak into the ground.

Guidance Source

Los Angeles County Model Stormwater Quality Management Program, 2003.

Watershed Management Program Appendix 3

A-3-2 Example Vacant Lot Ordinance

For the TSS Reduction Strategy

EXAMPLE VACANT LOT ORDINANCE

For the TSS Reduction Strategy (City of Whittier Municipal Code § 8.08.026)

8.08.026 VACANT LOTS

For the purpose of this section, a vacant lot shall mean any property which is either undeveloped or has an existing on-site building/structure that is either abandoned, vacant and/or is un-leased by the property owner for more than thirty days.

All vacant lots within the city (except those that do not immediately front onto a public street, are less than five feet wide in width or depth, are identified on the city's zoning map as "open space," are used as designated habitat conservation or for active agricultural production) shall be maintained in accordance with the following provisions of this section within thirty days of becoming vacant:

A. Unimproved Vacant Lot Types. Lots that are unimproved due to never having been developed or having become vacant subsequent to the removal of any pre-existing buildings, structures or impervious surfaces shall be subject to the approval of a vacant lot landscape and irrigation plan by the director of parks, recreation and community services and shall be improved and maintained at all times in accordance with the following provisions:

1. Lots That Are Less Than One-Half Acre. For unimproved vacant lots that are less than one-half acre in size (21,780 square feet), the entire lot shall be improved and maintained in the following manner:

    a) The property owner shall landscape the entire lot using drought tolerate or xeriscape material that requires little to no water after the first three years of growth. Durable, high quality, synthetic turf may also be used as an alternative. The landscape material selected shall be reviewed and approved to the satisfaction of the director of parks, recreation and community services prior to installation, per Section 13.42.120 of the Whittier Municipal Code. The ground cover shall be maintained in good condition at all times.

    b) The lot shall be improved with an operable automatic irrigation system for the ground cover which shall be installed and maintained in good condition by the property owner at all times.

    c) The lot shall be maintained free of litter, weeds, graffiti, debris, including the stockpiling of any material, at all times. Any on-site litter, weeds, debris or stockpiling of material shall be immediately removed by the property owner, upon discovery. The property owner or their designated representative shall be responsible for inspecting the property at reasonable intervals or take other steps to reasonably ensure that no litter, weeds, graffiti, debris or material stockpiling collects or is maintained on the lot.

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d) Any dead or dying vegetation as well as any broken, malfunctioning or non-functioning irrigation components on the lot shall be replaced by the property owner within seventy-two hours of their discovery or notification. The property owner shall be responsible for inspecting the property at reasonable intervals, or take other steps to reasonably ensure that there is no dead or dying vegetation nor any broken, malfunctioning or non-functioning irrigation components on the lot.

e) At the discretion of the director of parks, recreation and community services the standards contained in Section 8.08.026(A)(2) (Lots that are one-half acre or greater) may be applied to vacant lots that are one-half acre or less if deemed appropriate to mitigate any one or more of the following circumstances:

i. To adequately secure the property from illegal dumping or other such illicit activities.

ii. Because of public safety concerns or hazards associated with the property.

iii. A declared state or regional drought.

2. Lots That Are One-Half Acre or Greater. For unimproved vacant lots that are one-half acre (21,780 square feet) or greater in size, the entire lot shall be improved and maintained in the following manner:

a) The property owner shall provide a minimum five-foot wide landscape planter adjacent to all public rights-of-way (except those property lines located immediately adjacent to an alley) that abut their vacant lot.

b) All landscape planters shall be improved with an operable automatic irrigation system. The landscape material selected shall consist of drought tolerate or xeriscape material that requires little to no water after the first three years of growth. Durable, high quality, synthetic turf may also be used as an alternative. The landscape material selected shall be reviewed and approved to the satisfaction of the director of parks, recreation and community services prior to installation, per Section 13.42.120 of the Whittier Municipal Code. The ground cover shall be maintained in good condition at all times.

c) All on-site landscaping and irrigation shall be maintained in good condition at all times by the property owner of the lot. Any dead or dying landscaping shall be replaced by the property owner within seventy-two hours of their discovery or notification, including any broken, malfunctioning or non-functioning irrigation components. The property owner shall be responsible for inspecting the property at reasonable intervals or take other steps to reasonably ensure that all of the landscaping and irrigation on the lot is maintained in good condition and there are no broken, malfunctioning or non-functioning irrigation components on the lot.

d) A six-foot high, view obscuring, decorative perimeter barrier shall be erected around the entire vacant lot, with a minimum five-foot wide perimeter

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landscape planter in front of the fencing. In circumstances where the director of parks, recreation and community services finds that a higher perimeter barrier is warranted for adequate security of the site and/or because of unusual topographical circumstances associated with the vacant lot, the perimeter barrier may be constructed up to a maximum of eight feet high. All perimeter barriers shall include a gravel pathway leading to a security gate to provide accessibility to the interior of the lot for the police department or other emergency personnel. A key or security code for the gate shall be provided to the Whittier Police Department by the property owner upon installation and shall be kept up-to-date at all times.

e) All decorative, view obscuring, perimeter barriers shall consist of either painted wood, redwood, woodcrete, green vinyl chain-link fencing with a green windscreen securely attached (along the interior of the fence), or any other durable, aesthetically attractive, material deemed acceptable to the director of parks, recreation and community services. On corner or reversed corner lots, all fencing shall comply with Section 18.64.050 for visual safety.

f) All perimeter barriers shall be maintained in good condition at all times by the property owner. Any on-site graffiti shall be removed by the property owner within seventy-two hours of its discovery or notification. The property owner shall be responsible for inspecting the property at reasonable intervals.

B. Improved Vacant Lots. Vacant lots improved with existing on-site buildings or structures that are vacant, abandoned, or un-leased for thirty days or more (as determined by the director of parks) shall be maintained by the property owner as follows:

1. All existing on-site landscaping and irrigation shall be maintained in good condition at all times and in accordance with the provisions contained in Chapters 8.08, 8.22 and8.24 of this code, including any conditions of approval applied to the site as part of the approved vacant lot landscape and irrigation plan under Section 8.08.026(C).
2. Any dead or dying vegetation as well as any broken, malfunctioning or non-functioning irrigation components for the lot shall be replaced by the property owner within seventy-two hours of their discovery or notification. The property owner or their designated representative shall be responsible for inspecting the property at reasonable intervals, or take other steps to reasonably ensure that there is no dead or dying vegetation nor any broken, malfunctioning or non-functioning irrigation components on the lot.
3. The lot shall be maintained free of litter, weeds, and debris, including the stockpiling of any material, at all times. Any on-site litter, debris or stockpiling of material shall be immediately removed by the property owner, upon discovery or notification. The property owner or their designated representative shall be responsible for inspecting the property at reasonable intervals, or take other steps to reasonably ensure that no litter, weeds, graffiti, debris or material stockpiling collects or is maintained on the lot.

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4. All on-site structures shall be maintained in good condition at all times. Damage to any on-site buildings or structures shall be abated within ten days by the property owner upon discovery. An alternative abatement period shall be required, if deemed necessary by the building official, to protect the public health, safety and welfare.
5. The lot shall be adequately secured at all times to prevent illegal dumping, criminal activity, vandalism, graffiti, on-site loitering by the homeless and any/all other attractive nuisances to the satisfaction of the director of parks, recreation and community services and the chief of police.

C. Vacant Lot Landscape and Irrigation Plan. Prior to the issuance of a demolition permit on any lot in which the construction of a new building, structure, parking lot, or impervious surface will not commence within thirty days after demolition, the property owner shall submit a vacant lot landscape and irrigation plan for review and approval of the director of parks, recreation and community services (with the appropriate plan check fees). The director of parks, recreation and community services may impose any reasonable conditions of approval on the vacant lot landscape and irrigation plan to ensure that the lot will be adequately maintained during the time that it is vacant. Upon approval of the plan, the landscape and irrigation improvements to the lot, as specified in the plan, shall be completed to the satisfaction of the director of parks, recreation and community services within thirty days after demolition. A reasonable extension of time may be granted by the director of parks, recreation and community services in those situations when the director, in his or her sole discretion, determines that a good faith effort is being made by the property owner to comply with the provisions of this section.

1. Appeal of Decision.
    a) The decision of the director of parks, recreation and community services to approve, conditionally approve or deny any vacant lot landscape and irrigation plan may be appealed in writing to the city manager within fifteen calendar days. The decision of the city manager shall be final, unless appealed in writing to the city council within fifteen calendar days of the city manager's decision. All decisions of the city council shall be final.
    b) At the sole discretion of the city council, the provisions contained within this ordinance may be made modified, as deemed appropriate, if a finding is made that the legal property owner has demonstrated an extreme financial hardship such as, but not limited to, the filing of bankruptcy, property tax default, their exists over six months of outstanding arrears to the monthly mortgage payment on the property, or any other extreme/unique hardship the city council believes is contrary to the purpose and intent of this ordinance.

D. View Obscuring Barriers and Fencing on Vacant Lots. There shall be no on-site fencing or view obscuring perimeter barriers that screen any vacant lot in any manner that obstructs vehicular and/or pedestrian visibility of the public right-of-way, or interferes with the public's use of the public right-of-way, as determined by the director of public works. The directors of public works and parks, recreation and community services shall approve the location and design of all vacant lot fencing and perimeter barriers prior to the construction of any such fencing or barriers on a vacant lot.

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E. The director of parks, recreation and community services shall implement all applicable sections of Chapter 13.42 (Water Conservation in Landscaping), regardless of the size of the vacant lot, to ensure that the approved vacant lot landscape and irrigation plan conserves water to greatest extent possible, while preserving the health of the landscaping approved on the vacant lot.

F. Where a recorded easement on vacant lot exists, the director of parks, recreation and community services may require and/or permit the property owner to use an appropriate ground cover over the easement (i.e., gravel, turf block, paving or some other acceptable material) that would enable a vehicle to drive over the easement. Any impervious surface approved over an easement shall be subject to the prior written approval of the easement holder.

G. Implementation. All vacant lots, regardless of how they became vacant, that are existing at the time of the adoption of the ordinance shall be brought into immediate compliance with all applicable provisions of this section, unless currently landscaped and irrigated under a previously approved vacant lot and landscape and irrigation plan approved by the director of community development or director of parks, recreation and community services prior to the adoption of this current ordinance. A reasonable extension of time may be granted by the director of parks, recreation and community services in those situations when the director, at his or her sole discretion, determines that a good faith effort is being made by the property owner to comply with this section.

H. Noncompliance Declared Nuisance. Failure to comply with any of the applicable requirements in this section shall constitute a public nuisance, as designated in Section 8.08.030, and the city attorney or the district attorney may commence an action or proceeding for civil abatement, removal and enjoinment thereof, in the manner proscribed by law; and shall take other steps and apply to such courts as may have jurisdiction to grant such relief as well as abate or remove the nuisance, including abatement in accordance with the provisions of this chapter.

(Ord. 2906 § 1, 2008)

(Ord. No. 2928, § 1, 6-23-09; Ord. No. 2958, § 3, 10-12-10)

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Watershed Management Program Appendix 3

A-3-3 Example Street Sweeping Municipal Code

For the TSS Reduction Strategy

EXAMPLE MUNICIPAL CODE LANGUAGE FOR PRIVATE PARKING LOT SWEEPING

For the TSS Reduction Program (City of Signal Hill Municipal Code § 12.16.060)

12.16.060 ILLICIT DISCHARGES

A. Except as otherwise permitted herein, all non-storm water discharges to the municipal storm drain system are prohibited.

B. No person shall cause, facilitate or permit any illicit discharge to the municipal storm drain system.

C. No person shall cause, facilitate or permit a discharge into an MS4 that causes or contributes to an exceedence of any water quality standard.

D. No person shall cause, facilitate or permit any discharge into an MS4 that causes or threatens to cause a condition of pollution, contamination, or nuisance (as defined in California Water Code § 13050).

E. No person shall cause, facilitate or permit any discharge into an MS4 containing pollutants which have not been reduced to the Maximum Extent Practicable.

Q. All owners and operators of industrial and/or commercial motor vehicle parking lots containing more than twenty-five parking spaces shall conduct regular sweeping and other similar measures to minimize the discharge of pollutants and other debris in the municipal storm drain system.

V. Any person who violates the terms of this section shall immediately commence all appropriate response action to investigate, assess, remove and/or remediate any pollutants discharged as a result of such violation, and shall reimburse the City or other appropriate governmental agency, for all costs incurred in investigating, assessing, monitoring and/or removing, cleaning up, treating or remediating any pollutants resulting from such violation, including all reasonable attorneys' fees and environmental and related consulting fees incurred in connection therewith.

(Ord. 2013-11-1462 § 1; Ord. 2003-02-1316 § 1; Ord. 2002-07-1304 § 2; Ord. 96-12-1215 § 1)

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Watershed Management Program Appendix 4

A-4-1 Reasonable Assurance Analysis

Reasonable Assurance Analysis for Lower Los Angeles River, Los Cerritos Creek, and Lower San Gabriel River

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

Paradigm Environmental
4797 Seminole Dr
San Diego, CA 92115

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1. Introduction

The Municipal Separate Storm Sewer System Permit (Permits) for Los Angeles County[1] and the City of Long Beach[2] includes optional provisions for a Watershed Management Program (WMP) that allows permittees the flexibility to customize their stormwater programs to achieve compliance with applicable receiving water limitations (RWLs) and water quality based effluent limitations (WQBELs) through implementation of control measures. A key element of each WMP is the Reasonable Assurance Analysis (RAA), which is used to demonstrate "that the activities and control measures…will achieve applicable WQBELs and/or RWLs with compliance deadlines during the Permit term" (NPDES Permit Order No. R4-2012-0175, Section C.5.b.iv.[5], page 64; NPDES Permit Order No. R4-2014-0024, Section C.5.h.vii.[2]). This report presents the Reasonable Assurance Analysis (RAA) for the Lower Los Angeles River (LLAR), Los Cerritos Channel (LCC), and Lower San Gabriel River (LSGR) WMPs.

While the Permits prescribe the RAA as a quantitative demonstration that control measures (best management practices [BMPs]) will be effective, the RAA also promotes a modeling process to identify and prioritize potential control measures to be implemented by the WMP. In other words, the RAA not only demonstrates the cumulative effectiveness of BMPs to be implemented, it also supports their *selection*. Furthermore, the RAA incorporates the applicable compliance dates and milestones for attainment of the WQBELs and RWLs, and therefore supports BMP scheduling.

On March 25, 2014, the Los Angeles Regional Water Quality Control Board (Regional Board) issued "RAA Guidelines" (LARWQCB 2014) to provide information and guidance to assist permittees in development of the RAA. The approach herein is consistent with the RAA Guidelines.

This report is organized in nine sections, as follows:

- Section 1: Introduction
- Section 2: Applicable Interim and Final Requirements
- Section 3: Modeling System to be used for the RAA
- Section 4: Current/Baseline Pollutant Loading
- Section 5: Estimated Required Pollutant Reductions
- Section 6: Determination of BMP Capacity for RAA
- Section 7: Cumulative Volume Reduction Goals to Achieve Required Reductions
- Section 8: Pollutant Reduction Plan
- Section 9: References

[1] National Pollutant Discharge Elimination System Permit Order No. R4-2012-0175

[2] National Pollutant Discharge Elimination System Permit Order No. R4-2014-0024

2. Applicable Interim and Final Requirements

The WMPs for LLAR, LCC, and LSGR follow the process in the Permits and identify the Water Quality Priorities (WQ Priorities) including the highest (Category 1) Water Quality Priorities which are subject to Total Maximum Daily Loads (TMDLs) and WQBELs. Practically all of these TMDLs include associated compliance schedules that are considered in this RAA. The TMDL and WMP milestones/compliance dates establish the pace at which BMPs must be implemented. Traditionally, the approach of TMDL implementation plans has been focused on *final* TMDL compliance, whereas the Permit compliance paths offered to WMPs increase emphasis on *milestones*. In line with the RAA Guidelines, for all final TMDL and TMDL/WMP milestones that occur in the next two Permit cycles, the combination of BMPs expected to result in attainment of the corresponding Permit limits are identified.

The TMDL milestones for the LLAR, LCC, and LSGR WMP areas are shown in Table 2-2 through Table 2-4. The Permits require each WMP to provide reasonable assurance for the TMDL milestones that occur in the current Permit term. If applicable TMDLs do not prescribe a milestone in the current Permits, a milestone must be established. The array of TMDLs creates a potentially complicated sequence based on multiple pollutants, and thus this RAA includes a limiting pollutant analysis. As described in Section 5, the identified limiting pollutant for wet weather is zinc for LLAR, LCC, and LSGR. As such, the wet weather milestones for the Los Angeles River, Los Cerritos Channel, and San Gabriel River Metals TMDLs establish the pace of stormwater BMP implementation. The wet weather milestones established for the current Permits include the following:

- **Lower Los Angeles River:** Achieve 31% of the required reduction by September 30, 2017. This milestone was created for the WMP, as the metals TMDL includes a 25% milestone in 2012 (prior to the current Permit term) and a 50% milestone in 2024 (beyond the current Permit term). Achievement of this milestone for zinc provides reasonable assurance of achieving a similar or greater reduction for other WQ Priorities.
- **Los Cerritos Channel:** Achieve 10% of the required reduction[3] by September 30, 2017. This milestone is directly from the metals TMDL. Achievement of this milestone for zinc provides reasonable assurance of achieving a similar or greater reduction for other WQ Priorities.
- **Lower San Gabriel River:** Achieve 10% of the required reduction by September 30, 2017. This milestone is directly from the metals TMDL. Achievement of this milestone for zinc provides reasonable assurance of achieving a similar or greater reduction for other WQ Priorities.

The pollutant reduction plan to achieve these milestones is described in Section 8, along with the plan to achieve the milestones for the next Permit term (achieve 35% of the required reduction in LCC and LSGR and achieve 50% of the required reduction in LLAR). A summary of the milestones within the current and next Permit terms and final milestone based on final TMDLs are summarized in Table 2-1. The required reductions that form the basis of the milestones are calculated in Section 5.

[3] The interim milestones are expressed in terms of the *required* reduction not total reduction (e.g., if the required reduction to attain final limits is 50%, then the 10% milestone equates to a 5% reduction). These reductions are calculated in Section 5.

Table 2-1. Summary of schedule for interim and final milestones

WMP Area	Milestone 1 (2017)	Milestone 2 (interim date of applicable metals TMDL)	Milestone 3 (final date of applicable metals TMDL)
LLAR	31%	50%	100%
LCC	10%	35%	100%
LSGR	10%	35%	100%

Table 2-2. Schedule of TMDL milestones for the Lower LA River

TMDL	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone (Bolded numbers indicated milestone deadlines within the current Permit term) [1]									
				2012	**2013**	**2014**	**2015**	**2016**	2020	2024	2028	2032	2037
LAR Nutrients	Ammonia-N, Nitrate-N, Nitrite-N, Nitrate-N+Nitrite-N	Meet WQBELs	All	Pre 2012									
				Final									
LAR Trash	Trash	% Reduction	All	9/30	9/30	9/30	9/30	9/30					
				70%	80%	**90%**	**96.70%**	**100%**					
LAR Metals	Copper, Lead	% of MS4 area Meets WQBELs	Dry	1/11					1/11	1/11			
				50%					75%	100%			
	Copper, Lead, Zinc, Cadmium	% of MS4 area Meets WQBELs	Wet	1/11						1/11	1/11		
				25%						50%	100%		
LA River Bacteria	*E. coli*	Meet WQBELs	Wet and Dry[2]										3/23
													Final
Dominguez Channel and LA/LB Harbors Toxics	Sediment: DDTs, PCBs, Copper, Lead, Zinc, PAHs	Meet WQBELs	All	12/28								3/23	
				Interim								Final	
Long Beach City Beaches and LAR Estuary Bacteria	Total Coliform, Fecal Coliform, Enterococcus	Meet WLAs	All	USEPA TMDLs, which do not contain interim milestones or implementation schedule. The Permits allow MS4 Permittees to propose a schedule in a WMP.									

[1] The Permit term is assumed to be five years from the Los Angeles County Permit effective date or December 27, 2017.

[2] The schedule for attaining the dry weather Bacteria TMDL is not shown in Table 3-2, which is stepwise by reach/segment and depends on whether a Load Reduction Strategy is developed for implementation.

Table 2-3. Schedule of TMDL milestones for Los Cerritos Channel WMP

TMDL	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone (Bolded numbers indicated milestone deadlines within the current Permit term) [1]									
				2012	**2013**	**2014**	**2015**	**2016**	2017	2020	2023	2026	2032
Los Cerritos Channel Metals	Copper	% Load Reduction or % of MS4 area Meets WQBELs	Dry						9/30	9/30			
									30%	70%	100%		
	Copper, Lead, Zinc	% Load Reduction or % of MS4 area Meets WQBELs	Wet						9/30	9/30			
									10%	35%	70%	100%	
Dominguez Channel and LA/LB Harbors Toxics	Sediment: DDTs, PCBs, Copper, Lead, Zinc, PAHs	Meet WQBELs	All	12/28									3/23
				Interim									Final

[1] The Permit term is assumed to be five years from the Los Angeles County Permit effective date or December 27, 2017.

Table 2-4. Schedule of TMDL milestones for the Lower San Gabriel River WMP

TMDL	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone (Bolded numbers indicated milestone deadlines within the current Permit term) [1]									
				2012	**2013**	**2014**	**2015**	**2016**	2017	2020	2023	2026	2032
San Gabriel River Metals	Copper, Selenium	% Load Reduction or % of MS4 area Meets WQBELs	Dry						9/30	9/30			
									30%	70%	100%		
	Copper, Lead, Zinc	% Load Reduction or % of MS4 area Meets WQBELs	Wet						9/30	9/30			
									10%	35%	70%	100%	
Dominguez Channel and LA/LB Harbors Toxics	Sediment: DDTs, PCBs, Copper, Lead, Zinc, PAHs	Meet WQBELs	All	12/28									3/23
				Interim									Final

[1] The Permit term is assumed to be five years from the Los Angeles County Permit effective date or December 27, 2017.

3. Modeling System used for the RAA

The Watershed Management Modeling System (WMMS) was used to develop this RAA. WMMS is specified in the Permits as a potential tool to conduct the RAA. The Los Angeles County Flood Control District (LACFCD), through a joint effort with U.S. Environmental Protection Agency (USEPA), developed WMMS specifically to support informed decisions associated with managing stormwater. The ultimate goal of WMMS is to identify cost-effective water quality improvement projects through an integrated, watershed-based approach. The WMMS encompasses Los Angeles County's coastal watersheds of approximately 3,100 square miles, representing 2,566 subwatersheds (Figure 3-1). As described in the following subsections, WMMS is a modeling system that incorporates three tools: (1) the watershed model for prediction of long-term hydrology and pollutant loading, (2) a BMP model, and (3) a BMP optimization tool to support regional, cost-effective planning efforts. A version of WMMS is available for public download from LACFCD.

The version of WMMS to be used for the RAA in the LLAR, LLC, and LSGR WMPs is customized from the public download version, including the following modification/enhancements:

- Updates to meteorological records to represent the last 10 years (per the RAA Guidelines) and to allow for simulation of the design storm;
- Calibration adjustments to incorporate the most recent 10 years of water quality data collected at the nearby mass emission station;
- Application of a second-tier of BMP optimization using System for Urban Stormwater Treatment and Analysis INtegration (SUSTAIN), which replaces the Nonlinearity-Interval Mapping Scheme (NIMS) component of WMMS.
- Optimization of BMP effectiveness for removal of bacteria pollutants (rather than metals only); and
- Updates to Geographic Information System (GIS) layers, as available.

The subwatersheds in the LLAR, LLC, and LSGR WMP areas that are represented by WMMS are shown in Figure 3-2 through Figure 3-4, which include modifications to confine to jurisdictional boundaries included in these WMP areas. Also shown are the "RAA assessment points", which are used to calculate required load reductions (described in Section 5).

3.1. Watershed Model - LSPC

The watershed model included within WMMS is the Loading Simulation Program C++ (LSPC) (Shen et al. 2004; Tetra Tech and USEPA 2002; USEPA 2003). LSPC is a watershed modeling system for simulating watershed hydrology, erosion, and water quality processes, as well as in-stream transport processes. LSPC also integrates a geographic information system (GIS), comprehensive data storage and management capabilities, and a data analysis/post-processing system into a convenient PC-based Windows environment. The algorithms of LSPC are identical to a subset of those in the Hydrologic Simulation Program–FORTRAN (HSPF) model with selected additions, such as algorithms to dynamically address land use change over time. Another advantage of LSPC is that there is no inherent limit to the size and resolution of the model than can be developed, making it an attractive option for modeling the Los Angeles region watersheds. USEPA's Office of Research and Development (Athens, Georgia) first made LSPC available as a component of USEPA's National TMDL Toolbox (http://www.epa.gov/athens/wwqtsc/index.html). LSPC has been further enhanced with expanded capabilities since its original public release.

The WMMS development effort culminated in a comprehensive watershed model of the Los Angeles County Flood Control District that includes the unique hydrology and hydraulics of the system and characterization of water quality loading, fate, and transport for all the key TMDL constituents (LACDPW 2010a, 2010b). Since the original development of the WMMS LSPC model, Los Angeles County personnel have independently updated the model with meteorological data through April 2012.

To support the objectives of the WMPs, jurisdictional boundaries were also intersected with the WMMS LSPC model subwatersheds resulting in a finer resolution spatial unit for modeling. Model land use was then resampled using this subwatershed-jurisdiction intersect, properly distributing land use categories at the jurisdictional level for attributing sources, while maintaining hydrologic connectivity within the watershed model. This refinement introduced a new layer of resolution, facilitating the rollup of modeled results by jurisdiction to better support source attribution and implementation responsibilities among the participating entities.



Figure 3-1. WMMS model domain and represented land uses and slopes by subwatershed

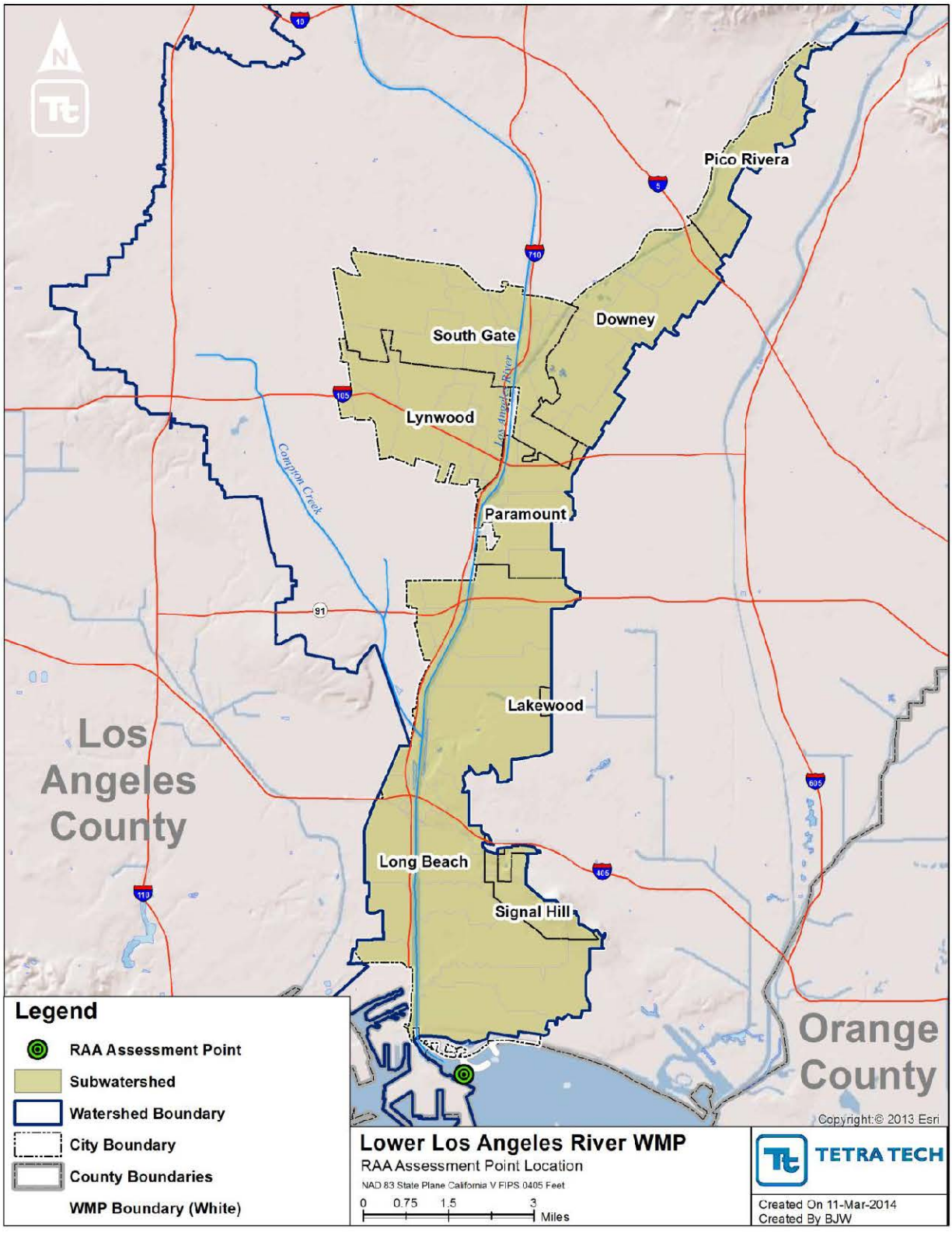


Figure 3-2. Lower LA River WMP Area subwatersheds represented by WMMS

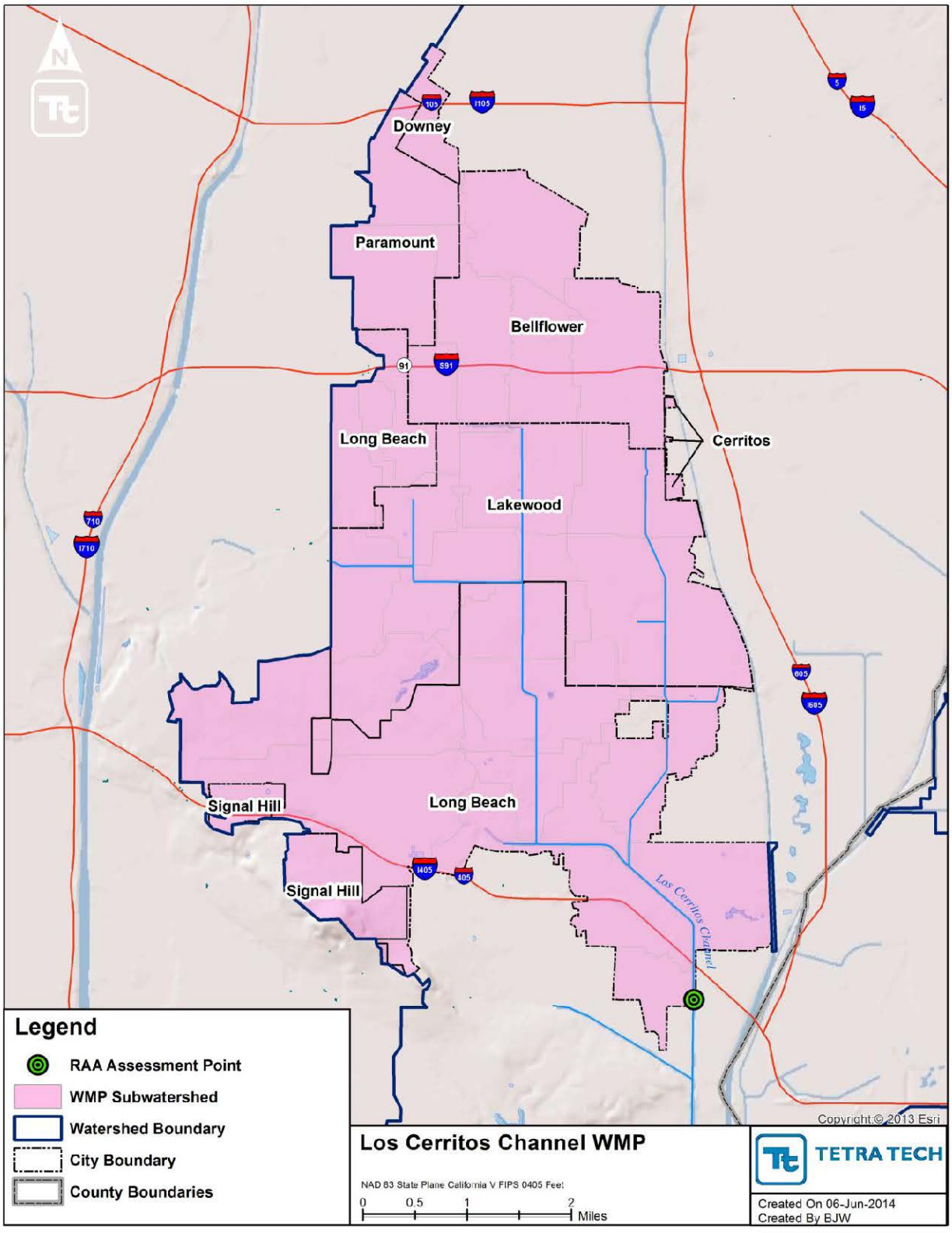


Figure 3-3. Los Cerritos WMP Area subwatersheds represented by WMMS

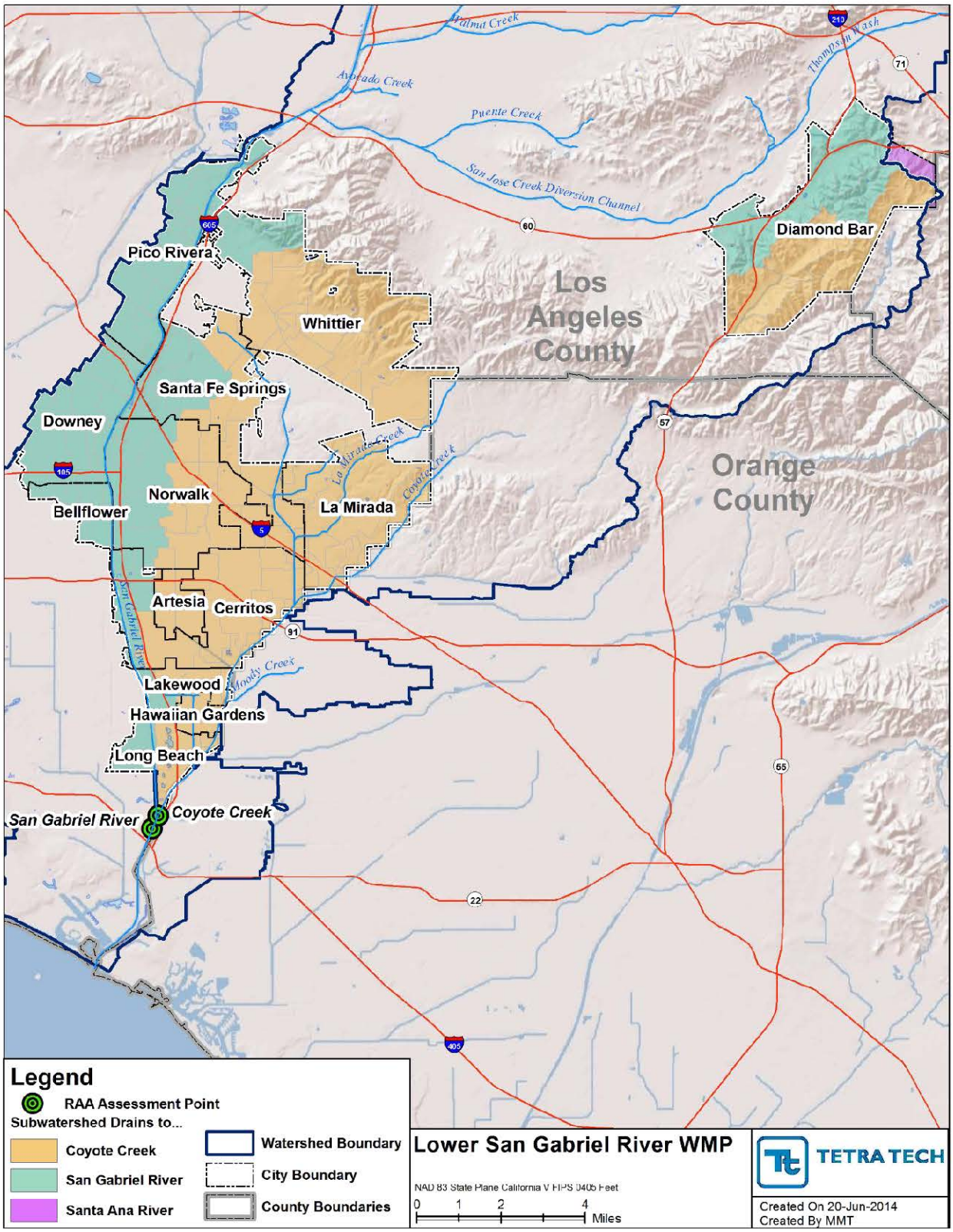


Figure 3-4. Lower San Gabriel River WMP Area subwatersheds represented by WMMS

3.2. Small-Scale BMP Model – SUSTAIN

The System for Urban Stormwater Treatment and Analysis INtegration (SUSTAIN) was developed by USEPA to support practitioners in developing cost-effective management plans for municipal storm water programs and evaluating and selecting BMPs to achieve water resource goals (USEPA, 2009). It was specifically developed as a decision-support system for selection and placement of BMPs at strategic locations in urban watersheds. It includes a process-based continuous simulation BMP module for representing flow and pollutant transport routing through various types of structural BMPs. Users are given the option to select from various algorithms for certain processes (e.g., flow routing, infiltration, etc.) depending on available data, consistency with coupled modeling assumptions, and the level of detail required. Figure 2-3 shows images from the SUSTAIN model user interface and documentation depicting some of the available BMP simulation options in a watershed context.

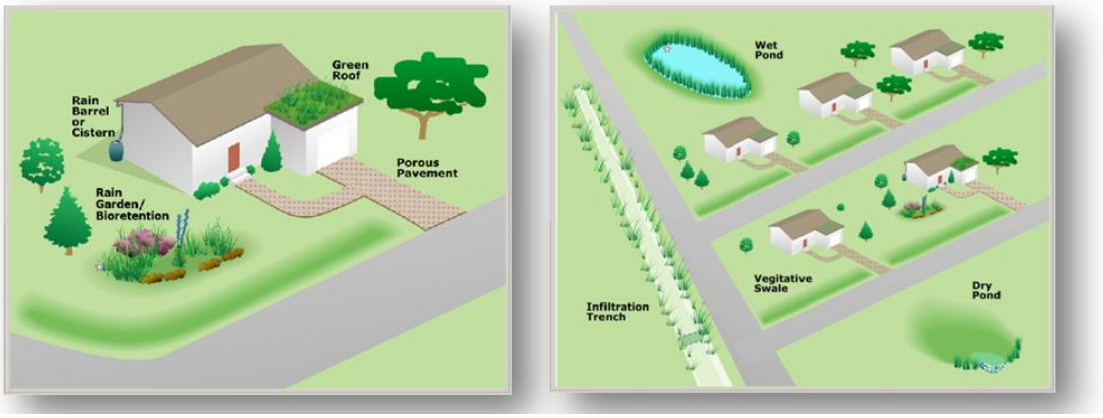


Figure 2-3. SUSTAIN model interface illustrating some available BMPs in watershed settings

SUSTAIN extends the capabilities and functionality of traditionally available models by providing integrated analysis of water quantity, quality, and *cost factors*. The SUSTAIN model in WMMS includes a cost database comprised of typical BMP component cost data from a number of published sources including BMPs constructed and maintained in Los Angeles County. SUSTAIN considers certain BMP properties as "decision variables," meaning that they are permitted to change within a given range during model simulation to support BMP selection and placement optimization. As BMP size changes, so do cost and performance. SUSTAIN runs iteratively to generate a cost-effectiveness curve comprised of optimized BMP combinations within the modeled study area (e.g., the model evaluates the optimal width and depth of certain BMPs to determine the most cost-effective configurations for planning purposes).

3.3. Large-Scale BMP Optimization Tool – NIMS/SUSTAIN

WMMS was specifically designed to dynamically evaluate effectiveness of BMPs implemented in subwatersheds for meeting downstream RWLs while maximizing cost-benefit. WMMS employs optimization based on an algorithm names Nonlinearity-Interval Mapping Scheme (NIMS) to navigate through the many potential scenarios of BMP strategies and identify the strategies that are the most cost effective (Zou et al. 2010). Given the relatively small spatial scale of the WMP area, NIMS was not applied for this study. Instead, a two-tiered approach was applied using the NSGA-II solution technique available in SUSTAIN. For Tier 1, treatment capacities were optimized for each contributing segment, which resulted in unique cost-effectiveness curves for each segment based on available opportunities therein. For Tier 2, the search space was composed of Tier 1 solutions, thereby streamlining the search process. The resulting Tier 2 curve represents the optimal large scale solution because it is comprised of optimized Tier 1 solutions. This approach is especially useful for prioritizing areas for management for scheduling implementation milestones as described in Section 8.

4. Current/Baseline Pollutant Loading

The LSPC model within WMMS was reconfigured and recalibrated specifically for the WMP areas to provide an estimate of current/existing pollutant loads from jurisdictions within the WMPs. Reconfiguration of model subwatersheds was performed to provide specific accounting of loadings from individual jurisdictions. Calibrations were performed to meet specifications of the RAA Guidelines (LARWQCB 2014).

4.1. Model Calibration to Existing Conditions

The LSPC watershed model was originally calibrated for hydrology using a regional approach relying on USGS observed daily streamflow datasets through Water Year (WY) 2006 (LACDPW 2010a). Water Quality was then calibrated using small-scale, land use level water quality monitoring data to develop representative event mean concentrations by land use (LACDPW 2010b). Model performance was also validated at the mass emissions monitoring stations in the context of a county-wide modeling effort. The calibration period for the original WMMS LSPC model began in 1996 and ended in 2006. For the RAA, an analysis was performed to evaluate performance of the LSPC model as it relates to the LLAR, LCC, and LSGR watersheds to understand and benchmark its applicability for use as a baseline condition. The evaluation of monitoring data was extended beyond the original WMMS-LSPC calibration to include the period from 10/1/2001 through 9/30/2011 incorporating both the average year (WY 2008) and 90th percentile (WY 2003) year.

Data available for the LACDPW water quality and hydrologic monitoring stations, S10 and F319 were used to reexamine simulated water quality and hydrology conditions in LA River. The two stations are co-located just south of the West Wardlow Road overpass and drain approximately 800 square miles, or nearly the entire LA River watershed. The monitoring stations were selected for comparison due to their location near the outlet of the LA River watershed, which encompasses the aggregate contributions of all upstream pollutant sources. The selected flow gage, F319, was also used to calibrate the WMMS LSPC model and, therefore, links the current and previous efforts. Water quality and hydrologic records for WYs 2003–2011 were compared to the simulated watershed model output to determine the necessary model parameter adjustments to establish an up-to-date model calibration. The locations of these two gages are presented in Figure 4-1. Statistical summaries and flow regime analysis of the water quality monitoring datasets from the Los Angeles River mass emission station S10 are presented in Attachment E.

Watershed model simulation of existing water quality conditions for the LCC watershed were evaluated for WYs 2003–2011 using data collected at the City of Long Beach Stearns Street monitoring location, just north of interstate 405. The water quality monitoring location is positioned at the WMP hydrologic outlet and captures the cumulative watershed loading effects impacting water quality conditions in this 27 square mile portion of the LCC watershed. No flow monitoring data are available in the watershed, thus simulated flow conditions could not be evaluated against observed data for LCC. The location of the water quality monitoring is presented in Figure 4-1 below and statistical summaries of the monitoring dataset are presented in Attachment E.

For the LSGR, hydrology was re-assessed at two monitoring locations using available data from WYs 2001-2011 The two monitoring locations selected include USGS 11087020 San Gabriel River at Whittier Narrows Dam CA and the LACDPW streamflow gage F354 located along Coyote Creek south of Spring Street (coincident with mass emission station S13). The USGS gage was selected for continuity with the development and calibration of the original WMMS LSPC modeling system. The primary monitoring location selected to calibrate water quality for LSGR was the LA County mass emission station S14. The San Gabriel River Monitoring Station is located below San Gabriel River Parkway in Pico Rivera. At this location the upstream tributary area is 450 square miles (LACDPW 2013). A second mass emission station, the Coyote Creek Monitoring Station (S13) located below Spring Street in the lower San Gabriel River watershed was also used to validate the water quality calibration. The locations of these two gages are presented below in Figure 4-1. Statistical summaries and flow regime analysis of the water quality monitoring datasets from the San Gabriel River and Coyote Creek mass emission stations S14 and S13 are presented in Attachment E.

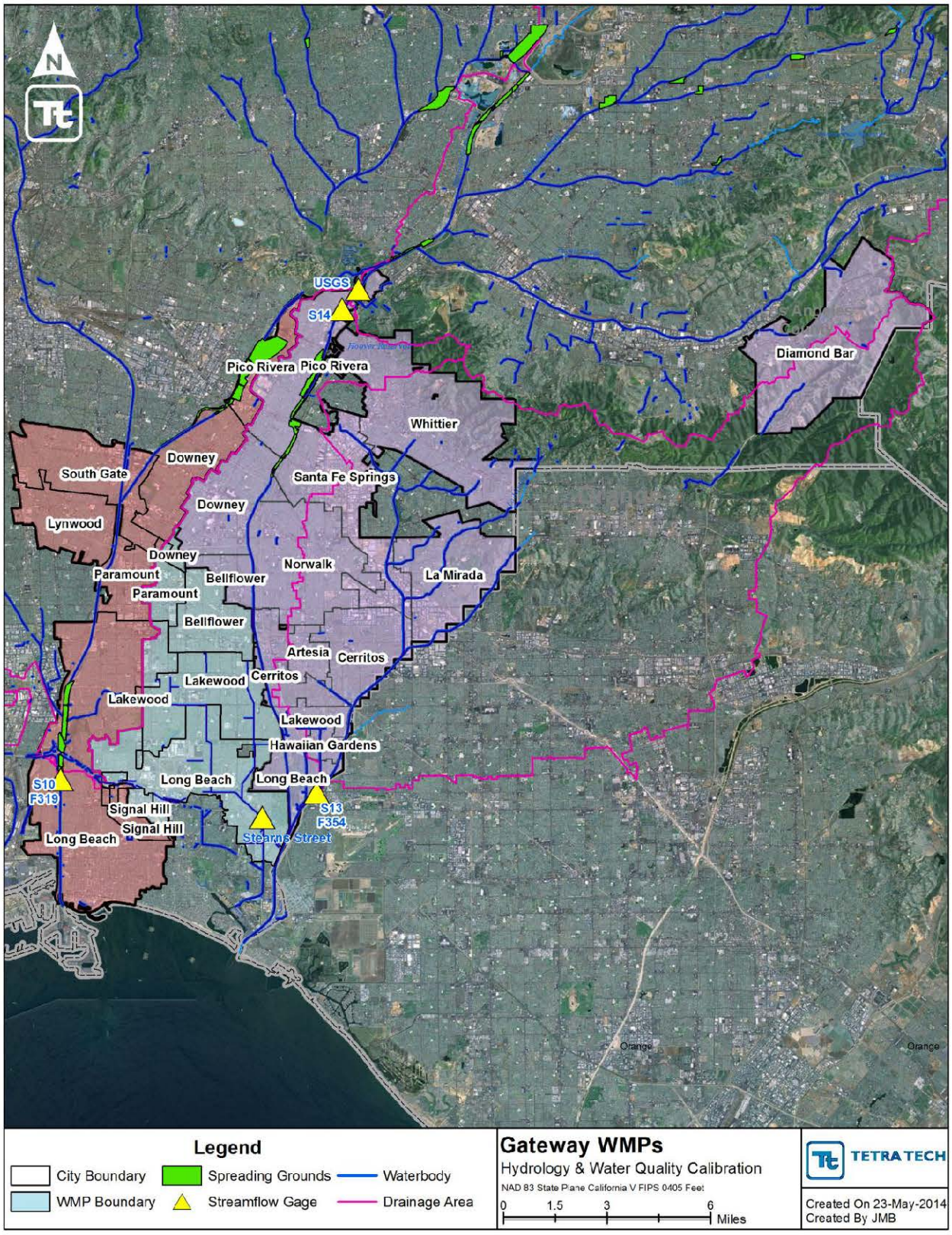


Figure 4-1. WMP groups hydrology and water quality calibration sites.

To demonstrate the ability to predict the effect of watershed processes and management actions, model calibration and validation are necessary and critical steps in any model application. Acceptable model calibration criteria for

benchmarking an RAA were developed by the Regional Board and are listed below in Table 4-1 (LARWQCB 2014). The objectives of establishing model assessment criteria are to ensure the calibrated model reflects all the model conditions and properly utilizes the available modeling parameters, thus yielding meaningful results. The lower bound of "Fair" level of agreement listed in Table 4-1 is considered a target tolerance for the model calibration process.

Table 4-1. Model assessment criteria from the RAA Guidelines

Constituent Group	Percent Difference Between Modeled and Observed		
	Very Good	Good	Fair
Hydrology / Flow	0 – 10	>10 – 15	>15 – 25
Sediment	0 – 20	>20 – 30	>30 – 40
Water Quality	0 – 15	>15 – 25	>25 – 35
Pesticides / Toxics	0 – 20	>20 – 30	>30 – 40

4.1.1. Hydrology Calibration

Table 4-2 and Table 4-3 present the hydrology calibration assessment for the Lower Los Angeles River and Lower San Gabriel River gages, respectively. Nash-Sutcliffle efficiency is a correlation coefficient commonly used in hydrological modeling to measure how well a model predicts temporal variation. A value of 1.0 means a perfect match between modeled and observed. A value of 0 means that the computed mean of observed data is as good a predictor as the model. A negative value means that the data-mean is a better predictor than the model. Because the Regional Board guidance only required annual average flow volume metric, evaluating Nash-Sutcliffe helped to demonstrate that the model also performed well at predicting *intra-annual* flow variablilty.

Table 4-2. Summary of model hydrology calibration performance for Lower Los Angeles River

Water Quality Parameter	Model Period	Hydrology Parameter	Modeled vs. Observed Volume (% Error)	Regional Board Guidance Assessment
In-stream flow at Los Angeles River below Wardlow Road (LA DPW F319)	10/1/2002 – 9/30/2011	Flow Volume	8.72	Very Good
		Nash-Sutcliffe	0.680	n/a

Table 4-3. Summary of model hydrology calibration performance for Lower San Gabriel River

Water Quality Parameter	Model Period	Hydrology Parameter	Modeled vs. Observed Volume (% Error)	Regional Board Guidance Assessment
In-stream flow at SAN GABRIEL R AB WHITTIER NARROWS DAM CA (USGS 1108702)	10/1/2001 – 9/30/2011	Flow Volume	-3.31	Very Good
		Nash-Sutcliffe	0.64	n/a
Coyote Creek near Spring Street (LA DPW F354)	10/1/2003 – 9/30/2011	Flow Volume	-6.17	Very Good
		Nash-Sutcliffe	0.62	n/a

4.1.2. Water Quality Calibration

Water quality calibration for the LLAR, LCC, and LSGR incorporated sampling from LA County mass emission stations at S10 (LA River), Streams Street (LCC), and S13 and S14 along Coyote Creek and the San Gabriel River, respectively. The updated observed concentration data collected at these sites were used to refine the calibration and benchmark model performance. Daily observed loads were calculated by multiplying observed concentration and daily observed flow. Daily loads were estimated for LCC using simulated flows due to the lack of observed data. The percent error between this daily observed load and the daily modeled load was then calculated for each constituent. The results of this evaluation at the two gages are presented in Table 4-4 through Table 4-7.

Table 4-4. Summary of model performance by constituent at the Los Angeles River (S10) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	91	-6.8	Very Good
Total Copper	58	-3.4	Very Good
Total Zinc	58	-18.1	Good
Total Lead	52	-0.1	Very Good
Fecal Coliform	57	-5.1	Very Good
Total Nitrogen	58	-4.0	Very Good
Total Phosphorous	57	6.9	Very Good

Table 4-5. Summary of model performance by constituent at Los Cerritos Channel (Stearns St.) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	85	2.7	Very Good
Total Copper	57	-2.1	Very Good
Total Zinc	56	1.5	Very Good
Total Lead	57	2.2	Very Good
Fecal Coliform	55	1.0	Very Good
Total Nitrogen	56	17.5	Good
Total Phosphorous	56	-0.4	Very Good

Table 4-6. Summary of model performance by constituent at the San Gabriel River (S14) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	45	8.57	Very Good
Total Copper	42	-9	Very Good
Total Zinc	44	16.1	Very Good
Total Lead	44	-3.97	Very Good
Fecal Coliform	43	1.85	Very Good
Total Nitrogen	*Not evaluated at this location*		
Total Phosphorous	44	-2.27	Very Good

Table 4-7. Summary of model performance by constituent at the Coyote Creek (S13) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	42	1.28	Very Good
Total Copper	27	-28.9	Fair
Total Zinc	27	-32.44	Fair
Total Lead	25	-1.58	Very Good
Fecal Coliform	24	-34.48	Fair
Total Nitrogen	*Not evaluated at this location*		
Total Phosphorous			

Two fecal coliform samples were removed from the observed dataset at the San Gabriel River S14 mass emission station prior to performing the load calculation. These two samples appear to be outliers in the dataset with concentration values 10-100x greater than the remaining samples. These observations occurred on 10/17/2005 and 10/13/2009.

For pollutants not explicitly represented in the WMMS LSPC model, and for dry weather analysis, 90th percentile concentrations were calculated based on observed monitoring data at the LACDPW mass emission sites. The 90th percentile concentration was used for compliance with the Regional Board RAA guidelines (LARWQCB 2014). A summary of the 90th percentile concentrations for each constituent and waterbody are presented below in Table 4-8. For subsequent load reduction analyses, these concentrations were assumed for all wet or dry weather conditions they were assigned to represent existing conditions within their respective watersheds.

Table 4-8. 90th percentile concentrations assumed for non-modeled pollutants

Waterbody	Pollutant	Wet Weather	Dry Weather	90th Percentile Concentration	Units
Los Angeles River (S10)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Cadmium	●		4.8	ug/l
	Copper		●	25.68	ug/l
	Lead		●	3.43	ug/l
	E. coli		●	19,600	MPN/100 mL
Los Cerritos Channel (Stearns)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Copper		●	25.4	ug/l
	E. coli		●	14,200	MPN/100 mL
San Gabriel River (S14)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Copper		●	29.89	ug/l
	Selenium		●	4.77	ug/l
	E. coli		●	2,190	MPN/100 mL
Coyote Creek (S13)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Copper		●	28.54	ug/l
	E. coli		●	11,500	MPN/100 mL

[1] DDT, PCBs and PAHs were below MDL, so concentrations were assumed half MDL.

4.2. Current Best Management Practices/Minimum Control Measures

It is important to note the model calibration incorporates local stormwater BMPs implemented through late 2012 into the baseline condition. The only BMPs/control devices that were explicitly incorporated into the baseline model were the Dominguez Gap basins. All other BMPs, which individually were assumed to have a small effect on water quality at the watershed scale, are implicitly represented in the baseline condition. BMPs implemented in 2013 can be categorized as WMP implementation measures and their volume/load reductions are a component of the pollutant reduction plan for attaining interim and final milestones.

5. Estimated Required Pollutant Load Reductions

This section provides a description of the process for identifying critical conditions and calculating required load reductions to meet interim and final limitations.

5.1. Selected Average (Interim) and Critical (Final) Conditions

The RAA Guidelines specify that average conditions shall be used to establish load reductions for interim milestones and critical conditions shall be used to establish load reductions for final limits. In addition, the Permits provide two pathways for addressing WQ Priorities (see Figure 5-1):

- Volume-based: Retain the standard runoff volume from the 85th percentile, 24-hour storm
- Load-based: Achieve the necessary pollutant load reductions to attain Permit limits

Both types of numeric goals were evaluated as part of this RAA.

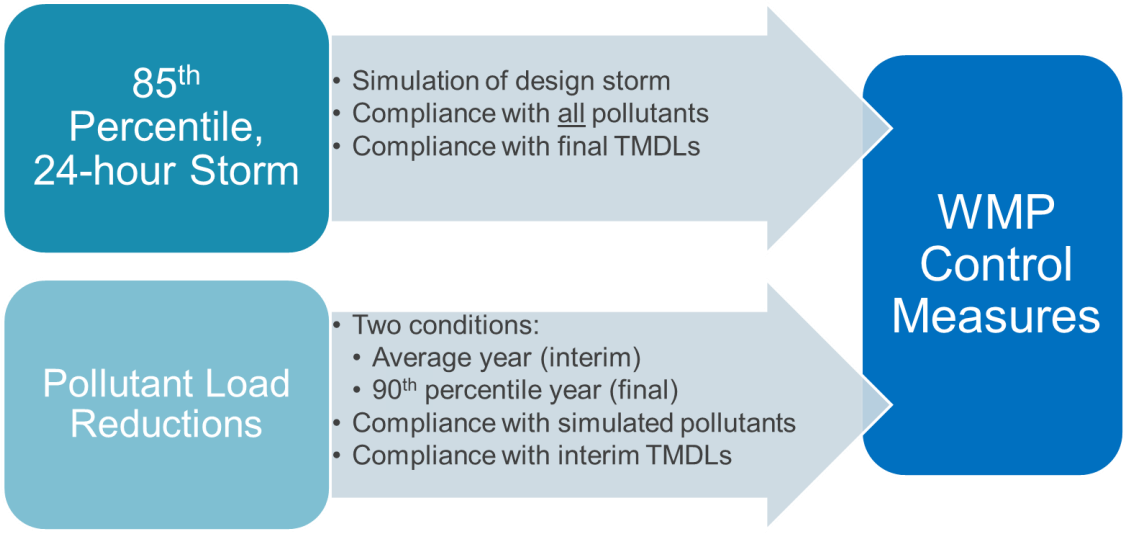


Figure 5-1. Two Types of Numeric Goals and WMP Compliance Paths according to the Permits

5.2. Representative Conditions for Wet Weather

Two approaches were considered and ultimately used in the RAA to represent wet weather critical conditions: the 90th percentile wet year and 85th percentile, 24-hour (design) storm, as described in the following subsections.

5.2.1. Average and 90th Percentile Wet Years

This RAA is based on continuous simulation, and a "representative" year-long time period was selected to represent average and critical conditions, which allows the modeling to capture the variability of rainfall and storm sizes/conditions. For LLAR, LCC, and LSGR, WY2008 was selected as the representative year for average conditions and WY2003 was selected as the representative year for the 90th percentile critical wet conditions.

To select these average and critical years for the RAA, the following steps were taken:

1. **Calculated key rainfall metrics for the last 25-years:** the average and critical years were identified by aggregating data from available rain gages across the entire Los Angeles River and San Gabriel River watersheds (LCC is in between, so the analysis for LLAR and LSGR also applies to LLC). For

comparison, other regional watersheds were also analyzed and presented. The two key metrics evaluated were: (1) total annual rainfall, and (2) average rainfall per wet day (with wet days defined as days with rainfall totals greater than 0.1 inches). The first is clearly an indicator of volume, while the second is an indicator of rainfall intensity. To evaluate long-term conditions, the analysis covered 25 water years (WY) from 1987 through 2011—the total rainfall for each precipitation gage was area-weighted and aggregated into annual totals by water year (i.e. previous October through current September).

2. **Selected years from the most recent 10-years that are most representative of average and 90th percentile**: per the RAA Guidelines, the most recent 10-year period represented in the available data were used to develop the RAA. Table 5-1 and Table 5-2 show average rainfall volumes and intensities (inches per wet day), respectively, for the most recent 10 years compared against the entire 25-years. Both the average and 90th percentile values were compared across the 10- and 25-year records. For the San Gabriel River, 2007-08 is a representative average year based on both the rainfall volume (Table 5-1) and intensity (Table 5-2) metrics. Because BMP performance is typically intensity-dependent, average rainfall per wet day (Table 5-2) was selected as a better metric for use in determining the 90th percentile than annual average rainfall (Table 5-1), which led to selection of 2002-03 as the critical year.

It should be noted that wet weather conditions were also reflective on the definition of dry/wet days. As described in Section 5, for analysis of non-bacteria pollutants (including the limiting pollutant zinc) days with greater than 90th percentile daily average flow were flagged as "wet," which aligns with the critical condition used for the LAR and LSGR metals TMDLs.

5.2.2. 85th Percentile, 24-hour Storm

The design storm is identified in the RAA Guidelines as an acceptable critical condition, and capture of design storm volumes by BMPs is a specified compliance metric in the Permits for TMDLs. The design storm was evaluated and used as a wet weather critical condition for the RAA. As described above, the design storm is a volume-based standard. Each subwatershed within each WMP area has a unique 85th percentile runoff volume, due to varying rainfall amounts and land characteristics (imperviousness, soils, slope, and the like). The rainfall depths associated with the 85th percentile, 24-hour storm are shown in Figure 5-2, based on rolling 24-hour intervals for the 25-year period between October 1, 1987 and September 30, 2011. Within the WMP area, the 85th percentile rainfall depth values range between 0.72 and 1.08 inches.

To determine the "standard volume" associated the design storm, initial conditions were set in LSPC to reflect representative conditions at the start of the simulation, along with regionally derived infiltration rates, and 85th percentile rainfall depths were used as rainfall boundary conditions. At each location the storm distribution presented in Figure 5-3 was used to temporally distribute the 24-hour rainfall volumes (LACDPW 2006). The model was then run to predict the associated runoff volumes for each subwatershed in the WMP area. Those runoff volumes represent the volumes that would need to be retained in order to attain the numeric goals associated with the 85th percentile, 24-hour storm.

Shown in Figure 5-4 are the rainfall depths and runoff depths (runoff volume divided by subwatershed area) associated with the design storm for each subwatershed in the WMP areas. About 50 percent of the subwatersheds in all three WMP areas experiences 0.4 inches or more of runoff under the 85th percentile, 24-hour storm, while about 10 percent of the area experiences about 0.55 inches or more of runoff. Figure 5-5 summarizes the total design storm volumes (in acre-feet) for each jurisdiction. The runoff depths for each subwatershed in the WMP area are graphically shown in Figure 5-6, Figure 5-7, and Figure 5-8.

Table 5-1. Average Rainfall Depths (Water Years 2002–2011 vs. 25-year Average and 90th Percentile)

Year	Average Rainfall Totals (in./year)				
	Ballona Creek	Dominguez Channel	Malibu Creek	San Gabriel River	Los Angeles River
2001-02	25.4	19.1	28.1	30.6	30.5
2002-03	17.1	13.9	20.8	23	20.4
2003-04	10.2	8.1	9.2	13.7	11.2
2004-05	39.3	28.4	42.6	49.6	46.7
2005-06	14.1	9.8	16.9	17.9	17.5
2006-07	4.3	3.1	6.8	6.4	5.8
2007-08	13.2	11.9	18.6	19.4	17.5
2008-09	9.6	8.5	12.3	14.6	12.5
2009-10	16.8	14.9	20.3	24.1	20.5
2010-11	21.2	18.5	25.3	28.5	25.7
Avg. (1987-2011)	15.9	12.5	18.4	20.7	19.2
90th %ile (1987-2011)	30.8	22.9	34.7	37.8	36.9

Red Box: WMP Watersheds. Blue highlighted cells are the two years in each basin with the smallest difference from the 25-year average. Orange cells have the smallest difference from the 90th percentile of the 25-year record.

Table 5-2. Average Rainfall Intensity (Water Years 2002–2011 vs. 25-year Average and 90th Percentile)

Year	Average Rainfall Per Wet Day (in./wet day)				
	Ballona Creek	Dominguez Channel	Malibu Creek	San Gabriel River	Los Angeles River
2001-02	0.36	0.32	0.41	0.42	0.36
2002-03	0.79	0.66	0.88	0.92	0.84
2003-04	0.61	0.48	0.61	0.66	0.58
2004-05	0.98	0.69	1.03	1.07	1.03
2005-06	0.53	0.41	0.61	0.64	0.61
2006-07	0.31	0.27	0.39	0.41	0.37
2007-08	0.56	0.52	0.68	0.76	0.71
2008-09	0.49	0.48	0.56	0.65	0.57
2009-10	0.64	0.6	0.71	0.82	0.72
2010-11	0.62	0.58	0.73	0.76	0.7
Avg. (1987-2011)	0.59	0.52	0.67	0.72	0.66
90th %ile (1987-2011)	0.78	0.66	0.91	0.97	0.89

Red Box: WMP Watersheds. Blue highlighted cells are the two years in each basin with the smallest difference from the 25-year average. Orange cells have the smallest difference from the 90th percentile of the 25-year record.

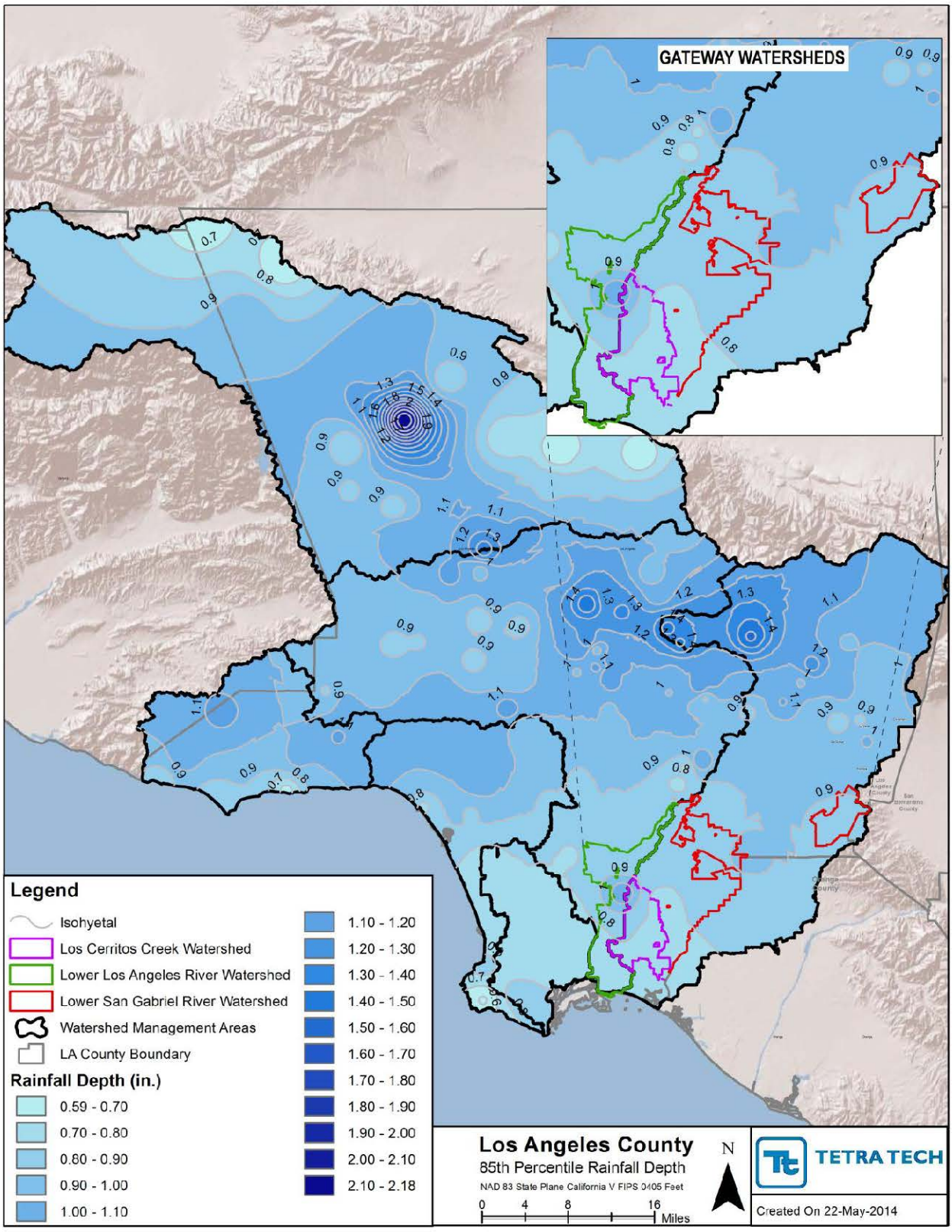


Figure 5-2. Rainfall depths associated with the 85th percentile, 24-hour storm.

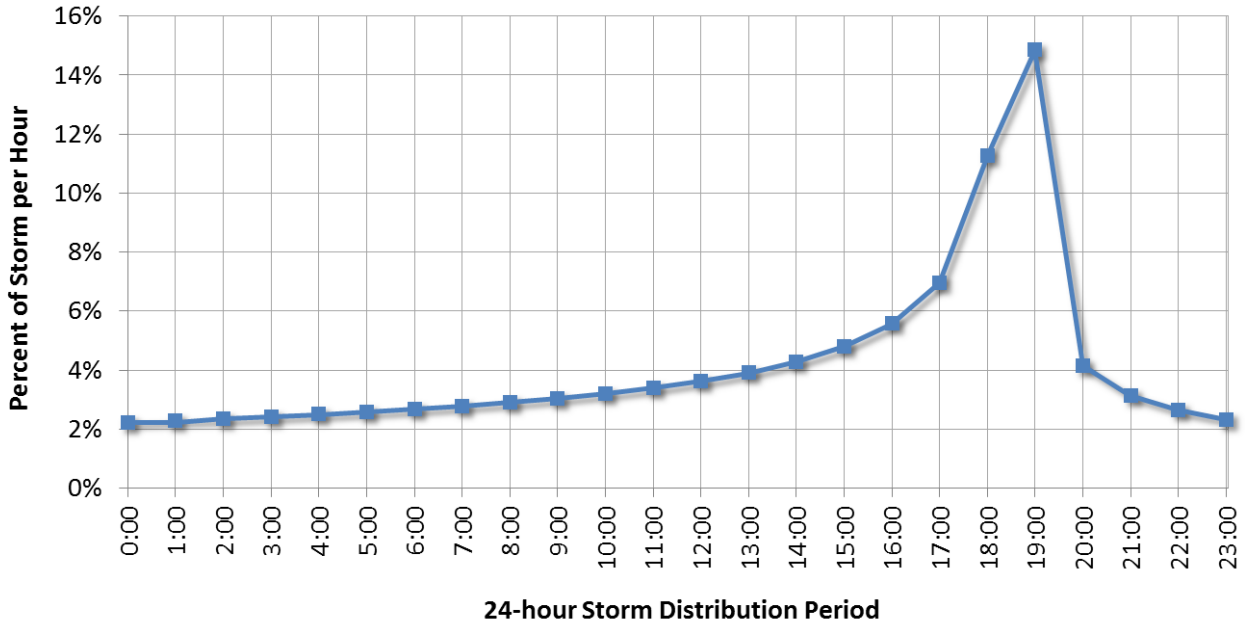


Figure 5-3. Temporal Distribution for 85th Percentile 24-hour Storm for LSPC Simulation.

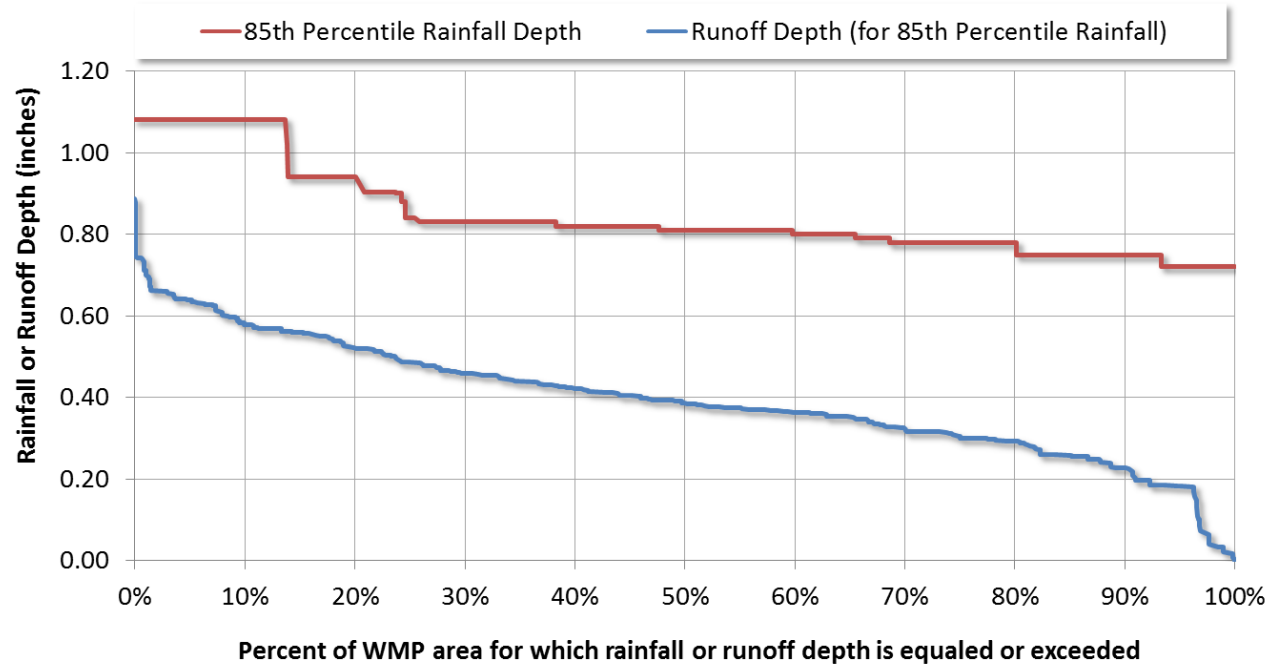


Figure 5-4. Rainfall and Runoff Depths Associated with 85th Percentile Rainfall in the WMP subwatersheds.

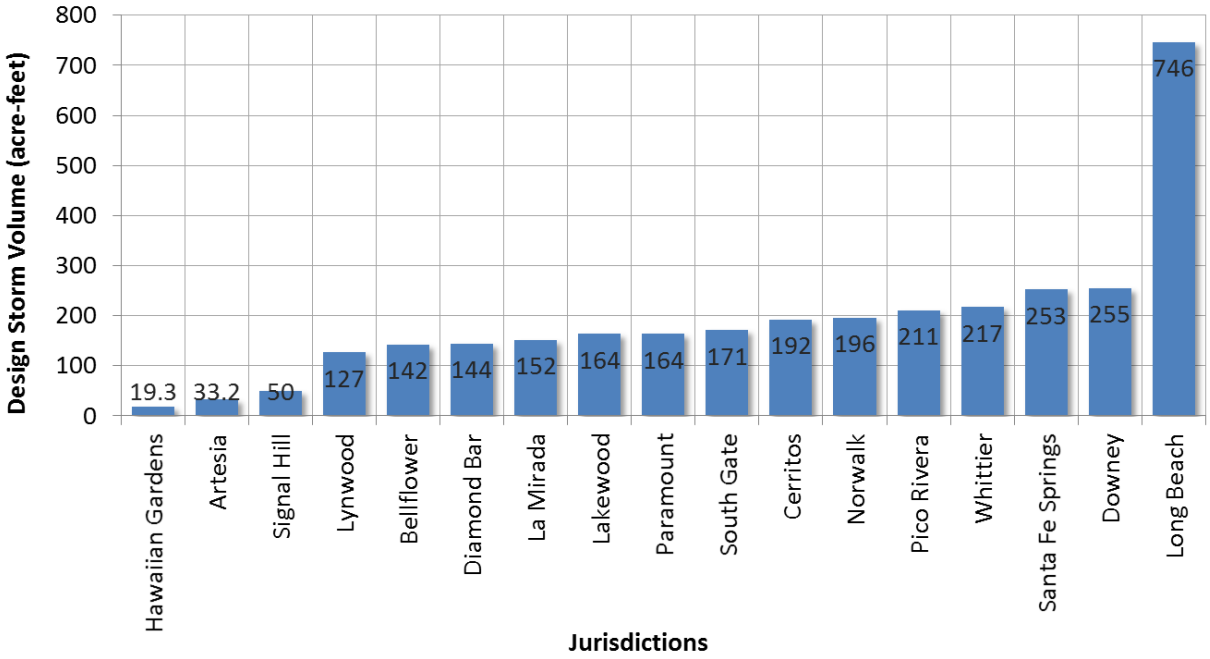


Figure 5-5. Runoff Volume Associated with the 85th Percentile, 24-hour Storm (by jurisdiction).

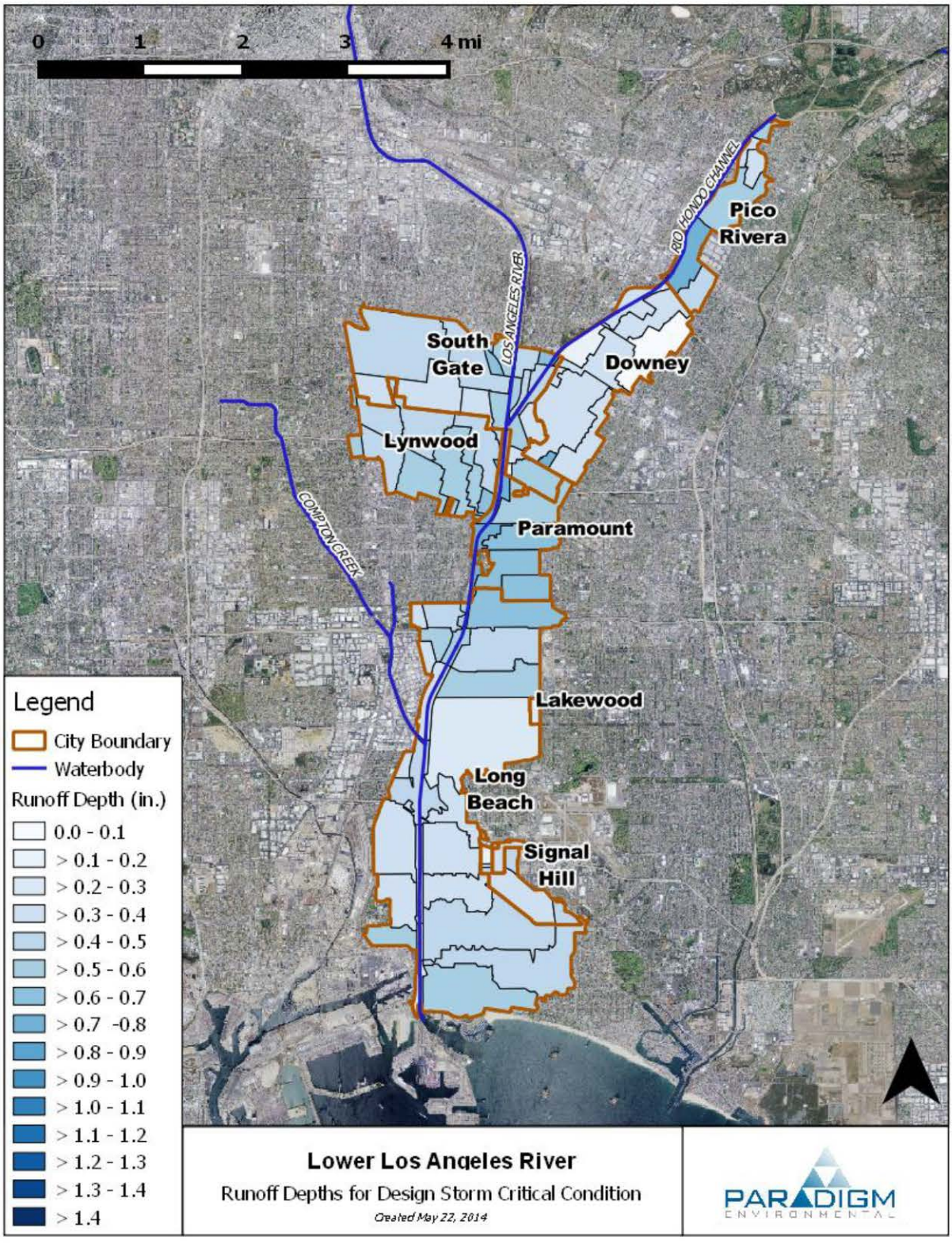


Figure 5-6. Runoff Associated with the 85th Percentile, 24-hour Storm for Lower Los Angeles River.

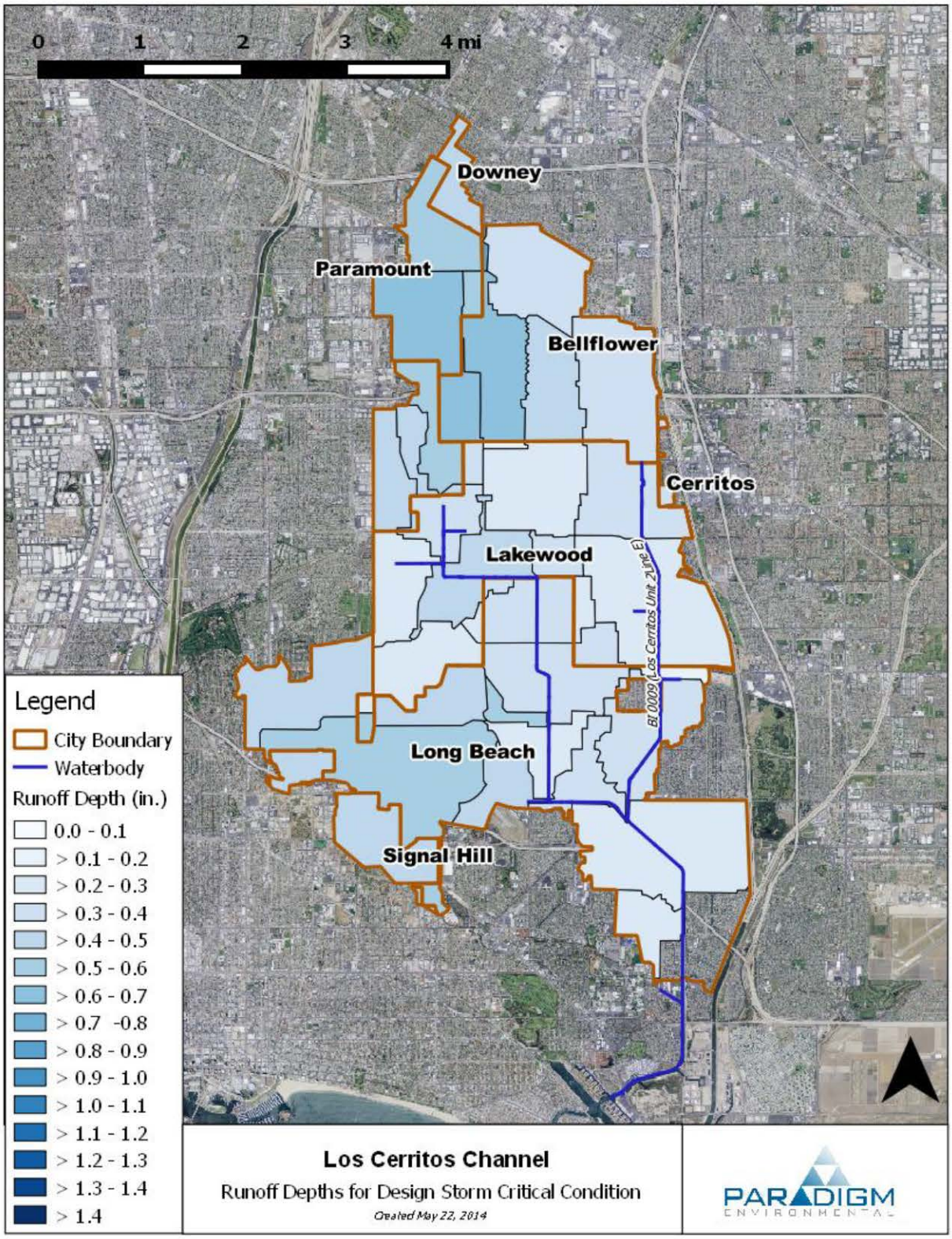


Figure 5-7. Runoff Associated with the 85th Percentile, 24-hour Storm for Los Cerritos Channel.

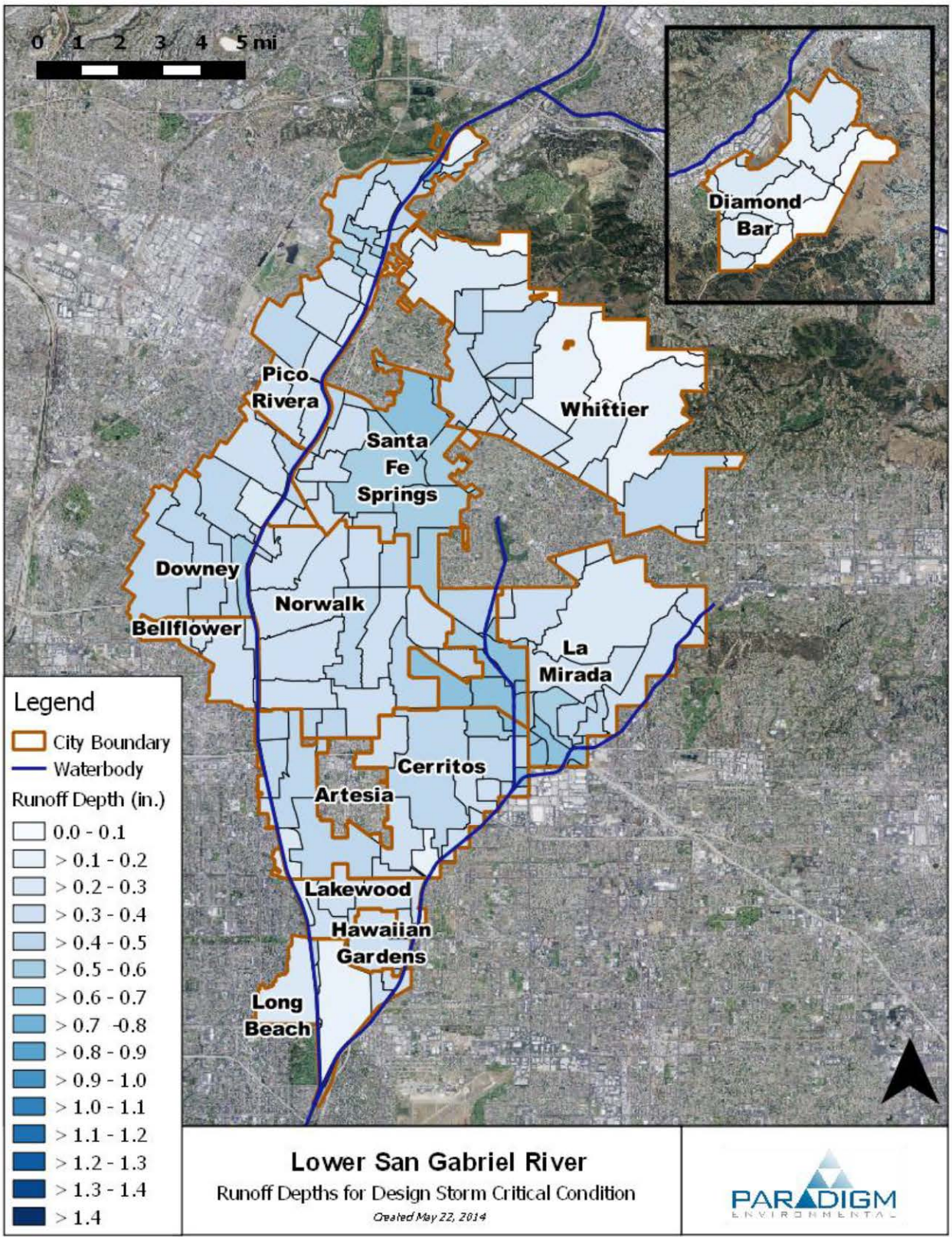


Figure 5-8. Runoff Associated with the 85th Percentile, 24-hour Storm for Lower San Gabriel River.

5.2.3. Representative Conditions for Dry Weather

Although clearly defined definitions exist for wet periods, definitions for dry periods are less clearly defined. Wet weather periods are either defined in terms of rainfall or instream flow. For bacteria, a wet day is one with a rainfall total greater than 0.1 inches plus the three subsequent days, while metals criteria define wet days as those with instream flow above the 90th percentile. One seemingly intuitive way of defining a dry period is simply to use the "non-wet" days represented as the inverse of wet days. However, summary of model results indicate some residual influence of wet weather among the "non-wet" days. This presents some challenges for estimating loads and evaluating dry weather compliance because BMP planning would be better served by choosing design conditions that are more influenced by natural background baseflow and/or anthropogenic activities such as point source discharges or dry weather runoff from irrigation (instead of post-rain event interflow).

The RAA Guidelines recommend using the most recent 10 years of data for modeling scenarios to ensure that the plans are based on a representative range of wet and dry conditions. Regional precipitation and instream flow patterns are highly variable; therefore, a representative dry period is one that consistently represents minimal influence to wet weather conditions. To identify a representative dry period, the analysis covered 25 WYs from 1987 through 2011. The following steps were taken:

1. The total rainfall for each precipitation gage in the study area was summarized and classified into wet and non-wet periods according to the bacteria criteria definition for wet weather (i.e. days with rainfall > 0.1 inches plus the three subsequent days).
2. Dry periods were evaluated on a monthly time scale. Table 5-3 shows the average number of consecutive 30-day dry periods, counted by month of the associated mid-interval date, for each of the rainfall gages within the three WMP areas over the 25 years of rainfall evaluated. The color-ramp indicates relative dryness, with red being driest. Table 5-3 indicates that on average, the months of June, July, and August are the driest months in the year, averaging 24-30 consecutive dry intervals. Note that because this table counts mid-interval dates by month, values approaching 30 actually indicate continuous dry intervals approaching 60 days (15 days on either side of the 30 day interval).
3. Select periods within the average and critical year were identified for dry weather simulations. The areal coverage or non-wet intervals in the two selected representative years (2008 and 2003) were compared against the 10-year period (2001-2011) and the long-term 25-year period (1998-2011). Figure 5-9, Figure 5-10, and Figure 5-11 show the selected representative dry period against summaries of non-wet weather conditions in the LLAR, LCC, and LSGR WMP areas, respectively. Within the two selected years, the 45-day period between 8/17 and 9/30 was found to be the most representative of dry weather conditions because (1) no rainfall occurred at any of the gages throughout all three WMP areas, (2) it was during a time of the year that was historically shown to experience the least amount of spatially-weighted rainfall in a year, and (3) it was late in the summer following an extended period of no rainfall for both 2003 and 2008.

The identified periods between 8/17 and 9/20 during the average and critical years were used for subsequent dry weather simulations for the dry weather component of the RAA.

Table 5-3. Consecutive 30-day Dry Periods per month by WMP and rainfall gage (10/1/1987 – 9/30/2011)

WMP	StaID	Average Number of Consecutive 30-Day Dry Intervals Per Month (10/1/1987 – 9/30/2011)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Los Cerritos Channel	D1254	2.2	1.9	6.2	11.9	22.3	25.2	28.9	28.9	21.4	12.7	7.8	4.4
	D1255	2.8	1.8	4.4	8.8	20.3	25.1	29.7	29.8	21.8	13.0	7.3	2.9
	D225	3.0	2.3	6.3	10.5	20.6	24.7	28.8	29.5	21.4	13.1	9.1	3.6
	D388	2.1	1.3	3.8	8.5	18.6	24.0	27.6	29.2	21.0	12.3	5.1	3.2
	D415	1.9	1.2	5.7	9.6	19.0	24.0	28.1	29.1	23.4	13.1	8.9	3.7
Lower Los Angeles River	D1113	4.2	2.5	8.3	9.8	19.5	24.4	28.1	27.8	23.6	13.7	8.8	4.5
	D1114	1.6	1.1	4.0	8.9	19.6	25.1	29.7	29.6	20.8	12.3	5.5	3.0
	D1256	2.1	1.4	4.8	10.4	20.5	24.6	28.8	29.8	23.5	14.2	6.2	3.1
	D291	3.3	1.1	5.0	8.8	19.4	24.4	28.7	28.4	21.9	11.6	4.6	3.5
	D388	2.1	1.3	3.8	8.5	18.6	24.0	27.6	29.2	21.0	12.3	5.1	3.2
	D415	1.9	1.2	5.7	9.6	19.0	24.0	28.1	29.1	23.4	13.1	8.9	3.7
Lower San Gabriel River	D106	4.2	0.6	6.0	10.9	19.7	24.6	28.6	29.0	23.9	14.0	8.2	4.0
	D1088	2.2	1.0	3.8	9.0	17.6	24.1	28.5	29.0	20.9	12.6	5.9	2.7
	D1095	2.4	0.5	4.4	10.0	19.2	24.6	28.6	29.1	21.2	14.2	7.1	4.2
	D1114	1.6	1.1	4.0	8.9	19.6	25.1	29.7	29.6	20.8	12.3	5.5	3.0
	D1254	2.2	1.9	6.2	11.9	22.3	25.2	28.9	28.9	21.4	12.7	7.8	4.4
	D1255	2.8	1.8	4.4	8.8	20.3	25.1	29.7	29.8	21.8	13.0	7.3	2.9
	D1256	2.1	1.4	4.8	10.4	20.5	24.6	28.8	29.8	23.5	14.2	6.2	3.1
	D1257	2.0	0.5	4.5	10.6	18.9	24.4	28.6	29.8	21.2	10.3	5.7	3.0
	D1271	1.8	1.6	3.9	9.4	18.1	24.4	28.6	29.7	21.6	11.7	7.3	3.4
	D156	3.0	1.5	5.2	10.1	19.2	24.6	28.5	29.3	21.0	13.4	7.2	5.0
	D17	1.7	1.2	5.2	9.1	17.5	22.4	28.6	29.0	22.6	11.3	5.2	3.7
	D225	3.0	2.3	6.3	10.5	20.6	24.7	28.8	29.5	21.4	13.1	9.1	3.6
	D269	1.8	0.5	4.2	8.1	18.0	24.2	28.6	29.1	22.2	13.0	6.7	3.2

Legend: Wet → Dry

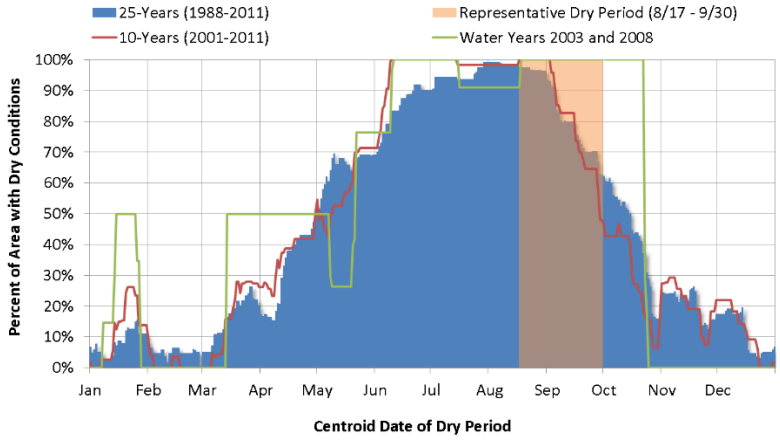


Figure 5-9. Spatiotemporal summary of non-wet weather conditions in the Lower Los Angeles River WMP area.

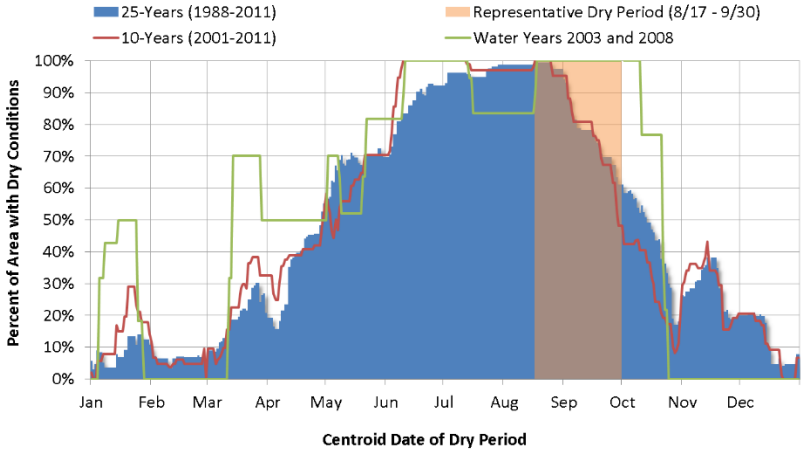


Figure 5-10. Analysis of summary of non-wet weather conditions in the Los Cerritos Channel WMP area.

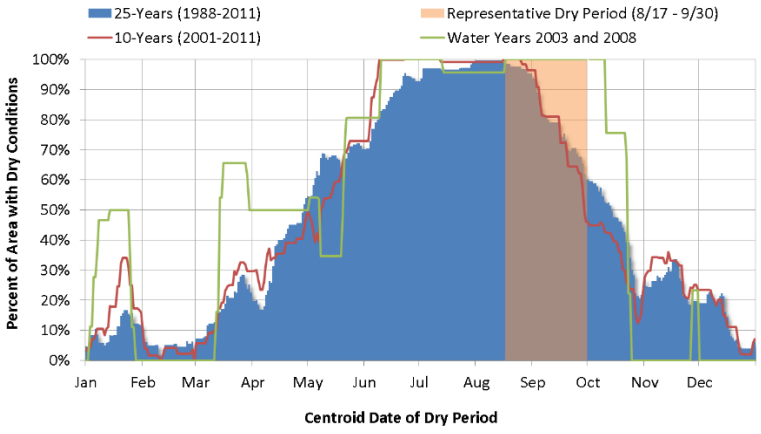


Figure 5-11. Spatiotemporal summary of non-wet weather conditions in the Lower San Gabriel River WMP area.

5.3. Calculated Required Pollutant Reductions to Achieve Final Limits

Using the average storm year (2007-08) and 90th percentile storm year (2002-03), required pollutant reductions were calculated for attainment of interim and final limitations, respectively, applicable to each WMP area. Per the RAA Guidelines, the percent reduction used to determine the control measures necessary to attain interim milestones shall be based on the average year, while the control measures for attainment of the final limits are based on the 90th percentile year.

Required load reductions were evaluated at RAA Assessment Points located at the bottom-most discharge from each WMP areas (shown in Figure 3-2 through Figure 3-4). The RAA Assessment Points represent locations where the collective discharge from each jurisdiction with each WMP area can be assessed to contribute to pollutant loads to the receiving waters. Pollutant loads outside of the WMP areas are not considered in this loading analysis at the RAA Assessment Points, although in reality other loads exist. However, transport of pollutant loads from individual jurisdictions within the WMP areas are considered, including the effect of LACFCD infrastructure and other hydraulic features that can impede flows and associated pollutant loads to the location of the RAA Assessment Points. The result is an accounting system that provides reasonable tracking and estimation of required load reductions throughout each individual WMP area so that meaningful goals can be set for BMP implementation planning.

Applicable targets for wet and dry conditions for Category 1 WQ Priorities (corresponding to the TMDLs within each watershed) are listed in Table 5-4 and Table 5-5, respectively. These targets were used to establish the daily "exceedance load" and daily "allowable load". The differences in these loads, as predicted by LSPC, were tracked across the average year and 90th percentile year and used to calculate the required pollutant reduction. While Category 1 WQ Priorities were emphasized, targets were also applied for Category 2 and Category 3 WQ Priorities. In particular, to provide a comprehensive WMP planning approach, copper, lead, zinc and *E. coli* were assessed for all RAA assessment points (even if a TMDL is not applicable).

For bacteria targets, it should be noted that Allowable Exceedance Days and high flow suspension (HFS) days were incorporated (if applicable) into the percent reduction calculation. The approach of the LA River Bacteria TMDL was used to align Exceedance Days and HFS days. The HFS applies to LLAR and LSGR but not LCC (and thus HFS days were not incorporated into the required reduction calculation for LCC). For LSGR and LCC, a bacteria TMDL has not been adopted but the RAA Guidelines state that targets and critical conditions from other TMDLs in the region should be utilized. If the Allowable Exceedance Days were removed from the percent reduction calculations for LSGR and LCC, the required reductions would increase.

Table 5-4. Applicable wet weather TMDL targets for Category 1 WQ Priorities

WMP Area	Waterbody	Pollutant	Target	Source
LLAR	LAR Reach 1 (freshwater)	Cd kg/d	2.8×10^{-9} X daily storm volume (L) - 1.8	WQBEL
	LAR Reach 1 (freshwater)	Cu kg/d	1.5×10^{-8} X daily storm volume (L) - 9.5	WQBEL
	LAR Reach 1 (freshwater)	Pb kg/d	5.6×10^{-8} X daily storm volume (L) - 3.85	WQBEL
	LAR Reach 1 (freshwater)	Zn kg/d	1.4×10^{-7} X daily storm volume (L) - 83	WQBEL
	All LLAR	DDT ug/kg TSS	1.58	Harbor Toxics TMDL
	All LLAR	PCBs ug/kg TSS	22.7	Harbor Toxics TMDL
	All LLAR	PAHs ug/kg TSS	4,022	Harbor Toxics TMDL
	LAR Reach 1 (freshwater)	*E-coli* MPN/100mL	235 (exceedances allowed during HFS days and 10 exceedance days)	WQBEL

WMP Area	Waterbody	Pollutant	Target	Source
LCC	All LCC	Cu g/d	$4.709X10^{-6}$ X daily storm volume (L)	WQBEL
	All LCC	Pb g/d	$26.852X10^{-6}$ X daily storm volume (L)	WQBEL
	All LCC	Zn g/d	$46.027X10^{-6}$ X daily storm volume (L)	WQBEL
	All LCC	DDT ug/kg TSS	1.58	Harbor Toxics TMDL
	All LCC	PCBs ug/kg TSS	22.7	Harbor Toxics TMDL
	All LCC	PAHs ug/kg TSS	4,022	Harbor Toxics TMDL
LSGR	SG Reach 2	Pb ug/L	81.34	WQBEL
	Coyote Cr.	Cu ug/L	24.71	WQBEL
	Coyote Cr.	Pb ug/L	96.99	WQBEL
	Coyote Cr.	Zn ug/L	144.57	WQBEL
	SG Reach 1 & Coyote Cr.	DDT ug/kg TSS	1.58	Harbor Toxics TMDL
	SG Reach 1 & Coyote Cr.	PCBs ug/kg TSS	22.7	Harbor Toxics TMDL
	SG Reach 1 & Coyote Cr.	PAHs ug/kg TSS	4,022	Harbor Toxics TMDL

Table 5-5. Applicable dry weather TMDL targets for Category 1 WQ Priorities

WMP Area	Waterbody	Pollutant	Target	Source
LLAR	LAR Reach 1 (freshwater)	Cu ug/L	23	WQBEL
	LAR Reach 1 (freshwater)	Pb ug/L	12	WQBEL
	LAR Reach 1 (freshwater)	*E-coli* MPN/100mL	126	WQBEL
LCC	All LCC	Cu g/d	67.2	WQBEL
	All LCC	*E-coli* MPN/100mL	126	WQBEL
LSGR	SG Reach 1	Cu ug/L	18	WQBEL
	SG Reach 1	*E-coli* MPN/100mL	126	WQBEL
	San Jose Cr. Reach 1&2	Se ug/L	5	WQBEL
	San Jose Cr. Reach 1&2	*E-coli* MPN/100mL	126	WQBEL
	Coyote Cr.	Cu kg/d	0.941	WQBEL
	Coyote Cr.	*E-coli* MPN/100mL	126	WQBEL

5.3.1. Wet-Weather Required Pollutant Reductions

The wet weather pollutant baseline loading and reduction targets for average and critical conditions are summarized in Table 5-6 and Table 5-7 respetively (all WMP areas) and shown graphically in Figure 5-12 through Figure 5-15 (individual WMP areas). These analyses were used to determine the limiting pollutant. The limiting pollutant is defined as the pollutant requiring the greatest load reduction, and BMPs implemented to achieve the limiting pollutant reductions are protective of other pollutant reductions (e.g., sediment or volume reductions). In Table 5-6. Wet-weather pollutant baseline loading by WMP area with analysis of limiting pollutants

WMP	Year[1]	Organics (kg)			Metals (kg)			Bacteria (Billion #)[1]
		DDT	PCB	PAH	TCu [2]	TPb	TZn [3]	E-Coli
Lower Los Angeles River (LLAR)	2003	0.12	0.77	19.80	2,437	2,464	11,153	2.78E+07
	2008	0.09	0.61	15.59	1,935	1,968	8,878	5.46E+07
Los Cerritos Channel (LCC)	2003	0.07	0.45	11.60	1,611	1,719	7,481	2.55E+08
	2008	0.05	0.35	9.13	505	386	2,607	2.40E+08
Lower San Gabriel River (LSGR)	2003	0.06	0.42	10.80	768	544	3,805	2.06E+06
	2008	0.05	0.33	8.50	393	337	2,512	1.98E+06
Coyote Creek (CC)	2003	0.11	0.71	18.20	1,640	1,197	8,373	6.57E+05
	2008	0.09	0.56	14.33	839	736	5,450	6.72E+06

Color ramps highlight potentially limiting (Red) vs. pollutants determined to be non-limiting for this analysis (Blue)

1. LLAR, LSGR, CC bacteria loads are for bacteria wet-days and exclude high flow suspension (HFS) days. LCC bacteria loads are for bacteria wet-days
2. Red box: Organics managed through sediment and associated metals reduction. Organic load reductions above influenced by assigned concentrations at half the MDLs (monitoring data below MDLs), and therefore are suspect and not considered limiting. Cu is not limiting after brake-pad reductions
3. Blue Box: Zinc is limiting pollutant for the 90th percentile year
4. Metals loads are for wet-weather days (90th percentile flow and greater)
5. Organics are summarized on an annual basis

Table 5-7, the red color gradient highlights limiting pollutants, with a deeper red generally indicating a more limiting pollutant. Zinc was identified as the limiting pollutant for each WMP area[4]. The determination of limiting pollutant considered implementation actions to control the pollutant – for example, Senate Bill 346 will result in significant reductions of copper loading from brake pads. Because total source control measures are not on the horizon for zinc, it becomes the limiting pollutant instead of copper. The evaluation of copper and organics as limiting pollutants and rationale for their exclusion is described below.

Although DDT and PCBs were estimated to have high load reduction requirements to meet WQBELs, they were not identified as limiting pollutants because the maximum detection limits (MDLs) used for the analysis heavily affected the calculated required reductions. Rather than use LSPC for reduction calculations, monitoring data were used directly and many reported concentrations for DDT, PCBs, and PAHs were below MDLs, so concentrations were assumed in the model to equal half the MDL. The MDL is above the target leading to non-detects requiring reductions. Of course, toxics will be addressed by control measures implemented for zinc. The Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL states that

[4] In LSGR, a higher percent reduction for bacteria was calculated for the average year than the 90th percentile (see Figure 5-14). Although total annual rainfall in 2008 and 2003 were virtually identical over the entire SGR watershed (20.5 and 20.4 inches/year, respectively), 2003 had fewer wet days than 2008, resulting in relatively more intense events on average (about 18 percent higher). As a result, 2003 had more HFS days than 2008—exceedances during HFS days are not considered when computing the required load reduction, lowering the required reduction.

"implementation of other TMDLs in the watershed may contribute to the implementation of this TMDL," and implementation of the effective TMDLs in Los Angeles River and San Gabriel River are integrated within Phase I of the implementation of the toxics TMDL (LARWQCB and USEPA 2011). As a result, DDT, PCBs, and PAHs were not represented in Figure 5-12 through Figure 5-15.

Although copper was calculated to have a higher required reduction than zinc, the effect of Senate Bill 346 is expected to reduce those reductions without any implementation of structural control measures. The Brake Pad Partnership was formed in 1999 as a collaboration of cities, industry, and other entities to address the lack of information and research regarding the impact of brake debris material in the environment. After its formation, the Brake Pad Partnership commissioned several technical studies to better quantify the fate and transport of copper to San Francisco Bay including a detailed source assessment. Overall findings of the study estimated that of the anthropogenic sources of copper, approximately 35 percent are attributed to brake pad releases (BPP 2010). Even if the reduction was only half of this amount, the adjustment to the required copper reduction would still result in zinc being the limiting pollutant in LLAR, LCC, and LSGR.

After excluding organics and total copper for the reasons described previously, total zinc becomes the limiting pollutant in each of the WMP areas during the 90th percentile year. In other words, reductions of zinc during WMP implementation will drive reduction of other pollutants, particularly because the pollutant reduction plan emphasizes sediment control (other pollutants are typically transported with sediment) and retention/infiltration rather than pollutant treatment.

Plots showing the differences between the baseline loads, allowable loads, and exceedance loads are shown in Attachment F.

Table 5-6. Wet-weather pollutant baseline loading by WMP area with analysis of limiting pollutants

WMP	Year[1]	Organics (kg)				Metals (kg)		Bacteria (Billion #)[1]
		DDT	PCB	PAH	TCu [2]	TPb	TZn [3]	E-Coli
Lower Los Angeles River (LLAR)	2003	0.12	0.77	19.80	2,437	2,464	11,153	2.78E+07
	2008	0.09	0.61	15.59	1,935	1,968	8,878	5.46E+07
Los Cerritos Channel (LCC)	2003	0.07	0.45	11.60	1,611	1,719	7,481	2.55E+08
	2008	0.05	0.35	9.13	505	386	2,607	2.40E+08
Lower San Gabriel River (LSGR)	2003	0.06	0.42	10.80	768	544	3,805	2.06E+06
	2008	0.05	0.33	8.50	393	337	2,512	1.98E+06
Coyote Creek (CC)	2003	0.11	0.71	18.20	1,640	1,197	8,373	6.57E+05
	2008	0.09	0.56	14.33	839	736	5,450	6.72E+06

Color ramps highlight potentially limiting (Red) vs. pollutants determined to be non-limiting for this analysis (Blue)

6. LLAR, LSGR, CC bacteria loads are for bacteria wet-days and exclude high flow suspension (HFS) days.
   LCC bacteria loads are for bacteria wet-days
7. Red box: Organics managed through sediment and associated metals reduction. Organic load reductions above influenced by assigned concentrations at half the MDLs (monitoring data below MDLs), and therefore are suspect and not considered limiting. Cu is not limiting after brake-pad reductions
8. Blue Box: Zinc is limiting pollutant for the 90th percentile year
9. Metals loads are for wet-weather days (90th percentile flow and greater)
10. Organics are summarized on an annual basis

Table 5-7. Wet-weather pollutant reduction targets by WMP area with analysis of limiting pollutants[5]

WMP	Year	Organics				Metals		Bacteria
		DDT	PCB	PAH	TCu [2]	TPb	TZn [3]	E-Coli
Lower Los Angeles River (LLAR)	2003	87.3%	72.0%	0.0%	84.1%	38.6%	67.4%	23.4%
	2008	90.0%	77.9%	0.0%	82.8%	32.9%	64.9%	45.1%
Los Cerritos Channel (LCC)	2003	86.6%	70.3%	0.0%	95.6%	76.7%	90.8%	40.4%
	2008	89.6%	77.1%	0.0%	87.1%	3.6%	75.6%	47.9%
Lower San Gabriel River (LSGR)	2003	79.5%	54.6%	0.0%	40.1%	0.0%	29.3%	22.9%
	2008	91.4%	80.7%	0.0%	18.0%	0.0%	25.0%[4]	53.0%
Coyote Creek (CC)	2003	75.9%	46.8%	0.0%	37.5%	0.0%	28.3%	19.1%
	2008	91.3%	76.8%	0.0%	22.7%	0.0%	30.4%[4]	59.2%

Color ramps highlight potentially limiting (Red) vs. pollutants determined to be non-limiting for this analysis (Blue)

1. Average year is 2008 and 90th percentile year is 2003
2. Red box: Organics managed through sediment and associated metals reduction. Organic load reductions above influenced by assigned concentrations at half the MDLs (monitoring data below MDLs), and therefore are suspect and not considered limiting. Cu is not limiting after brake-pad reductions
3. Blue Box: Zinc is limiting pollutant for the 90th percentile year
4. Bacteria reduction target is lower in 2003 than 2008 because more days were classified as HFS

[5] For the Diamond Bar jurisdiction of the San Gabriel River WMP area, a portion flows to the Santa Ana River. Since this area is open space and therefore not associated with MS4 runoff, no reductions were determined necessary. Loadings for the 90th percentile year from this area are 1.16 kg/year of total Cu, 0.87 kg/year of total Pb, 5.21 kg/year of total Zn, and 4.91x10^{12} #/year of E-coli.

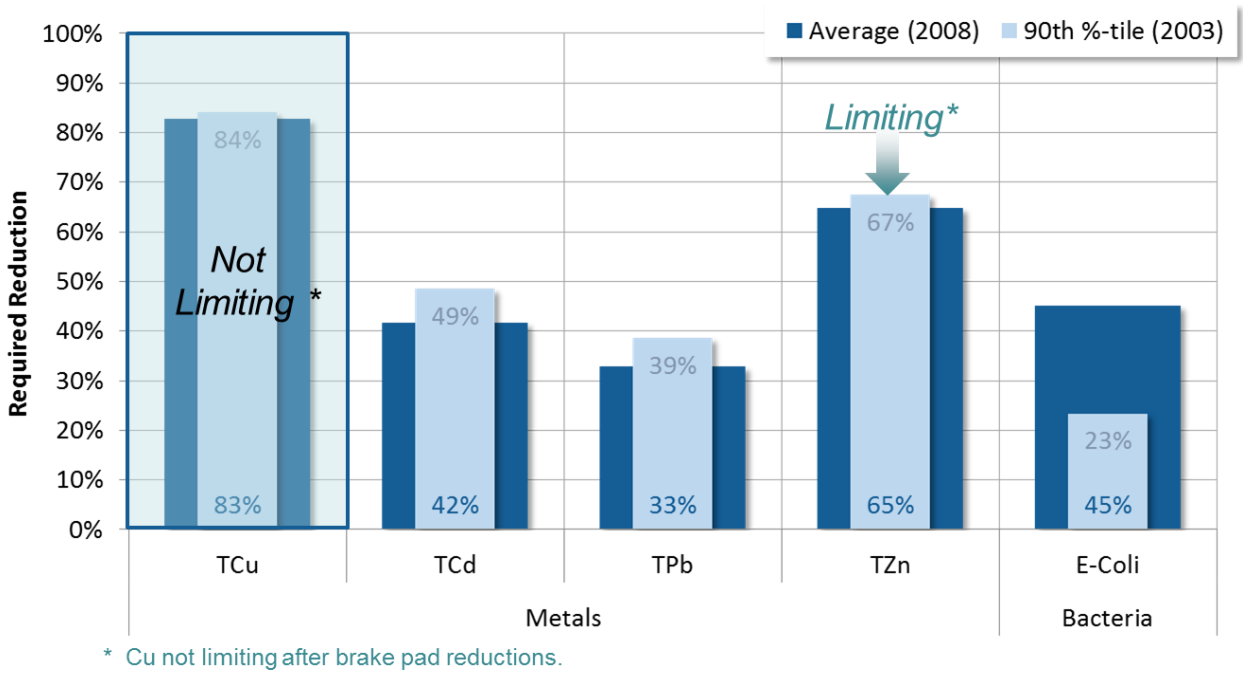


Figure 5-12. Wet-weather pollutant reduction targets and limiting pollutant for Lower Los Angeles River WMP.[6]

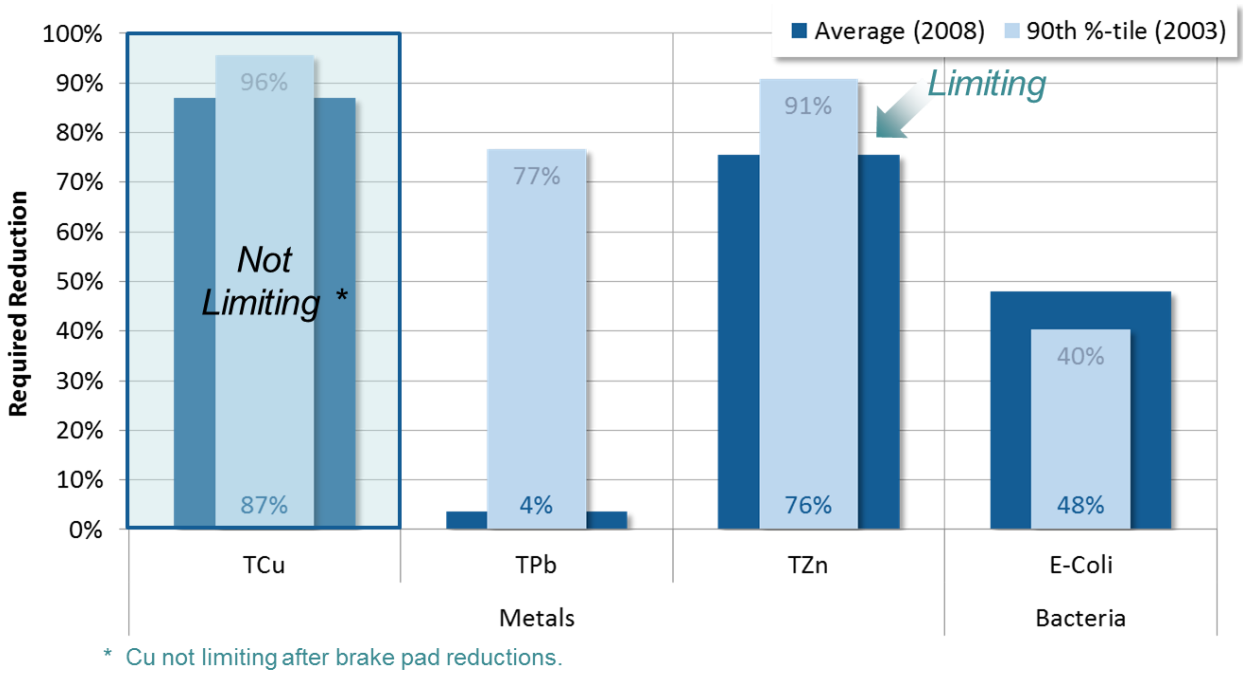


Figure 5-13. Wet-weather pollutant reduction targets and limiting pollutant for Los Cerritos Chanel WMP.

[6] Note that the Los Cerritos Channel TMDLs for Metals requires no reduction of Pb.

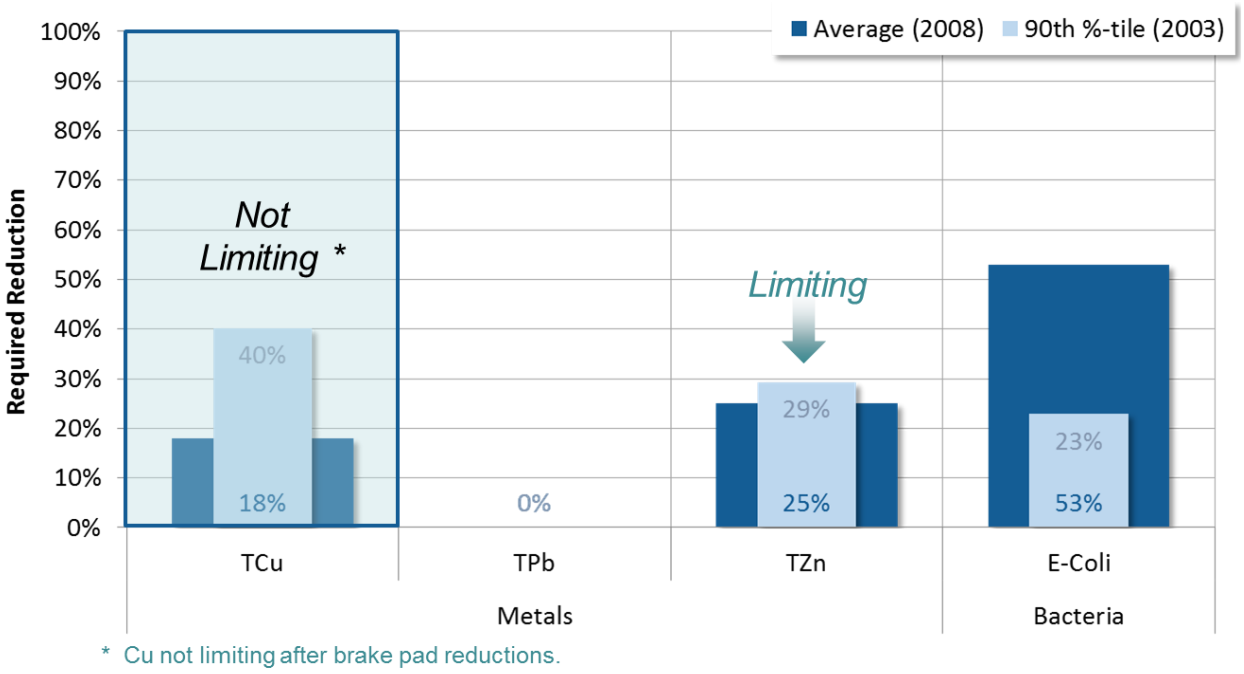


Figure 5-14. Wet-weather pollutant reduction targets and limiting pollutant for Lower San Gabriel River.

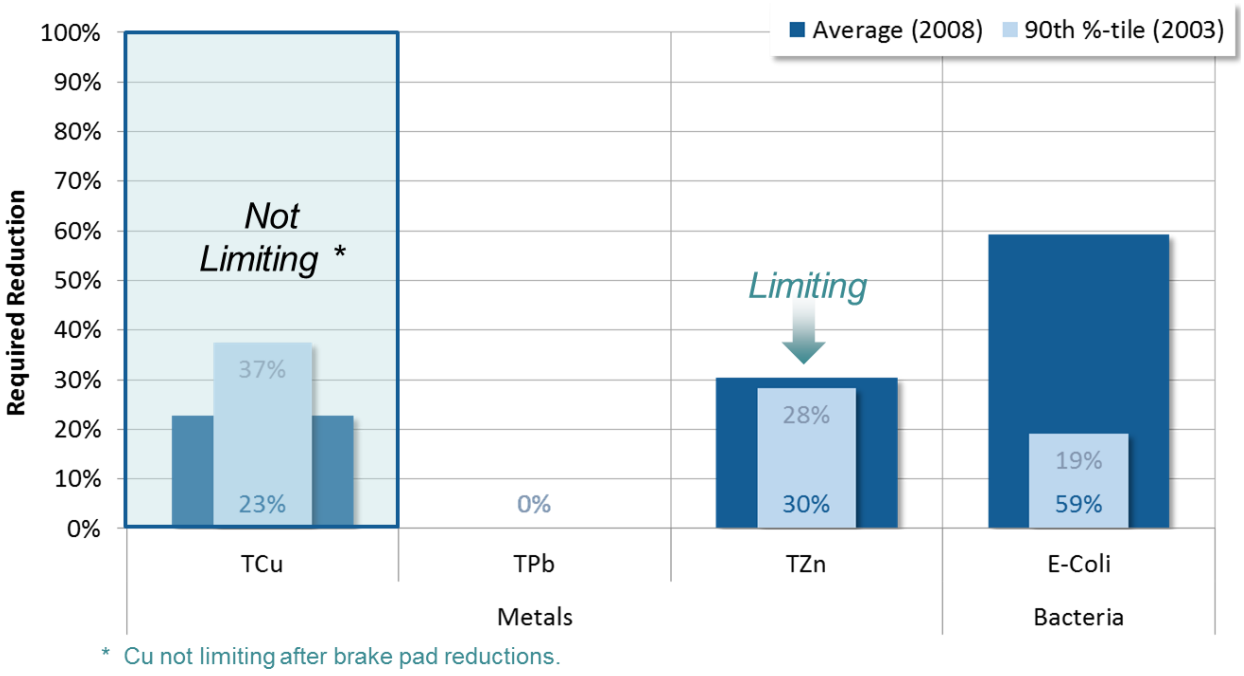


Figure 5-15. Wet-weather pollutant reduction targets and limiting pollutant for Coyote Creek.

5.3.2. Dry-Weather Pollutant Reduction Targets

Using the representative dry-weather period of August 17 through September 30, as defined in Section 5.2.3, modeled instream flow was multiplied by the observed dry weather concentrations to get existing conditions loads, which are shown in Table 5-8. Likewise, target concentrations were also multiplied by modeled instream flow to get allowable load for each waterbody, which is shown in Table 5-9. Finally, Table 5-10 summarizes dry-weather reduction targets for each listed segment for both the average year and the 90th percentile year.

For dry weather, bacteria is the limiting pollutant (not zinc) because the required reductions are much higher than other pollutants. Reductions of bacteria during WMP implementation will drive reductions of other pollutants.

Table 5-8. Modeled existing condition dry-weather loads by water body

Existing Condition		Dry Weather Flow (cfs)		Existing Load (kg/day or MPN/day)		
Waterbody	**Pollutant**	**2003**	**2008**	**2003**	**2008**	**Mean**
LAR Reach 1 (freshwater)	Cu ug/L	99.97	65.63	6.28	4.12	5.20
LAR Reach 1 (freshwater)	Pb ug/L	99.97	65.63	0.84	0.55	0.69
LAR Reach 1 (freshwater)	*E. coli* MPN/100ml	99.97	65.63	4.79E+13	3.15E+13	3.97E+13
LCC	Cu ug/L	4.65	2.20	0.29	0.14	0.21
LCC	*E. coli* MPN/100ml	4.65	2.20	1.62E+12	7.64E+11	1.19E+12
SG Reach 1	Cu ug/L	69.04	75.36	5.05	5.51	5.28
SG Reach 1	*E. coli* MPN/100ml	69.04	75.36	3.70E+12	4.04E+12	3.87E+12
San Jose Cr. Reach 1 & 2	Se ug/L	12.54	19.62	0.06	0.09	0.07
San Jose Cr. Reach 1 & 2	*E. coli* MPN/100ml	12.54	19.62	6.72E+11	1.05E+12	8.62E+11
Coyote Cr.	Cu ug/L	19.65	15.69	1.37	1.10	1.23
Coyote Cr.	*E. coli* MPN/100ml	19.65	15.69	5.53E+12	4.41E+12	4.97E+12

Table 5-9. Allowable TMDL dry-weather loads by water body

Existing Condition		Dry Weather Flow (cfs)		Allowable Load (kg/day or MPN/day)		
Waterbody	**Pollutant**	**2003**	**2008**	**2003**	**2008**	**Mean**
LAR Reach 1 (freshwater)	Cu ug/L	99.97	65.63	5.63	3.69	4.66
LAR Reach 1 (freshwater)	Pb ug/L	99.97	65.63	2.94*	1.93*	2.43*
LAR Reach 1 (freshwater)	*E. coli* MPN/100ml	99.97	65.63	3.08E+11	2.02E+11	2.55E+11
LCC	Cu ug/L	4.65	2.20	0.07	0.07	0.07
LCC	*E. coli* MPN/100ml	4.65	2.20	1.43E+10	6.78E+09	1.06E+10
SG Reach 1	Cu ug/L	69.04	75.36	3.04	3.32	3.18
SG Reach 1	*E. coli* MPN/100ml	69.04	75.36	2.13E+11	2.32E+11	2.23E+11
San Jose Cr. Reach 1 & 2	Se ug/L	12.54	19.62	0.15*	0.24*	0.20*
San Jose Cr. Reach 1 & 2	*E. coli* MPN/100ml	12.54	19.62	3.87E+10	6.05E+10	4.96E+10
Coyote Cr.	Cu ug/L	19.65	15.69	0.94	0.94	0.94
Coyote Cr.	*E. coli* MPN/100ml	19.65	15.69	6.06E+10	4.48E+10	5.45E+10

*Existing dry-weather loads are currently below the allowable loads thus showing compliance for this pollutant.

Table 5-10. Required dry-weather percent reductions by water body

WMP	Waterbody	Pollutant	Required Dry-Weather Percent Reductions		
			2003	**2008**	**Mean**
LLAR	LAR Reach 1 (freshwater)	Cu	10%	10%	10%
	LAR Reach 1 (freshwater)	Pb	0%	0%	0%
	LAR Reach 1 (freshwater)	*E. coli*	99.36%	99.36%	99.36%
LCC	LCC	Cu	76.74%	50.85%	68.43%
	LCC	*E. coli*	99.11%	99.11%	99.11%
LSGR	Coyote Cr.	Cu	31.42%	14.11%	23.73%
	Coyote Cr.	*E. coli*	98.90%	98.90%	98.90%
	SG Reach 1	Cu	39.78%	39.78%	39.78%
	SG Reach 1	*E. coli*	94.25%	94.25%	94.25%
	San Jose Cr. Reach 1 & 2	Se	0%	0%	0%
	San Jose Cr. Reach 1 & 2	*E. coli*	94.25%	94.25%	94.25%

Color Ramp shows relative magnitude of reductions—darker means higher reductions

6. Determination of Potential BMP Capacity for RAA

The process for determining the necessary cumulative BMP capacity depends on the type of numeric goal being addressed. As shown in Figure 6-1, the volume-based (design storm) approach, necessary BMP capacity was determined through a design storm analysis. For the load-based (pollutant reduction), the analysis leveraged the optimization routines in the customized WMMS. An initial step in the RAA was a comparison of the volume reductions required by the load-based and volume-based numeric goals, to support selection of the wet weather critical conditions.

For LLAR, LCC, and LSGR, the 90th percentile WY (2002-03) weather was selected as the critical condition for wet weather.

Details on the analyses performed to determine potential BMP treatment capacity are provided in Attachment A. The attachment describes the approach for incorporating nonstructural BMPs, accounting for the effect of LACFCD infrastructure, and separating the contribution from non-MS4 sources.

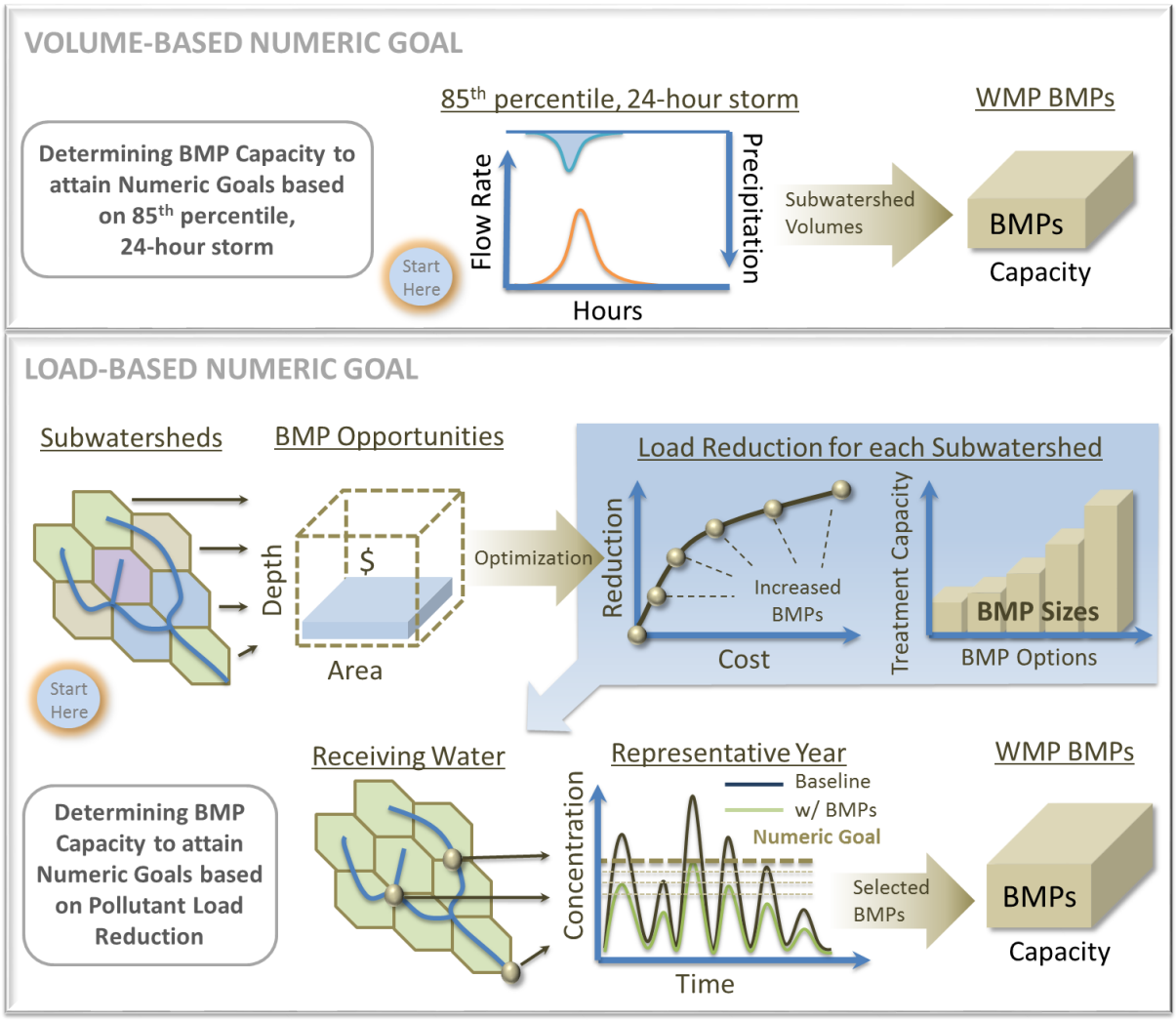


Figure 6-1. Illustration of Process for Determining Required BMP Capacities for the WMP using Volume-Based (top panel) and Load-Based (bottom panel) Numeric Goals.

7. Cumulative Volume Reduction Goals to Achieve Required Pollutant Reductions

The first output of the RAA is a series of "volume reduction goals" for each subwatershed and jurisdiction in the WMP area. WMMS was used to determine the stormwater retention volumes for each subwatershed that would achieve the required load reductions, as reported in this section. These calculated runoff reduction volumes for each subwatershed are a surrogate compliance metric for the responsible agencies. It should be noted that upon implementation, opportunities may arise where flow-through BMPs may provide similar ultimate pollutant load reduction, and may replace the need to implement volume-based reduction BMPs.

These volumes also form the basis for selection of BMPs to achieve those volume reductions, as described in Section 9 and Attachment A.

7.1. Volume Reductions for Structural BMPs

Structural BMPs were modeled using the assumptions outlined in Attachment A. BMP capacities were optimized across the entire study area to achieve the final milestone pollutant reduction requirements at each of the assessment points. Instead of summarizing optimization results in terms of BMP capacity, which is really specific to the network described in Attachment A, the results were summarized as required *annual* wet-weather retention volume (in acre-feet). This provides a volumetric basis that is (1) closely related to load reduction and (2) readily transferable as a control target for parallel BMP modeling at a finer resolution. Because the volumes were isolated to wet days, it is also not skewed by dry-weather runoff retention. The following subsections provide more details about the wet- and dry-weather analysis components.

7.1.1. Wet Weather

Using the structural BMP routing network in WMMS (described in Attachment A), the required *annual* wet-weather retention volume (in acre-feet) were calculated using the critical year time series. For milestones, the percent reduction was based on average year targets while final limits were based on critical year targets. The reported annual volumes are (1) based on required load reductions and (2) ready for BMP modeling at a finer resolution. A 10 percent load reduction was assumed to result from implementation of all nonstructural control measures outlined in the WMPs, setting the foundation of WMP implementation, and structural control measures provide additional load reduction.

Table 7-1 through Table 7-4 present incremental and cumulative retention volumes required to achieve each load reduction milestone by jurisdiction. The milestones are based on the metals TMDLs as described in Section 2. In order to calculate the incremental volume reductions for each milestone, optimization was performed for each jurisdiction to (1) emphasize BMP implementation in subwatersheds that volume reduction could most cost effectively reduce pollutants and (2) establish a cost-effective sequence of subwatersheds for each jurisdiction to achieve the milestones over time. In other words, WMMS was used to develop an implementation schedule that provides early gains in receiving water quality.

Table 7-1. Annual volume reduction goals to achieve interim and final milestones for Lower Los Angeles River WMP by jurisdiction

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Downey	31%	143.8	143.8
	50%	221.7	365.5
	Final	360.5	726.0
Lakewood	31%	14.3	14.3
	50%	0.0	14.3
	Final	0.0	14.3
Long Beach	31%	540.7	540.7
	50%	1090.8	1,631.5
	Final	2270.1	3,901.7
Lynwood	31%	303.3	303.3
	50%	185.2	488.6
	Final	619.6	1,108.1
Paramount	31%	181.8	181.8
	50%	227.8	409.6
	Final	579.2	988.8
Pico Rivera	31%	365.3	365.3
	50%	0.0	365.3
	Final	12.0	377.3
Signal Hill	31%	32.8	32.8
	50%	106.6	139.4
	Final	58.4	197.9
South Gate	31%	229.3	229.3
	50%	343.2	572.6
	Final	940.0	1,512.6

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
2: Includes full implementation of planned non-structural practices

Table 7-2. Annual volume reduction goals to achieve interim and final milestones for Los Cerritos Channel WMP by jurisdiction

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Bellflower	10%	NS	NS
	35%	336.1	336.1
	Final	801.3	1,137.4
Cerritos	10%	NS	NS
	35%	9.7	9.7
	Final	3.2	12.9
Downey	10%	NS	NS
	35%	77.0	77.0
	Final	35.8	112.8
Lakewood	10%	NS	NS
	35%	282.4	282.4
	Final	874.8	1,157.2
Long Beach	10%	NS	NS
	35%	560.9	560.9
	Final	2115.2	2,676.1
Paramount	10%	NS	NS
	35%	278.8	278.8
	Final	353.1	631.9
Signal Hill	10%	NS	NS
	35%	269.9	269.9
	Final	52.7	322.6

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
NS: Non-structural practices achieve 10% milestone

Table 7-3. Annual volume reduction goals to achieve interim and final milestones for Lower San Gabriel River WMP

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Artesia	10%	NS	NS
	35%	1.1	1.1
	Final	0.0	1.1
Bellflower	10%	NS	NS
	35%	1.3	1.3
	Final	61.5	62.8
Cerritos	10%	NS	NS
	35%	6.6	6.6
	Final	52.8	59.4
Diamond Bar	10%	NS	NS
	35%	0.3	0.3
	Final	32.8	33.0
Downey	10%	NS	NS
	35%	4.3	4.3
	Final	259.6	263.9
Lakewood	10%	NS	NS
	35%	7.4	7.4
	Final	2.2	9.6
Long Beach	10%	NS	NS
	35%	26.9	26.9
	Final	2.3	29.2
Norwalk	10%	NS	NS
	35%	0.8	0.8
	Final	136.1	136.9
Pico Rivera	10%	NS	NS
	35%	0.2	0.2
	Final	74.8	75.1
Santa Fe Springs	10%	NS	NS
	35%	0.0	0.0
	Final	106.0	106.0
Whittier	10%	NS	NS
	35%	0.0	0.0
	Final	7.5	7.5

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
NS: Non-structural practices achieve 10% milestone

Table 7-4. Annual volume reduction goals to achieve interim and final milestones for the Coyote Creek portion of Lower San Gabriel River WMP by jurisdiction

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Artesia	10%	NS	NS
	35%	47.9	47.9
	Final	0.0	47.9
Cerritos	10%	NS	NS
	35%	0.1	0.1
	Final	194.2	194.3
Diamond Bar	10%	NS	NS
	35%	1.0	1.0
	Final	73.0	74.0
Hawaiian Gardens	10%	NS	NS
	35%	27.0	27.0
	Final	3.4	30.4
La Mirada	10%	NS	NS
	35%	0.8	0.8
	Final	174.9	175.7
Lakewood	10%	NS	NS
	35%	17.5	17.5
	Final	8.2	25.7
Long Beach	10%	NS	NS
	35%	37.5	37.5
	Final	0.0	37.5
Norwalk	10%	NS	NS
	35%	3.0	3.0
	Final	149.5	152.5
Santa Fe Springs	10%	NS	NS
	35%	0.4	0.4
	Final	260.3	260.7
Whittier	10%	NS	NS
	35%	2.1	2.1
	Final	252.6	254.7

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
NS: Non-structural practices achieve 10% milestone

7.1.2. Dry Weather

Dry-weather reductions from non-structural BMPs were calculated using flow from representative dry period (Section 5.2) of 8/17/2003 through 9/30/2003 and 90th percentile concentrations calculated from observed data (Section 5.2.1). Similar to wet weather, a 10% load reduction is assumed to result from the cumulative effect of nonstructural BMPs. Also, the effects of a 25% reduction in irrigation of urban grass was explicitly simulated in the model to estimate the resulting associated reduction of dry weather flows at the RAA Assessment Points. Irrigation was modeled as artificial rainfall within the LSPC model as a function of the potential evapotranspiration of urban grass. Once irrigation was reduced 25%, this directly impacted a large portion of the nonstormwater discharges drivin primarily from over irrigation and impacts on dry weather flows were significant. The projected effect of non-structural and irrigation controls on dry weather flow and loads is presented in Table 7-5. Since *E. Coli* is the limiting dry weather pollutant with required reductions in excess of 90%, the remaining volume reduction not controlled by non-structural measures will be treated by the structural BMPs described in the previous section.

Table 7-5. Projected dry weather reductions from non-structural control measures

Watershed	Constituent	Quantity (Volume or Mass)			Percent Reduction Achieved	
		Baseline	NM	NS	NM	NS
Lower Los Angeles River	Flow (M Gal.)	198.3	178.5	86.6	10.0%	56.4%
	Copper (kg)	19.28	17.35	8.42	10.0%	56.4%
	Lead (kg)	2.58	2.32	1.12	10.0%	56.4%
	E. Coli (Billion MPN)	147,166	132,449	64,230	10.0%	56.4%
Los Cerritos Channel	Flow (M Gal.)	133.6	120.2	56.3	10.0%	57.8%
	Copper (kg)	12.84	11.56	5.42	10.0%	57.8%
	E. Coli (Billion MPN)	71,808	64,627	30,277	10.0%	57.8%
Lower San Gabriel River	Flow (M Gal.)	163.3	147.0	71.2	10.0%	56.4%
	Copper (kg)	18.48	16.63	8.06	10.0%	56.4%
	Selenium (kg)	2.95	2.65	1.29	10.0%	56.4%
	E. Coli (Billion MPN)	13,540	12,186	5,903	10.0%	56.4%
Coyote Creek	Flow (M Gal.)	213.4	192.0	88.4	10.0%	58.6%
	Copper (kg)	23.05	20.75	9.55	10.0%	58.6%
	E. Coli (Billion MPN)	92,887	83,599	38,491	10.0%	58.6%

NM: Non-modeled non-structural practices achieve 10% reduction

NS: Non-structural 25% irrigation reduction practices achieve an additional approximately 60% reduction

8. MS4 Volume Reduction Goals to Achieve Required Pollutant Reductions

Each jurisdiction in the Group's WMP area is subject to stormwater runoff from non-MS4 facilities. In particular, Caltrans roads and facilities regulated by nontraditional or general industrial permits contribute to the runoff volume for each subwatershed. It will be important for these entities to retain their runoff and/or eliminate their cause/contribution to receiving water exceedances. The runoff from these non-MS4 facilities was therefore estimated and subtracted from the cumulative volume reduction goal (Section 7) to establish the MS4 responsible targets as described in Attachment A.

8.1. Summary of MS4 Responsible Reduction Goals

Runoff volumes estimated for non-MS4 permitted areas and Caltrans were subtracted from the reduction target to generate the required MS4 treatment capacity shown in Table 8-1 through Table 8-4.

Table 8-1. Lower Los Angeles River Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Downey	726.0	654.7	71.2
Lakewood	14.3	14.3	-
Long Beach	3,901.7	3,039.6	862.1
Lynwood	1,108.1	667.9	440.2
Paramount	988.8	606.1	382.7
Pico Rivera	377.3	287.2	90.0
Signal Hill	197.9	188.9	9.0
South Gate	1,512.6	1,174.3	338.2
TOTAL	8,826.5	6,633.1	2,193.5

Table 8-2. Los Cerritos Channel Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Bellflower	1,137.4	990.4	147.0
Cerritos	12.9	12.9	0.0
Downey	112.8	93.0	19.8
Lakewood	1,157.2	1,152.1	5.1
Long Beach	2,676.1	1,629.8	1,046.2
Paramount	631.9	525.5	106.4
Signal Hill	322.6	284.3	38.3
TOTAL	6,050.9	4,688.0	1,364.8

Table 8-3. San Gabriel River Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Artesia	1.1	1.1	0.0
Bellflower	62.8	57.4	5.4
Cerritos	59.4	4.1	55.3
Diamond Bar	33.0	1.1	32.0
Downey	263.9	87.3	176.7
Lakewood	9.6	2.2	7.4
Long Beach	29.2	29.2	0.0
Norwalk	136.9	4.8	132.1
Pico Rivera	75.1	60.4	14.7
Santa Fe Springs	106.0	30.3	75.8
Whittier	7.5	7.1	0.4
TOTAL	784.6	284.9	499.7

Table 8-4. Coyote Creek Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Artesia	47.9	15.9	32.0
Cerritos	194.3	56.7	137.6
Diamond Bar	74.0	36.7	37.4
Hawaiian Gardens	30.4	27.1	3.4
La Mirada	175.7	124.9	50.8
Lakewood	25.7	19.7	6.0
Long Beach	37.5	0.0	37.5
Norwalk	152.5	52.5	99.9
Santa Fe Springs	260.7	12.6	248.1
Whittier	254.7	200.1	54.6
TOTAL	1,253.4	546.1	707.3

9. Pollutant Reduction Plan

The BMPs used to achieve the MS4 volume reduction goals in Section 8 are not, per se, a component of the Permit compliance determination. Instead, over time each agency will report and demonstrate that the *cumulative* effect of projects implemented over time add up to the required reductions for interim milestones and final targets (reported as "MS4 Compliance Target"). However, the initial scenario of BMPs for WMP implementation (referred to as a Pollutant Reduction Plan in the RAA Guidelines) and their costs may be the most beneficial outcome of the WMP. A detailed WMP implementation scenario is presented in Attachment B, broken down by jurisdiction and subwatershed. The volume reductions are separated among right-of-way (ROW) BMPs and Low Impact Development (LID) on public parcels (in combination with nonstructural BMPs).

The Pollutant Reduction Plan is considered an "initial" scenario because over time, through adaptive management, the responsible agencies will likely "shift" among different types of BMPs (e.g., increase implementation of green streets and reduce implementation of regional BMPs) or substitute alterative BMPs altogether (e.g., implement dry wells instead of green streets). These shifts will be supported by analyses to show the substituted BMPs provide an equivalent volume reduction as the replaced BMPs.

9.1. Existing/Planned Regional Control Measures

Existing regional BMPs play an integral part in measuring the current reductions and need for future control measures. The annual volume or load removed from the existing and planned regional control measures were subtracted from the MS4 responsible runoff to determine the remaining treatment volume required. Detailed information for the existing and planned regional control measures is found in Attachment A.

The existing and planned regional control measure information was provided for the Lower Los Angeles River and Lower San Gabriel River. The jurisdictions that were impacted are listed with the associated annual reduction provided by these facilities in Table 9-1 and Table 9-2.

Table 9-1. Lower Los Angeles River Critical Year Existing/Planned Regional BMP Runoff Volume Reductions

Jurisdiction	COMPLIANCE TARGET		
	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Existing/Planned Regional BMP Reductions (acre-ft/year)	Remaining MS4 Responsible Critical Year Storm Volume (acre-ft/year)
Lakewood	14.3	6.4	7.9
Long Beach	3,039.6	633.4	2,406.2
Signal Hill	188.9	22.7	166.2

Table 9-2. Lower San Gabriel River Critical Year Existing/Planned Regional BMP Runoff Volume Reductions

Jurisdiction	COMPLIANCE TARGET		
	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Existing/Planned Regional BMP Reductions (acre-ft/year)	Remaining MS4 Responsible Critical Year Storm Volume (acre-ft/year)
Downey	87.3	24.0	63.3

9.2. Future Control Measures for Attainment of Interim and Final Limits

The Pollutant Reduction Plans for wet and dry weather illustrate the sequencial BMP implementation strategy to attain all interim and final limits. Within each of the jurisdictions, the subwatershed subareas were individually prioritized and associated with milestones on the basis of cost-effectiveness for zinc removal. The optimization modeling results presented in Section 7 and Figure 9-1, Figure 9-2 and Figure 9-3 shown below identify the prioritization of subwatershed implementation based on the most effective combination of BMPs. The implementation schedule outlined in the Pollutant Reduction Plans for wet and dry weather are based upon this prioritization. The plans are presented in the following subsections.

9.2.1. Wet Weather

The interim and final targets are presented in total acre-feet per year that requires treatement through structural BMPs (less the non-MS4 and existing regional volumes as described in Sections 8 and 9.1). To properly capture the annual volume, BMPs are sized to the minimum volume needed to capture the target annual volume. Thus, the BMPs are presented as a volume (acre-feet) that has the ability to capture the required annual total to meet compliance.

An overall jurisdictional summary table is presented in Table 9-3 that outlines the required BMP volume to achieve compliance in the associated WMP group. The BMP volumes are the sum of existing distributed BMPs, potential green street BMPs, LID on public parcels, and remaining BMP volume that must be implemented as regional (or other) projects as necessary to meet the annual volume reduction target.

Table 9-4 through Table 9-7 outlines the jurisdiction-wide BMP volume targets necessary to meet the annual volume interim and final limits established in Section 8. Each distributed BMP was associated with a jurisdictional subwatershed and the associated implementation schedule, thus summing their impact across different interim goals. The remaining BMP volume after accounting for existing distributed BMPs is spread across right-of-way BMPs, LID on public parcels, and remaining BMP volume including potential regional projects. Priority was given to LID on public parcels, followed by right-of-way BMPs and finally other BMPs. The incremental column shows the total additional BMP volume required for each milestone while the cumulative measures the total BMP volume required by each milestone to hit the final compliance targets. Deatiled discussion on how the BMPs in the right-of-way and LID on public parcels were determined is found in Attachment A. Detailed tables are provided in Attachment B for each jurisdiction and associated subwatersheds. Detailed tables describing the existing distributed BMPs are found in Attachment D.

Table 9-3. Jurisdictional Final Target BMP Volumes by WMP Group

	LLAR	LCC	LSGR - SGR	LSGR - CC	
Jurisdiction	**Total BMP Volume to Achieve Compliance (acre-ft)**	**Total BMP Volume to Achieve Compliance (acre-ft)**	**Total BMP Volume to Achieve Compliance (acre-ft)**	**Total BMP Volume to Achieve Compliance (acre-ft)**	**TOTAL**
Artesia	-	-	0.1	1.1	**1.2**
Bellflower	-	118.2	5.5	-	**123.7**
Cerritos	-	1.6	0.6	6.4	**8.6**
Diamond Bar	-	-	0.2	8.9	**9.1**
Downey	83.4	10.2	17.5	-	**111.2**
Hawaiian Gardens	-	-	-	2.2	**2.2**
La Mirada	-	-	-	15.2	**15.2**
Lakewood	1.2	169.5	0.4	1.9	**173.0**
Long Beach	319.1	208.7	2.7	0.0	**530.5**
Lynwood	95.5	-	-	-	**95.5**
Norwalk	-	-	0.3	4.7	**5.0**
Paramount	76.6	55.1	-	-	**131.7**
Pico Rivera	41.2	-	10.8	-	**52.0**
Santa Fe Springs	-	-	4.9	2.1	**7.0**
Signal Hill	22.3	28.6	-	-	**50.9**
South Gate	173.0	-	-	-	**173.0**
Whittier	-	-	1.4	39.1	**40.5**
TOTAL	**812.3**	**591.9**	**44.4**	**81.6**	**1,530.2**

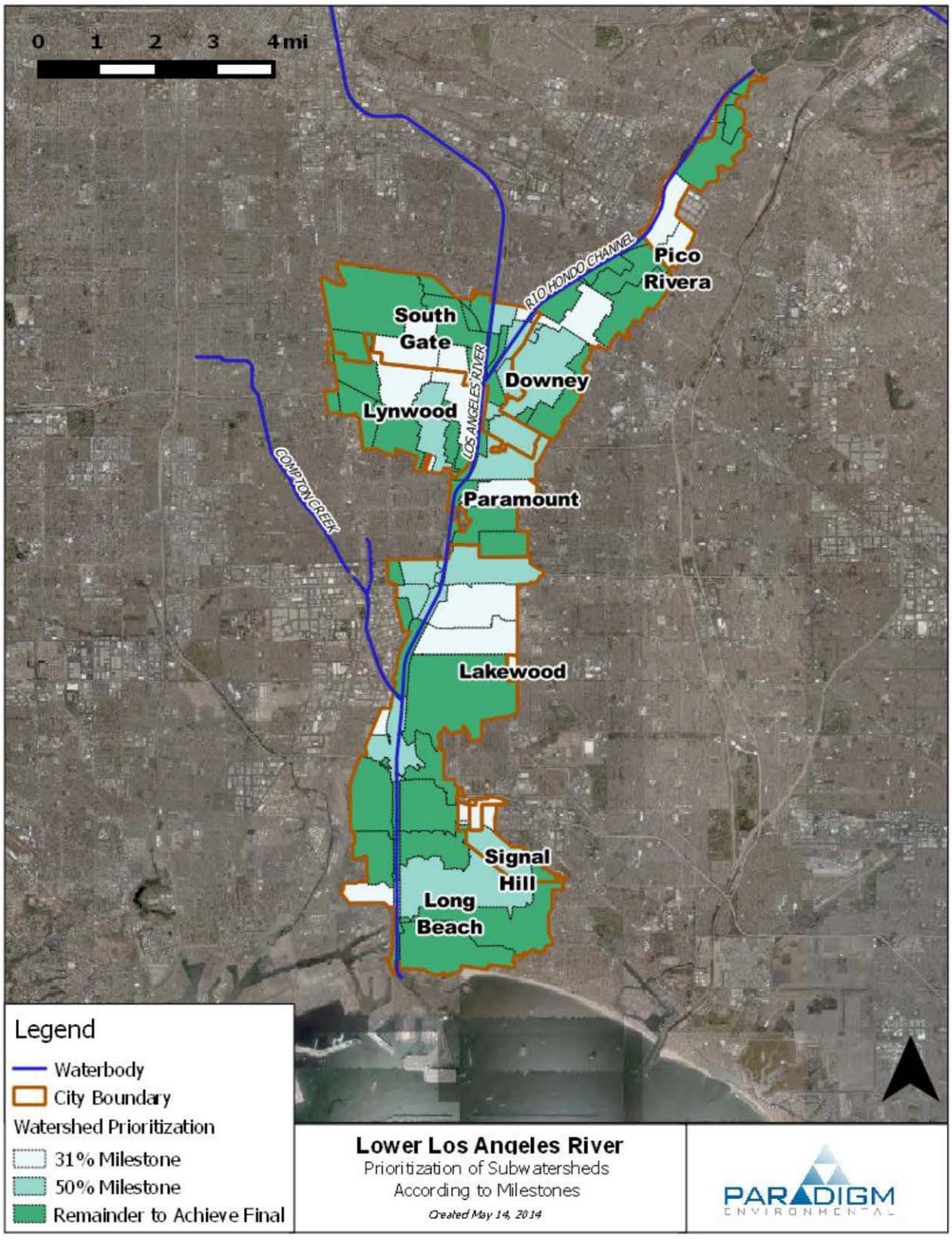


Figure 9-1. LLAR implementation areas associated with Interim and final milestones.

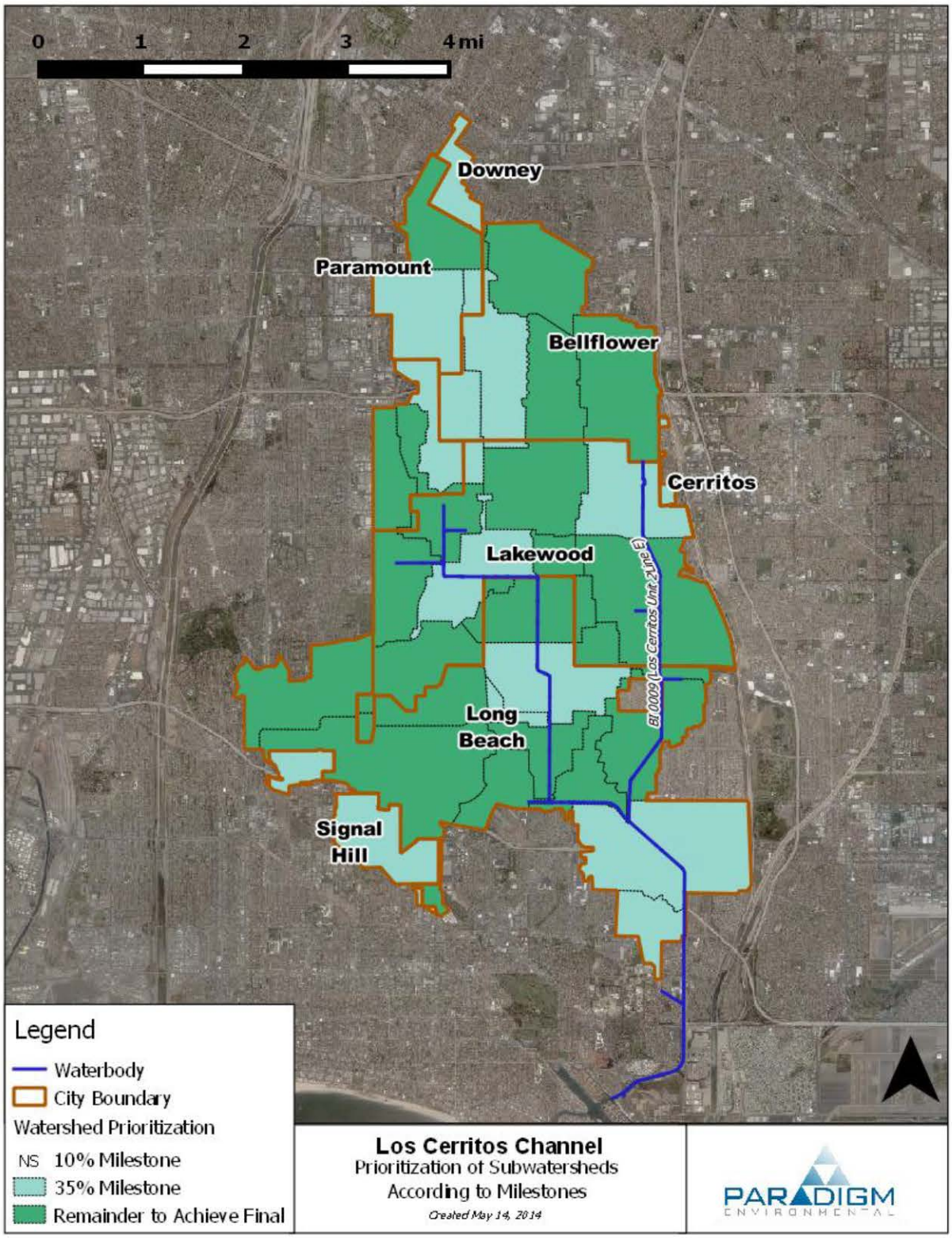


Figure 9-2. LCC implementation areas associated with Interim and final milestones.

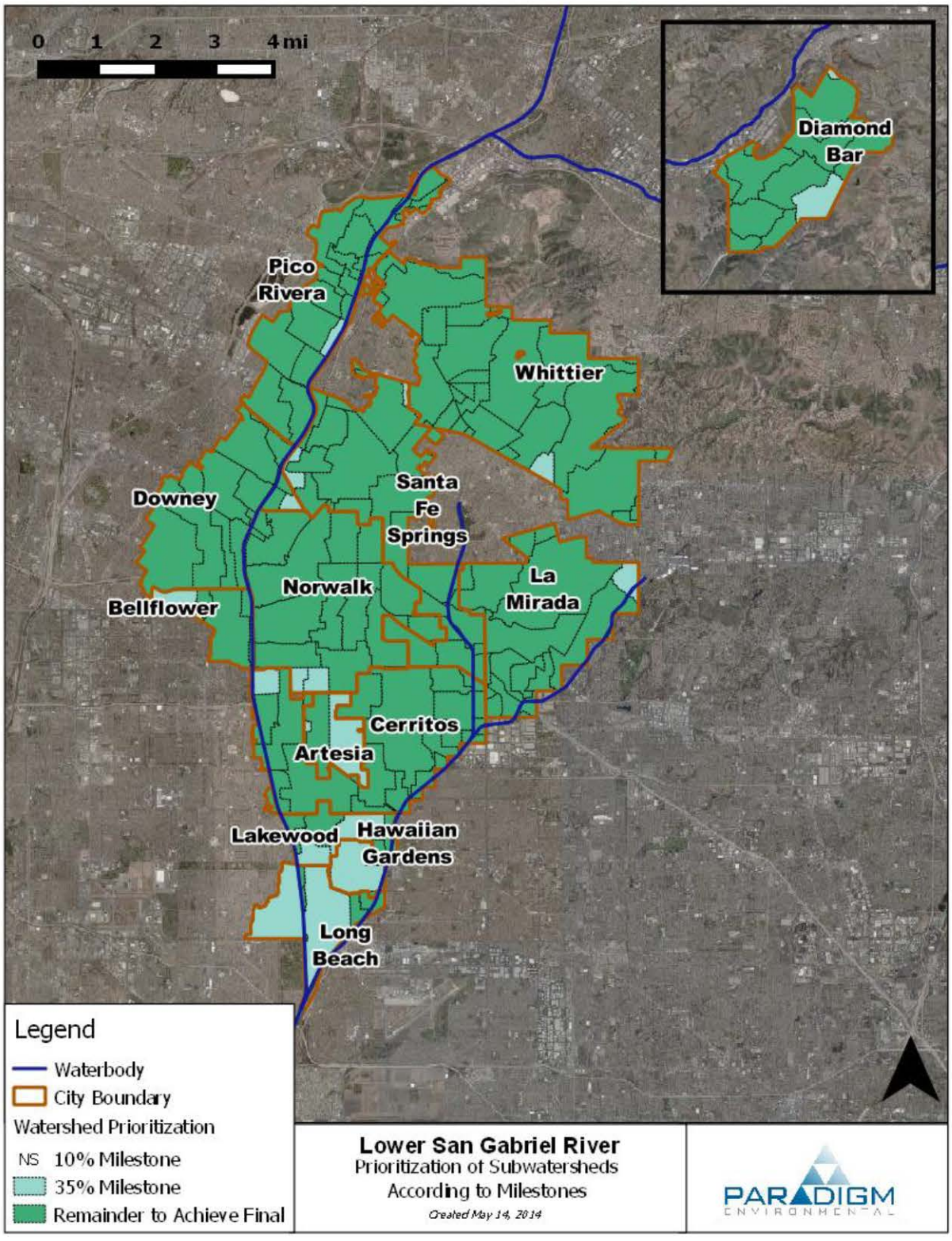


Figure 9-3. LSGR implementation areas associated with Interim and final milestones.

Table 9-4. Lower Los Angeles River Pollutant Reduction Plan for Attainment of Interim and Final Limits

		COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
Jurisdiction	Milestone	Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Downey	31%	143.8	143.8	1.1	12.2	12.2	0.7	0.7	7.1	7.1
	50%	187.1	330.9	0.7	2.5	14.7	10.1	10.8	0.6	7.7
	Final	323.9	654.7	2.0	31.2	45.9	4.4	15.3	10.7	18.4
Lakewood	31%	7.9	7.9	NA	1.1	1.1	0.0	0.0	-	-
	50%	-	7.9		-	1.1	-	0.0	-	-
	Final	-	7.9		-	1.1	-	0.0	-	-
Long Beach	31%	6.5	6.5	NA	1.0	1.0	0.0	0.0	-	-
	50%	567.0	573.5		40.3	41.3	7.5	7.5	24.7	24.7
	Final	1,832.7	2,406.2		113.4	154.6	20.8	28.3	111.5	136.2
Lynwood	31%	235.9	235.9	NA	18.4	18.4	2.7	2.7	13.1	13.1
	50%	134.9	370.8		12.8	31.2	3.8	6.5	0.1	13.2
	Final	297.2	667.9		22.7	53.9	4.5	11.1	17.3	30.5
Paramount	31%	163.7	163.7	0.1	9.0	9.0	1.7	1.7	10.2	10.2
	50%	65.7	229.4		7.4	16.4	0.8	2.5	0.3	10.4
	Final	376.6	606.1		14.9	31.2	2.1	4.7	30.2	40.6
Pico Rivera	31%	275.3	275.2	NA	11.5	11.5	0.5	0.5	27.4	27.4
	50%	-	275.2		-	11.5	-	0.5	-	27.4
	Final	12.0	287.2		1.3	12.8	0.0	0.5	0.5	27.9
Signal Hill	31%	8.5	8.5	0.2	0.8	0.8	0.2	0.2	0.2	0.2
	50%	105.8	114.3		7.0	7.8	0.9	1.1	5.9	6.1
	Final	51.9	166.2		2.2	10.0	0.0	1.1	4.9	11.0
South Gate	31%	229.3	229.3	4.7	23.2	23.2	0.9	0.9	6.5	6.5
	50%	198.1	427.4		15.0	38.3	0.8	1.7	12.6	19.1
	Final	746.9	1,174.3		49.3	87.5	5.1	6.8	54.7	73.8

Table 9-5. Los Cerritos Channel Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Bellflower	10%	NS	NS		-	-	-	-	-	-
	35%	244.4	244.4	NA	15.1	15.1	1.2	1.2	16.2	16.2
	Final	746.0	990.4		43.0	58.1	3.2	4.5	39.4	55.6
Cerritos	10%	NS	NS		-	-	-	-	-	-
	35%	9.7	9.7	NA	1.0	1.0	0.0	0.0	0.5	0.5
	Final	3.2	12.9		-	1.0	-	0.0	0.1	0.6
Downey	10%	NS	NS		-	-	-	-	-	-
	35%	57.2	57.2	0.1	5.3	5.3	0.0	0.0	2.7	2.7
	Final	35.8	93.0		-	5.3	-	0.0	2.1	4.8
Lakewood	10%	NS	NS		-	-	-	-	-	-
	35%	282.4	282.4	NA	31.5	31.5	4.7	4.7	6.9	6.9
	Final	869.7	1,152.1		90.0	121.5	7.0	11.8	29.3	36.2
Long Beach	10%	NS	NS		-	-	-	-	-	-
	35%	473.5	473.5	NA	33.8	33.8	12.3	12.3	16.4	16.4
	Final	1,156.3	1,629.8		87.9	121.7	9.5	21.8	48.9	65.3
Paramount	10%	NS	NS		-	-	-	-	-	-
	35%	267.0	267.0	NA	14.3	14.3	3.0	3.0	17.1	17.1
	Final	258.5	525.5		8.5	22.8	3.5	6.4	8.7	25.8
Signal Hill	10%	NS	NS		-	-	-	-	-	-
	35%	231.6	231.6	0.0	11.2	11.2	1.2	1.2	14.2	14.2
	Final	52.7	284.3		-	11.2	-	1.2	2.0	16.2

NS: Non-structural practices achieve 10% milestone

NA: No information/not enough information provided

*Runoff from non-MS4 sources and reductions fro existing regional BMPs are excluded from compliance target (see Attachment A)

Table 9-6. San Gabriel River Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Artesia	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.1	1.1		-	-	0.1	0.1	-	-
	Final	-	1.1		-	-	-	0.1	-	-
Bellflower	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.3	1.3		0.2	0.2	0.0	0.0	-	-
	Final	56.1	57.4		1.5	1.8	3.7	3.7	0.0	0.0
Cerritos	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	4.1	4.1		0.6	0.6	0.0	0.0	-	-
Diamond Bar	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	1.1	1.1		0.2	0.2	-	-	-	-
Downey	10%	NS	NS		-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	63.3	63.3	7.1	10.0	10.0	0.4	0.4	-	-
Lakewood	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	2.2	2.2		0.2	0.2	0.0	0.0	0.1	0.1
Long Beach	10%	NS	NS	NA	-	-	-	-	-	-
	35%	26.9	26.9		1.1	1.1	1.3	1.3	-	-
	Final	2.3	29.2		0.3	1.4	-	1.3	0.0	0.0

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Norwalk	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.8	0.8		-	-	0.1	0.1	-	-
	Final	4.0	4.8		-	-	0.3	0.3	-	-
Pico Rivera	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.2	0.2		0.0	0.0	-	-	-	-
	Final	60.2	60.4		10.7	10.8	-	-	0.0	0.0
Santa Fe Springs	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	30.3	30.3		4.6	4.6	-	-	0.3	0.3
Whittier	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.0	0.0		-	-	-	-	0.0	0.0
	Final	7.1	7.1		1.4	1.4	-	-	-	0.0

NS: Non-structural practices achieve 10% milestone

NA: No information/not enough information provided

*Runoff from non-MS4 sources and reductions fro existing regional BMPs are excluded from compliance target (see Attachment A)

Table 9-7. Coyote Creek Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Artesia	10%	NS	NS	NA	-	-	-	-	-	-
	35%	15.9	15.9		-	-	1.1	1.1	-	-
	Final	-	15.9		-	-	-	1.1	-	-
Cerritos	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.1	0.1		0.0	0.0	-	-	-	-
	Final	56.6	56.7		3.0	3.1	3.4	3.4	-	-
Diamond Bar	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.0	1.0		0.3	0.3	-	-	-	-
	Final	35.6	36.7		8.0	8.2	-	-	0.7	0.7
Hawaiian Gardens	10%	NS	NS	NA	-	-	-	-	-	-
	35%	23.6	23.6		0.3	0.3	1.5	1.5	-	-
	Final	3.4	27.1		0.2	0.6	0.1	1.6	0.0	0.0
La Mirada	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	124.9	124.9		9.6	9.6	5.6	5.6	-	-
Lakewood	10%	NS	NS	NA	-	-	-	-	-	-
	35%	17.5	17.5		0.9	0.9	0.7	0.7	-	-
	Final	2.3	19.7		-	0.9	0.3	0.9	-	-
Long Beach	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	0.0	0.0		-	-	0.0	0.0	-	-

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Norwalk	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.6	1.6		-	-	0.2	0.2	-	-
	Final	50.9	52.5		1.4	1.4	3.2	3.4	-	-
Santa Fe Springs	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	12.6	12.6		1.0	1.0	-	-	1.1	1.1
Whittier	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	200.1	200.1		39.0	39.0	-	-	0.0	0.0

NS: Non-structural practices achieve 10% milestone

NA: No information/not enough information provided

*Runoff from non-MS4 sources and reductions fro existing regional BMPs are excluded from compliance target (see Attachment A)

9.2.2. Dry Weather

Dry weather reductions are attained through a combination of non-structural practices and structural BMPs as they are implemented as part of the wet weather attainment of limits. As wet-weather BMPs are implemented, they serve to remove the dry-weather flows thus meeting the compliance set forth to achieve dry-weather reductions. As a summary of the dry weather analysis, Table 9-8 through Table 9-11 outline the jurisdiction-wide attainment of interim and final milestones for dry weather. The reduction from implemented BMPs compares the actual dry-weather reduction versus the compliance target.

Table 9-8. Lower Los Angeles River Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Downey	31%	30.8%	65.9%
	50%	49.7%	76.9%
	Final	99.4%	99.4%
Lakewood	31%	30.8%	99.4%
	50%	49.7%	99.4%
	Final	99.4%	99.4%
Long Beach	31%	30.8%	62.1%
	50%	49.7%	74.3%
	Final	99.4%	99.4%
Lynwood	31%	30.8%	71.8%
	50%	49.7%	80.2%
	Final	99.4%	99.4%
Paramount	31%	30.8%	51.0%
	50%	49.7%	72.4%
	Final	99.4%	99.4%
Pico Rivera	31%	30.8%	71.8%
	50%	49.7%	71.8%
	Final	99.4%	99.4%
Signal Hill	31%	30.8%	69.3%
	50%	49.7%	94.9%
	Final	99.4%	99.4%
South Gate	31%	30.8%	62.8%
	50%	49.7%	75.9%
	Final	99.4%	99.4%

Table 9-9. Los Cerritos Channel Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Bellflower	10%	9.9%	58.1%
	35%	34.7%	71.4%
	Final	99.1%	99.1%
Cerritos	10%	9.9%	56.4%
	35%	34.7%	99.1%
	Final	99.1%	99.1%
Downey	10%	9.9%	59.8%
	35%	34.7%	99.1%
	Final	99.1%	99.1%
Lakewood	10%	9.9%	55.6%
	35%	34.7%	69.6%
	Final	99.1%	99.1%
Long Beach	10%	9.9%	60.1%
	35%	34.7%	76.9%
	Fin al	99.1%	99.1%
Paramount	10%	9.9%	52.8%
	35%	34.7%	79.8%
	Final	99.1%	99.1%
Signal Hill	10%	9.9%	60.8%
	35%	34.7%	99.1%
	Final	99.1%	99.1%

Table 9-10. San Gabriel River Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Artesia	10%	9.4%	57.6%
	35%	33.0%	94.3%
	Final	94.25%	94.25%
Bellflower	10%	9.4%	49.9%
	35%	33.0%	57.6%
	Final	94.25%	94.25%
Cerritos	10%	9.4%	43.7%
	35%	33.0%	48.1%
	Final	94.25%	94.25%
Diamond Bar	10%	9.4%	58.2%
	35%	33.0%	58.8%
	Final	94.25%	94.25%
Downey	10%	9.4%	57.4%
	35%	33.0%	58.1%
	Final	94.25%	94.25%
Lakewood	10%	9.4%	43.1%
	35%	33.0%	73.7%
	Final	94.25%	94.25%
Long Beach	10%	9.4%	46.6%
	35%	33.0%	91.6%
	Final	94.25%	94.25%
Norwalk	10%	9.4%	54.8%
	35%	33.0%	55.7%
	Final	94.25%	94.25%
Pico Rivera	10%	9.4%	51.8%
	35%	33.0%	51.9%
	Final	94.25%	94.25%
Santa Fe Springs	10%	9.4%	54.4%
	35%	33.0%	57.9%
	Final	94.25%	94.25%
Whittier	10%	9.4%	57.9%
	35%	33.0%	58.0%
	Final	94.25%	94.25%

Table 9-11. Coyote Creek Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Artesia	10%	9.9%	60.9%
	35%	34.6%	85.1%
	Final	98.9%	98.9%
Cerritos	10%	9.9%	56.3%
	35%	34.6%	56.3%
	Final	98.9%	98.9%
Diamond Bar	10%	9.9%	61.3%
	35%	34.6%	65.9%
	Final	98.9%	98.9%
Hawaiian Gardens	10%	9.9%	59.7%
	35%	34.6%	96.9%
	Final	98.9%	98.9%
La Mirada	10%	9.9%	57.4%
	35%	34.6%	58.7%
	Final	98.9%	98.9%
Lakewood	10%	9.9%	60.7%
	35%	34.6%	76.5%
	Final	98.9%	98.9%
Long Beach	10%	9.9%	54.5%
	35%	34.6%	91.9%
	Final	98.9%	98.9%
Norwalk	10%	9.9%	59.2%
	35%	34.6%	60.8%
	Final	98.9%	98.9%
Santa Fe Springs	10%	9.9%	51.7%
	35%	34.6%	52.0%
	Final	98.9%	98.9%
Whittier	10%	9.9%	60.7%
	35%	34.6%	61.4%
	Final	98.9%	98.9%

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Attachment A: DETERMINATION OF BMP TREATMENT CAPACITY

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

January 15, 2015

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1. Determination of BMP Treatment Capacity

The process for determining the necessary cumulative BMP capacity depends on the type of numeric goal being addressed. As shown in Figure 1-1, the volume-based (design storm) approach, necessary BMP capacity was determined through a design storm analysis. For the load-based (pollutant reduction), the analysis leveraged the optimization routines in the customized WMMS. An initial step in the RAA was a comparison of the volume reductions required by the load-based and volume-based numeric goals, to support selection of the wet weather critical conditions.

This appendix describes key analyses conducted to determine the potential capacity of different BMPs including non-structural BMPs. In addition, it describes the approach for non-MS4 sources.

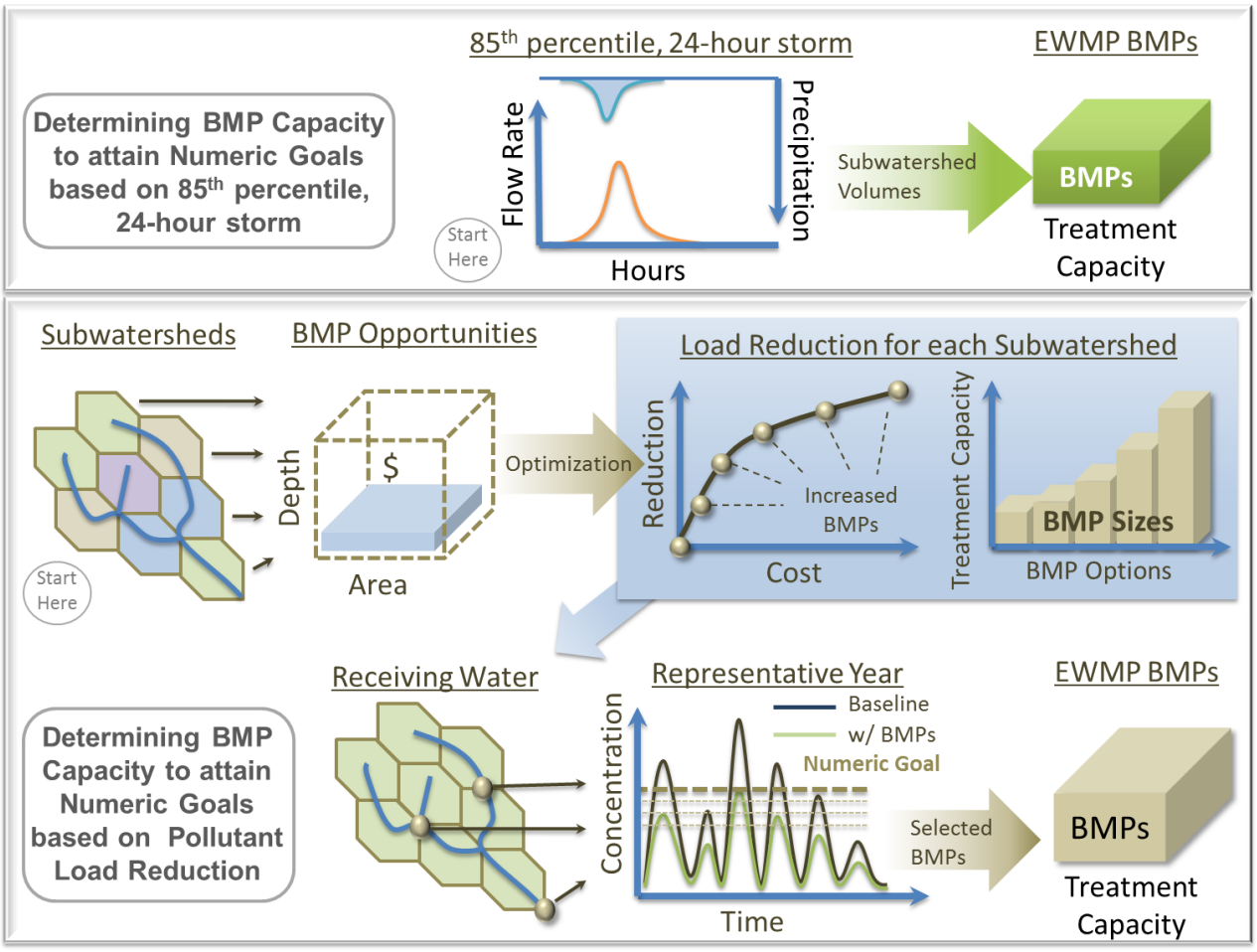


Figure 1-1. Illustration of Process for Determining Required BMP Capacities for the WMP using Volume-Based (top panel) and Load-Based (bottom panel) Numeric Goals.

1.1. Load Reduction Optimization Modeling Analysis

During development of WMMS, distributed BMPs were modeled at the subwatershed-scale using a generalized BMP treatment train. Depending on the land use type, different types of BMPs were applied. The three generalized BMP pathways were: (1) transportation, (2) residential, and (3) commercial/industrial/institutional. A conceptual schematic of the BMP network and pathways is presented in Figure 1-2 (LACDPW 2011).

For the RAA, subwatershed-scale SUSTAIN models were developed using the WMMS modeling assumptions. Each BMP from the treatment train described in Figure 1-2 was configured consistently with modeling performed during development of the WMMS system and followed the Regional Board RAA guidelines. A summary of key BMP parameters used for RAA modeling are presented in Table 1-1. Background infiltration rates were changed from those used during WMMS development (0.5 inches per hour) to site-specific infiltrations rates provided in the Los Angeles County Hydrology Manual and associated spatial datasets (LACDPW 2006). These rates also deviate somewhat from the values suggested in the RAA Guidelines (0.1 – 0.3 inches per hour); however, the data are locally-derived, published and reliable which provides adequate justification for their use.

First, SUSTAIN models were configured using the existing condition watershed model runoff timeseries and land use distributions as inputs, and benchmarked against the aggregated LSPC model results to establish baseline consistency. Second, using the SUSTAIN configuration with the respective BMP opportunities per pathway (as presented in Figure 1-2) in each subwatershed, optimization runs were formulated to maximize zinc reduction (i.e. the limiting target pollutant) while minimizing total estimated implementation cost. This resulted in a matrix of high-resolution cost-effectiveness curves for each subwatershed. Finally, a Tier-II optimization framework was configured to collectively optimize target load reductions at the downstream assessment point, with an added equitability constraint to ensure that each jurisdiction shared proportionally in the reduction effort. For the Tier-II optimization, instead of the decision variables being individual BMPs within a network like before, they were comprised of individual solutions taken off the cost-effectiveness curves at each subwatershed. The primary objective was to quantify the stormwater retention volume and load reductions provided by the collective actions occurring within each contributing jurisdiction tributary to the assessment point.

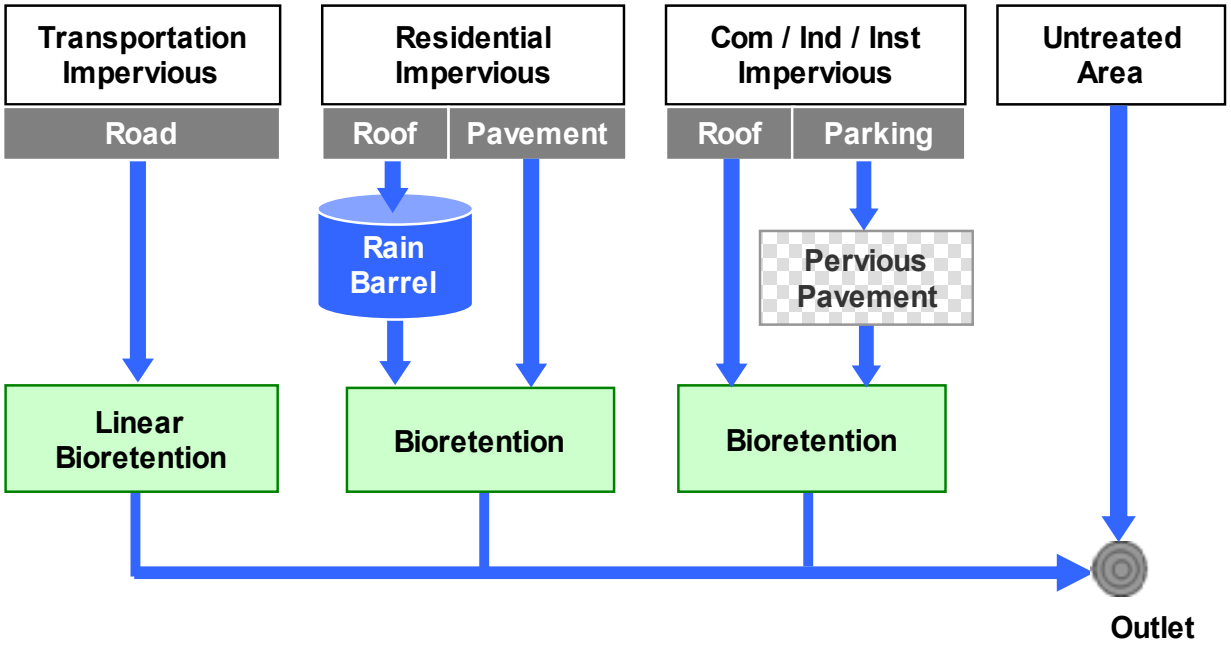


Figure 1-2. Conceptual schematic of the WMMS aggregate BMP treatment train (LACDPW 2011b).

Table 1-1. BMP parameters used in the load reduction modeling analysis

Constituent Group	Rain Barrel	Bioretention	Porous Pavement
Media Infiltration Rate (in/hr)	n/a	0.1 – 0.9	0.1 – 0.9
Substrate Layer Porosity (fraction)	n/a	0.4	0.4
Substrate Layer Field Capacity (fraction)	n/a	0.3	0.055
Substrate Layer Wilting Point (fraction)	n/a	0.1	0.05
Underdrain Gravel Porosity (fraction)	n/a	0.5	0.45
Vegetative Parameter, A (unitless)	n/a	0.6	1.0
Background Infiltration Rate (in/hr)	n/a	0.1 – 0.9	0.1 – 0.9
First Order Decay Rate (1/day)[1]	0.2 – 0.8	0.2 – 0.8	0.2 – 0.8
Underdrain Filtration Rate (%)[1]	n/a	0.5 – 0.9	0.5 – 0.9

1. Rates vary by pollutant and the type of BMP soil media

1.2. BMP Capacity Analysis for the Rights-of-Way

A key consideration for WMP implementation is the potential BMP capacity that could be provided by rights-of-way (ROW). In order to highlight the potential structural BMP implementation approaches to meet the volume targets, a BMP opportunity analysis was conducted. Two broad categories of BMPs – ROW BMPs and LID on public parcels – were used to describe the networks of BMPs needed to meet the target reductions.

This section describes how right-of-ways were evaluated for opportunities to locate BMPs and evaluate the key components that affect the ability of the ROW BMP networks to be effective: space available in the ROW, types of BMPs to site in the ROW, drainage areas that could potentially be treated by ROW BMPs, and estimated BMP infiltration rates.

Stormwater BMPs in the ROW are treatment systems arranged linearly within the street ROW and are designed to reduce runoff volumes and improve runoff water quality from the roadway and adjacent parcels. Implementing BMPs in the ROW provides an opportunity to meet water quality goals by locating BMPs in areas owned or controlled by a municipality to avoid the cost of land acquisition or establishing an easement. Implementing BMPs in the ROW allows for direct control of construction, maintenance, and monitoring activities by the responsible jurisdiction. Bioretention and permeable pavement are typically best suited for implementation in the ROW



Figure 1-3. Conceptual schematic of ROW BMPs with an underdrain (Arrows indicate water pathways).

Not all roads are suited for ROW BMP retrofits; therefore, screening is required to eliminate roads where ROW BMP retrofits are impractical or infeasible due to physical constraints. While ROW BMP retrofits can be implemented in a variety of settings, the physical characteristics of the road itself such as the road type, local topography, and depth to groundwater can significantly influence the practicality of designing and constructing these features. A screening protocol was established to identify realistic opportunities for retrofits based on the best available GIS data. The opportunities identified during this process provide the foundation for the engineering analysis to determine the volume of stormwater that can be treated by ROW BMP retrofits in the subject watersheds. This section describes the data and the screening process used to identify the best available roads for ROW BMP retrofits.

1.2.1. Data Used

To evaluate BMP opportunities and available implementation areas, several key data sets were processed and formatted. Table 1-2 outlines the data set names, formats, descriptions, and sources.

Table 1-2. Summary of Data

Data Set	Format	Description	Source
Parcels	GIS Shapefile	Outlines property boundaries and sizes	Los Angeles County (LAC) Assessor
Roads	GIS Shapefile	Shows street centerline network & classification by Topologically Integrated Geographic Encoding and Reference (TIGER)	LAC GIS Portal
Land Use	GIS Shapefile	Subdivides the region into predefined land use categories with similar runoff properties. Each individual land use feature identifies the associated percent impervious coverage.	LAC WMMS Model
Subwatersheds	GIS Shapefile	Defines drainage areas to selected outlet points	LAC WMMS Model
Slopes	GIS Shapefile	Classifies regions by the slope category	LAC WMMS Model
Soils	GIS Shapefile	Outlines spatial extents of dominant soil types	LAC GIS Portal
Jurisdictions	GIS Shapefile	Establishes city and county boundaries	LAC GIS Portal
Drainage Network	GIS Shapefile	Identifies stormwater structure layout and conveyance methods	LAC GIS Portal
Groundwater Contours	GIS Shapefile	Illustrates groundwater depth as measured from the surface	LAC BOS
Soil Runoff Coefficient Curves	PDF File	Curves characterize effect of rainfall intensity on runoff coefficient per soil type	Hydrology Manual Appendix C (LADPW 2006)
Aerial Imagery	Layer File	Orthoimage of entire region	ESRI Maps & Data Imagery
Runoff Rates	Time Series	Hourly runoff for land uses for the continuous simulation model	LAC WMMS Model

1.2.2. ROW BMP Screening

High traffic volumes, speed limits, slopes, and groundwater tables, impact the feasibility of ROW BMP implementation. Road classification data contains information typically useful for determining if the street is subject to high traffic volumes and speeds, and Census TIGER road data provides the best available road classification information for the study area. Table 1-3 shows the Master Address File (MAF)/TIGER Feature Classification Codes (MTFCC) deemed appropriate for ROW BMP retrofit opportunities. Only roads with the MTFCCs listed in Table 1-3 can be considered for ROW BMP retrofits in this screening analysis. All other roads are screened out.

Table 1-3. ROW BMP MTFCC

MTFCC	Description
S1400	Local neighborhood road, rural road, city street
S1730	Alley
S1780	Parking lot road

In addition to the screening of road types, opportunities were further screened to remove segments that have steep slopes. BMP implementation on streets with grades greater than 10 percent present engineering challenges that substantially reduce the cost effectiveness of the retrofit opportunity. From the available slope information, roads were considered as retrofit opportunities if the slope was less than 10 percent.

The final screen applied to the roads is the depth to groundwater. Implementing ROW BMPs in areas where the groundwater table is high is not recommended due to the fact that the BMPs are rendered ineffective due to their storage capacity being seriously diminished with groundwater inflow. From the groundwater contours provided, roads were eliminated as opportunities if the depth to groundwater was less than 10 feet. Attachment C highlights the areas identified with groundwater depths of 10 feet or less. The highlighted areas provide a starting point for elimination, however it should be noted that further evaluation may be necessary based on local knowledge of areas with high groundwater tables or daylighting of perched groundwater layers as identified by the jurisdictions.

The results of the ROW BMP screening are presented in Attachment C. Attachment C shows the roads available for retrofit (highlighted in green) versus all of the roads within the study area. An overall watershed map and individual jurisdictional maps for each watershed show all the identified retrofit opportunities. The maps indicate that a majority of the roads within each jurisdiction pass through the screening as potential retrofits. It should be noted that due to the coarse nature of the road classification data, only freeways, highways, and major roads were eliminated in the classification screening process. In practice, retrofitting every street that passed through the screening will likely not be feasible and adaptive management strategies will be necessary in the future to further refine the road classification data layer to more accurately identify road types suitable for ROW BMP retrofits.

The screened opportunities were used as the basis to evaluate the potential runoff volume reduction provided by ROW BMP implementations. In the following section, an engineering assessment is presented that determines the ROW BMP contributing drainage areas and the overall volume reductions achieved through ROW BMP implementation.

1.2.3. ROW BMP Configuration

The three most important assumptions necessary to evaluate BMP volume reduction performance are (1) the physical BMP configuration assumptions, (2) the contributing drainage area characteristics, and (3) the in-situ soil infiltration rates. By understanding the area draining to the BMPs and the volume capacity and function of the BMPs, an assessment can be performed to evaluate the potential of ROW retrofit BMPs to capture the required runoff volume in each subwatershed. This section summarizes the information and processes used to establish BMP configuration assumptions to be used for the runoff analysis presented in the following section.

1.2.4. BMP Assumptions Based on Green Streets

ROW BMPs consists of multiple types and combinations of stormwater treatment options. A well-established and often utilized ROW BMP is green streets. Green streets provide multiple benefits for pollutant and volume reduction and have been implemented in locations throughout the nation. In the future and as updates are made to the WMP, other ROW BMPs may be incorporated to achieve the required volume reductions.

Green streets typically consist of bioretention areas between the curb and sidewalk (herein referred to as the parkway) and/or permeable pavement within the parking lane. Prior to evaluating green street BMP treatment capacity, it is imperative to establish a configuration that can be assumed for typical implementation watershed-wide. This establishes the parkway space needed for the BMPs (plan view) and also determines the hydraulic function and storage capacity of the subsurface systems.

Bioretention systems are surface and subsurface water filtration systems, which use vegetation and underlying soils to store, filter, and reduce runoff volume while removing pollutants. Figure 1-4 represents a typical bioretention system incorporated into a green street design. Bioretention systems consist of a ponding depth and engineered soil media depth to treat runoff. Table 1-4 outlines typical widths, depths, and soil parameters associated with green street bioretention cells. Green streets were assumed to have no underdrains because the

WMP emphasizes low impact development and stormwater volume reduction to achieve pollutant load reductions.

Driveways and utilities limit the road length that can be converted into a green street. From past experience and aerial imagery review in the local watersheds, it was determined that 30 percent of the road length could be considered as the maximum possibility for conversion into bioretention area. This factor was used to limit the total length of potential green street bioretention areas. The parameters outlined above and in the table below were assumed to be the typical green street BMP implementation configuration for the screening analysis and the BMP treatment capacity evaluation described in the next section.

Table 1-4. BMP Design and Modeling Parameters for Subsequent Analyses

Component	Design Parameter	Value
Ponding Area	Depth	0.8 feet
	Width	4.0 feet
Media Layer	Depth	3.0 feet
	Porosity	0.4
Overall Profile	Effective Depth[1]	2.0 feet

[1] Effective depth is the maximum equivalent depth of water stored within the bioretention area less the depth displaced by soil media (vertical summation of surface ponding depth and void storage depth)

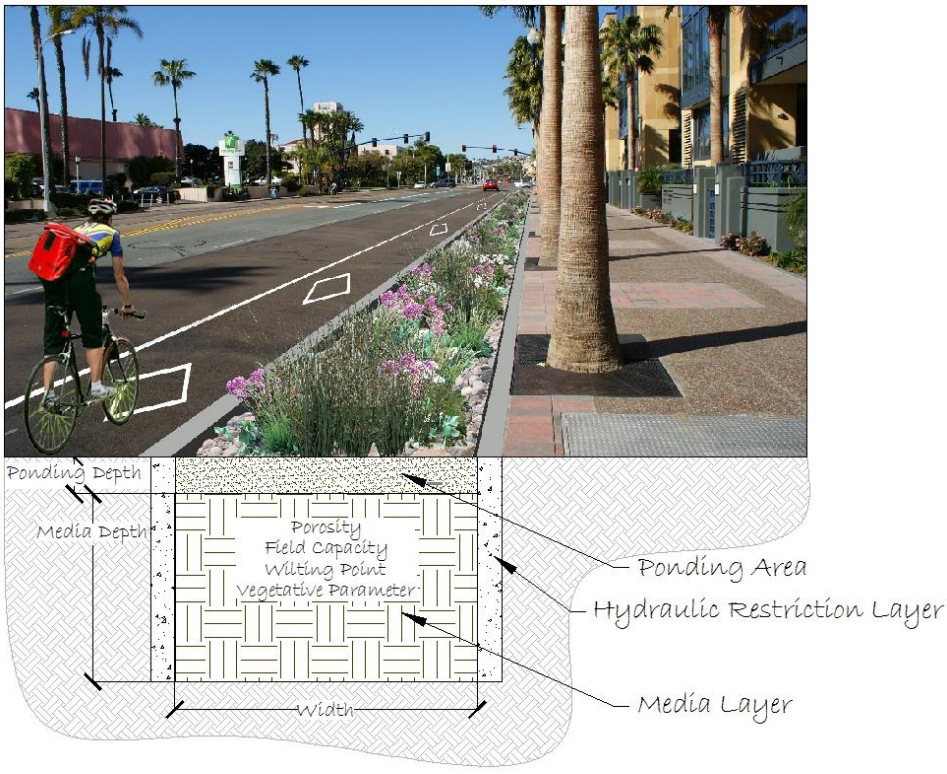


Figure 1-4. Typical bioretention section view (City of San Diego 2011).

Contributing Drainage Area Analysis

The purpose of this analysis was to realistically represent the area, type, and impervious coverage of land draining to potential green streets throughout the entire watershed. This is a critical step in WMP development because it predicts what volume of runoff can be assumed treated by green streets and what remaining (untreated) runoff must be routed to regional BMPs or addressed in other ways. The following engineering analyses were performed at a subwatershed-scale within the limits of available data and resources to estimate the maximum potential green street treatment capacity; given more detailed street-by-street drainage area data, the assumptions and results presented herein could be refined in future efforts to optimize green street treatment capacity. Figure 1-5 illustrates a simplified routing schematic used to represent the available runoff flow pathways to green street and regional BMPs throughout the watershed. The following subsections explain how each representative drainage area illustrated in Figure 1-5 was characterized.

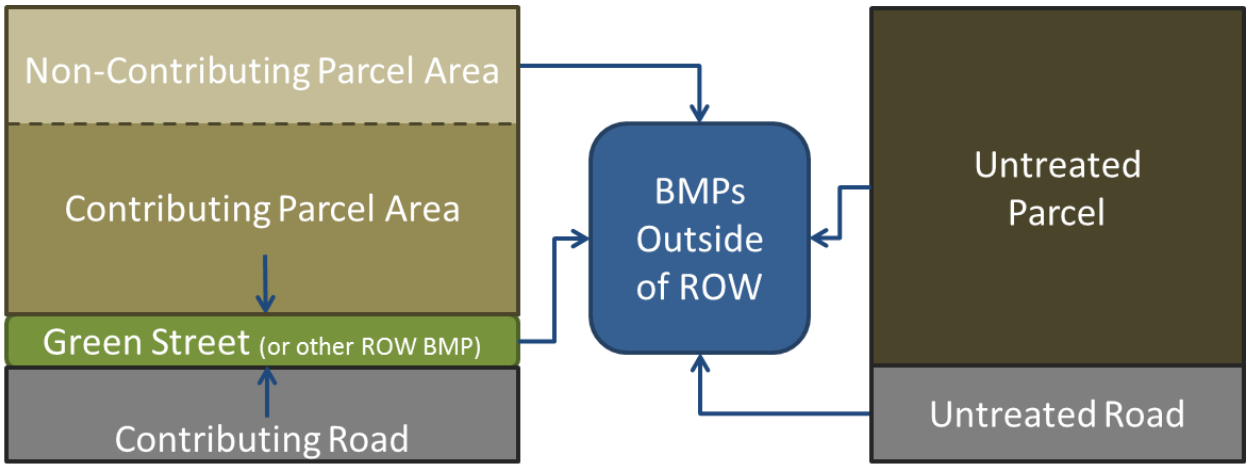


Figure 1-5. Green streets model schematic (arrows denote direction of runoff routing; figure not to scale).

Typical Parcel Size & Street Frontage Analysis

The nature of the green street analysis requires an understanding of typical parcel sizes and how much of the parcel drains to the ROW. Much of the runoff from parcels and the road drains to the ROW and is conveyed downstream through curb, gutter, and pipes. By identifying the typical parcel size, frontage length, and associated road area that drains to a candidate right-of-way area (Figure 1-6) the total area draining to potential green street retrofit opportunities was extrapolated throughout the watershed. For purposes of this study, only the high-density residential, multifamily residential, commercial, institutional, and industrial land uses were considered as contributing substantial runoff to the ROW (all other land uses contain minimal impervious area and thus contribute insubstantial runoff to the ROW).

The typical parcel size for each land use was determined by identifying all parcels for each land use. Once all the parcels were selected, the median parcel size for each land use was calculated and tabulated. This method evaluated thousands of parcels throughout the entire watershed and provided the most accurate depiction of the typical parcel size for each land use based on available data. Results are shown in Table 1-5.

Each parcel is adjacent to a portion of the ROW where the green street would be implemented. A subset of parcels approximate to the median parcel size for each land use was selected to determine the average frontage length. The portion of the selected parcels that was in contact with the ROW was measured using desktop analysis tools and averaged between all parcels of the same land use. Results are shown in Table 1-5.

Road area draining to green streets constitutes a substantial component of the total impervious drainage area. To establish road drainage areas, typical road widths were defined by sampling representative road segments located in each land use. Widths were measured from curb-to-curb using aerial orthoimagery and reported to the nearest even integer. The median sampled road width for each land use was calculated and compared with the City of Los Angeles Standard Street Dimensions (City of Los Angeles Bureau of Engineering 1999) for validation. To predict the resulting contributing road areas, the previously measured frontage length was multiplied by half the road width. Roads were assumed to be crowned; therefore, only half of the width would drain to one side of the road. Results are shown in Table 1-5.

As discussed in Section 1.2.4, only 30 percent of the frontage length could be converted into bioretention area. This factor was multiplied by the frontage length and used in limiting the total length of bioretention available within the model, as presented in Table 1-5.

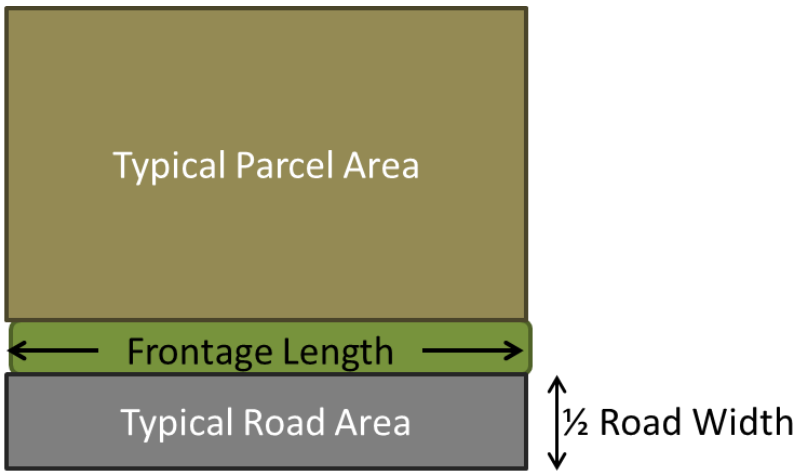


Figure 1-6. Typical parcel area, road width, road area, and frontage length schematic (figure not to scale)

Table 1-5. Typical parcel area, road area, and frontage length

Land Use	Typical Parcel Area (ft^2)	Frontage Length (ft)	Typical Road Width (ft)	Typical Road Area (ft^2)	BMP Length (ft)
High-density Residential	6,528	57	38	1,083	17
Multifamily Residential	13,526	60	30	900	18
Commercial	12,429	100	63	3,150	30
Institutional	38,215	143	37	2,646	43
Industrial	26,467	117	46	2,691	35
Other Land Use (Open Space, Vacant, etc.)	n/a[1]	100	40	2,000	30

[1] assumed not draining to ROW

Contributing Parcel Area Analysis

Many parcels will not always entirely drain to the ROW because portions can be retained on-site or flow onto an adjacent property. The actual volume of water that can be treated by a green street BMP was determined by identifying the typical proportion of the parcel that drains to the ROW (as shown in context of the model

schematic in Figure 1-7). This step also determines the area, and associated runoff, that is *not* expected to drain to green streets and is routed directly to downstream regional facilities or other practices (herein referred to as non-contributing parcel area).

The contributing areas to the green street BMPs were found using random sampling and identifying the surrounding parcel drainage patterns. Parcels were selected using a random number generator and drainage areas were determined on a desktop analysis using topography, aerial imagery, and drainage infrastructure features. The average contributing percentage was identified by evaluating multiple sites. Table 1-6 shows the percent contributing areas by land use that were determined from this analysis.

The impervious coverage of contributing parcel areas was also characterized during this step so that runoff could be simulated and routed to green streets in each land use. This was performed by tabulating the imperviousness data from the WMMS Model for each individual land use feature. The area-weighted mean impervious coverage was then calculated for each land use type. Results are tabulated for each land use in Table 1-6.

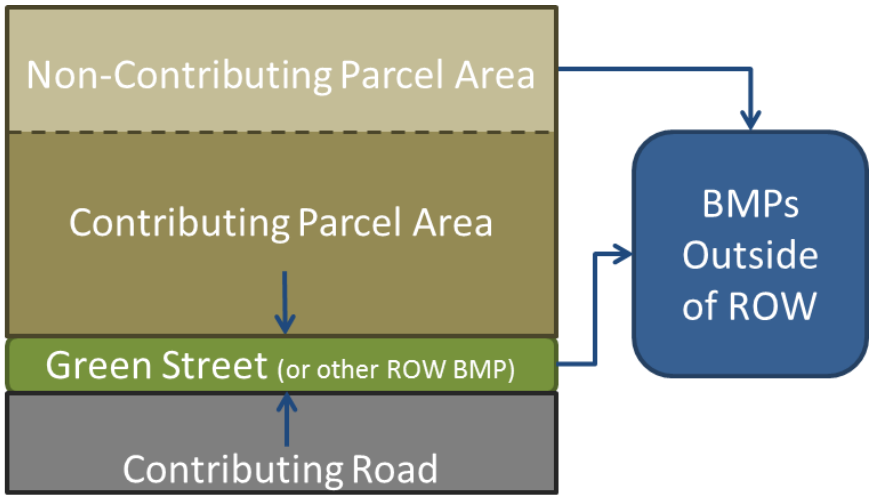


Figure 1-7. Parcel contributing area to ROW (impervious varies by land use; arrows denote direction of runoff routing; figure not to scale).

Table 1-6. Contributing area percentage by land use

Land Use	Contributing to ROW	Non-contributing to ROW	Percent Impervious
High-density Residential	80%	20%	36%
Multifamily Residential	80%	20%	60%
Commercial	80%	20%	90%
Institutional	80%	20%	72%
Industrial	35%	65%	66%
Other Land Use (Open Space, Vacant, etc.)	0%	100%	n/a

Untreated Roads Tabulation

Untreated roads consist of roadways with steep slopes, classifications not suited for green street implementation, or adjacent to open space or vacant parcels. Untreated road and associated adjacent parcel area that will ultimately drain to other BMPs was tabulated using available GIS data and screening results from Section 1.2.2 (conceptually illustrated in Figure 1-8).

Because green streets are implemented in the linear environment of the transportation corridor, it was assumed that the percentage of parcel area draining to green streets would be proportional to the percentage of suitable roads for green streets (as identified in Section 1.2.2) in each subwatershed. In other words, parcels associated with unsuitable roads were assumed to bypass green street treatment and routed directly to other facilities (these areas are defined herein as *untreated parcels*). The total treated and untreated parcel areas were reconciled with the total areas of each land use (per subwatershed) in the WMMS Model for validation and consistency.

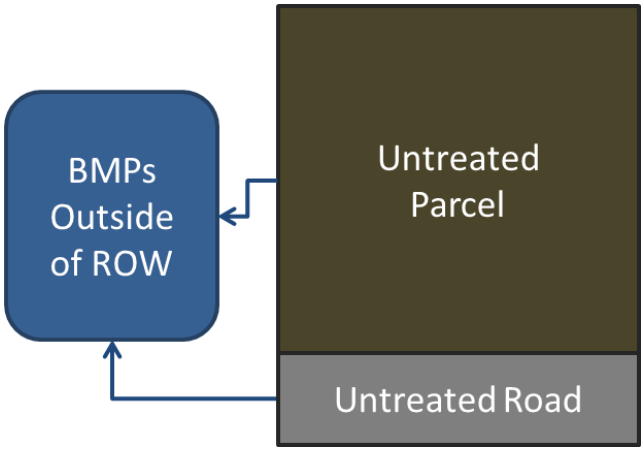


Figure 1-8. Schematic depicting untreated parcel and untreated road runoff routing (arrows denote direction of runoff routing; figure not to scale).

Summary of Contributing Drainage Areas

Results of the preceding analyses are presented in Figure 1-9. Areas that were assumed *un*treated by green streets include unsuitable roads and adjacent parcels, portions of suitable parcels that do not drain to the ROW, and predominantly pervious parcels (Open Space, Vacant, etc.), as discussed in preceding subsections; runoff from these untreated areas is assumed routed directly to regional facilities. Note that contributing areas are not necessarily proportional to contributing runoff due to variation in impervious coverage; runoff routing resulting from the preceding analyses is presented in the following section.

Given more detailed street-by-street engineering analyses, the potential area treated by green streets could be optimized, but the results below represent realistic estimates based on sound engineering judgment and currently available data and resources. Adaptive management strategies could target specific land uses that tend to bypass green street treatment (e.g. runoff, and associated treatment capacity, generated by industrial areas could be addressed through relevant industrial permits or onsite BMPs). Additional discussion on adaptive management strategies is provided in Section 8 of the main report.

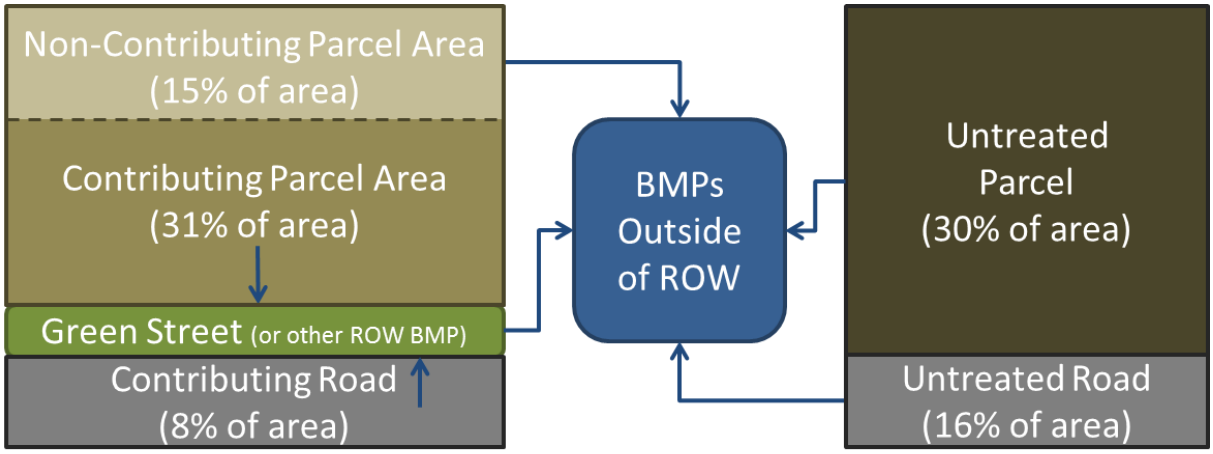


Figure 1-9. Schematic characterizing approximate distribution of routing to BMPs in the ROW for all WMP areas (arrows denote direction of runoff routing; figure not to scale).

BMP Infiltration Rates by Subwatershed

The purpose of performing the subwatershed infiltration rate analysis was to assign an average green street BMP infiltration rate to each subwatershed using soils data. Infiltration rates were assigned at the subwatershed level, which is the finest resolution at which the model performs hydrologic and water quality computations.

Soil data coverage provided through the LACDPW categorized soil unit areas into soil types. Runoff coefficient curves reported in the Hydrology Manual were developed by LACDPW for each soil type using double ring infiltrometer tests performed on areas of homogeneous runoff characteristics (LACDPW 2006). LADPW employed a sprinkling-type infiltrometer to perform the tests in each homogeneous area.

Runoff coefficient curves represent the response of the runoff coefficient (defined as the ratio of runoff to rainfall from a land area) to varying rainfall intensities. Each curve displays an inflection point representing the rainfall intensity at which substantial runoff initiates. According to LADPW (2006), each curve was assigned a minimum runoff coefficient of 0.1, "indicating that there is some runoff even at the smallest rainfall intensities." If it is assumed that substantial runoff initiates when the intensity of rainfall is greater than the soil's inherent infiltration rate, then the infiltration rate can be assumed equal to the rainfall intensity at the inflection point (less the assumed minimum runoff).

As demonstrated conceptually in Figure 1-10, the inflection point, and subsequently calculated infiltration rate, for each unique soil type in the WMP areas were identified using the runoff coefficient curves in Appendix C of the *Hydrology Manual* (LADPW 2006). Subwatershed areas were then intersected with the soil type coverage to calculate an area-weighted infiltration rate. Attachment C shows the distribution of the infiltration rates.

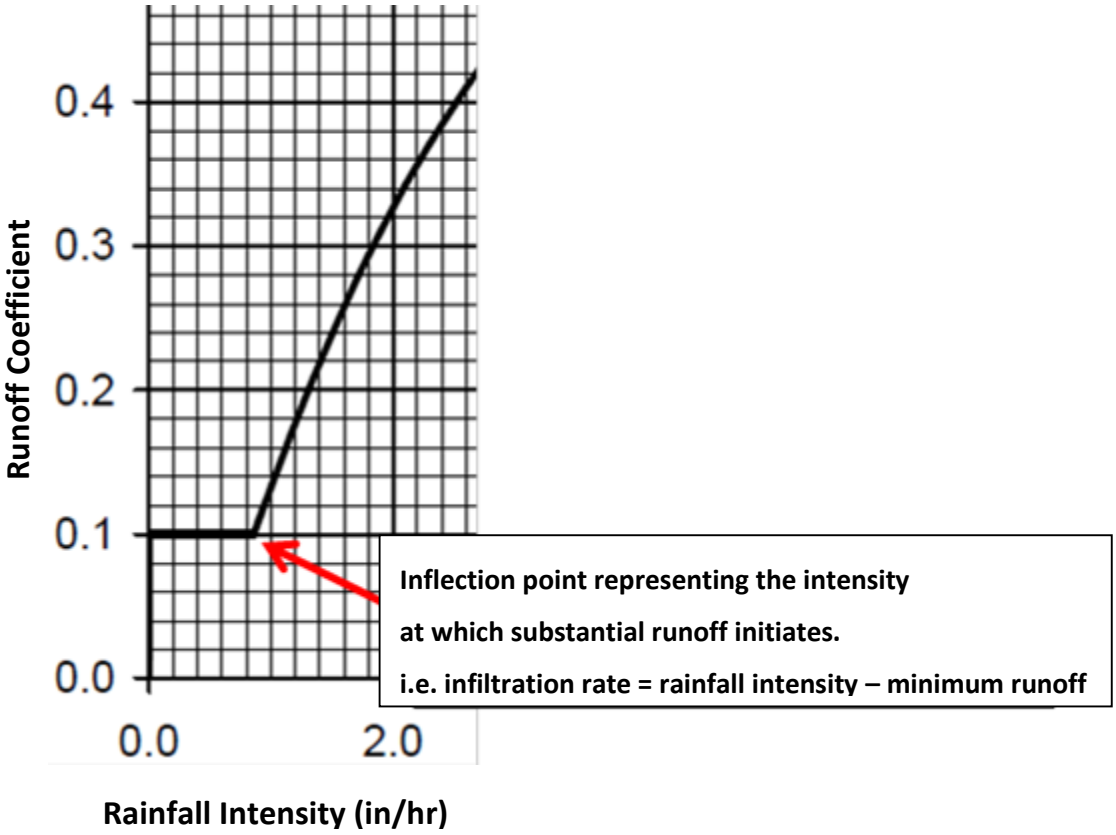


Figure 1-10. Example determination of runoff coefficient inflection point for an arbitrary soil type in Appendix C of LACDPW (2006).

1.3. LID on Public Parcels Assessment

Retrofitting public parcels with LID can be an efficient strategy for reducing stormwater runoff. This method allows municipalities the flexibility to prioritize and schedule stormwater projects to coincide with improvements that are already on the books (such as scheduled parking lot resurfacing, utility work, and public park improvements). Implementing LID on public parcels also allows municipalities the freedom to construct, inspect, and maintain BMPs without the need to purchase private property or to create stormwater easements.

The spatial extent of public parcels in each subwatershed was identified by selecting all parcels labeled as public by their assessors identification number (AIN). A total of 7,052 acres of public land was identified during this process (7% of the total WMP area). Each public parcel was assumed to implement BMPs that would treat the 85th percentile, 24-hour storm. The BMP volume was assumed to equal the 85th percentile, 24-hour storm depth times the impervious area.

LID retrofits are not feasible in all locations due to steep slopes, soil contamination hazards, and other constrains. The total runoff to be retained on public parcels was therefore discounted by 30% in order to provide a more realistic goal; this estimate was made in the lack of more detailed data, based on past LID screening exercises performed in Los Angeles County. The discount factor should be refined as actual public project sites are screened and prioritized.

1.4. Existing, Planned, and Potential BMPs

Existing and planned BMPs throughout the WMP areas were identified by the jurisdictions. These BMPs will provide capacity to reduce the annual storm runoff volume and demonstrate progress towards achieving the target runoff volume reduction.

1.4.1. Modeled Existing/Planned Subwatershed-Scale Regional BMPs

Regional BMPs that treat large portions of, or entire, subwatersheds (i.e. those with drainage areas larger than 50 acres) were modeled to quantify the impact to the upstream jurisdictions. The modeling approach and predicted performance for these specific sites is detailed in the following subsections. It is important to note that modeling was performed at a planning level coincident with the resolution of the subwatershed-scale WMMS model. Limited data were available to represent the sites, so conservative engineering assumptions were applied where appropriate. The calculated equivalent volume reductions from the BMPs can be refined during the adaptive management process once detailed design and monitoring data become available for the sites.

DeForest Wetlands Project

The DeForest Wetlands Project is located along the east bank of the Los Angeles River in the City of Long Beach and is comprised of approximately 34 acres of restored terrestrial and freshwater habitat and recreational amenities. The Project provides both groundwater recharge and surface water quality improvement. Site and modeling details are listed in Table 1-7.

Table 1-7. DeForest Wetlands Project details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	In Development		
Compliance Targets for Contributing Subwatersheds[1]	**248.7**	**ac-ft/yr**	Subwatershed 486066
	247.6	**ac-ft/yr**	Subwatershed 486068
Given Details			
Drainage Area	1490	ac	Delineated in GIS using WMMS subwatershed boundaries
Average Annual Infiltration Volume	15-35	ac-ft/yr	Per Section 3 of the WMP
Average Annual Treated Volume	800-1000	ac-ft/yr	Per Section 3 of the WMP; assumed volume is fully treated by wetland pollutant removal mechanisms prior to discharge; assumed treated volume is in addition to infiltration volume
Annual Runoff Volume Entering Wetland[1]	1589	ac-ft/yr	WMMS output
Annual Zinc Load Entering Wetland[1]	1808	lb Zn/yr	WMMS output
Wetland Zinc Effluent Concentration	20	µg/L	Upper limit of 95% confidence interval for wetland channels, per RAA Guidelines (LARWQCB 2014)
Modeling Results			
Estimated Annual Zinc Load Reduced by Infiltration[1]	17.1	lb Zn/yr	Assumed loading associated with minimum average infiltrated runoff; assumed load sequestered in sediments and/or sorbed to underlying soils
Estimated Annual Zinc Load Reduced by Wetland Functions[1]	535	lb Zn/yr	Reduction associated with treated volume; calculated by subtracting average effluent load associated with minimum treated volume from annual influent loading
Estimated Zinc Load Reduction	30.5%		

Relative to Annual Runoff[1]			
Estimated Zinc Load Reduction Relative to Compliance Target[1]	97.7%		
Estimated Equivalent Annual Volume Reduction[1]	**243.1**	**ac-ft/yr**	Subwatershed 486066
	242.0	**ac-ft/yr**	Subwatershed 486068

[1] Indicated annual volumes are referenced to the critical year

Dominguez Gap Wetlands Project

The Dominguez Gap Wetlands Project consists of two treatment wetlands situated on the east and west banks of the Los Angeles River that features habitat and recreational amenities. The East Basin is a 37-ac facility that is dewatered manually by a pump. The West Basin primarily functions as an infiltration basin and is approximately 15 acres. Table 1-8 and Table 1-10 characterize the site and modeling details of the East and West Basins, respectively.

Table 1-8. Dominguez Gap East Wetlands Project – East Basin details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	Complete		
Compliance Targets for Contributing Subwatersheds[1]	**346.9**	**ac-ft/yr**	Subwatershed 486014
	14.3	**ac-ft/yr**	Subwatershed 446014
Given Details			
Drainage Area	2075	ac	Delineated in GIS using WMMS subwatershed boundaries
Maximum Volume Treated per Storm Event	71	ac-ft	Per Section 3 of the WMP; assumed volume is fully treated by wetland pollutant removal mechanisms prior to discharge
Maximum Annual Volume Treated[1]	526	ac-ft/yr	Based on storm events recorded for critical year; assumed all storm event runoff volume treated up to 71 ac-ft
Annual Runoff Volume Entering Wetland[1]	913	ac-ft/yr	WMMS output
Annual Zinc Load Entering Wetland[1]	934	lb Zn/yr	WMMS output
Wetland Zinc Effluent Concentration	20	µg/L	Upper limit of 95% confidence interval for wetland channels, per RAA Guidelines (LARWQCB 2014)
Modeling Results			
Annual Zinc Load Reduced by Infiltration[1]	unknown	lb Zn/yr	Site soil information or monitored data required
Annual Zinc Load Reduced by Wetland Functions[1]	202	lb Zn/yr	Reduction associated with treated volume; calculated by subtracting average effluent load associated with minimum treated volume from annual influent loading
Zinc Load Reduction Relative to Annual Runoff[1]	22%		
Zinc Load Reduction Relative to Compliance Target[1]	55%		
Equivalent Annual Volume Reduction[1]	**191.7**	**ac-ft/yr**	Subwatershed 486014
	6.4	**ac-ft/yr**	Subwatershed 446014

[1] Indicated annual volumes are referenced to the critical year

Table 1-9. Dominguez Gap Wetlands Project – West Basin details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	Complete		
Compliance Targets for Contributing Subwatersheds[1]	**152.0**	**ac-ft/yr**	Subwatershed 486013 (41% contributes to West Basin)
	7.4	**ac-ft/yr**	Subwatershed 486015
Given Details			
Drainage Area	299	ac	Delineated in GIS using WMMS subwatershed boundaries
Annual Runoff Volume Infiltrated	All	ac-ft/yr	Per Section 3 of the WMP, no connection to Los Angeles River
Modeling Results			
Subwatershed 486013 Annual Runoff Volume Infiltrated[1]	47%		41% of subwatershed area contributes 47% of runoff volume to the basin
Subwatershed 446015Annual Runoff Volume Infiltrated	100%		100% of subwatershed area contributing
Equivalent Annual Volume Reduction[1]	**152.0**	**ac-ft/yr**	Subwatershed 486013 (compliance target is 43% annual reduction, so meets target)
	7.4	**ac-ft/yr**	Subwatershed 446015

[1] Indicated annual volumes are referenced to the critical year

Willow Springs Park

The Willow Springs Park project will convert a public parcel to a 47-acre park. The park will contain bioswales and a water feature integrated into a recreational spaces. Table 1-10 Characterizes the site and modeling details.

Table 1-10. Willow Springs Park details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	In Development		
Compliance Targets for Contributing Subwatersheds[1]	**26.5**	**ac-ft/yr**	Subwatershed 776012
	7.2	**ac-ft/yr**	Subwatershed 486012
Given Details			
Drainage Area	211	ac	Delineated in GIS using WMMS subwatershed boundaries
Total BMP Footprint	11	Ac	Per Section 3 of the WMP; natural channels/bioswales with very high infiltration rates
Underlying soil infiltration rates	0.9	In/hr	WMMS
Subwatershed area contributing	95%		
Modeling Results			
Maximum infiltration rate over footprint of BMP	0.83	ac-ft/hr	Assumed constant infiltration over entire footprint, applied to each time step of model runoff output draining to park – meets compliance target via infiltration
Equivalent Annual Volume Reduction[1]	**26.5**	**ac-ft/yr**	Subwatershed 776012
	7.2	**ac-ft/yr**	Subwatershed 446012

[1] Indicated annual volumes are referenced to the critical year

Discovery Park Infiltration Basin

An existing infiltration basin located at 12400 Columbia Way in the City of Downey treats runoff from approximately 51 acres (5% of the subwatershed in which the site is located). Field observations indicate that the facility has capacity to infiltration runoff at a rate of 2 in/hr (equivalent to approximately 4 ac-ft/day) in addition to detention storage. Table 1-11 reports the simplified modeling assumptions for this BMP – upon further evaluation of as-built conditions, the associated volume reduction can be refined during the adaptive management process.

Table 1-11. Discovery Park Infiltration Basin details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower San Gabriel River		
Location	City of Downey		
Status	Complete		
Compliance Targets for Treated Subwatersheds[1]	**80.6**	**ac-ft/yr**	Subwatershed 245115
Given Details			
Drainage Area	51	ac	
Observed Infiltration Rate	4	ac-ft/day	Per Gerald Green, personal communication, 2014, February 2
Percentage of Subwatershed Contributing to BMP	5%		
Approximate Runoff Volume Draining to BMP[1]	44	ac-ft/yr	WMMS
Modeling Results			
Equivalent Annual Volume Reduction[1]	**24**	**ac-ft/yr**	Assumed constant infiltration over entire footprint, applied to each time step of model runoff output draining to park

[1] Indicated annual volumes are referenced to the critical year

Parque Dos Rios

Parque Dos Rios is located at the confluence of the Los Angeles River and Rio Hondo River. An approximately 30-ac area between the freeway and the Los Angeles River will be converted to an infiltration basin to treat additional upstream area. Currently, the site is self-retaining open space and is characterized in the baseline model as such. No further runoff volume reductions were calculated for this site; as design details are finalized for the infiltration basin improvements, associated volume reductions can be applied towards upstream jurisdictional compliance targets.

1.4.2. Identified Parcel-Scale Regional and Distributed BMPs

The jurisdictions within the WMP areas compiled detailed lists of BMPs intended to treat areas smaller than 50 acres. As with the preceding regional BMPs, these strategies represent progress towards achieving the compliance target in each respective jurisdiction. The distributed BMPs are listed in Attachment D and can be applied towards meeting the compliance targets in each jurisdiction.

The WMP groups have identified additional potential regional BMPs and these are listed in Section 3 for LCC and Section 4 for LLAR and LSGR of the respective WMP.

1.5. Non-MS4 Facility Runoff

Each jurisdiction is the Group's WMP area is subject to stormwater runoff from non-MS4 facilities. In particular, Caltrans roads and facilities regulated by nontraditional or general industrial permits contribute to the runoff volume for each subwatershed. It will be important for these entities to retain their runoff and/or eliminate their cause/contribution to receiving water exceedances. The runoff from these non-MS4 facilities was therefore estimated and subtracted from the treatment target as described below.

1.5.1. Non-MS4 Permitted Areas

Non-MS4 permitted areas were identified based on the address list of permittees on the State Water Resources Control Board (SWRCB) website. Using the address information, corresponding parcel areas were selected using the LA County Assessor Parcel Viewer and the associated GIS Shapefile. The percentage of permitted land use area relative to the total land use area was calculated and the associated non-MS4 permitted area runoff as extracted from the WMMS runoff response output.

1.5.2. Caltrans

The design storm runoff generated by Caltrans facilities was estimated using WMMS land use data. Areas labeled as Transportation consist of freeways and other extensive transportation facilities that tend to fall under Caltrans jurisdiction (versus areas labeled as Secondary Roads, which are managed by local transportation departments); these areas were assumed to be Caltrans facilities. Runoff from Transportation land uses, less runoff from any overlapping non-MS4 permitted areas identified above, was extracted from the WMMS model output for each subwatershed.

1.6. Institutional BMPs and Minimum Control Measures

It is challenging to accurately quantify most institutional BMP and minimum control measure (MCM) benefits in terms of pollutant load reductions because they generally require extensive survey and monitoring information to quantify. In addition, nonstructural BMPs may target pollutants, land uses, or populations, resulting in different load reductions depending on the implementation technique. A number of MCMs are outlined in each WMP, representing an array of practices to most effectively address pollutants at their source or affect their transport. For the purposes of the RAA, a 10% reduction was assumed to represent the cumulative impact of these practices during both wet and dry conditions. Another explicitly modeled nonstructural BMP was a goal to reduce 25% of irrigation of urban vegetation, a goal that can result from a myriad of practices ranging from public education, enforcement, incentive programs, creative water rate structures, etc. The 25% reduction in irrigation was modeled directly in LSPC and is the primary driver for dry weather flow reductions. Pollutant load reductions from these nonstructural BMPs were subtracted from loads simulated in the baseline model to quantify progress towards meeting the watershed numeric goals. Results of both the 10% reduction for collective MCMs, in addition to irrigation reduction, are presented in Section 7 of the main RAA report for both wet and dry conditions.

Attachment B: Detailed Jurisdictional Compliance Tables

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

January 15, 2015

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B1. Lower Los Angeles River WMP – MS4 vs Non-MS4

B1.1. City of Downey

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6076	17.1	17.0	0.1
6077	123.0	123.0	-
6079	210.3	176.4	33.9
6082	0.3	0.3	-
6100	11.4	10.7	0.7
6102	143.8	143.8	-
6103	0.0	-	0.0
6104	37.1	37.1	-
6106	100.2	76.4	23.9
6111	82.1	69.5	12.6
6113	0.6	0.6	0.0
Grand Total	726.0	654.7	71.2

B1.2. City of Lakewood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6014	14.3	14.3	-
Grand Total	14.3	14.3	-

B1.3. City of Long Beach

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6001	17.7	0.0	17.7
6002	387.5	378.7	8.8
6003	430.0	429.9	0.1
6004	3.4	2.4	1.0
6005	29.9	6.6	23.3
6006	55.9	35.9	20.0
6007	110.5	67.0	43.5
6008	172.5	144.0	28.5
6009	160.5	159.5	1.1
6010	128.3	100.8	27.5
6011	202.2	184.8	17.4
6012	7.2	0.0	7.2
6013	152.0	12.3	139.6
6014	346.9	346.9	-
6015	7.4	4.3	3.1
6016	3.0	0.0	3.0
6017	1.9	1.1	0.9
6018	49.3	45.8	3.5
6065	89.8	36.7	53.2
6066	248.7	202.6	46.1
6067	83.9	25.3	58.6
6068	247.6	222.5	25.1
6069	102.2	42.6	59.6
6070	83.4	22.2	61.2
6071	276.3	94.4	181.9
6072	0.3	0.3	-
7016	503.6	473.3	30.3
Grand Total	3,901.7	3,039.6	862.1

B1.4. City of Lynwood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6023	40.3	26.3	13.9
6024	16.1	10.6	5.4
6028	11.2	11.2	-
6030	168.8	45.2	123.6
6031	145.5	133.0	12.5
6032	115.7	60.5	55.2
6033	130.0	113.3	16.6
6074	185.2	134.9	50.4
6078	59.8	0.0	59.8
6080	146.6	91.7	54.9
6081	76.8	41.3	35.5
6082	12.2	0.0	12.2
Grand Total	1,108.1	667.9	440.2

B1.5. City of Paramount

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6069	0.0	0.0	-
6071	157.1	120.7	36.4
6072	183.8	172.9	10.9
6073	124.1	61.4	62.6
6075	181.8	163.7	18.1
6076	227.8	65.7	162.1
6078	112.3	21.7	90.6
6080	1.9	0.0	1.9
Grand Total	988.8	606.1	382.7

B1.6. City of Pico Rivera

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6106	86.5	44.3	42.2
6111	0.0	0.0	0.0
6112	5.9	1.4	4.5
6113	272.8	229.5	43.3
6114	0.0	0.0	-
6115	0.0	0.0	-
6116	0.0	0.0	-
6117	0.0	0.0	-
6126	12.0	12.0	-
6129	0.0	0.0	-
Grand Total	377.3	287.2	90.0

B1.7. City of Signal Hill

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6002	106.6	105.8	0.8
6003	43.7	43.7	-
6007	6.4	0.0	6.4
6009	8.3	8.2	0.1
6011	6.3	6.0	0.3
6012	26.6	25.2	1.4
Grand Total	197.9	188.9	9.0

B1.8. City of South Gate

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6031	148.6	148.6	-
6033	70.0	61.9	8.1
6034	422.9	416.7	6.3
6076	125.9	92.5	33.4
6078	0.0	0.0	-
6079	68.9	54.4	14.6
6080	48.7	48.7	-
6082	137.6	82.8	54.7
6083	36.2	11.5	24.7
6084	159.7	137.8	21.9
6085	67.8	0.0	67.8
6089	35.7	18.3	17.4
6090	43.8	3.4	40.4
6096	0.6	0.6	-
6098	0.1	0.1	-
6100	80.6	51.2	29.4
6101	25.0	25.0	-
6102	6.3	6.3	-
6104	7.4	7.4	-
6350	18.6	0.0	18.6
6351	8.2	7.1	1.0
Grand Total	1,512.6	1,174.3	338.2

B2. Lower Los Angeles River WMP – Compliance Tables

B2.1. City of Downey

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6076	Final	17.0	-	-	1.2	-	1.2
6077	Final	123.0	0.3	11.8	1.2	6.4	19.6
6079	50%	176.4	0.7	1.7	10.1	-	12.5
6082	Final	0.3	-	-	0.0	0.0	0.0
6100	50%	10.7	0.0	0.8	0.0	0.6	1.4
6102	31%	143.8	1.1	12.2	0.7	7.1	21.1
6103	Final	-	0.7	-	-	-	0.7
6104	Final	37.1	0.3	3.2	0.0	0.9	4.5
6106	Final	76.4	0.4	9.1	1.6	-	11.1
6111	Final	69.5	0.3	7.1	0.5	3.3	11.2
6113	Final	0.6	-	0.0	-	0.1	0.1
Grand Total		654.7	3.8	45.9	15.3	18.4	83.4

B2.2. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6014	31%	7.9	-	1.1	0.0	-	1.2
Grand Total		7.9	-	1.1	0.0	-	1.2

B2.3. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6001	Final	-	-	-	-	-	-
6002	50%	378.7	-	23.8	5.2	19.3	48.3
6003	Final	429.9	-	22.4	1.4	32.8	56.5
6004	50%	2.4	-	0.1	-	0.3	0.3
6005	31%	6.6	-	1.0	0.0	-	1.0
6006	Final	35.9	-	0.3	0.1	4.1	4.5
6007	Final	67.0	-	6.4	0.1	4.0	10.6
6008	Final	144.0	-	13.9	2.0	3.5	19.4
6009	Final	159.5	-	11.5	0.7	9.2	21.4
6010	Final	100.8	-	8.2	0.9	4.8	13.9
6011	Final	184.8	-	14.4	0.9	9.6	24.9
6012	31%	-	-	-	-	-	-
6013	50%	-	-	-	-	-	-
6014	Final	155.2	-	15.0	7.9	-	22.9
6015	31%	-	-	-	-	-	-
6016	Final	-	-	-	-	-	-
6017	50%	1.1	-	-	-	0.1	0.1
6018	Final	45.8	-	4.3	-	2.6	6.9
6065	Final	36.7	-	0.4	0.0	4.6	5.0
6066	31%	-	-	-	-	-	-
6067	50%	25.3	-	2.6	0.3	0.5	3.3
6068	31%	-	-	-	-	-	-
6069	50%	42.6	-	0.6	0.0	3.5	4.1
6070	50%	22.2	-	2.7	0.4	-	3.1
6071	50%	94.4	-	10.5	1.6	1.0	13.1
6072	50%	0.3	-	0.0	-	0.0	0.0
7016	Final	473.3	-	16.5	6.9	36.3	59.7
Grand Total		2,406.2	-	154.6	28.3	136.2	319.1

B2.4. City of Lynwood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6023	Final	26.3	-	1.0	0.7	1.6	3.3
6024	Final	10.6	-	0.4	-	1.1	1.4
6028	31%	11.2	-	0.8	-	0.9	1.7
6030	Final	45.2	-	4.0	2.4	-	6.4
6031	31%	133.0	-	9.9	2.0	7.5	19.4
6032	Final	60.5	-	6.0	0.4	3.4	9.8
6033	Final	113.3	-	7.4	0.2	10.7	18.2
6074	50%	134.9	-	12.8	3.8	0.1	16.8
6078	Final	-	-	-	-	-	-
6080	31%	91.7	-	7.7	0.7	4.7	13.2
6081	Final	41.3	-	4.0	0.8	0.5	5.3
6082	Final	-	-	-	-	-	-
Grand Total		667.9	-	53.9	11.1	30.5	95.5

B2.5. City of Paramount

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6069	31%	0.0	-	-	-	-	-
6071	Final	120.7	0.0	4.9	0.9	9.9	15.6
6072	Final	172.9	0.0	7.6	1.1	13.9	22.6
6073	Final	61.4	-	1.9	0.2	4.6	6.6
6075	31%	163.7	-	9.0	1.7	10.2	20.9
6076	50%	65.7	-	7.4	0.8	0.3	8.6
6078	Final	21.7	-	0.5	0.0	1.8	2.3
6080	Final	-	-	-	-	-	-
Grand Total		606.1	0.1	31.2	4.7	40.6	76.6

B2.6. City of Pico Rivera

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6106	31%	44.3	-	5.9	0.5	0.2	6.5
6111	Final	-	-	-	-	-	-
6112	31%	1.4	-	0.0	-	0.1	0.2
6113	31%	229.5	-	5.6	0.0	27.0	32.7
6114	Final	-	-	-	-	-	-
6115	Final	0.0	-	-	-	0.0	0.0
6116	Final	-	-	-	-	-	-
6117	Final	-	-	-	-	-	-
6126	Final	12.0	-	1.3	0.0	0.5	1.8
6129	Final	-	-	-	-	-	-
Grand Total		287.2	-	12.8	0.5	27.9	41.2

B2.7. City of Signal Hill

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6002	50%	105.8	-	7.0	0.9	5.9	13.9
6003	Final	43.7	-	1.9	0.0	4.2	6.0
6007	Final	-	-	-	-	-	-
6009	Final	8.2	0.1	0.3	-	0.7	1.1
6011	31%	6.0	0.1	0.8	-	0.2	1.1
6012	31%	2.5	-	0.0	0.2	-	0.2
Grand Total		166.2	0.2	10.0	1.1	11.0	22.3

B2.8. City of South Gate

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6031	31%	148.6	-	16.9	0.8	5.3	22.9
6033	Final	61.9	-	4.5	0.3	4.8	9.5
6034	Final	416.7	-	30.0	3.8	25.3	59.0
6076	50%	92.5	-	7.5	0.7	5.1	13.2
6078	Final	-	-	-	-	-	-
6079	50%	54.4	-	4.9	0.1	3.4	8.4
6080	31%	48.7	-	5.8	-	2.5	8.3
6082	Final	82.8	0.0	4.3	0.1	9.4	13.8
6083	Final	11.5	-	0.7	-	0.9	1.6
6084	Final	137.8	4.7	8.3	0.8	5.9	19.8
6085	50%	-	-	-	-	-	-
6089	Final	18.3	-	0.8	0.2	1.8	2.7
6090	Final	3.4	-	0.6	-	-	0.6
6096	31%	0.6	-	0.0	0.0	0.0	0.1
6098	31%	0.1	-	-	0.0	-	0.0
6100	50%	51.2	-	2.6	0.0	4.2	6.8
6101	31%	25.0	-	0.5	0.1	2.6	3.3
6102	31%	6.3	-	-	-	0.8	0.8
6104	Final	7.4	-	0.0	0.0	0.9	1.0
6350	Final	-	-	-	-	-	-
6351	Final	7.1	-	0.0	0.0	1.1	1.1
Grand Total		1,174.3	4.7	87.5	6.8	73.8	173.0

B3. Los Cerritos Channel WMP – MS4 vs Non-MS4

B3.1. City of Bellflower

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5507	305.0	268.1	36.9
5517	154.4	137.7	16.7
5518	235.2	233.5	1.7
5519	289.1	235.8	53.2
5523	138.8	100.4	38.5
5524	14.8	14.8	-
Grand Total	1,137.4	990.4	147.0

B3.2. City of Cerritos

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5506	0.0	0.0	-
5507	12.9	12.9	0.0
Grand Total	12.9	12.9	0.0

B3.3. City of Downey

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5524	112.8	93.0	19.8
Grand Total	112.8	93.0	19.8

B3.4. City of Lakewood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5506	226.6	226.5	0.0
5507	176.3	176.3	-
5510	20.7	19.9	0.8
5512	143.1	138.8	4.3
5514	35.3	35.3	-
5515	26.6	26.6	-
5516	31.9	31.9	-
5517	134.4	134.4	-
5519	9.5	9.5	-
5520	164.5	164.5	-
5521	95.2	95.2	-
5522	71.9	71.9	-
5523	21.4	21.4	-
Grand Total	1,157.2	1,152.1	5.1

B3.5. City of Long Beach

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5501	0.3	0.3	0.0
5502	0.5	0.2	0.2
5503	78.2	77.8	0.4
5504	349.2	300.9	48.2
5505	133.3	130.5	2.8
5506	8.6	8.6	0.0
5508	74.6	65.6	9.0
5509	129.3	25.6	103.7
5510	807.6	152.2	655.3
5511	50.5	48.5	2.0
5512	454.0	329.5	124.5
5513	32.5	30.5	2.0
5514	153.5	152.8	0.7
5515	91.0	91.0	-
5520	7.4	7.4	-
5521	108.7	49.2	59.5
5522	50.8	48.6	2.2
5523	146.4	110.7	35.7
Grand Total	2,676.1	1,629.8	1,046.2

B3.6. City of Paramount

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5519	36.5	35.4	1.2
5523	343.3	332.6	10.7
5524	252.1	157.5	94.6
Grand Total	631.9	525.5	106.4

B3.7. City of Signal Hill

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5510	322.6	284.3	38.3
Grand Total	322.6	284.3	38.3

B4. Los Cerritos Channel WMP - Compliance Tables

B4.1. City of Bellflower

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5507	Final	268.1	-	16.7	1.2	13.2	31.1
5517	Final	137.7	-	9.3	0.8	9.3	19.4
5518	Final	233.5	-	16.8	1.2	10.2	28.2
5519	35%	176.3	-	11.4	0.9	12.1	24.4
	Final	59.5	-	-	-	3.6	3.6
5523	35%	68.0	-	3.7	0.4	4.1	8.2
	Final	32.3	-	-	-	2.0	2.0
5524	Final	14.8	-	0.2	-	1.2	1.4
Grand Total		990.4	-	58.1	4.5	55.6	118.2

B4.2. City of Cerritos

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5506	Final	0.0	-	-	-	0.0	0.0
5507	35%	9.7	-	1.0	0.0	0.5	1.4
	Final	3.2	-	-	-	0.1	0.1
Grand Total		12.9	-	1.0	0.0	0.6	1.6

B4.3. City of Downey

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5524	35%	57.2	0.1	5.3	0.0	2.7	8.1
	Final	35.8	-	-	-	2.1	2.1
Grand Total		93.0	0.1	5.3	0.0	4.8	10.2

B4.4. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5506	Final	226.5	-	31.4	2.1	5.1	38.5
5507	35%	131.0	-	15.4	2.6	1.5	19.5
	Final	45.2	-	-	-	3.6	3.6
5510	Final	19.9	-	0.4	-	1.5	1.9
5512	Final	138.8	-	7.7	0.2	7.0	14.9
5514	Final	35.3	-	3.7	1.3	0.4	5.4
5515	Final	26.6	-	3.9	0.2	0.5	4.6
5516	Final	31.9	-	4.0	0.4	0.8	5.3
5517	Final	134.4	-	18.6	1.4	2.8	22.9
5519	35%	3.1	-	0.2	-	0.2	0.4
	Final	6.4	-	-	-	0.1	0.1
5520	35%	130.9	-	14.0	2.1	4.4	20.6
	Final	33.5	-	-	-	3.3	3.3
5521	Final	95.2	-	11.6	0.6	2.2	14.3
5522	Final	71.9	-	8.7	0.8	1.6	11.1
5523	35%	17.4	-	1.9	-	0.7	2.6
	Final	4.0	-	-	-	0.3	0.3
Grand Total		1,152.1	-	121.5	11.8	36.2	169.5

B4.5. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5501	35%	0.1	-	0.0	0.0	0.0	0.0
	Final	0.1	-	-	-	0.0	0.0
5502	35%	0.1	-	0.0	0.0	0.0	0.0
	Final	0.2	-	-	-	0.0	0.0
5503	35%	57.7	-	4.2	2.3	2.0	8.5
	Final	20.1	-	-	-	1.7	1.7
5504	35%	196.6	-	10.2	3.3	8.7	22.2
	Final	104.4	-	-	-	5.5	5.5
5505	Final	130.5	-	15.9	1.6	3.2	20.7
5506	Final	8.6	-	0.1	0.2	0.4	0.7
5508	Final	65.6	-	7.7	0.9	1.7	10.3
5509	Final	25.6	-	-	2.2	-	2.2
5510	Final	152.2	-	9.8	0.9	6.1	16.8
5511	Final	48.5	-	6.7	0.2	1.3	8.1
5512	Final	329.5	-	22.2	1.7	16.8	40.7
5513	35%	23.9	-	1.5	0.1	2.1	3.7
	Final	6.6	-	-	-	0.4	0.4
5514	35%	106.0	-	10.9	5.9	-	16.7
	Final	46.8	-	3.7	-	2.8	6.5
5515	Final	91.0	-	10.8	1.7	2.3	14.9
5520	Final	7.4	-	0.8	-	0.3	1.2
5521	Final	49.2	-	6.0	0.1	1.8	7.9
5522	Final	48.6	-	4.2	0.0	3.1	7.3
5523	35%	89.3	-	7.0	0.8	3.5	11.3
	Final	21.4	-	-	-	1.6	1.6
Grand Total		1,629.8	-	121.7	21.8	65.3	208.7

B4.6. City of Paramount

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5519	35%	24.0	-	1.9	0.2	1.4	3.5
	Final	11.4	-	-	-	0.6	0.6
5523	35%	243.0	-	12.4	2.8	15.7	30.9
	Final	89.6	-	-	-	4.1	4.1
5524	Final	157.5	-	8.5	3.5	4.0	16.0
Grand Total		525.5	-	22.8	6.4	25.9	55.1

B4.7. City of Signal Hill

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5510	35%	231.6	0.0	11.2	1.2	14.2	26.6
	Final	52.7	-	-	-	2.0	2.0
Grand Total		284.3	0.0	11.2	1.2	16.2	28.6

B5. Lower San Gabriel River (San Gabriel River) WMP – MS4 vs Non-MS4

B5.1. City of Artesia

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5109	1.1	1.1	-
Grand Total	1.1	1.1	-

B5.2. City of Bellflower

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5110	0.0	0.0	-
5112	0.7	0.6	0.2
5113	56.8	51.5	5.3
5114	0.0	0.0	-
5115	1.3	1.3	-
5116	0.1	0.1	-
5118	3.9	3.9	-
Grand Total	62.8	57.4	5.4

B5.3. City of Cerritos

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5107	0.0	0.0	-
5108	0.0	0.0	-
5109	40.7	0.0	40.7
5110	2.9	2.9	-
5111	6.8	0.0	6.8
5112	2.3	1.2	1.2
5113	0.0	0.0	-
5516	6.6	0.0	6.6
Grand Total	59.4	4.1	55.3

B5.4. City of Diamond Bar

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5197	0.0	0.0	-
5198	0.0	0.0	-
5203	12.6	0.0	12.6
5204	3.8	0.0	3.8
5205	1.0	1.0	-
5212	15.3	0.0	15.3
5213	0.3	0.0	0.3
Grand Total	33.0	1.1	32.0

B5.5. City of Downey

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5113	0.0	0.0	-
5114	78.3	22.4	55.9
5115	80.6	0.0	80.6
5118	0.0	0.0	0.0
5119	52.5	52.5	-
5122	4.3	0.0	4.3
5124	0.0	0.0	0.0
5125	38.4	2.5	35.8
5126	9.8	9.8	-
5127	0.0	0.0	-
5128	0.0	0.0	-
Grand Total	263.9	87.3	176.7

B5.6. City of Lakewood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5105	0.8	0.8	-
5106	7.4	0.0	7.4
5107	0.0	0.0	-
5108	1.4	1.4	-
5110	0.0	0.0	-
Grand Total	9.6	2.2	7.4

B5.7. City of Long Beach

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5102	0.0	0.0	-
5103	26.9	26.9	-
5104	2.3	2.3	-
5105	0.0	0.0	-
5106	0.0	0.0	-
Grand Total	29.2	29.2	-

B5.8. City of Norwalk

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5109	0.8	0.8	-
5116	0.5	0.0	0.5
5117	14.5	0.0	14.5
5118	3.7	0.1	3.5
5120	39.1	0.0	39.1
5121	41.5	3.9	37.6
5122	34.7	0.0	34.7
5124	2.2	0.0	2.2
Grand Total	136.9	4.8	132.1

B5.9. City of Pico Rivera

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5127	0.0	0.0	-
5128	10.9	6.4	4.5
5130	6.2	6.1	0.1
5131	17.2	11.7	5.5
5132	0.0	0.0	-
5135	4.3	4.3	-
5136	7.2	7.2	-
5137	0.2	0.2	-
5139	7.8	7.8	-
5140	0.0	0.0	-
5141	4.9	4.9	-
5142	0.0	0.0	-
5143	8.9	8.9	-
5144	3.8	0.0	3.8
5145	1.7	1.7	-
5147	0.0	0.0	-
5148	0.2	0.2	0.0
5149	0.0	0.0	-
5150	0.3	0.0	0.3
5151	0.3	0.0	0.3
5153	1.0	1.0	-
5154	0.0	0.0	-
Grand Total	75.1	60.4	14.7

B5.10. City of Santa Fe Springs

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5120	3.1	3.1	0.0
5122	11.0	0.0	11.0
5123	80.0	23.9	56.2
5127	0.0	0.0	0.0
5129	4.5	0.0	4.5
5130	1.7	0.0	1.7
5132	0.0	0.0	-
5133	0.1	0.0	0.1
5134	5.6	3.3	2.3
5135	0.0	0.0	-
Grand Total	106.0	30.3	75.8

B5.11. City of Whittier

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5138	7.1	7.1	-
5142	0.0	0.0	0.0
5146	0.4	0.0	0.4
5147	0.0	0.0	-
5148	0.0	0.0	-
5153	0.0	0.0	-
5173	0.0	0.0	-
Grand Total	7.5	7.1	0.4

B6. Lower San Gabriel River (San Gabriel River) WMP – Compliance Tables

B6.1. City of Artesia

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5109	35%	1.1	-	-	0.1	-	0.1
Grand Total		1.1	-	-	0.1	-	0.1

B6.2. City of Bellflower

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5110	Final	0.0	-	-	-	0.0	0.0
5112	Final	0.6	-	0.1	0.0	-	0.1
5113	Final	51.5	-	0.9	3.4	-	4.3
5114	Final	-	-	-	-	-	-
5115	35%	1.3	-	0.2	0.0	-	0.2
5116	Final	0.1	-	-	-	0.0	0.0
5118	Final	3.9	-	0.6	0.3	-	0.9
Grand Total		57.4	-	1.8	3.7	0.0	5.5

B6.3. City of Cerritos

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5107	Final	-	-	-	-	-	-
5108	Final	-	-	-	-	-	-
5109	Final	-	-	-	-	-	-
5110	Final	2.9	-	0.4	0.0	-	0.4
5111	Final	-	-	-	-	-	-
5112	Final	1.2	-	0.2	0.0	-	0.2
5113	Final	-	-	-	-	-	-
5116	35%	-	-	-	-	-	-
Grand Total		4.1	-	0.6	0.0	-	0.6

B6.4. City of Diamond Bar

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5197	Final	0.0	-	0.0	-	-	0.0
5198	Final	-	-	-	-	-	-
5203	Final	-	-	-	-	-	-
5204	Final	-	-	-	-	-	-
5205	Final	1.0	-	0.2	-	-	0.2
5212	Final	-	-	-	-	-	-
5213	35%	-	-	-	-	-	-
Grand Total		1.1	-	0.2	-	-	0.2

B6.5. City of Downey

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5113	Final	-	1.0	-	-	-	1.0
5114	Final	22.4	0.8	2.1	0.4	-	3.3
5115	Final	-	0.6	-	-	-	0.6
5118	Final	-	0.6	-	-	-	0.6
5119	Final	52.5	3.3	6.4	-	-	9.7
5122	35%	-	0.0	-	-	-	0.0
5124	Final	-	0.0	-	-	-	0.0
5125	Final	2.5	0.4	0.1	-	-	0.5
5126	Final	9.8	0.3	1.4	-	-	1.7
5127	Final	-	0.1	-	-	-	0.1
5128	Final	-	0.0	-	-	-	0.0
Grand Total		87.3	7.1	10.0	0.4	-	17.5

B6.6. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5105	Final	0.8	-	-	0.0	0.1	0.1
5106	35%	-	-	-	-	-	-
5107	Final	-	-	-	-	-	-
5108	Final	1.4	-	0.2	0.0	-	0.2
5110	Final	-	-	-	-	-	-
Grand Total		2.2	-	0.2	0.0	0.1	0.4

B6.7. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5102	Final	-	-	-	-	-	-
5103	35%	26.9	-	1.1	1.3	-	2.4
5104	Final	2.3	-	0.3	-	-	0.3
5105	Final	-	-	-	-	-	-
5106	Final	0.0	-	-	-	0.0	0.0
Grand Total		29.2	-	1.4	1.3	0.0	2.7

B6.8. City of Norwalk

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5109	35%	0.8	-	-	0.1	-	0.1
5116	Final	-	-	-	-	-	-
5117	Final	-	-	-	-	-	-
5118	Final	0.1	-	-	0.0	-	0.0
5120	Final	-	-	-	-	-	-
5121	Final	3.9	-	-	0.3	-	0.3
5122	Final	-	-	-	-	-	-
5124	Final	-	-	-	-	-	-
Grand Total		4.8	-	-	0.3	-	0.3

B6.9. City of Pico Rivera

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5127	Final	0.0	-	-	-	0.0	0.0
5128	Final	6.4	-	1.2	-	-	1.2
5130	Final	6.1	-	1.1	-	-	1.1
5131	Final	11.7	-	2.0	-	-	2.0
5132	Final	0.0	-	-	-	0.0	0.0
5135	Final	4.3	-	0.8	-	-	0.8
5136	Final	7.2	-	1.3	-	-	1.3
5137	35%	0.2	-	0.0	-	-	0.0
5139	Final	7.8	-	1.4	-	-	1.4
5140	Final	-	-	-	-	-	-
5141	Final	4.9	-	0.8	-	-	0.8
5142	Final	-	-	-	-	-	-
5143	Final	8.9	-	1.6	-	-	1.6
5144	Final	-	-	-	-	-	-
5145	Final	1.7	-	0.3	-	-	0.3
5147	Final	-	-	-	-	-	-
5148	Final	0.2	-	0.0	-	-	0.0
5149	Final	0.0	-	-	-	-	-
5150	Final	-	-	-	-	-	-
5151	Final	-	-	-	-	-	-
5153	Final	1.0	-	0.2	-	-	0.2
5154	Final	-	-	-	-	-	-
Grand Total		60.4	-	10.8	-	0.0	10.8

B6.10. City of Santa Fe Springs

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5120	Final	3.1	-	0.2	-	0.3	0.5
5122	Final	-	-	-	-	-	-
5123	Final	23.9	-	3.8	-	-	3.8
5127	35%	-	-	-	-	-	-
5129	Final	-	-	-	-	-	-
5130	Final	-	-	-	-	-	-
5132	Final	-	-	-	-	-	-
5133	Final	-	-	-	-	-	-
5134	Final	3.3	-	0.6	-	-	0.6
5135	Final	0.0	-	0.0	-	0.0	0.0
Grand Total		30.3	-	4.6	-	0.3	4.9

B6.11. City of Whittier

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5138	Final	7.1	-	1.4	-	-	1.4
5142	Final	-	-	-	-	-	-
5146	Final	-	-	-	-	-	-
5147	Final	-	-	-	-	-	-
5148	Final	-	-	-	-	-	-
5153	35%	0.0	-	-	-	0.0	0.0
5173	Final	-	-	-	-	-	-
Grand Total		7.1	-	1.4	-	0.0	1.4

B7. Lower San Gabriel River WMP (Coyote Creek) – MS4 vs Non-MS4

B7.1. City of Artesia

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5008	0.0	0.0	-
5018	47.9	15.9	32.0
Grand Total	47.9	15.9	32.0

B7.2. City of Cerritos

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5008	41.7	7.7	34.0
5016	0.0	0.0	-
5017	4.3	4.3	-
5018	49.7	14.9	34.8
5023	0.0	0.0	-
5024	48.7	0.0	48.7
5026	5.8	5.8	0.1
5028	12.2	0.0	12.2
5029	4.9	4.9	-
5030	0.1	0.1	0.0
5035	3.8	0.0	3.8
5036	2.2	1.2	1.0
5038	0.0	0.0	-
5059	16.0	15.1	0.8
5060	0.0	0.0	-
5061	4.9	2.6	2.3
Grand Total	194.3	56.7	137.6

B7.3. City of Diamond Bar

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5053	0.0	0.0	-
5054	1.0	1.0	-
5055	8.4	8.4	-
5056	10.6	0.0	10.6
5057	26.8	0.0	26.8
5058	27.2	27.2	-
Grand Total	74.0	36.7	37.4

B7.4. City of Hawaiian Gardens

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5004	0.0	0.0	-
5007	27.0	23.6	3.4
5009	0.1	0.1	-
5013	1.3	1.3	-
5014	2.1	2.1	-
Grand Total	30.4	27.1	3.4

B7.5. City of La Mirada

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5037	0.0	0.0	-
5038	1.1	0.0	1.1
5039	7.5	0.0	7.5
5040	2.1	0.0	2.1
5041	2.0	0.0	2.0
5042	0.0	0.0	0.0
5043	34.8	19.1	15.7
5044	0.8	0.0	0.8
5045	0.8	0.0	0.8
5059	1.4	1.4	-
5060	0.9	0.0	0.9
5062	40.4	20.5	19.9
5063	37.0	37.0	-
5064	0.0	0.0	-
5067	0.0	0.0	-
5069	40.3	40.3	-
5070	0.0	0.0	-
5073	5.7	5.7	-
5074	0.8	0.8	-
5080	0.0	0.0	-
Grand Total	175.7	124.9	50.8

B7.6. City of Lakewood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5004	0.0	0.0	-
5007	17.5	17.5	0.0
5008	8.2	2.3	5.9
5014	0.0	0.0	-
5015	0.0	0.0	-
5016	0.0	0.0	-
5017	0.0	0.0	-
Grand Total	25.7	19.7	6.0

B7.7. City of Long Beach

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5003	0.0	0.0	0.0
5004	37.5	0.0	37.5
5005	0.0	0.0	-
5007	0.0	0.0	-
5009	0.0	0.0	-
5013	0.0	0.0	-
Grand Total	37.5	0.0	37.5

B7.8. City of Norwalk

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5008	3.0	1.6	1.3
5018	36.0	2.0	34.0
5019	41.5	24.3	17.2
5020	0.0	0.0	-
5021	43.4	16.9	26.5
5022	28.7	7.7	21.0
5024	0.0	0.0	-
5025	0.0	0.0	-
5060	0.0	0.0	-
5068	0.0	0.0	-
5071	0.0	0.0	-
5073	0.0	0.0	-
Grand Total	152.5	52.5	99.9

B7.9. City of Santa Fe Springs

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5019	0.0	0.0	-
5020	27.7	0.0	27.7
5022	13.5	0.0	13.5
5024	0.0	0.0	-
5025	31.2	0.0	31.2
5060	28.9	0.0	28.9
5061	0.0	0.0	-
5062	2.6	0.0	2.6
5067	19.4	0.0	19.4
5068	6.1	0.0	6.1
5069	2.3	0.0	2.3
5071	50.5	0.0	50.5
5072	2.6	2.6	-
5073	23.5	0.0	23.5
5084	1.4	1.4	-
5089	19.8	0.0	19.8
5092	1.1	1.1	-
5093	22.1	0.0	22.1
5094	7.4	7.4	-
5095	0.4	0.0	0.4
Grand Total	260.7	12.6	248.1

B7.10. City of Whittier

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5045	0.0	0.0	-
5064	0.0	0.0	-
5065	3.7	3.7	-
5070	0.0	0.0	-
5079	18.5	11.7	6.8
5080	52.6	26.0	26.5
5081	2.1	0.0	2.1
5082	6.8	0.2	6.6
5083	0.0	0.0	-
5086	1.7	0.0	1.7
5087	21.0	20.8	0.2
5088	25.0	24.7	0.3
5089	0.6	0.5	0.1
5090	0.8	0.8	-
5091	6.6	5.7	0.9
5092	13.8	8.9	4.9
5093	0.0	0.0	-
5094	0.6	0.6	-
5095	24.2	21.1	3.1
5096	3.8	3.8	-
5097	5.2	5.2	-
5098	48.7	47.9	0.7
5099	11.3	10.6	0.7
5100	7.3	7.3	-
5101	0.6	0.6	-
Grand Total	254.7	200.1	54.6

B8. Lower San Gabriel River WMP (Coyote Creek) – Compliance Tables

B8.1. City of Artesia

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5008	Final	-	-	-	-	-	-
5018	35%	15.9	-	-	1.1	-	1.1
Grand Total		15.9	-	-	1.1	-	1.1

B8.2. City of Cerritos

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5008	Final	7.7	-	-	0.9	-	0.9
5016	Final	-	-	-	-	-	-
5017	Final	4.3	-	-	0.5	-	0.5
5018	Final	14.9	-	-	1.1	-	1.1
5023	Final	-	-	-	-	-	-
5024	Final	-	-	-	-	-	-
5026	Final	5.8	-	1.0	0.0	-	1.0
5028	Final	-	-	-	-	-	-
5029	Final	4.9	-	0.3	0.2	-	0.6
5030	35%	0.1	-	0.0	-	-	0.0
5035	Final	-	-	-	-	-	-
5036	Final	1.2	-	0.2	0.0	-	0.2
5038	Final	-	-	-	-	-	-
5059	Final	15.1	-	1.6	0.5	-	2.0
5060	Final	-	-	-	-	-	-
5061	Final	2.6	-	-	0.2	-	0.2
Grand Total		56.7	-	3.1	3.4	-	6.4

B8.3. City of Diamond Bar

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5053	Final	-	-	-	-	-	-
5054	35%	1.0	-	0.3	-	-	0.3
5055	Final	8.4	-	1.2	-	0.7	1.9
5056	Final	-	-	-	-	-	-
5057	Final	-	-	-	-	-	-
5058	Final	27.2	-	6.7	-	-	6.7
Grand Total		36.7	-	8.2	-	0.7	8.9

B8.4. City of Hawaiian Gardens

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5004	Final	-	-	-	-	-	-
5007	35%	23.6	-	0.3	1.5	-	1.8
5009	Final	0.1	-	-	-	0.0	0.0
5013	Final	1.3	-	-	0.1	-	0.1
5014	Final	2.1	-	0.2	0.0	-	0.3
Grand Total		27.1	-	0.6	1.6	0.0	2.2

B8.5. City of La Mirada

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5037	Final	-	-	-	-	-	-
5038	Final	-	-	-	-	-	-
5039	Final	-	-	-	-	-	-
5040	Final	-	-	-	-	-	-
5041	Final	-	-	-	-	-	-
5042	Final	-	-	-	-	-	-
5043	Final	19.1	-	1.9	0.6	-	2.5
5044	Final	-	-	-	-	-	-
5045	35%	-	-	-	-	-	-
5059	Final	1.4	-	0.3	-	-	0.3
5060	Final	-	-	-	-	-	-
5062	Final	20.5	-	1.0	1.1	-	2.1
5063	Final	37.0	-	-	3.0	-	3.0
5064	Final	-	-	-	-	-	-
5067	Final	-	-	-	-	-	-
5069	Final	40.3	-	5.3	0.9	-	6.2
5070	Final	-	-	-	-	-	-
5073	Final	5.7	-	1.0	-	-	1.0
5074	Final	0.8	-	0.1	-	-	0.1
5080	Final	-	-	-	-	-	-
Grand Total		124.9	-	9.6	5.6	-	15.2

B8.6. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5004	Final	-	-	-	-	-	-
5007	35%	17.5	-	0.9	0.7	-	1.6
5008	Final	2.3	-	-	0.3	-	0.3
5014	Final	-	-	-	-	-	-
5015	Final	-	-	-	-	-	-
5016	Final	-	-	-	-	-	-
5017	Final	-	-	-	-	-	-
Grand Total		19.7	-	0.9	0.9	-	1.9

B8.7. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5003	Final	-	-	-	-	-	-
5004	35%	-	-	-	-	-	-
5005	Final	-	-	-	-	-	-
5007	Final	-	-	-	-	-	-
5009	Final	-	-	-	-	-	-
5013	Final	0.0	-	-	0.0	-	0.0
Grand Total		0.0	-	-	0.0	-	0.0

B8.8. City of Norwalk

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5008	35%	1.6	-	-	0.2	-	0.2
5018	Final	2.0	-	-	0.2	-	0.2
5019	Final	24.3	-	-	1.8	-	1.8
5020	Final	-	-	-	-	-	-
5021	Final	16.9	-	-	1.3	-	1.3
5022	Final	7.7	-	1.4	-	-	1.4
5024	Final	-	-	-	-	-	-
5025	Final	-	-	-	-	-	-
5060	Final	-	-	-	-	-	-
5068	Final	-	-	-	-	-	-
5071	Final	-	-	-	-	-	-
5073	Final	-	-	-	-	-	-
Grand Total		52.5	-	1.4	3.4	-	4.7

B8.9. City of Santa Fe Springs

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5019	Final	0.0	-	-	-	0.0	0.0
5020	Final	-	-	-	-	-	-
5022	Final	-	-	-	-	-	-
5024	Final	-	-	-	-	-	-
5025	Final	-	-	-	-	-	-
5060	Final	-	-	-	-	-	-
5061	Final	-	-	-	-	-	-
5062	Final	-	-	-	-	-	-
5067	Final	-	-	-	-	-	-
5068	Final	-	-	-	-	-	-
5069	Final	-	-	-	-	-	-
5071	Final	-	-	-	-	-	-
5072	Final	2.6	-	0.3	-	0.1	0.4
5073	Final	-	-	-	-	-	-
5084	Final	1.4	-	0.2	-	-	0.2
5089	Final	-	-	-	-	-	-
5092	Final	1.1	-	0.1	-	0.2	0.2
5093	Final	-	-	-	-	-	-
5094	Final	7.4	-	0.4	-	0.9	1.2
5095	35%	-	-	-	-	-	-
Grand Total		12.6	-	1.0	-	1.1	2.1

B8.10. City of Whittier

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5045	Final	0.0	-	-	-	0.0	0.0
5064	Final	-	-	-	-	-	-
5065	Final	3.7	-	0.8	-	-	0.8
5070	Final	0.0	-	-	-	0.0	0.0
5079	Final	11.7	-	2.5	-	-	2.5
5080	Final	26.0	-	5.5	-	-	5.5
5081	35%	-	-	-	-	-	-
5082	Final	0.2	-	0.0	-	-	0.0
5083	Final	-	-	-	-	-	-
5086	Final	-	-	-	-	-	-
5087	Final	20.8	-	4.1	-	-	4.1
5088	Final	24.7	-	5.4	-	-	5.4
5089	Final	0.5	-	0.1	-	-	0.1
5090	Final	0.8	-	0.2	-	-	0.2
5091	Final	5.7	-	1.1	-	-	1.1
5092	Final	8.9	-	1.7	-	-	1.7
5093	Final	0.0	-	-	-	0.0	0.0
5094	Final	0.6	-	0.1	-	0.0	0.1
5095	Final	21.1	-	3.9	-	-	3.9
5096	Final	3.8	-	0.7	-	-	0.7
5097	Final	5.2	-	1.0	-	-	1.0
5098	Final	47.9	-	8.7	-	-	8.7
5099	Final	10.6	-	1.9	-	-	1.9
5100	Final	7.3	-	1.4	-	-	1.4
5101	Final	0.6	-	0.1	-	-	0.1
Grand Total		200.1	-	39.0	-	0.0	39.1

Attachment C: Supporting Figures for Watershed Control Measures

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

June 6, 2014



Figure 1. LLAR Downey Subwatershed IDs

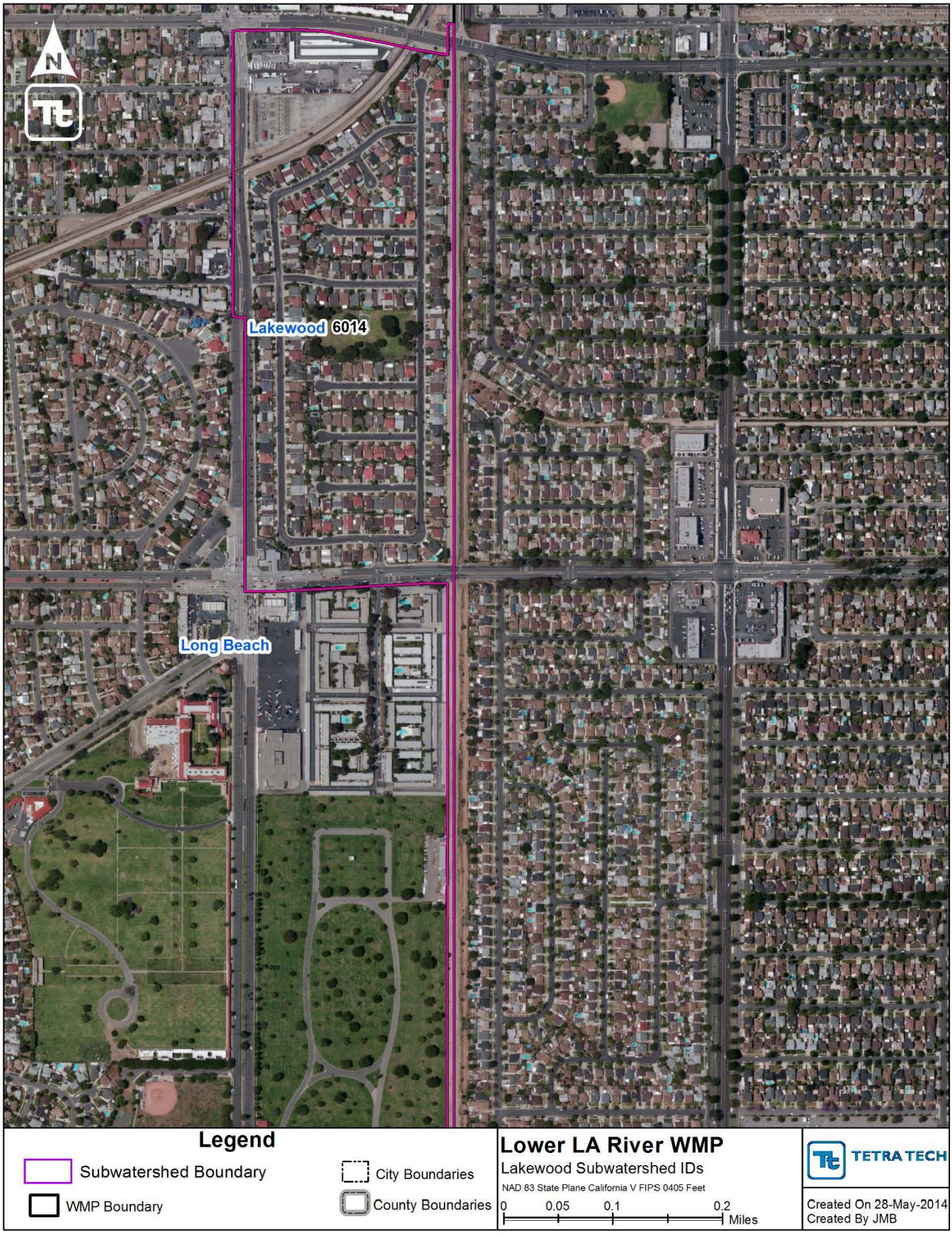


Figure 2. LLAR Lakewood Subwatershed IDs

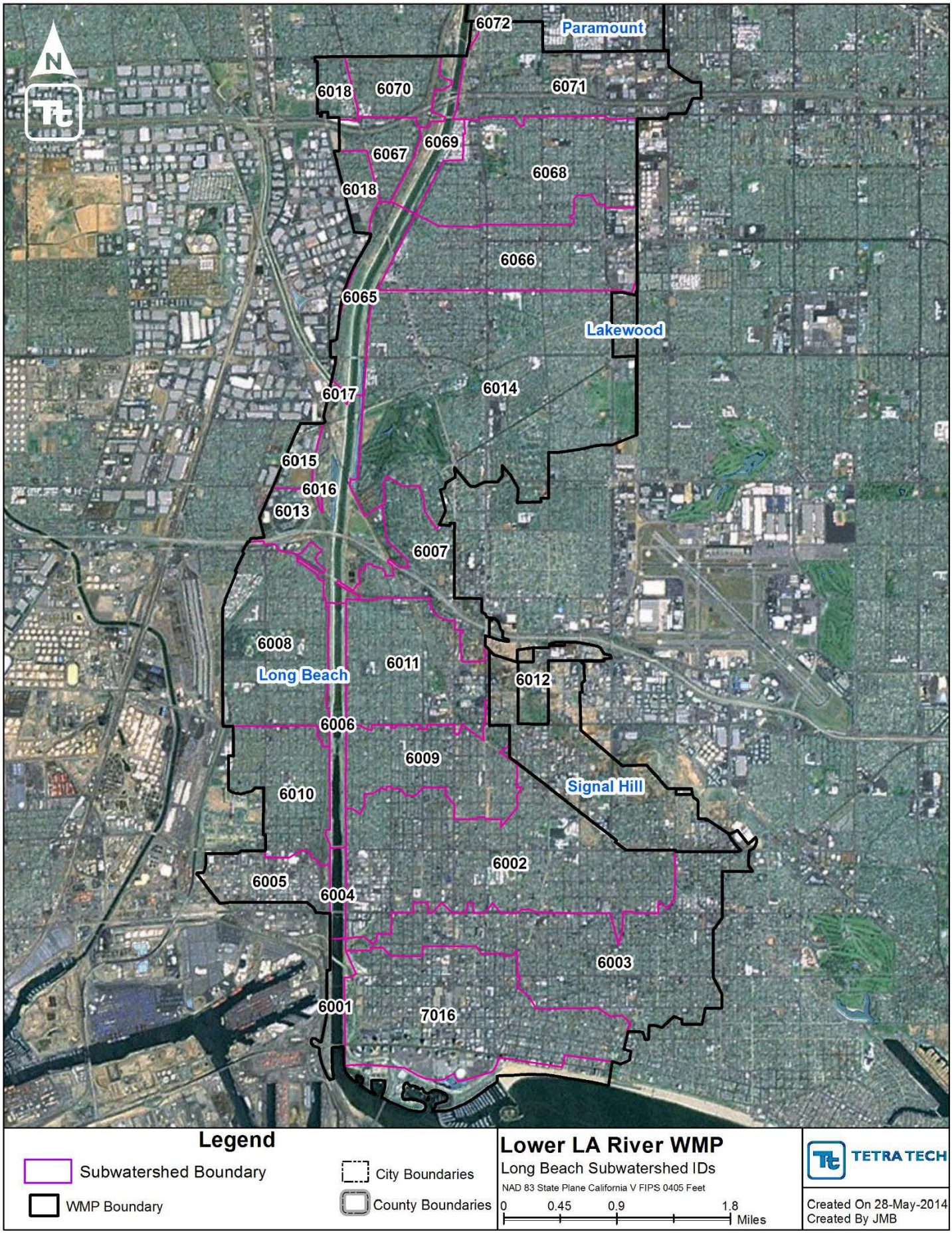


Figure 3. LLAR Long Beach Subwatershed IDs



Figure 4. LLAR Lynwood Subwatershed IDs



Figure 5. LLAR Paramount Subwatershed IDs



Figure 6. LLAR Pico Rivera Subwatershed IDs

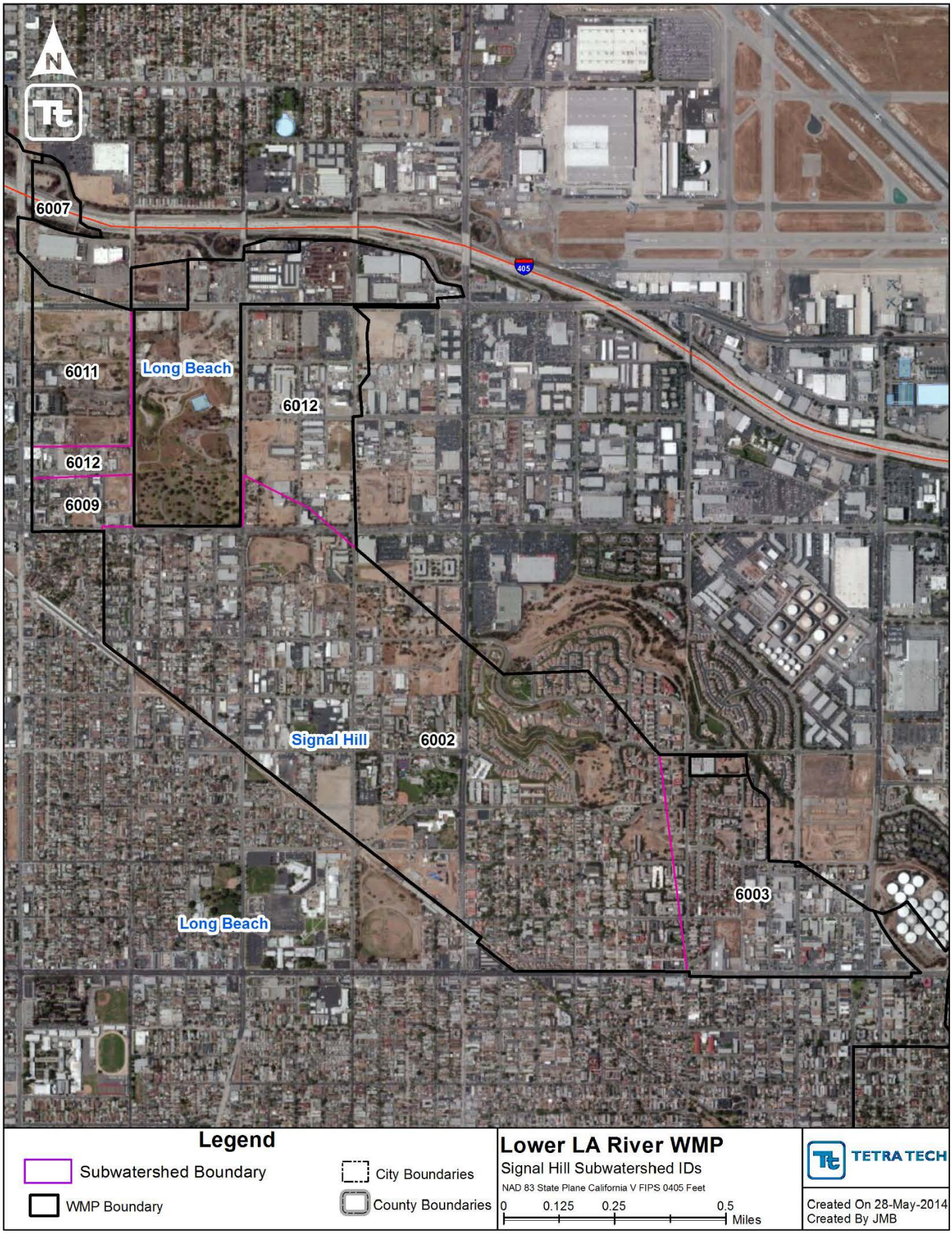


Figure 7. LLAR Signal Hill Subwatershed IDs



Figure 8. LLAR South Gate Subwatershed IDs

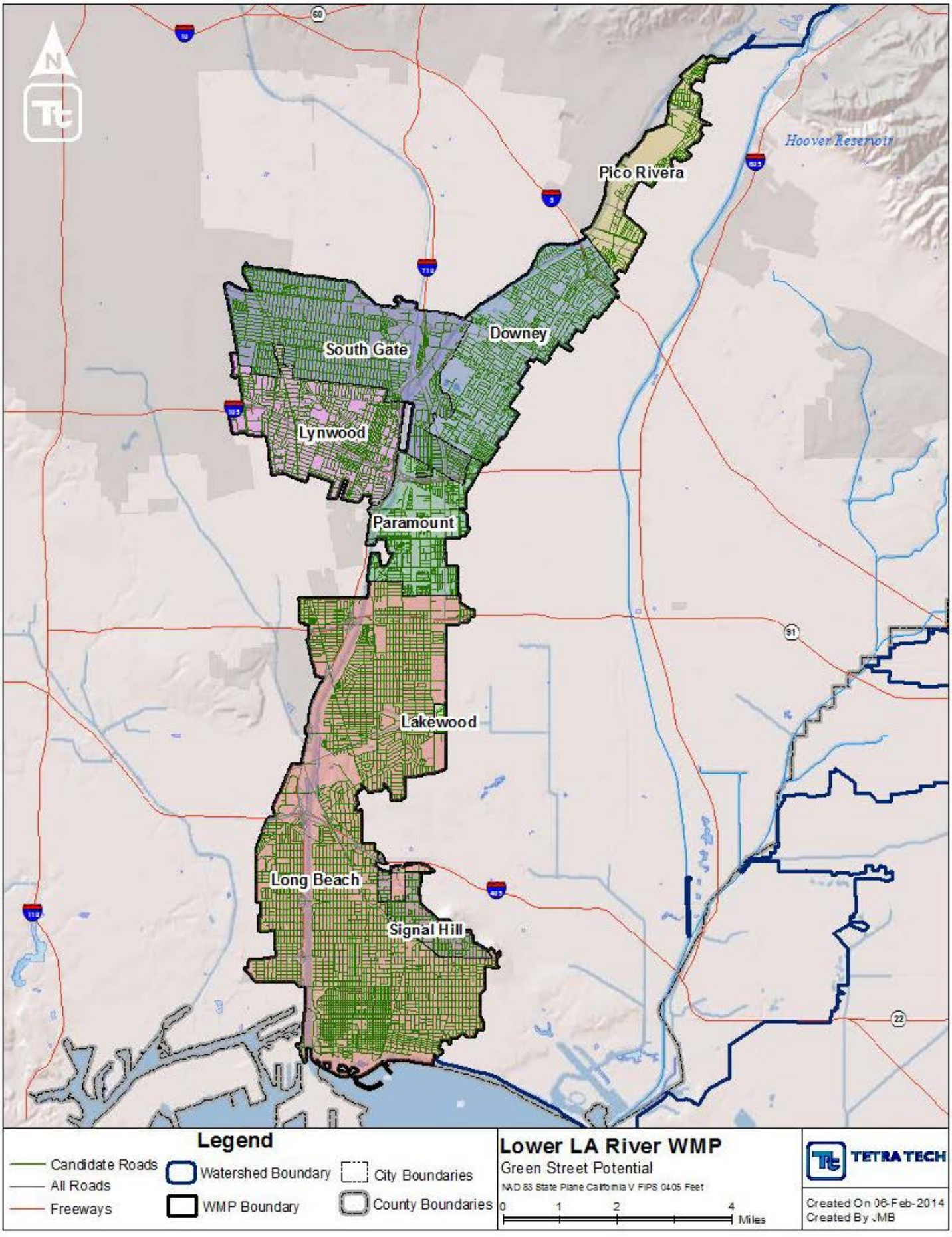


Figure 9. LLAR ROW BMP Potential Opportunities

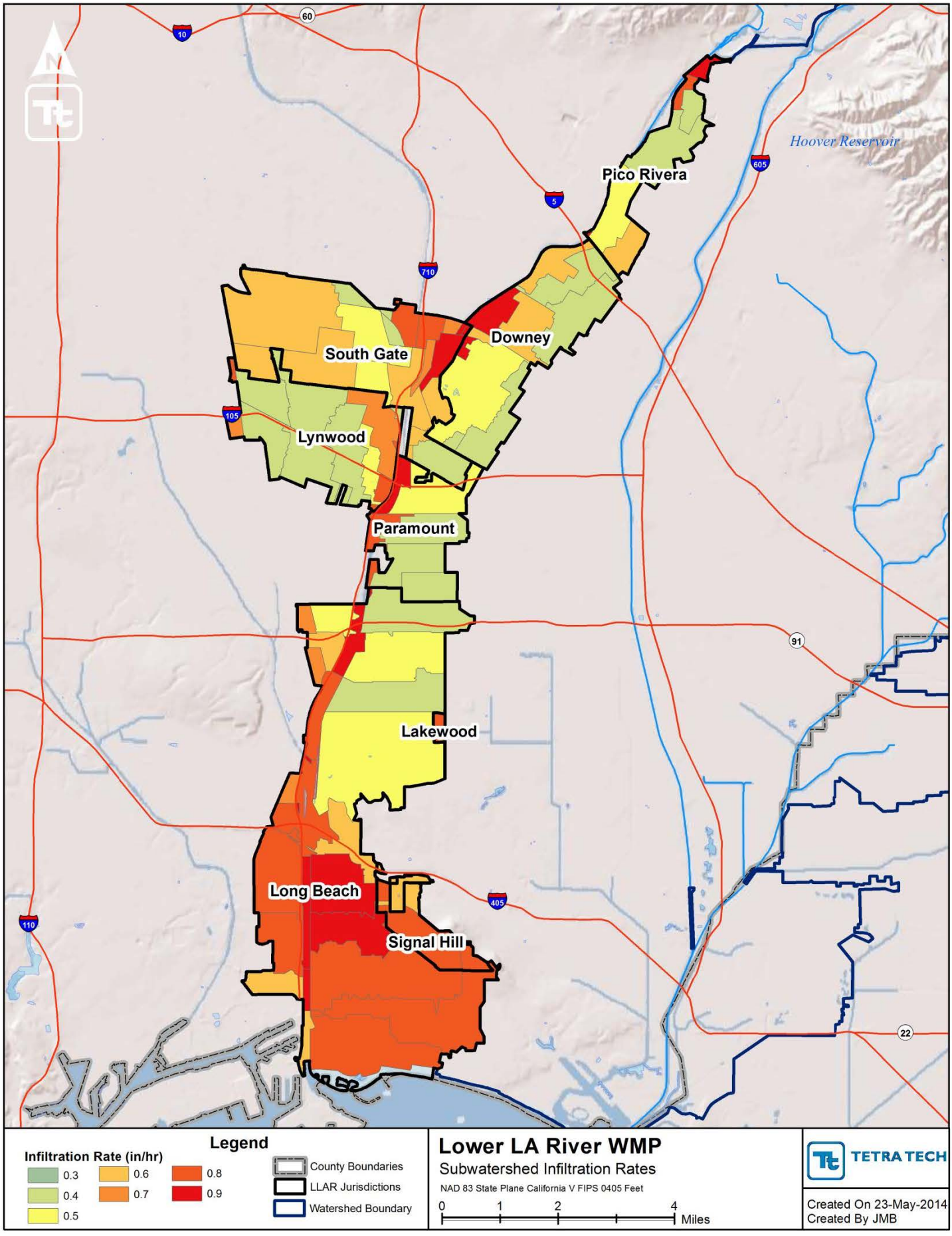


Figure 10. LLAR Subwatershed Infiltration Rates

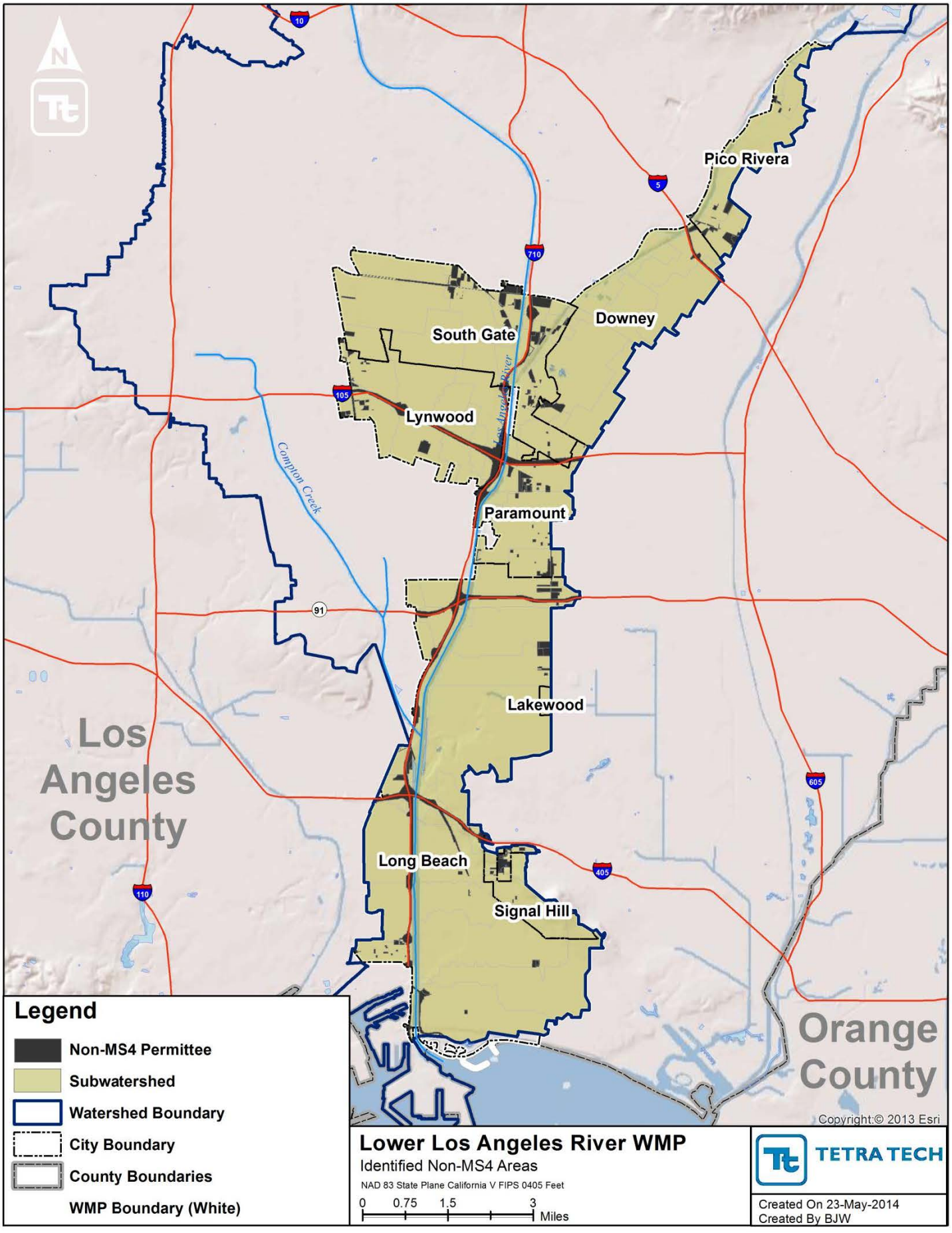


Figure 11. LLAR Non-MS4 Permittees

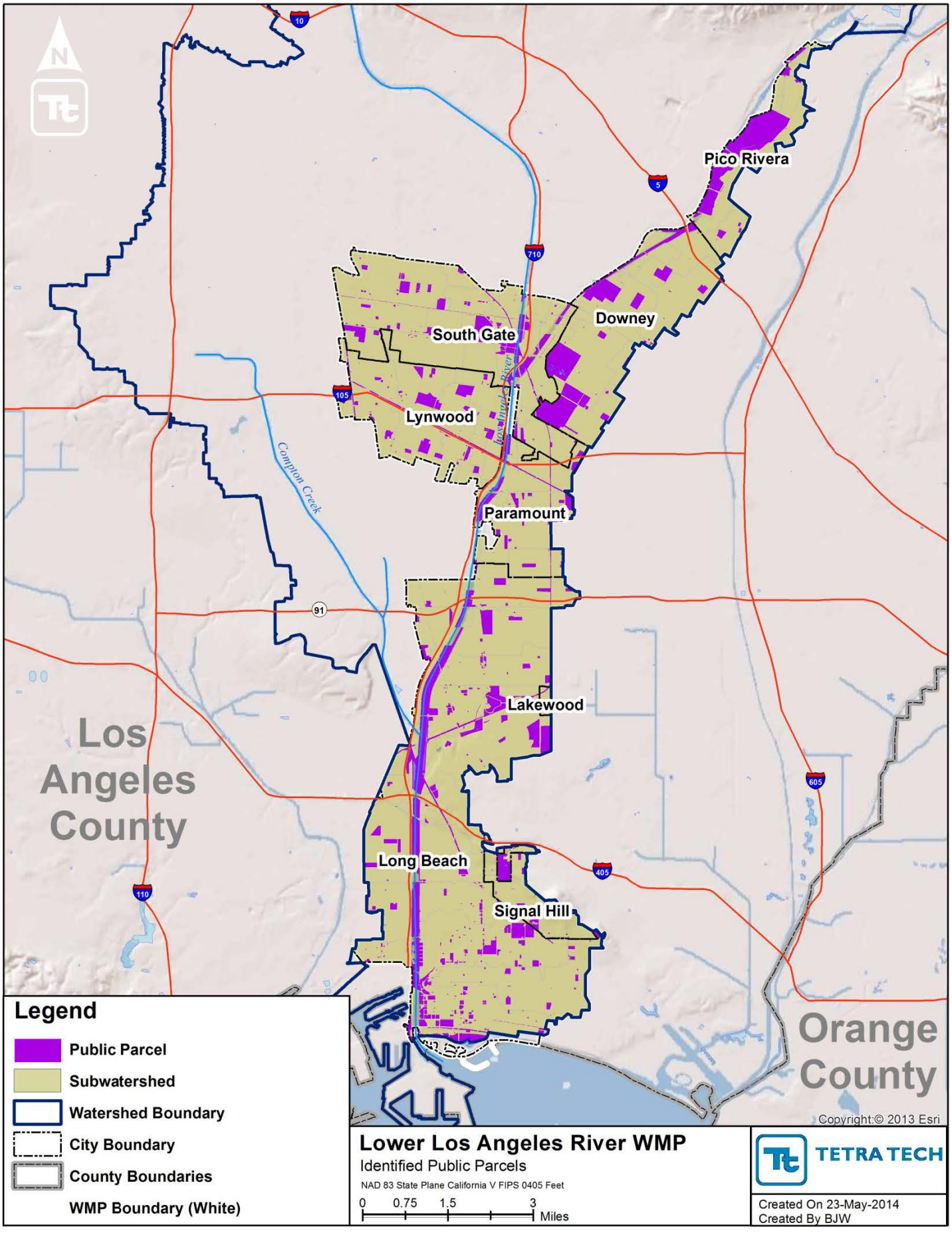


Figure 12. LLAR identified public parcels

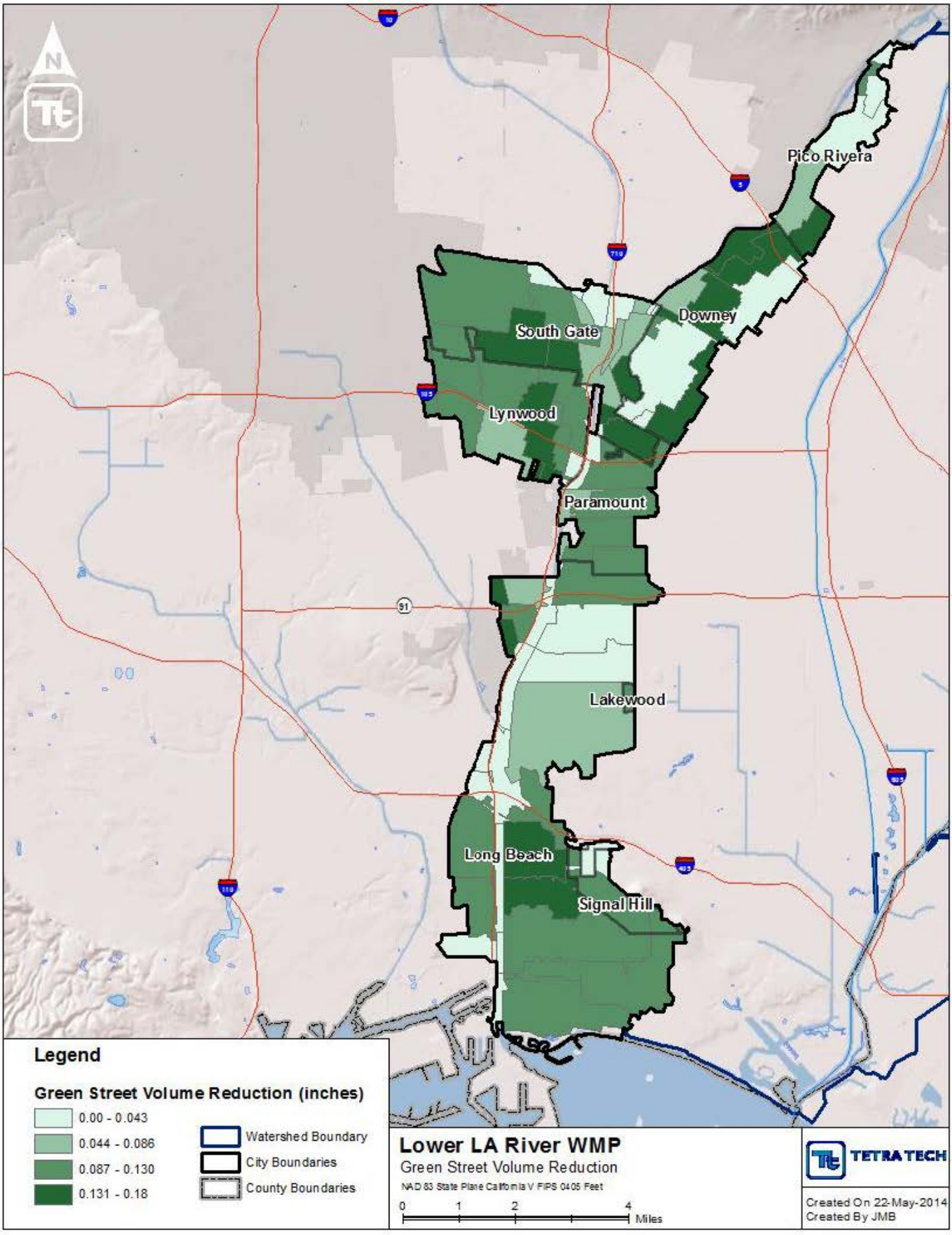


Figure 13. LLAR ROW BMP Volume Reduction

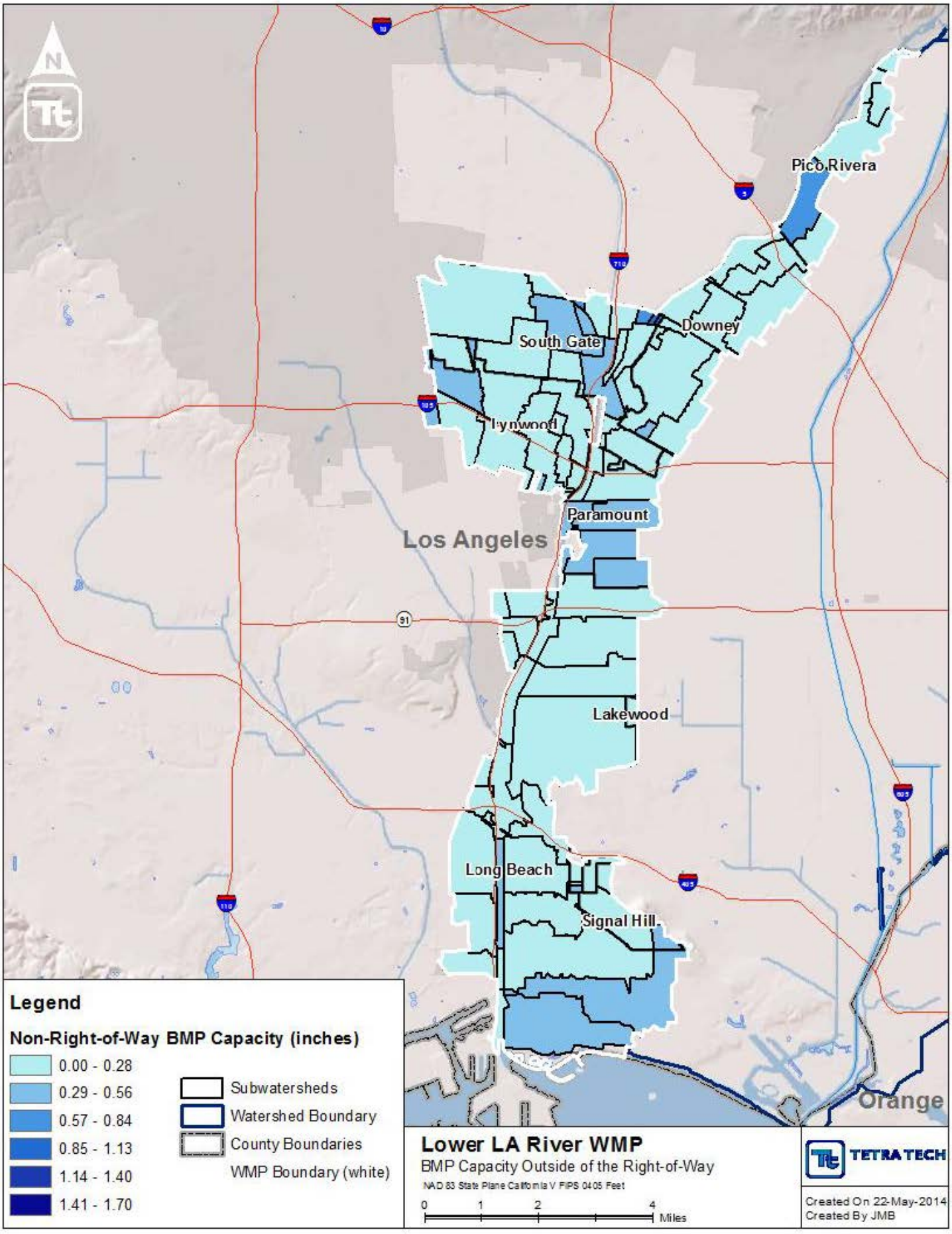


Figure 14. LLAR BMP capacity outside of the right-of-way

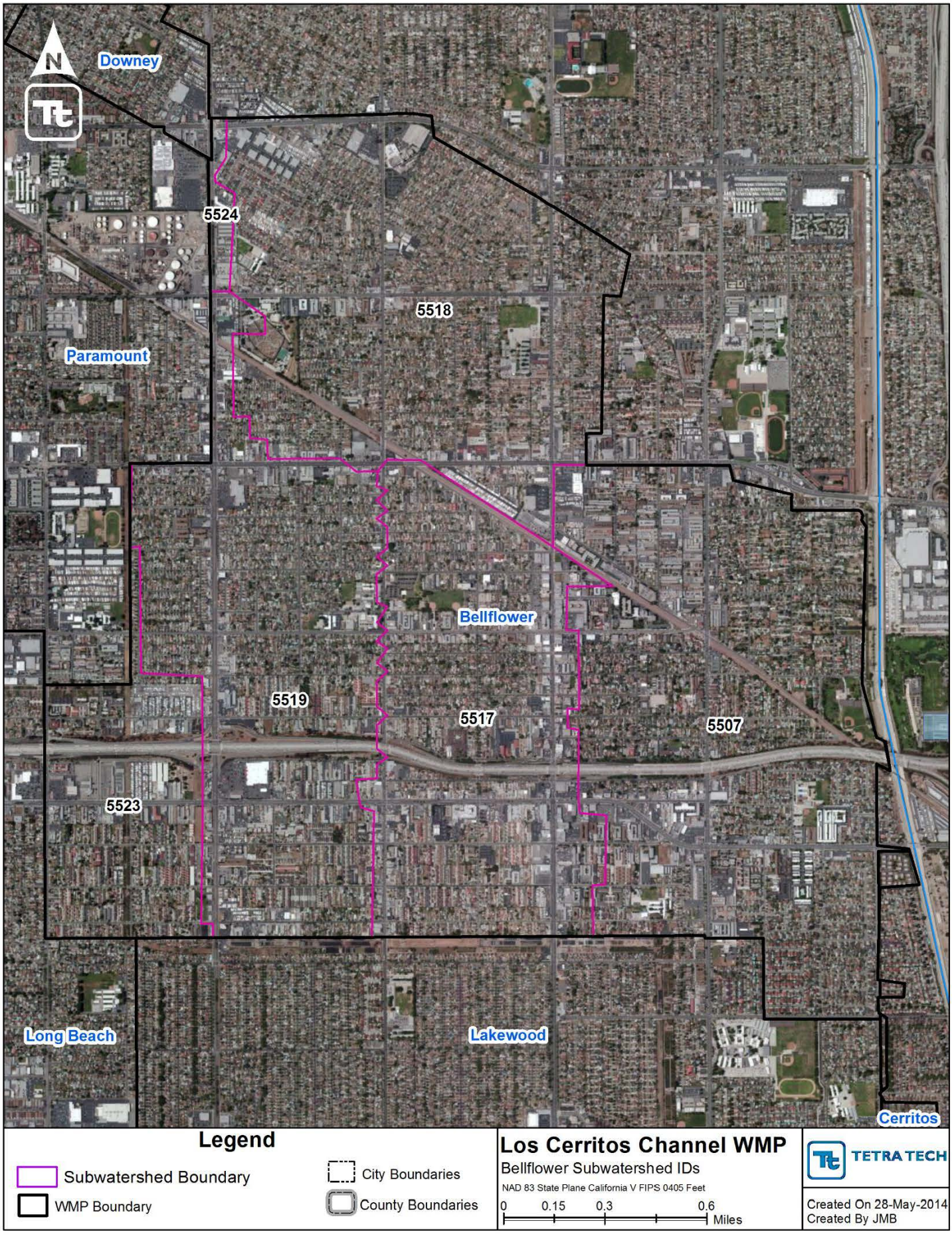


Figure 15. LCC Bellflower Subwatershed IDs



Figure 16. LCC Cerritos Subwatershed IDs

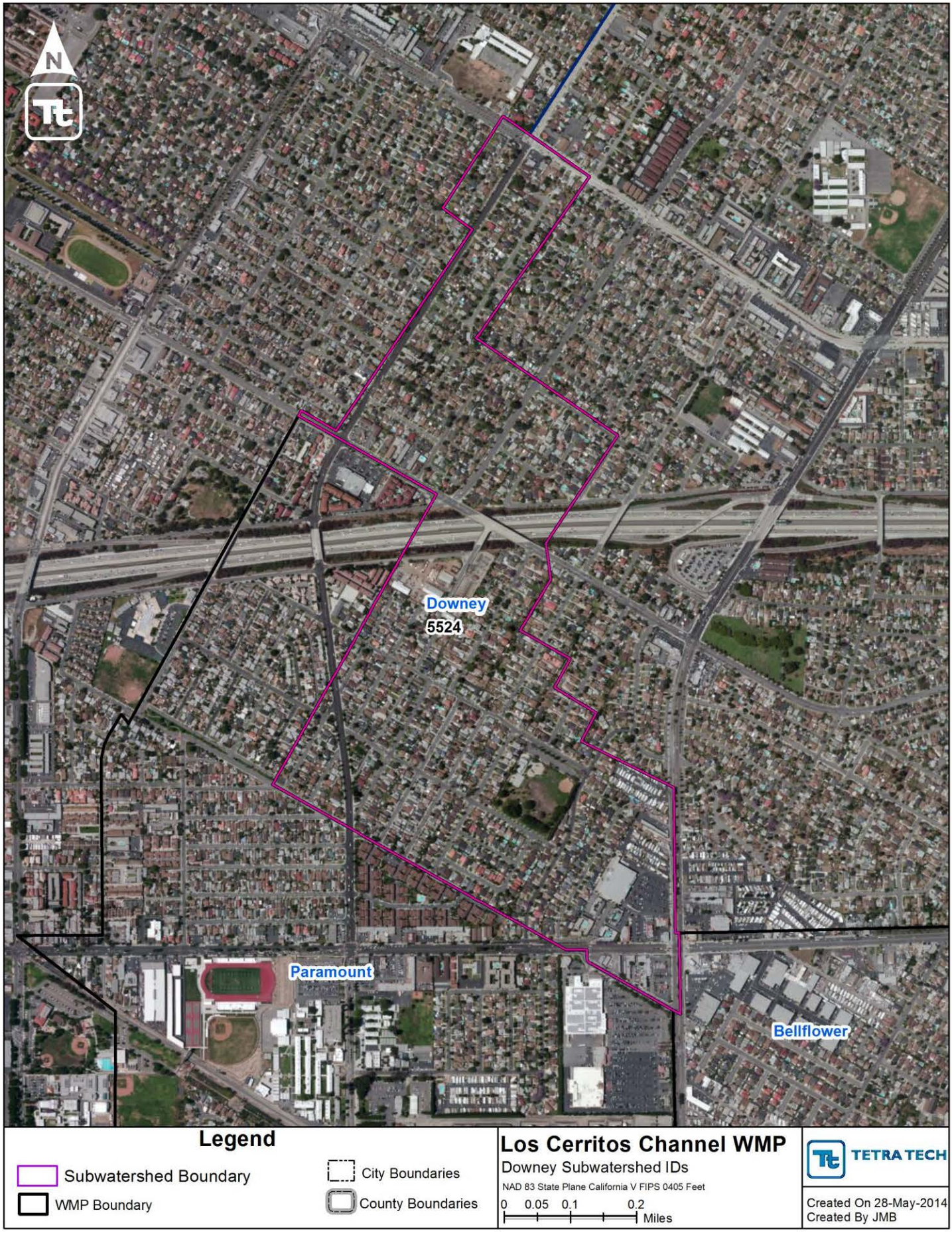


Figure 17. LCC Downey Subwatershed IDs

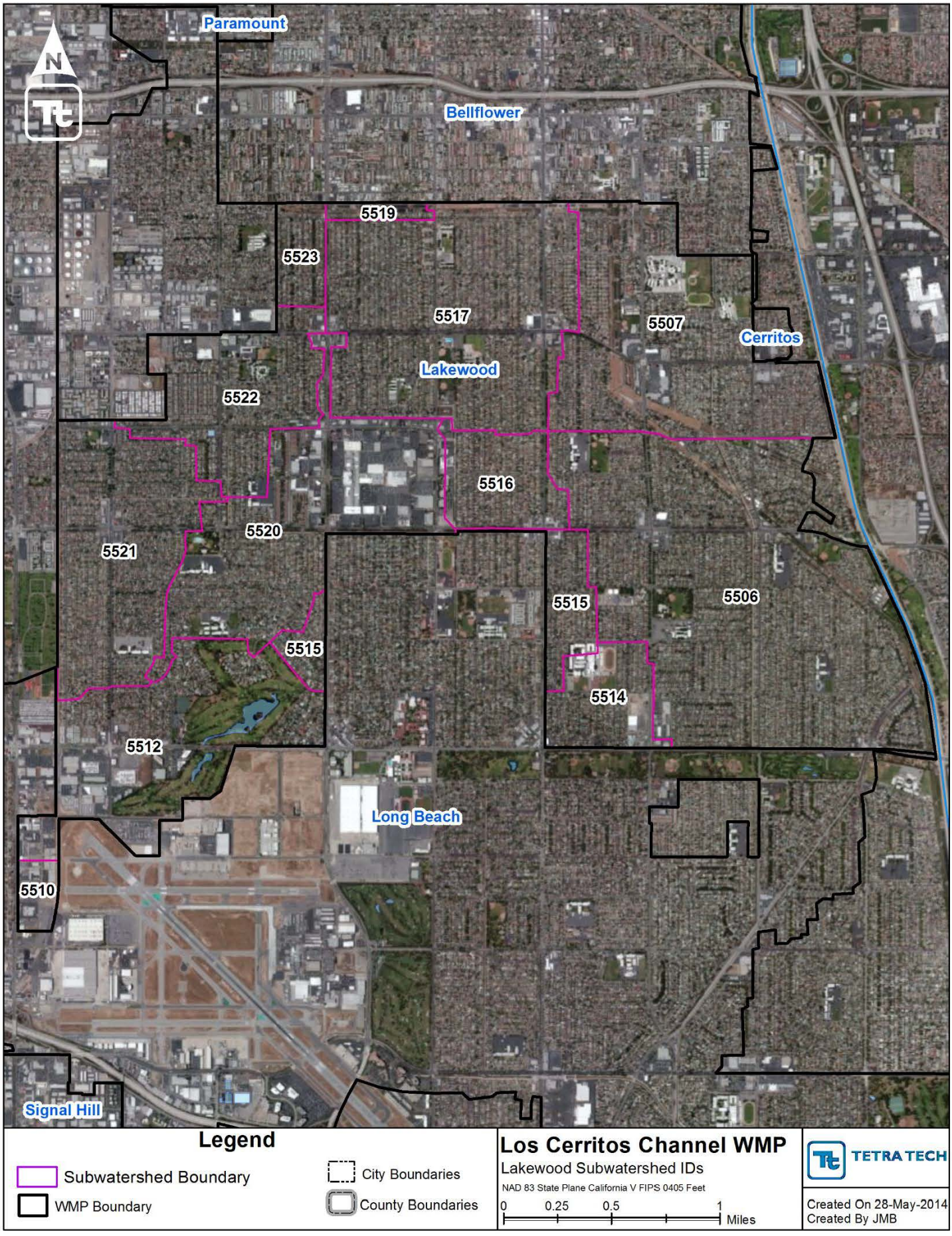


Figure 18. LCC Lakewood Subwatershed IDs

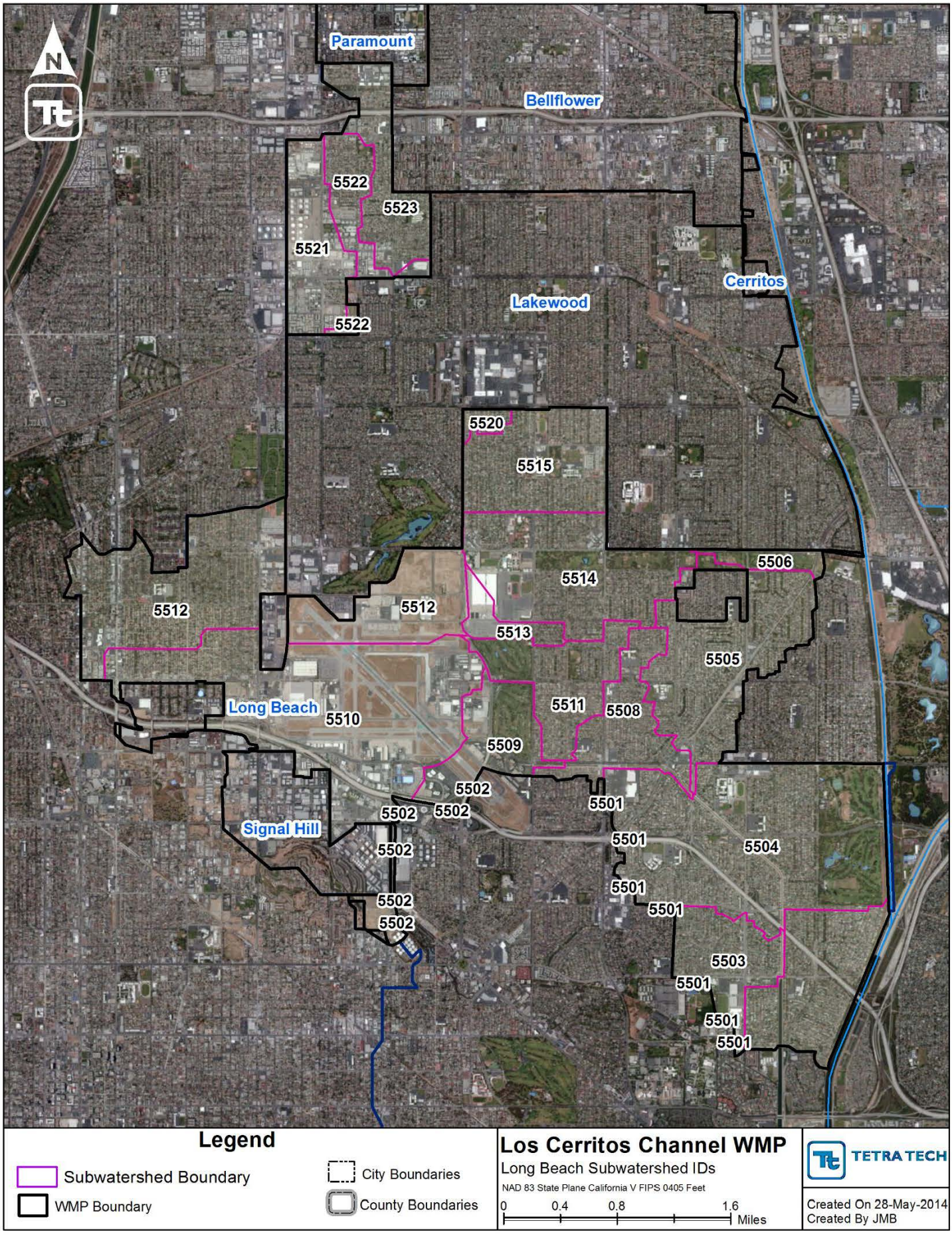


Figure 19. LCC Long Beach Subwatershed IDs



Figure 20. LCC Paramount Subwatershed IDs



Figure 21. LCC Signal Hill Subwatershed IDs

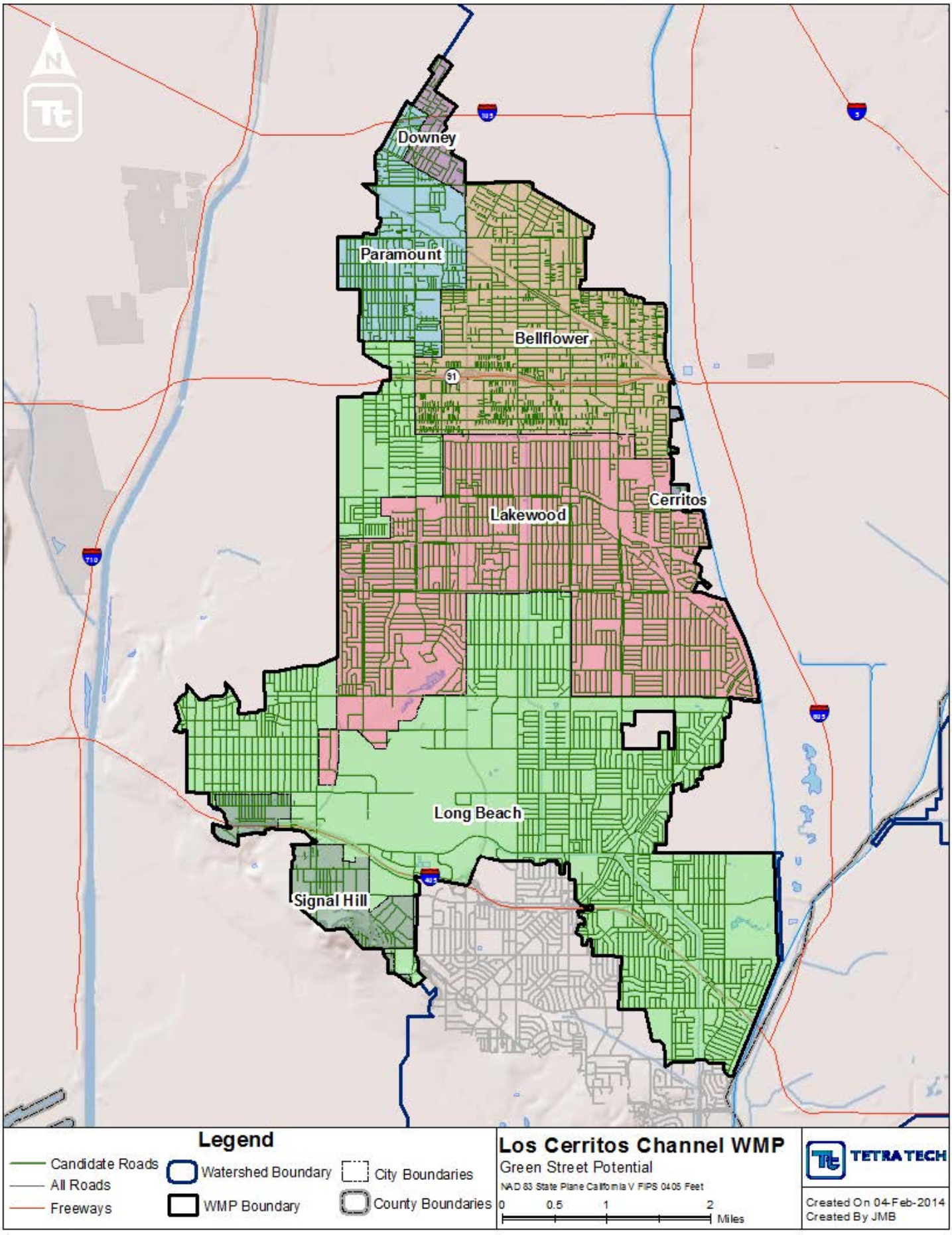


Figure 22. LCC ROW BMP Potential Opportunities

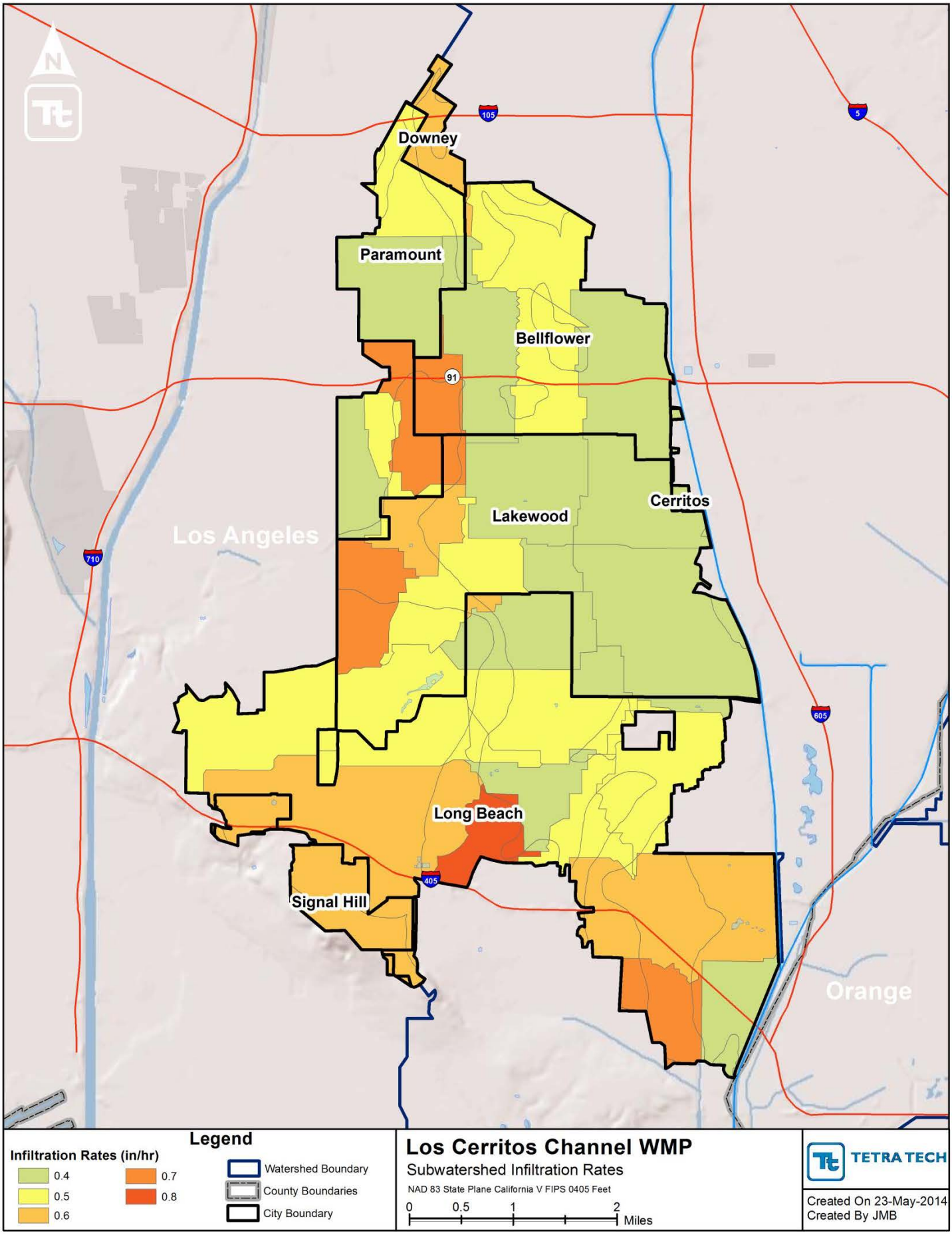


Figure 23. LCC Subwatershed Infiltration Rates

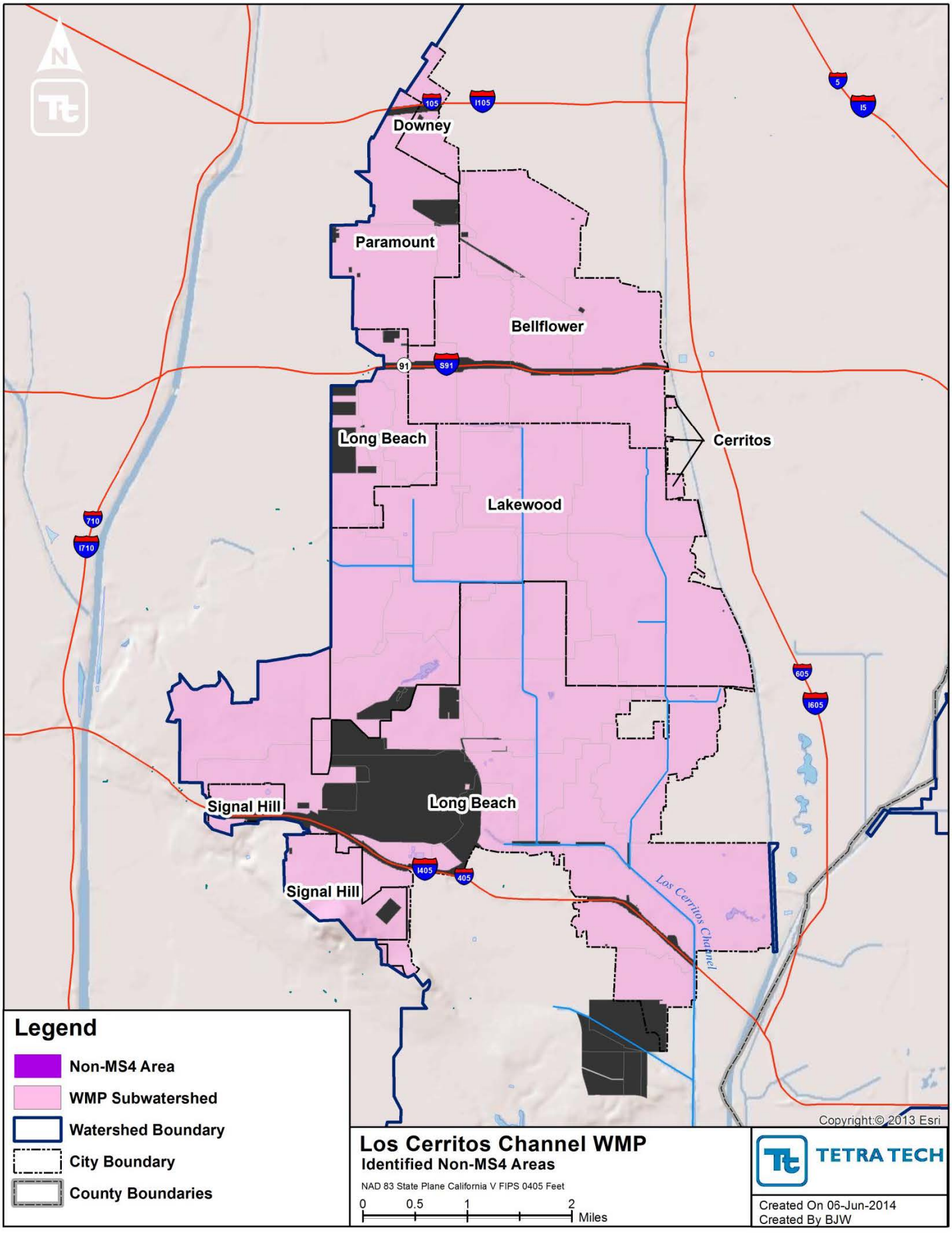


Figure 24. LCC Non-MS4 Permittees

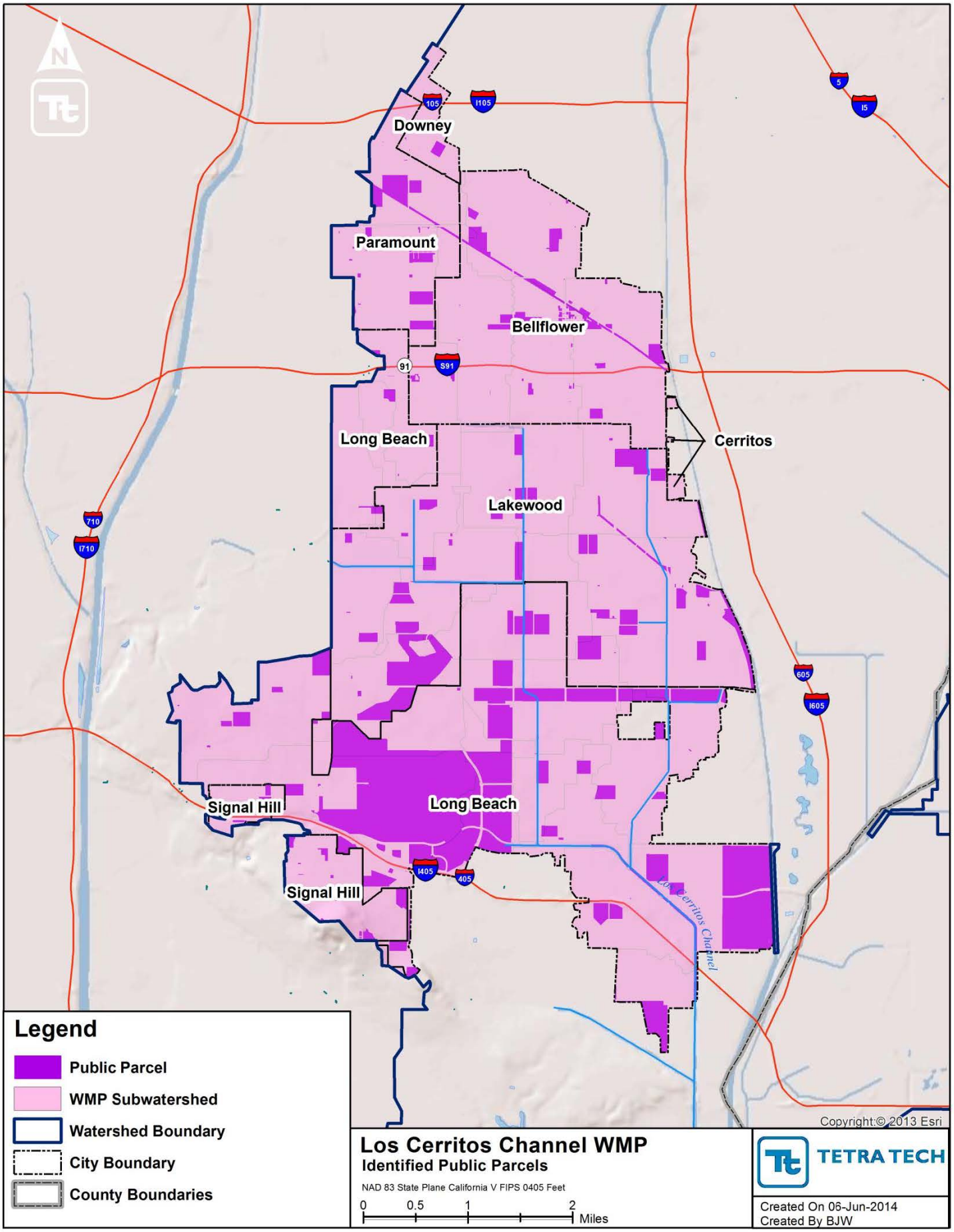


Figure 25. LCC identified public parcels

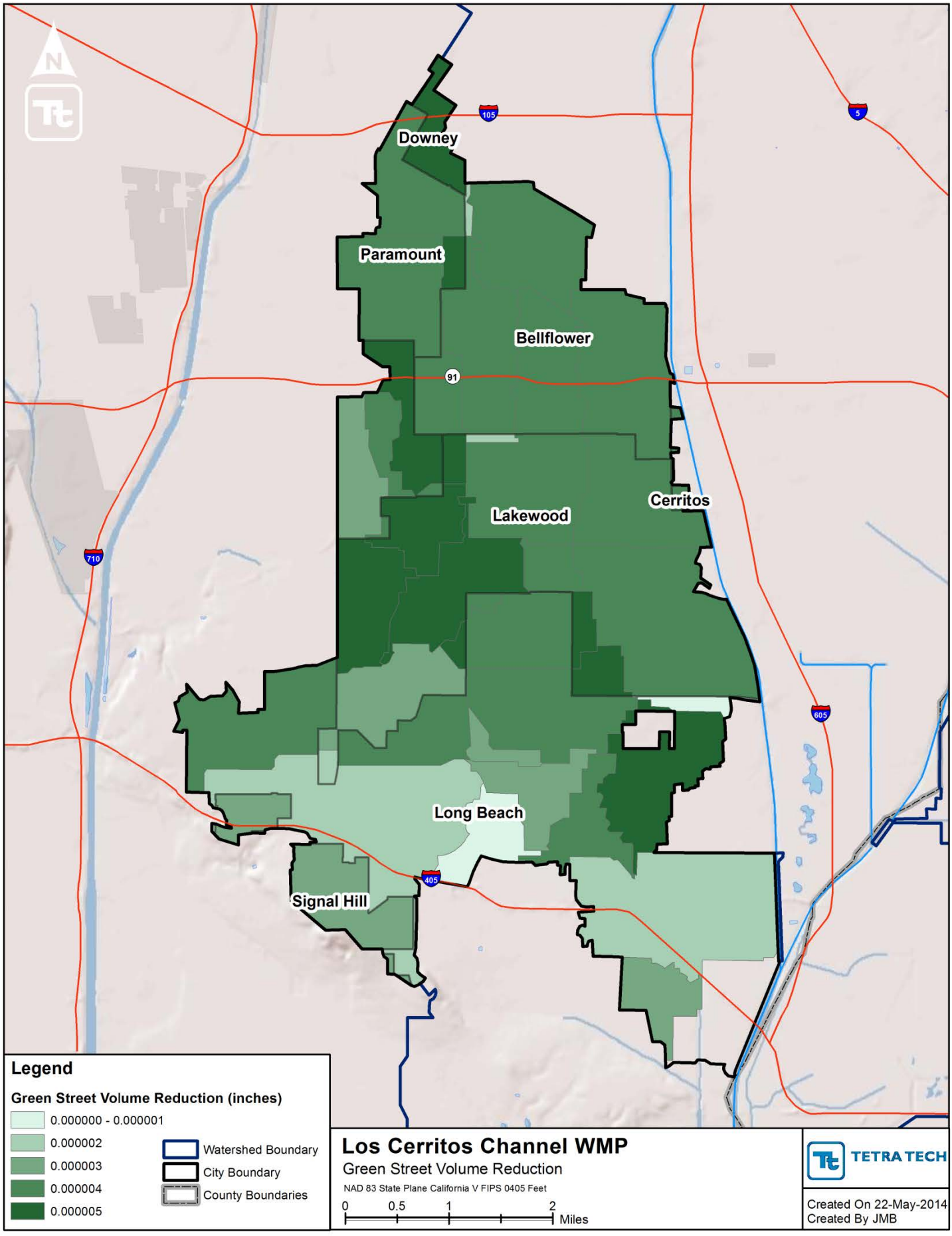


Figure 26. LCC ROW BMP Volume Reduction

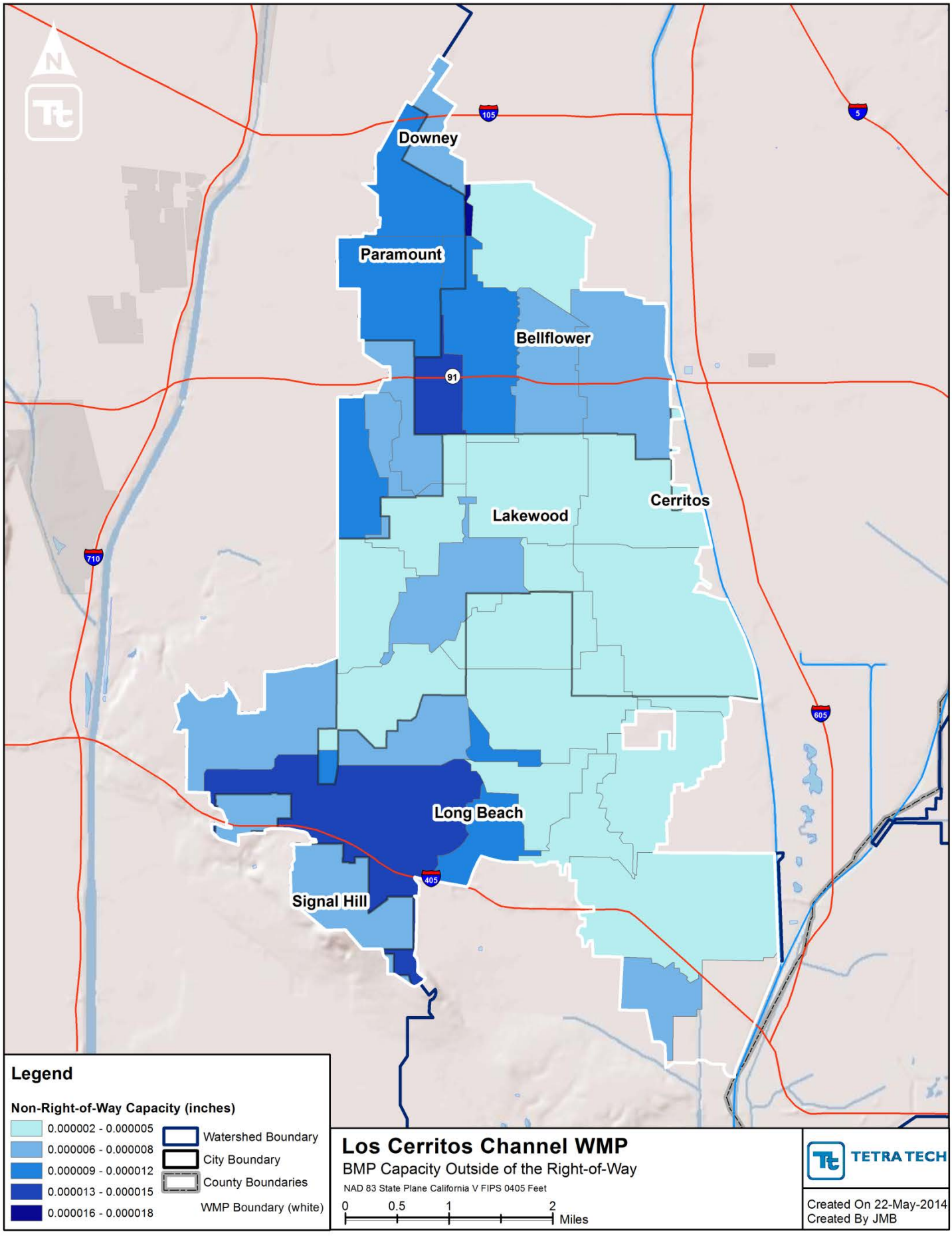


Figure 27. LCC BMP capacity outside of the right-of-way



Figure 28. LSGR (SGR) Artesia Subwatershed IDs

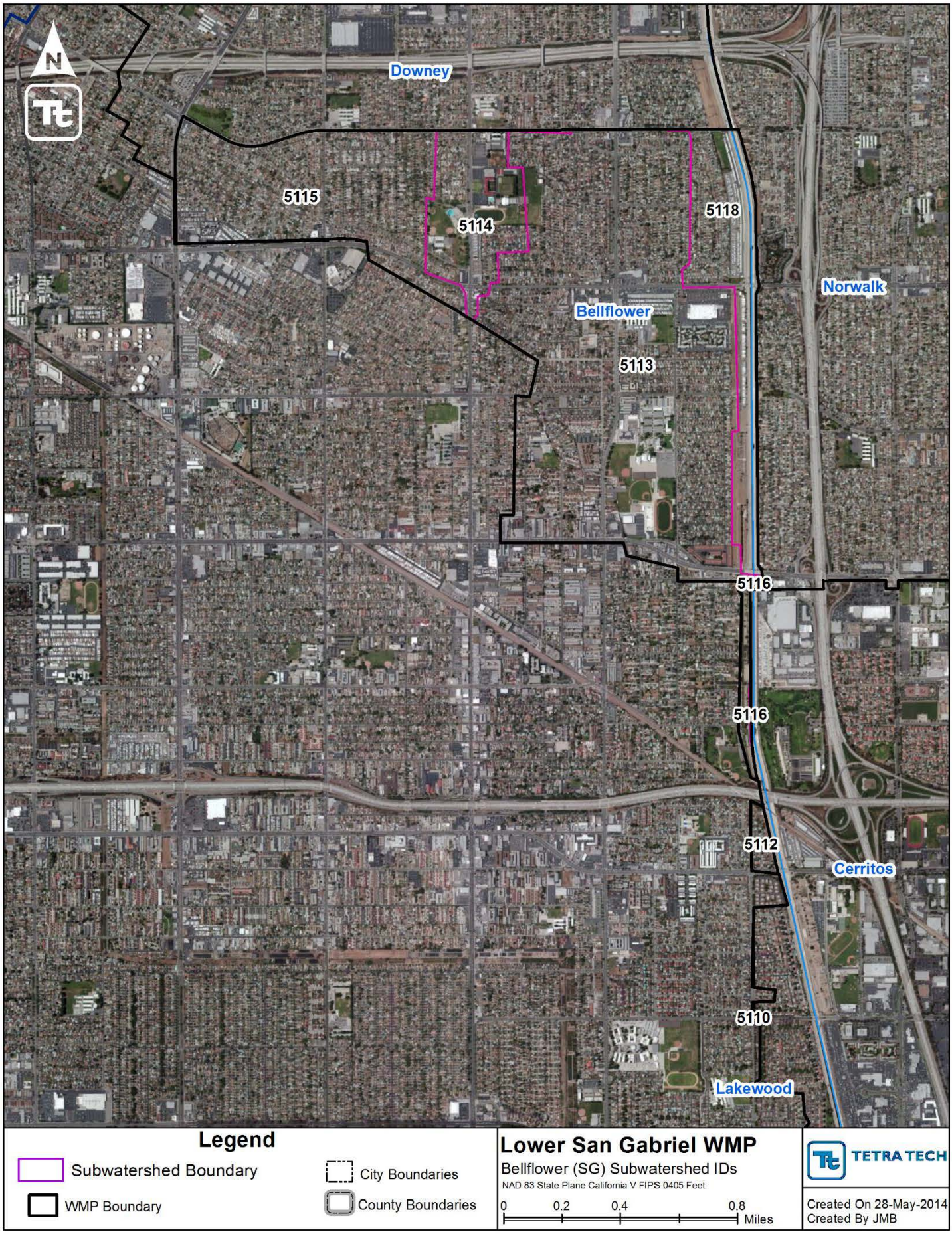


Figure 29. LSGR (SGR) Bellflower Subwatershed IDs

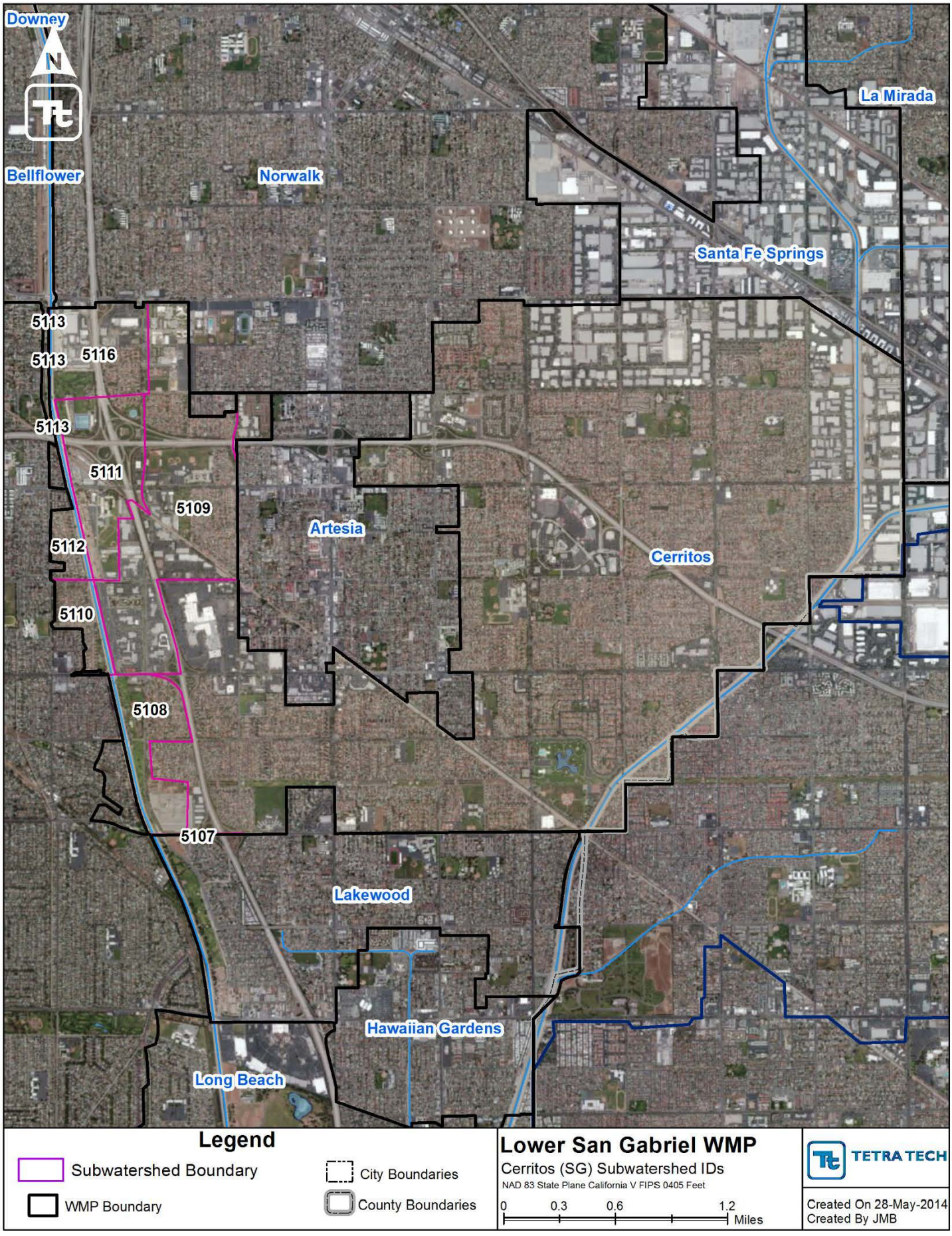


Figure 30. LSGR (SGR) Cerritos Subwatershed IDs

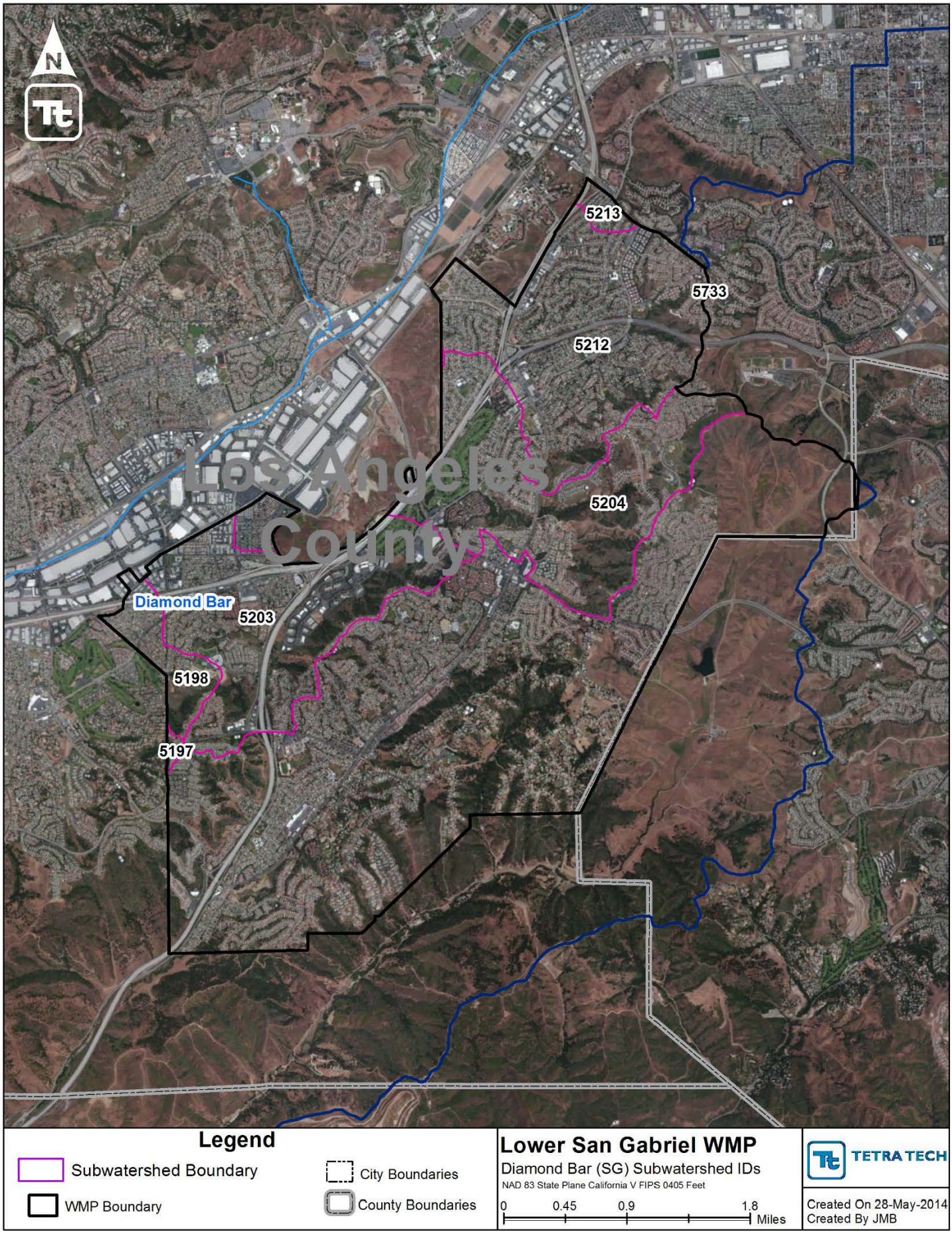


Figure 31. LSGR (SGR) Diamond Bar Subwatershed IDs

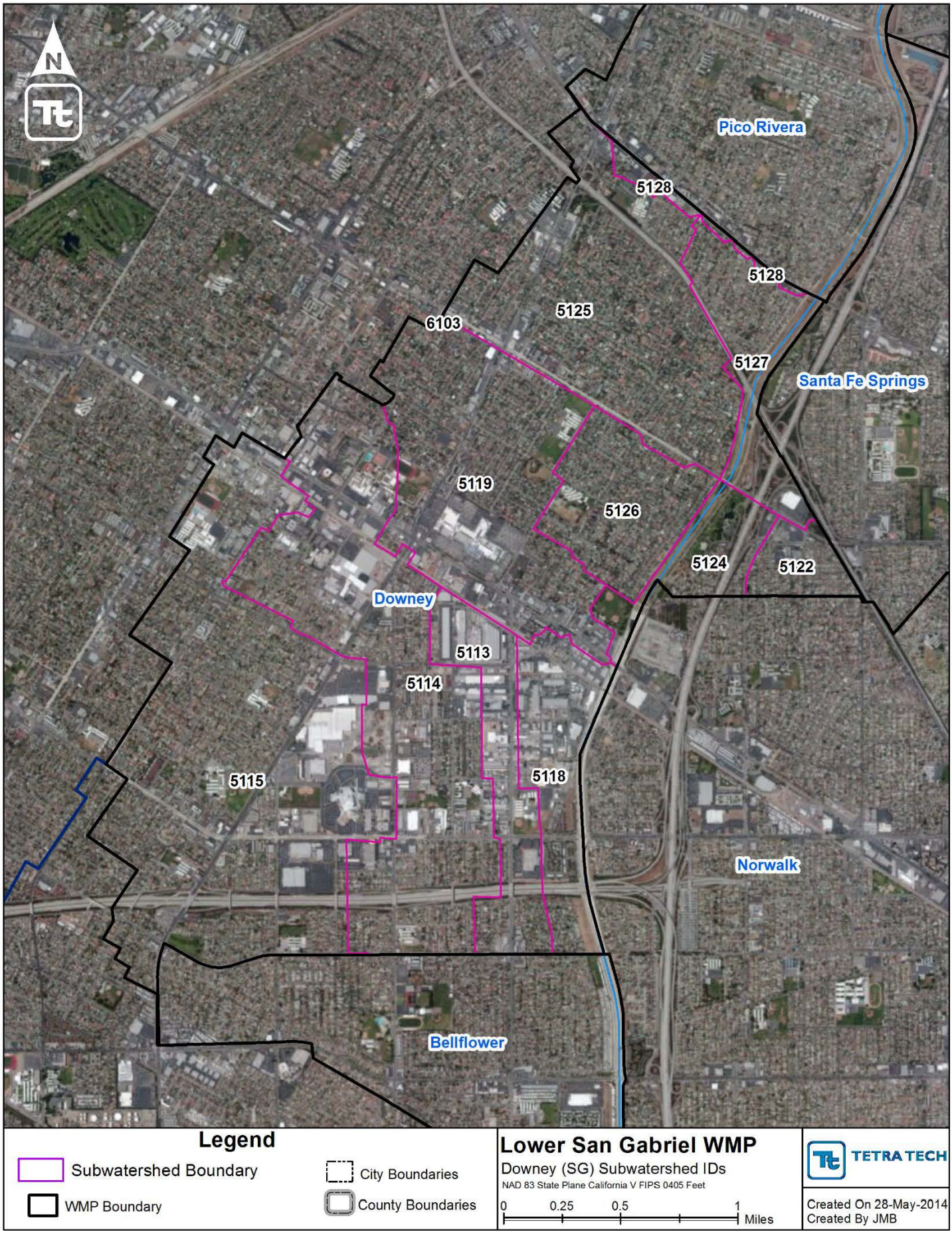


Figure 32. LSGR (SGR) Downey Subwatershed IDs

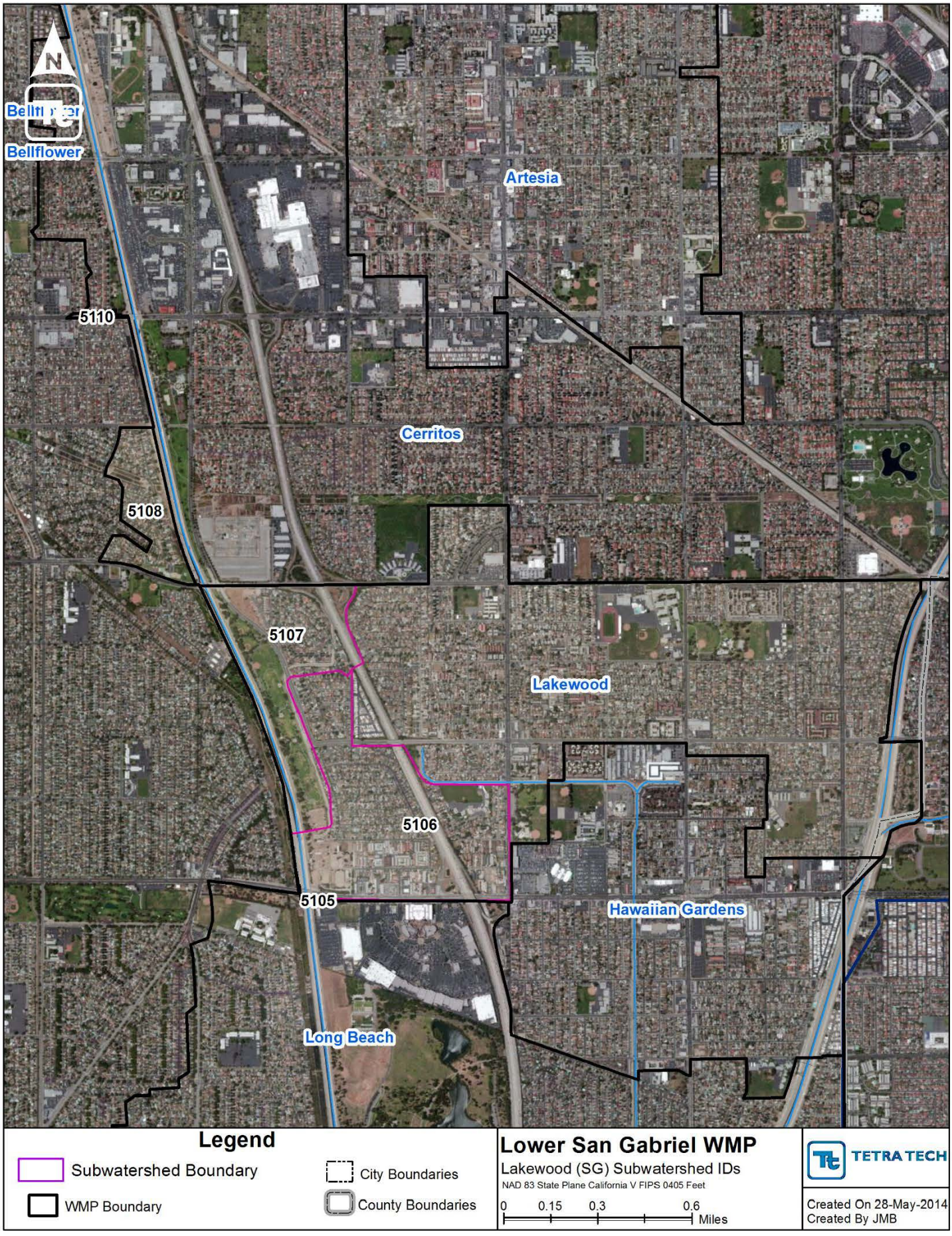


Figure 33. LSGR (SGR) Lakewood Subwatershed IDs

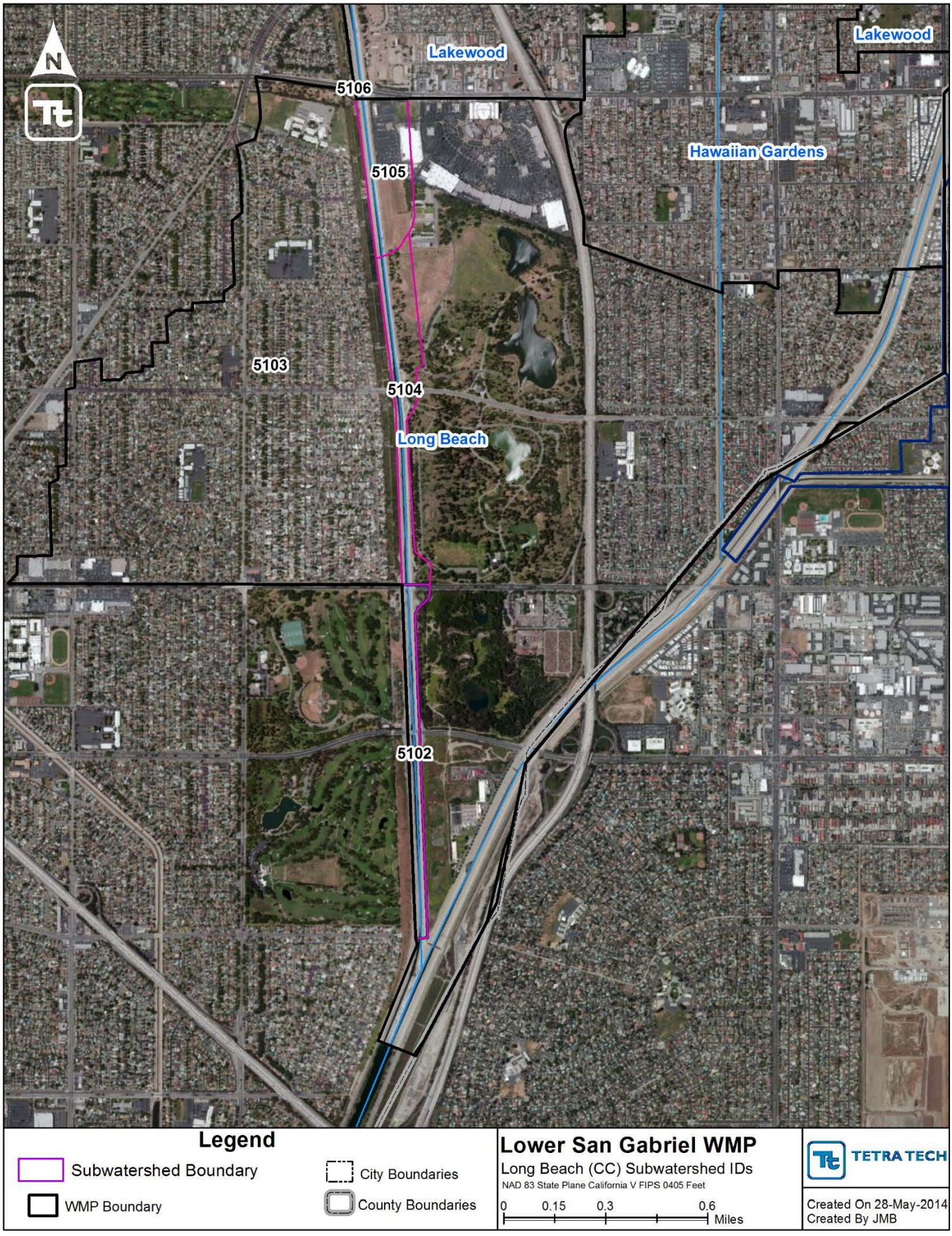


Figure 34. LSGR (SGR) Long Beach Subwatershed IDs

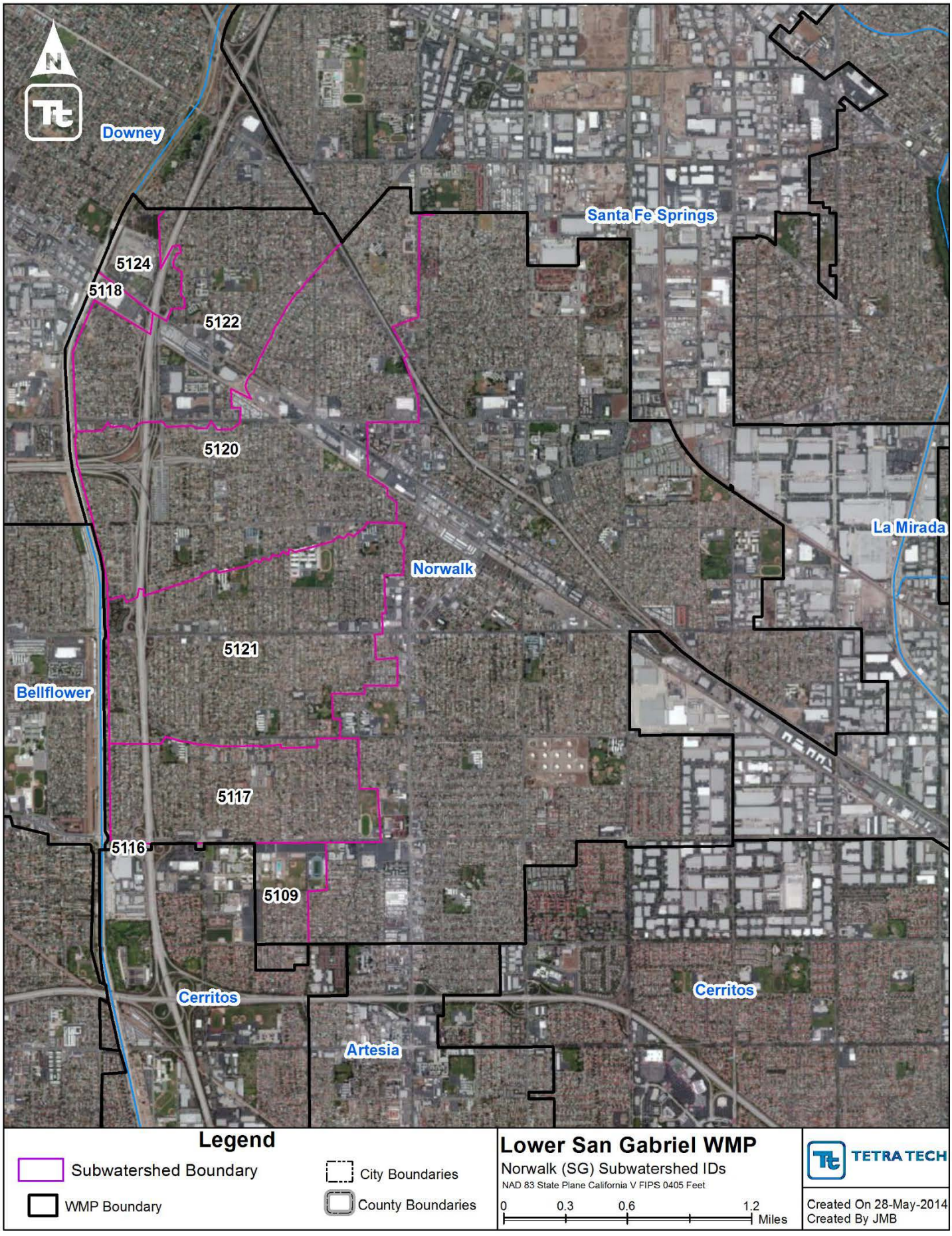


Figure 35. LSGR (SGR) Norwalk Subwatershed IDs

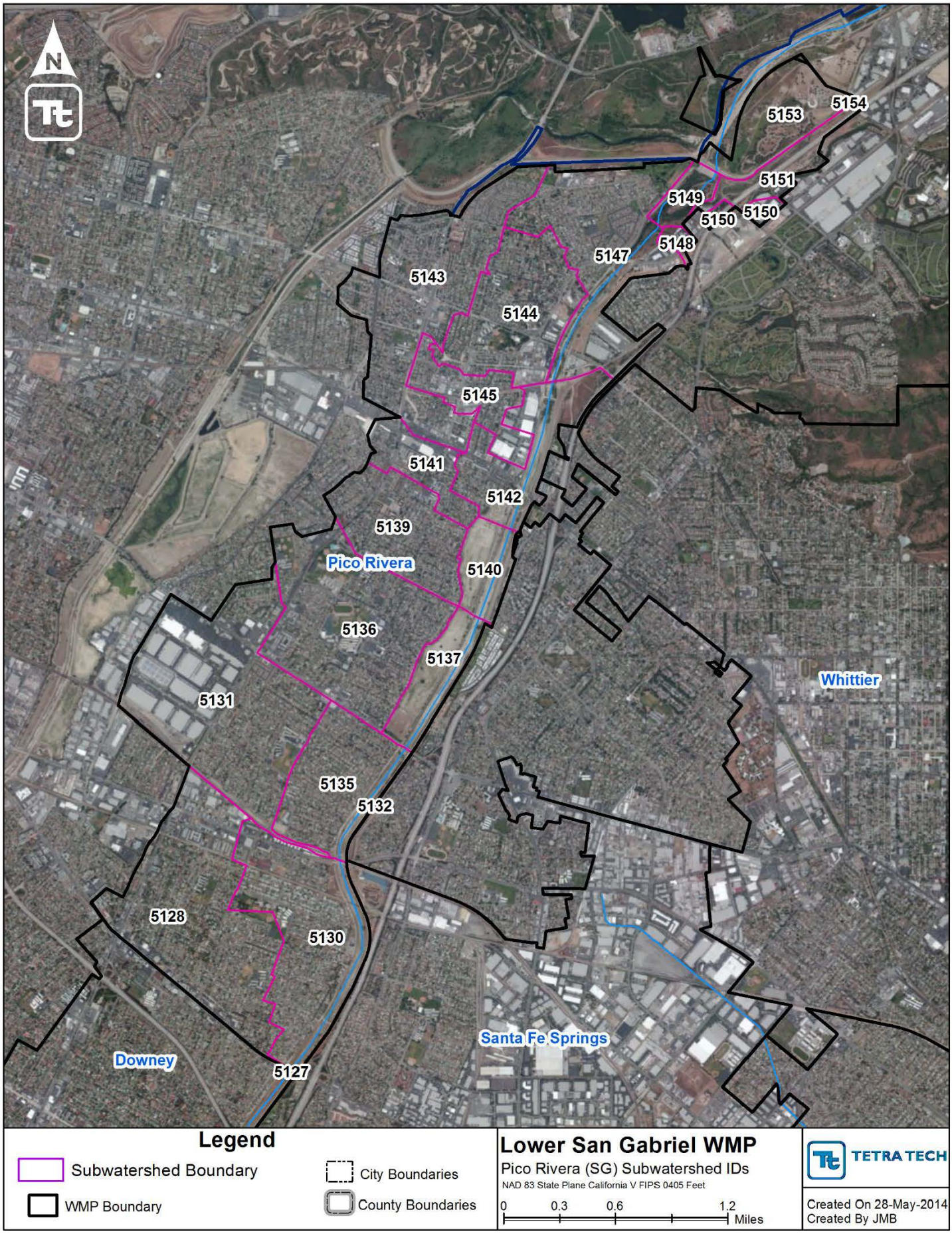


Figure 36. LSGR (SGR) Pico Rivera Subwatershed IDs

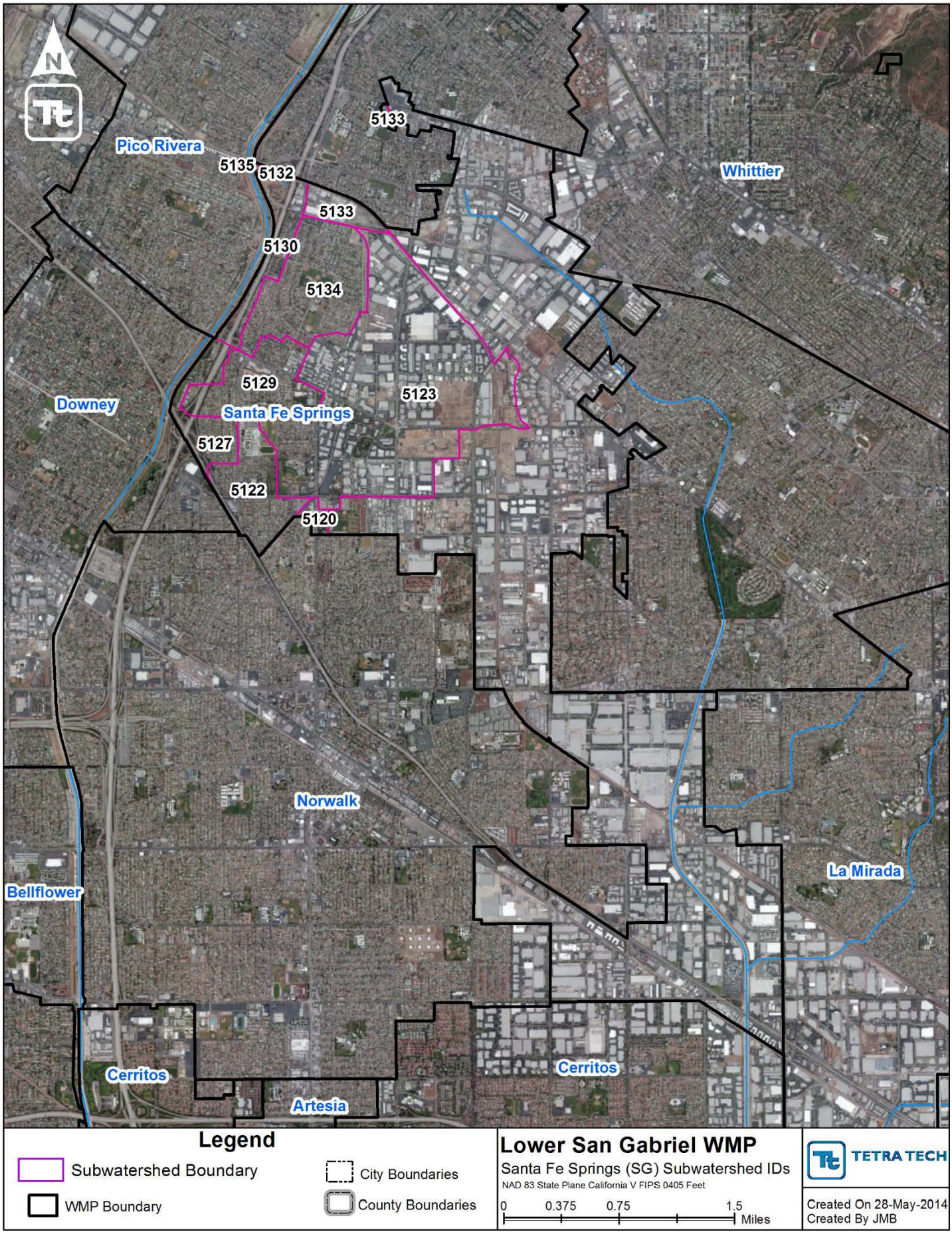


Figure 37. LSGR (SGR) Santa Fe Springs Subwatershed IDs

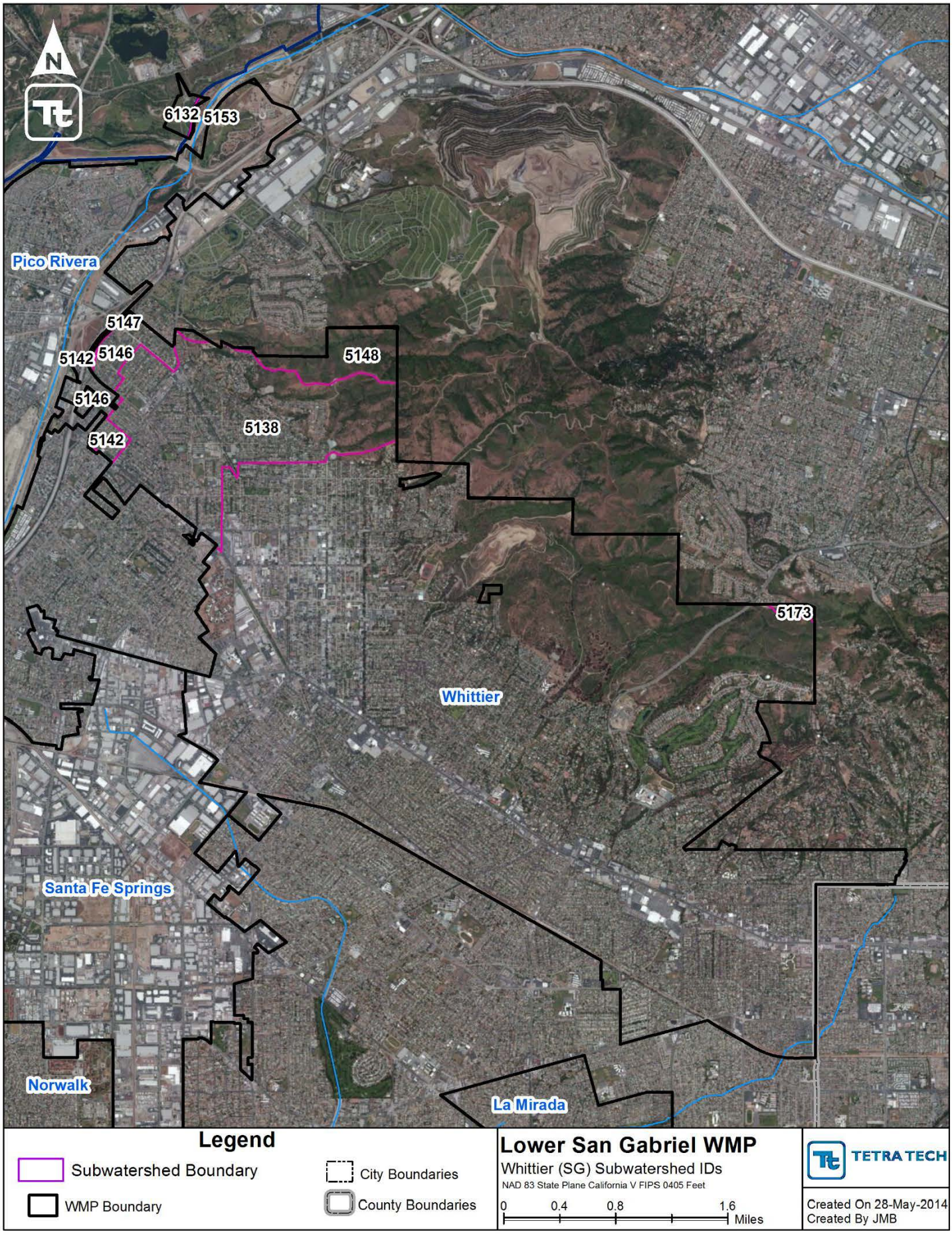


Figure 38. LSGR (SGR) Whittier Subwatershed IDs



Figure 39. LSGR (CC) Artesia Subwatershed IDs

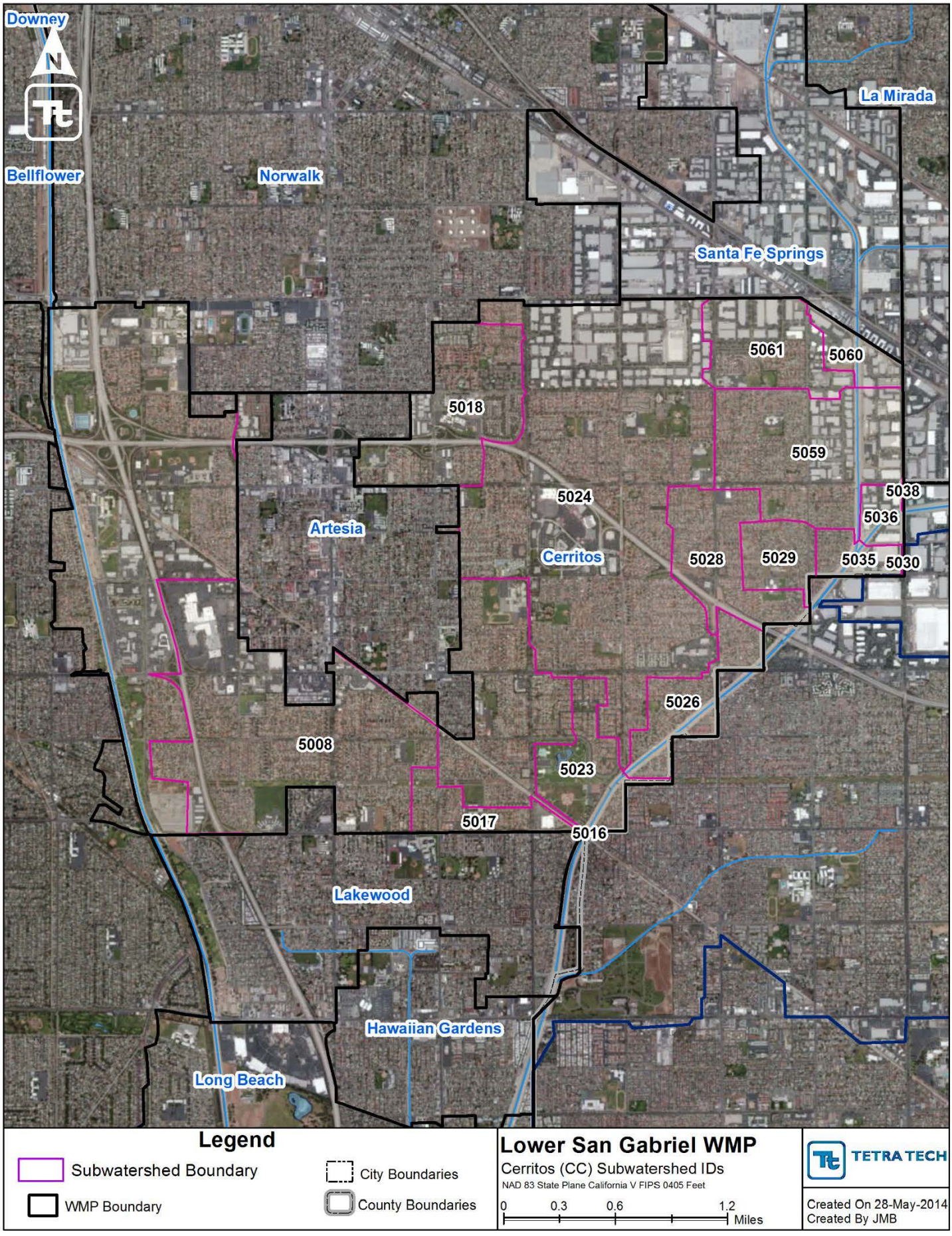


Figure 40. LSGR (CC) Cerritos Subwatershed IDs

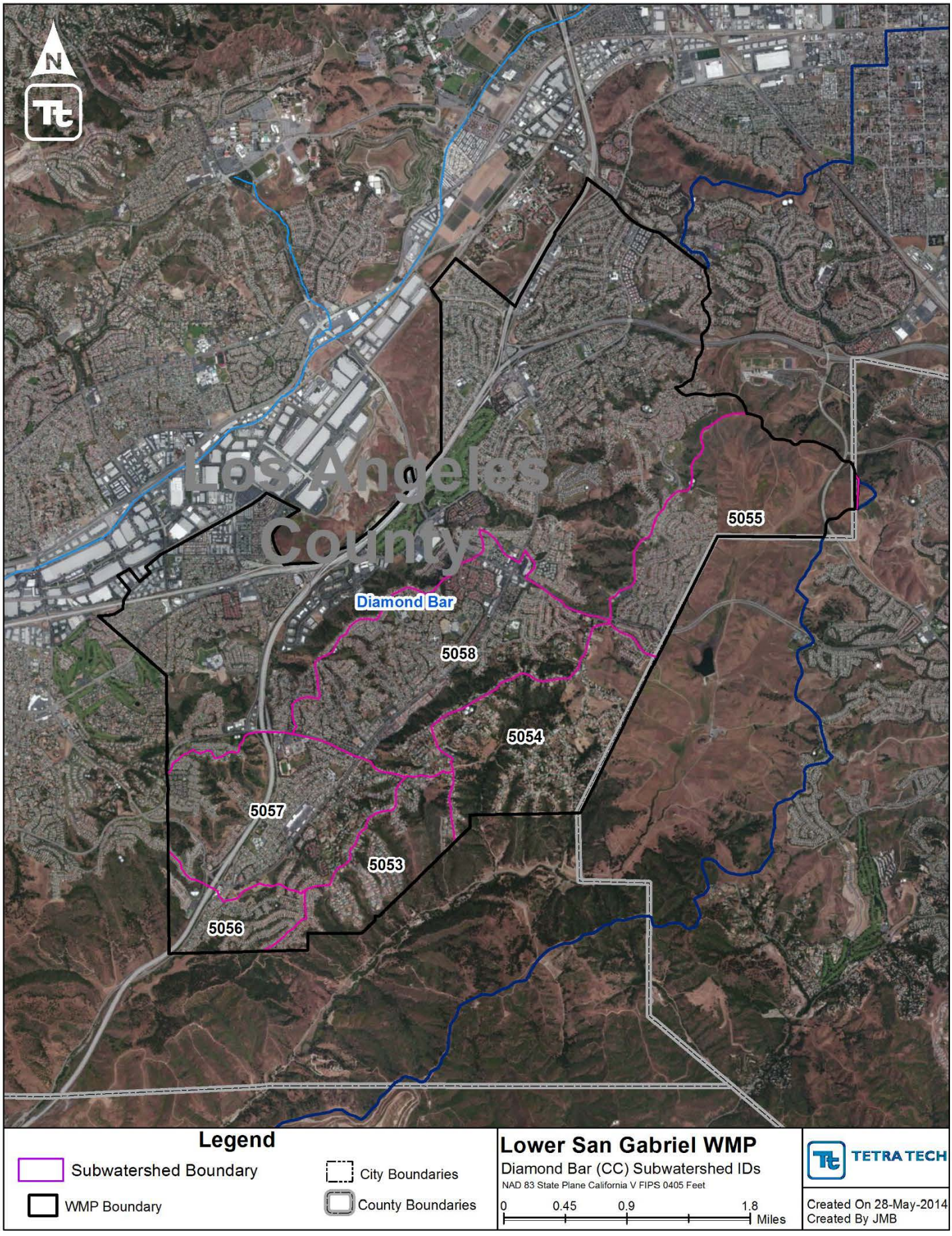


Figure 41. LSGR (CC) Diamond Bar Subwatershed IDs

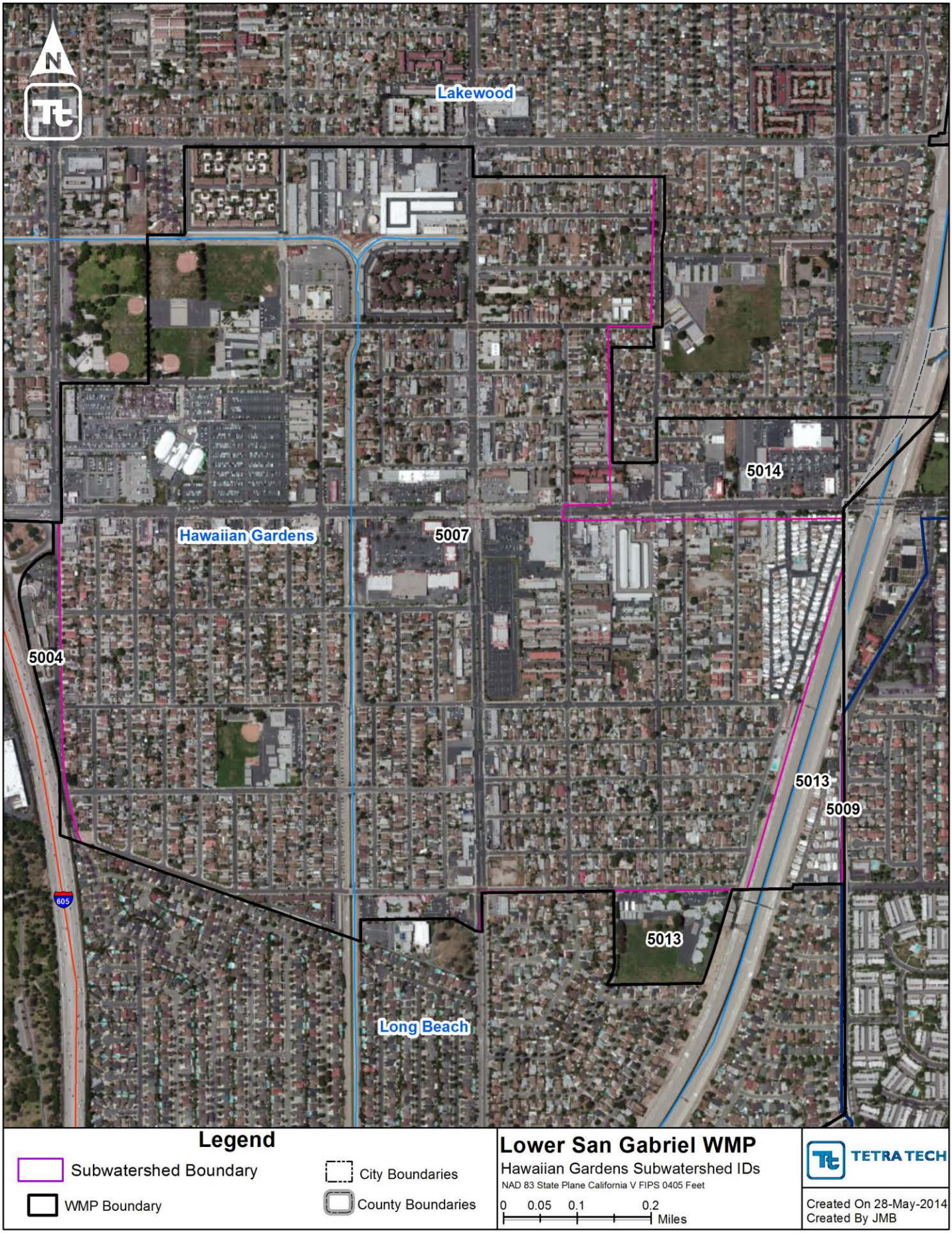


Figure 42. LSGR (CC) Hawaiian Gardens Subwatershed IDs

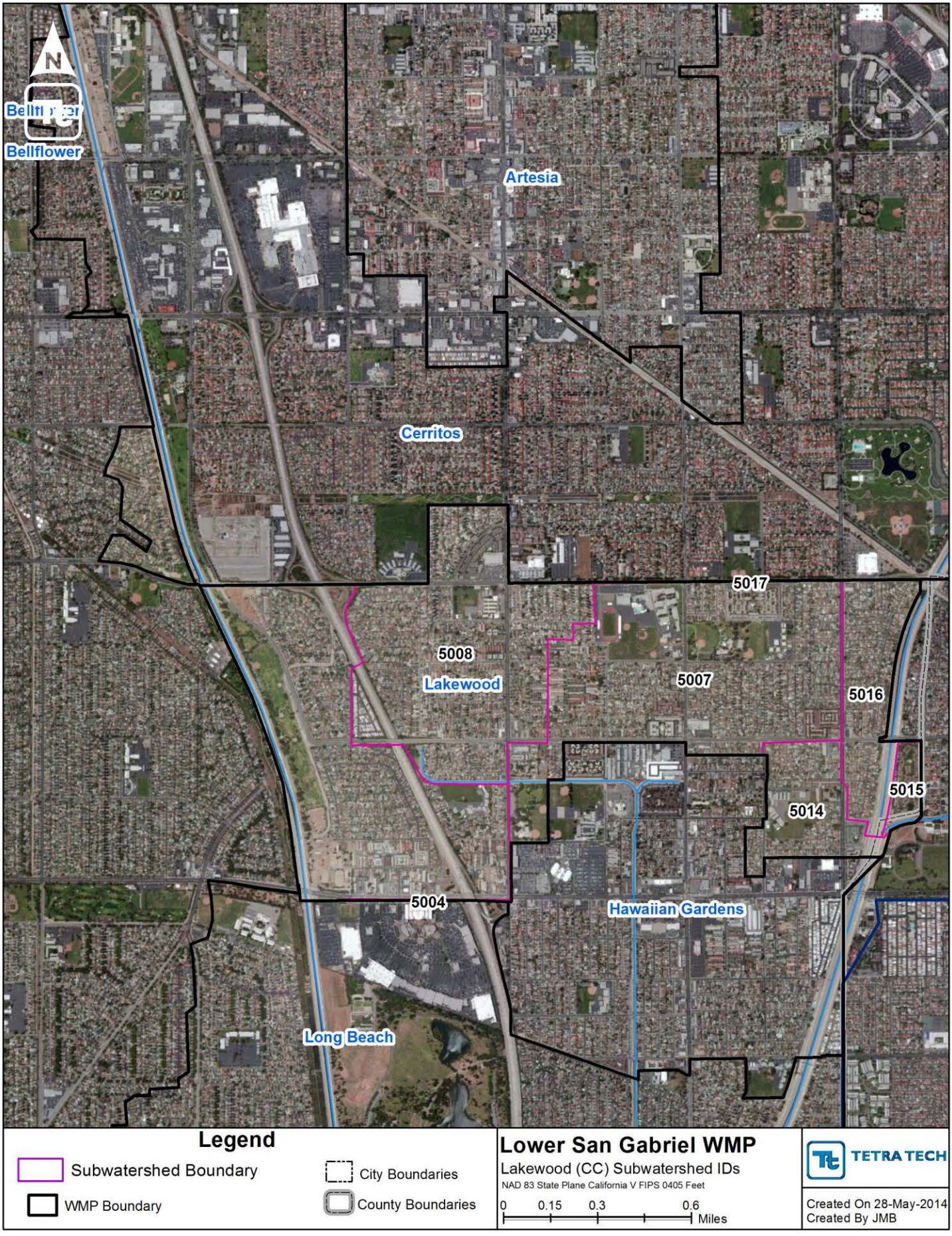


Figure 43. LSGR (CC) Lakewood Subwatershed IDs

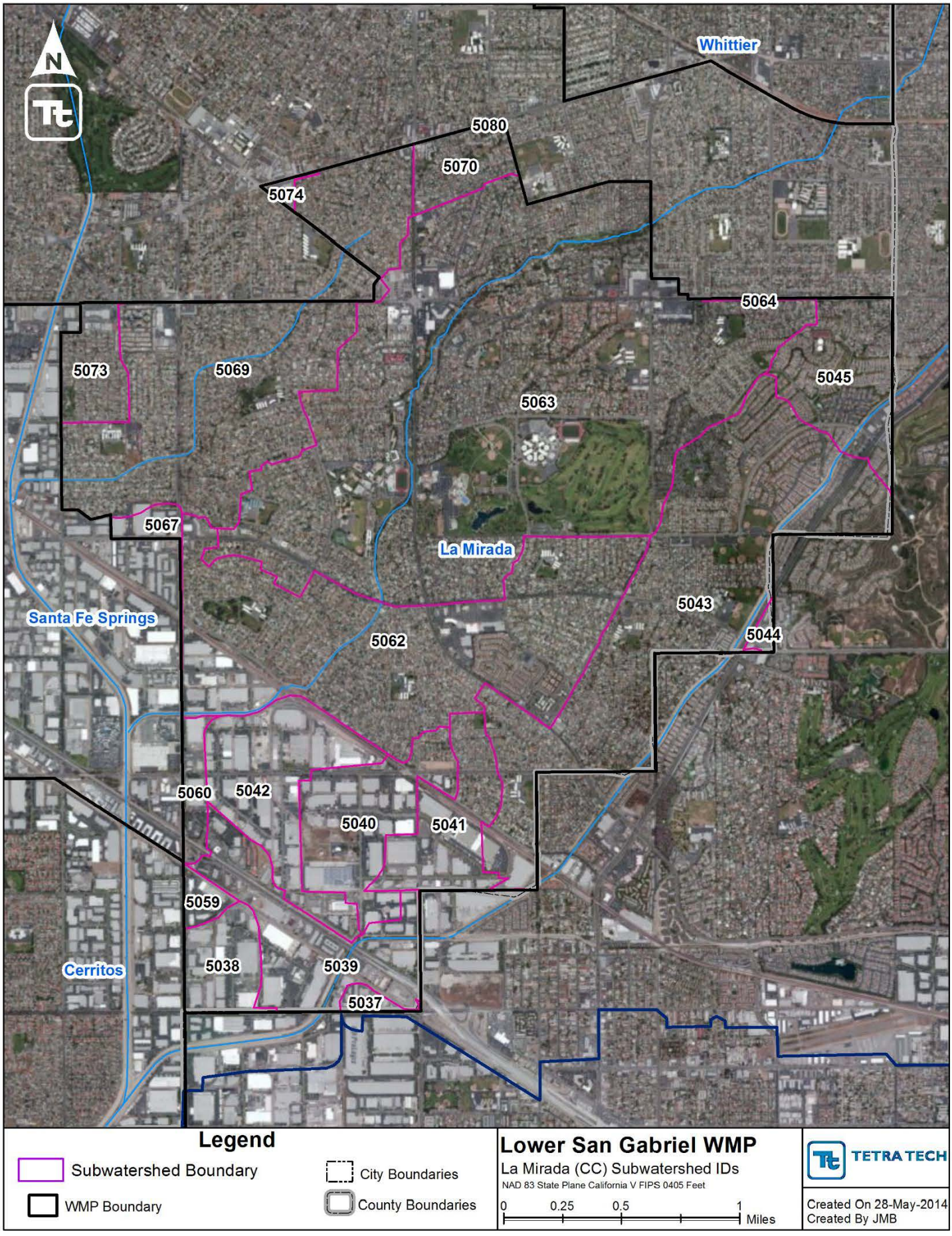


Figure 44. LSGR (CC) La Mirada Subwatershed IDs

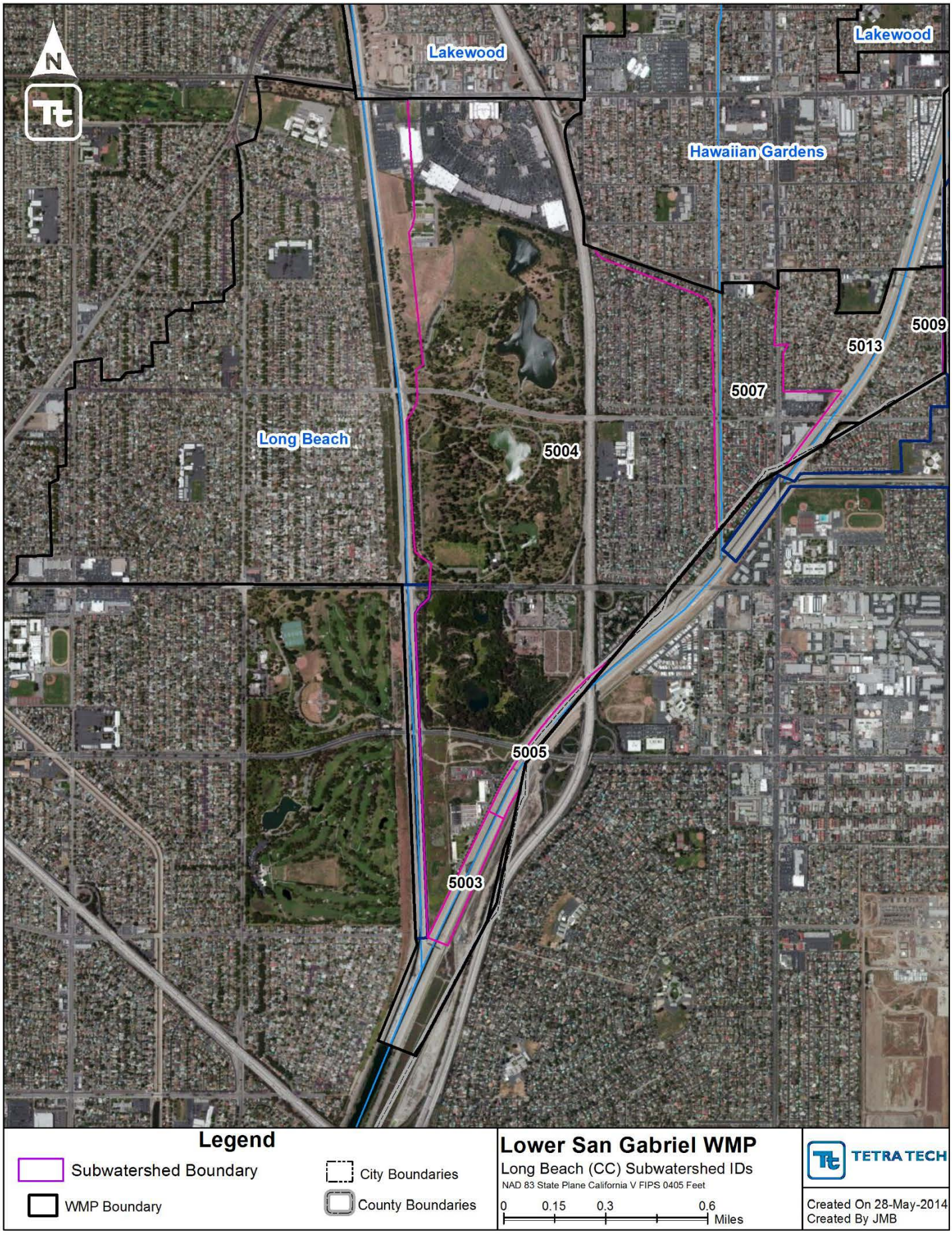


Figure 45. LSGR (CC) Long Beach Subwatershed IDs

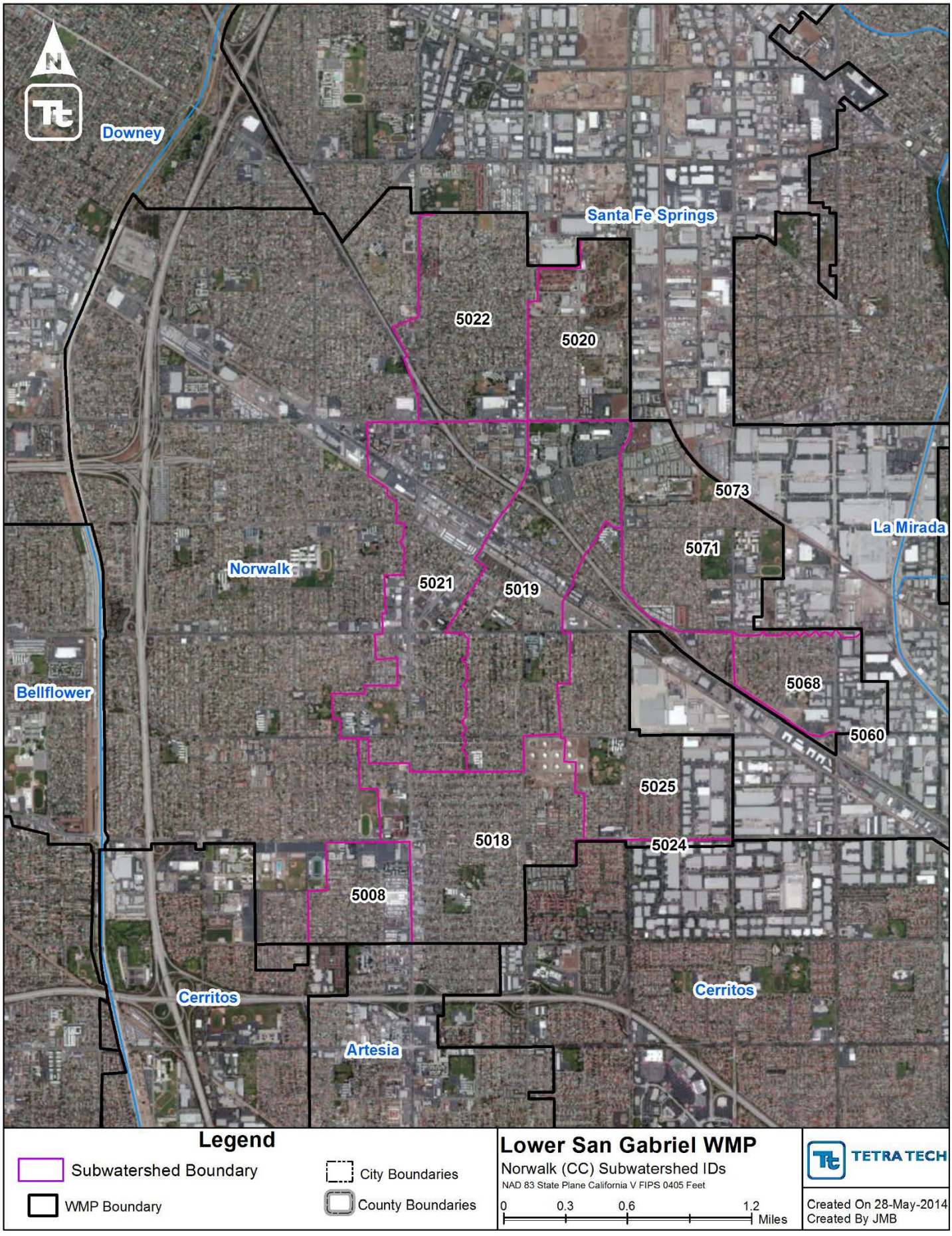


Figure 46. LSGR (CC) Norwalk Subwatershed IDs

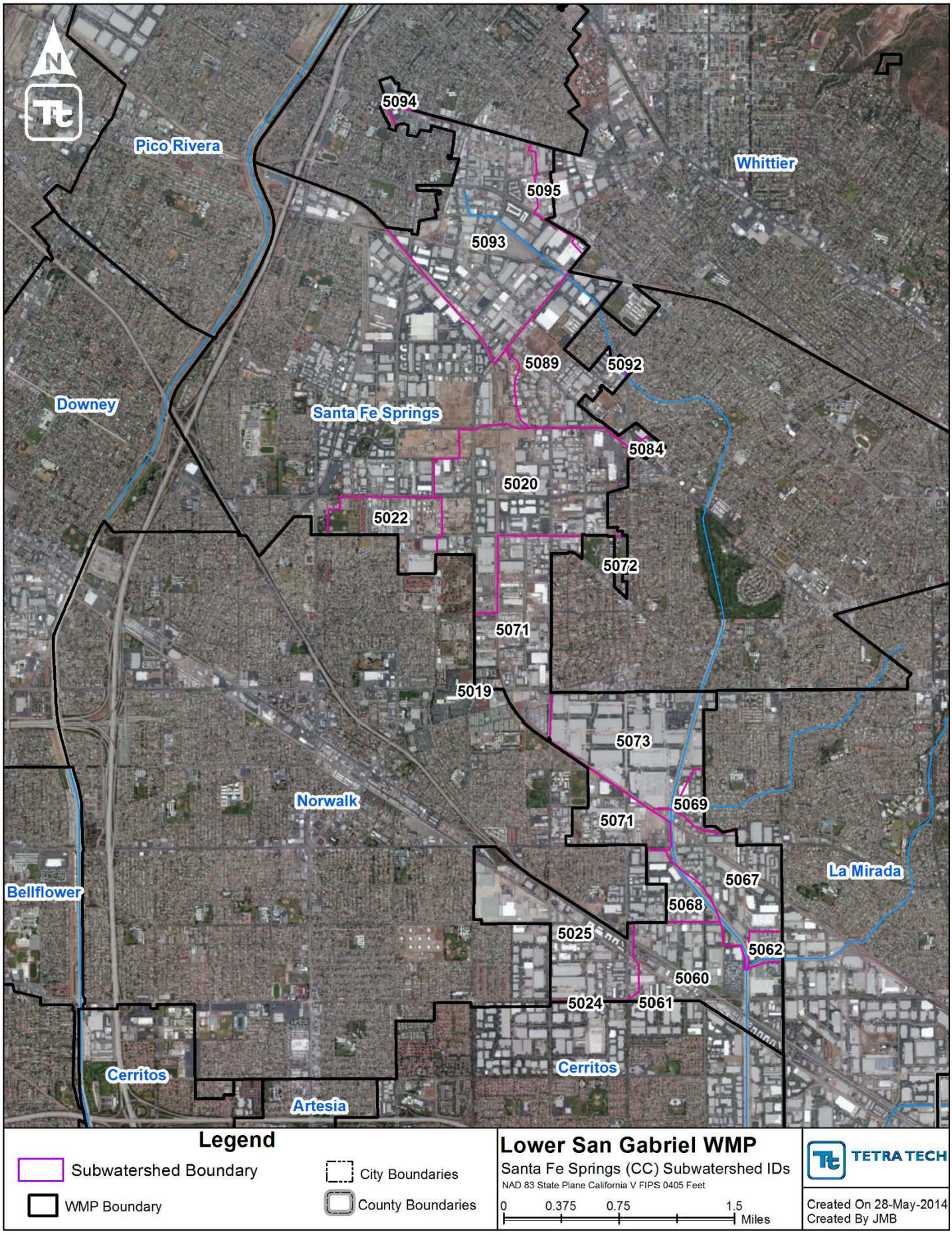


Figure 47. LSGR (CC) Santa Fe Springs Subwatershed IDs

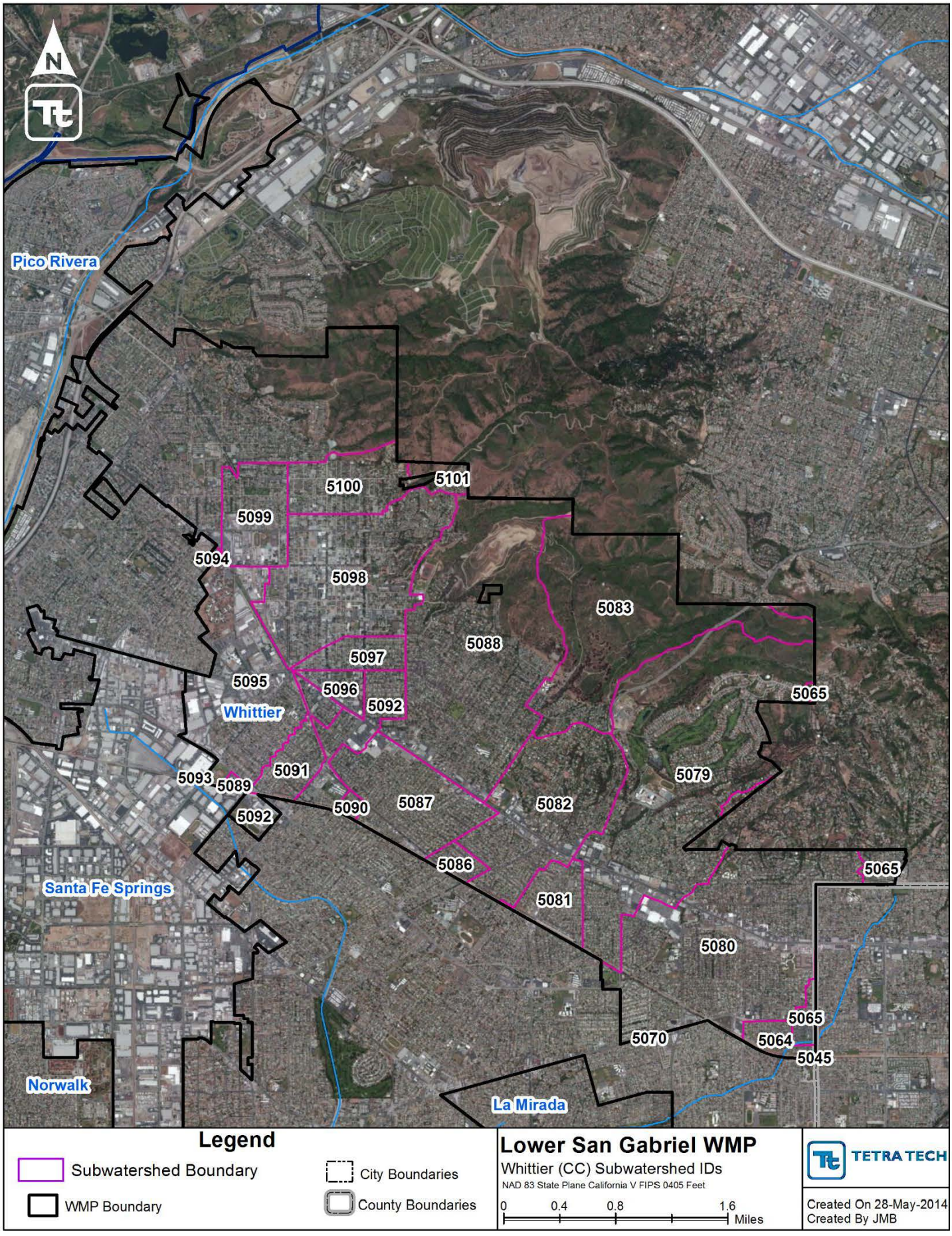


Figure 48. LSGR (CC) Whittier Subwatershed IDs

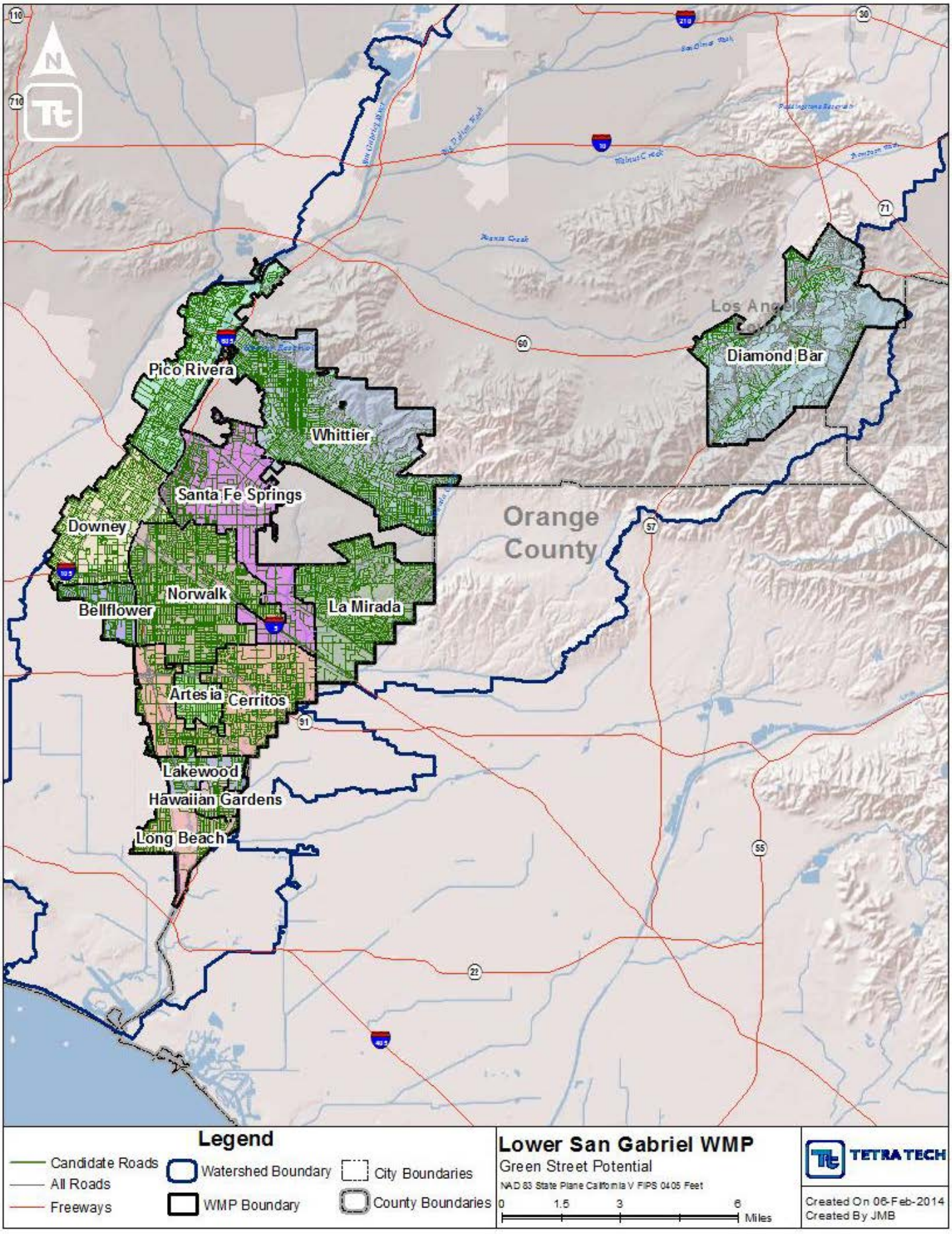


Figure 49. LSGR ROW BMP Potential Opportunities

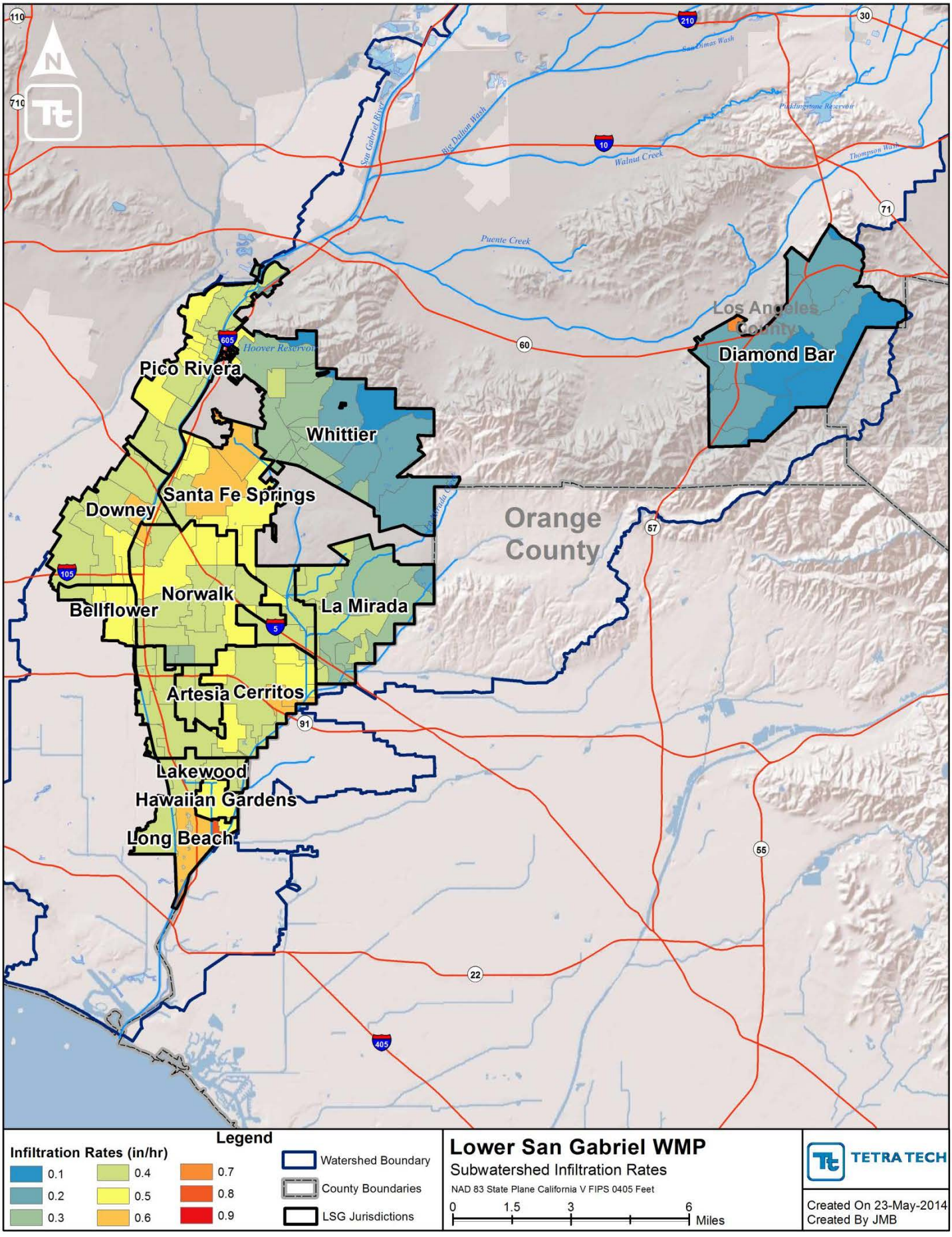


Figure 50. LSGR Subwatershed Infiltration Rates

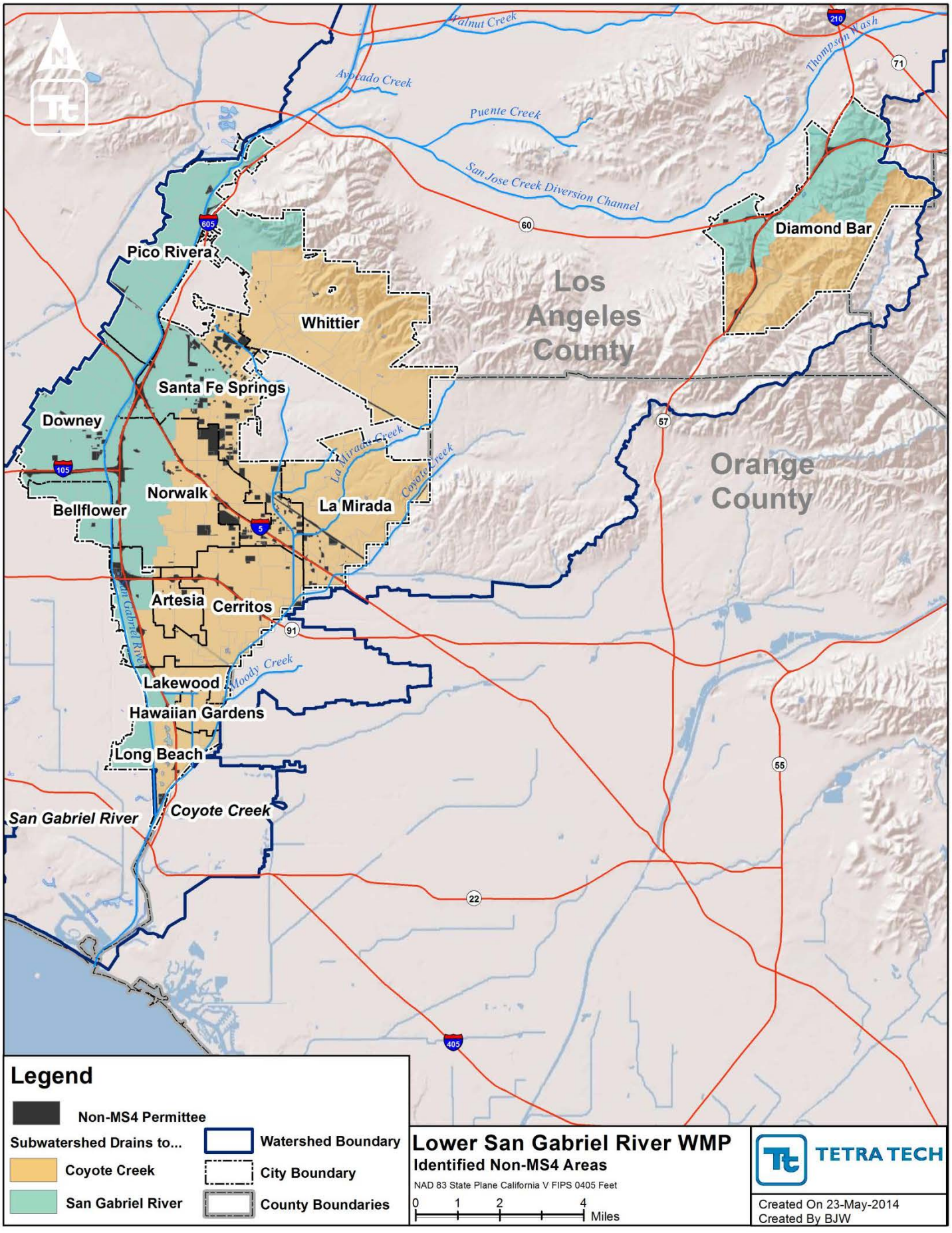


Figure 51. LSGR Non-MS4 Permittees

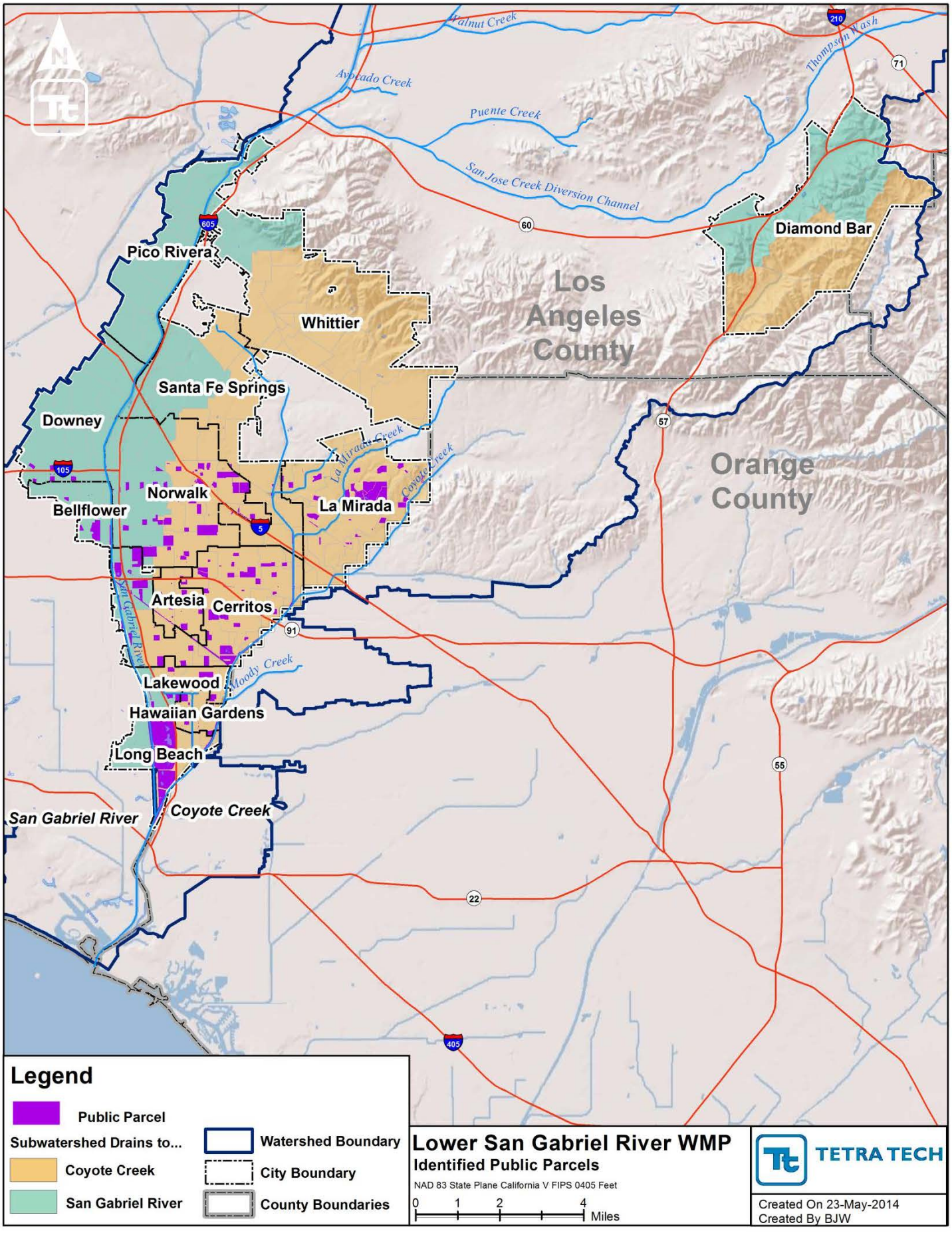


Figure 52. LSGR identified public parcels

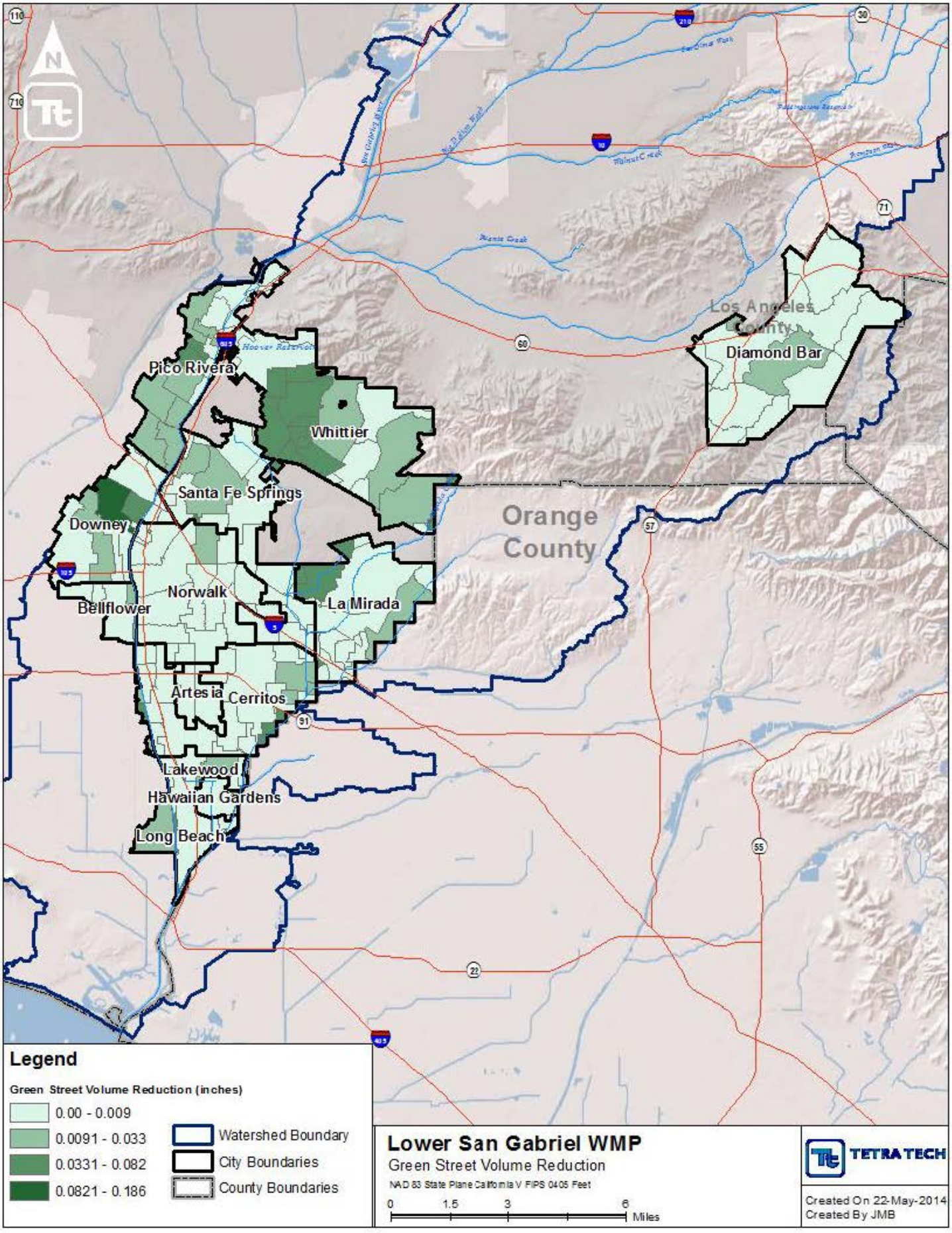


Figure 53. LSGR ROW BMP Volume Reduction

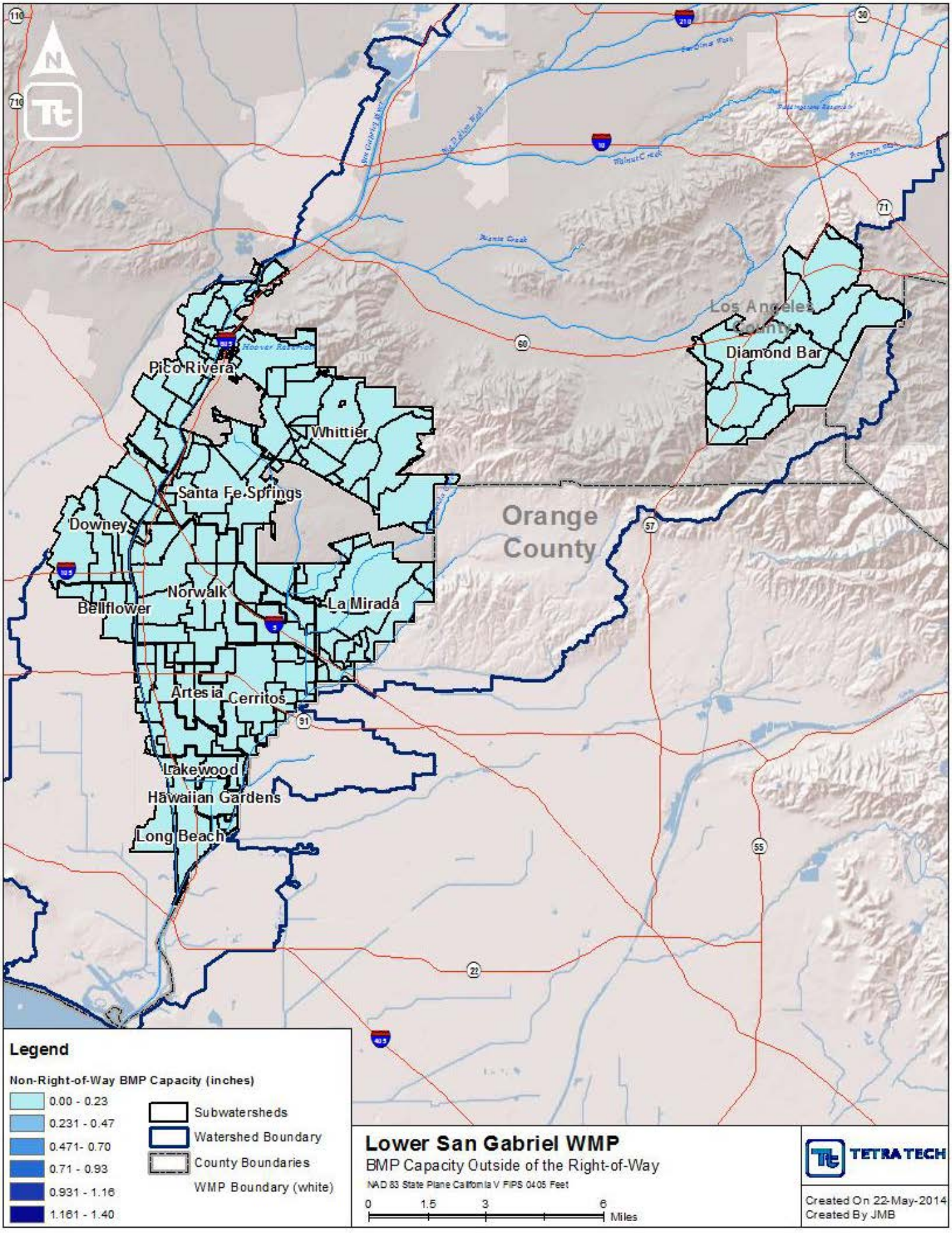


Figure 54. LSGR BMP capacity outside of the right-of-way

Attachment D: Existing and Planned BMPs

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

January 15, 2015

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D1. Existing and Planned BMPs

The following tables summarize existing and planned BMPs in each jurisdiction.

D1.1. City of Bellflower

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration	Existing	Riverview Park Infiltration Trenches	2012	10500 Somerset Blvd.	33.896662	-118.11016	105113	16	ac		
Bioretention / Biofiltration	Existing	Riverview Park Infiltration Trenches	2012	10500 Somerset Blvd.	33.896662	-118.11016	105113	16	ac		
Flow-Through Treatment BMP	Existing	Commercial Gas Station and mart	2008	14300 Bellflower Blvd	33.901581	-118.124915	105114	0.42	ac		
Flow-Through Treatment BMP	Existing	Commercial Storage	2005	10526 Rosecrans	33.902009	-118.108102	575118	19.5	ac		
Infiltration BMPs	Existing	St George Church	2012	15725 Cornuta	33.890539	-118.120735	105113	1.36	ac		
Infiltration BMPs	Existing	Autozone	2012	10239 Rosecrans	33.902265	-118.114834	105113	0.78	ac		

D1.2. City of Downey

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow Through Treatment BMP	Existing	8314 SECOND ST	2/14/2014		33.9409	-118.13243	245114	1322	sf	0.153	cfs
Flow Through Treatment BMP	Existing	10030 LAKEWOOD	8/17/2007		33.9477	-118.11664	245125	24560	sf	0.17	cfs
Infiltration BMP	Existing	12327 WOODRUFF AV	2/14/2014		33.91989	-118.11706	245113	6894.4	sf	430.9	cf
Infiltration BMP	Existing	12145 WOODRUFF	7/8/2008		33.92338	-118.11805	245113	3200	sf	200	cf
Infiltration BMP	Existing	9500 WASHBURN	2/14/2014		33.92366	-118.1172	245113	342000	sf	9500	cf
Infiltration BMP	Existing	9236 HALL	4/17/2007		33.92972	-118.12155	245113	411840	sf	25740	cf
Infiltration BMP	Existing	9737 IMPERIAL	6/22/2010		33.91761	-118.11961	245114	5600	sf	350	cf
Infiltration BMP	Existing	12254 BELLFLOWER	9/13/2003		33.9214	-118.1239	245114	57600	sf	3600	cf
Infiltration BMP	Existing	11904 BELLFLOWER	2/14/2014		33.92607	-118.12515	245114	5400	sf	300	cf
Infiltration BMP	Existing	11610 LAKEWOOD	9/28/2007		33.93101	-118.12594	245114	91520	sf	5720	cf
Infiltration BMP	Existing	8329 DAVIS	6/15/2010		33.9366	-118.13379	245114	12608	sf	788	cf
Infiltration BMP	Existing	8522 FIRESTONE	2/16/2005		33.93678	-118.12978	245114	105456	sf	6591	cf
Infiltration BMP	Existing	8320 FIRESTONE BLVD	1/1/2010		33.9387	-118.13176	245114	90660	sf	525	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9060 IMPERIAL	4/15/2005		33.91646	-118.13532	245115	7056	sf	441	cf
Infiltration BMP	Existing	8141 DE PALMAQ	6/30/2003		33.93618	-118.1402	245115	443008	sf	27688	cf
Infiltration BMP	Existing	8317 DAVIS ST	2/14/2014		33.93683	-118.13441	245115	13920	sf	870	cf
Infiltration BMP	Existing	8333 IOWA	10/11/2001		33.93756	-118.13356	245115	9808	sf	613	cf
Infiltration BMP	Existing	8100 PHLOX	5/20/2004		33.93956	-118.13854	245115	14400	sf	900	cf
Infiltration BMP	Existing	11040 BROOKSHIRE	1/1/2014		33.93932	-118.12496	245119	1923616	sf	120226	cf
Infiltration BMP	Existing	11136 DOLLISON	6/22/2010		33.93448	-118.09613	245122	13824	sf	864	cf
Infiltration BMP	Existing	10239 PICO VISTA	4/7/2003		33.939	-118.10316	245126	2176	sf	136	cf
Infiltration BMP	Existing	10233 PICO VISTA	4/7/2003		33.93914	-118.10305	245126	2176	sf	136	cf
Infiltration BMP	Existing	10228 PICO VISTA	4/7/2003		33.93919	-118.10235	245126	5856	sf	366	cf
Infiltration BMP	Existing	10229 PICO VISTA	4/7/2003		33.93928	-118.10295	245126	2176	sf	136	cf
Infiltration BMP	Existing	10223 PICO VISTA	4/7/2003		33.93946	-118.10289	245126	2048	sf	128	cf
Infiltration BMP	Existing	10218 PICO VISTA	4/7/2003		33.93947	-118.10223	245126	5952	sf	372	cf
Infiltration BMP	Existing	10215 PICO VISTA	4/7/2003		33.93962	-118.10237	245126	2112	sf	132	cf
Infiltration BMP	Existing	10211 PICO VISTA	4/7/2003		33.93969	-118.10255	245126	2304	sf	144	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10219 PICO VISTA	4/7/2003		33.93975	-118.10273	245126	2304	sf	144	cf
Infiltration BMP	Existing	12800 PARAMOUNT	9/16/2008		33.92108	-118.15383	246077	3168	sf	198	cf
Infiltration BMP	Existing	7930 STEWARD & GRAY	11/18/2004		33.93539	-118.14527	246077	1600	sf	100	cf
Infiltration BMP	Existing	12229 JULIUS	1/1/2006		33.93343	-118.1561	246079	944	sf	59	cf
Infiltration BMP	Existing	7845 BENARES ST	6/14/2001		33.93839	-118.14549	246079	3568	sf	223	cf
Infiltration BMP	Existing	7841 BENARES ST	6/14/2001		33.93851	-118.14537	246079	1760	sf	110	cf
Infiltration BMP	Existing	7837 BENARES ST	6/14/2001		33.93863	-118.14528	246079	1760	sf	110	cf
Infiltration BMP	Existing	7848 BENARES ST	6/14/2001		33.93863	-118.14598	246079	10640	sf	665	cf
Infiltration BMP	Existing	7833 BENARES ST	6/14/2001		33.93875	-118.14518	246079	1760	sf	110	cf
Infiltration BMP	Existing	7844 BENARES ST	6/14/2001		33.93876	-118.14591	246079	2000	sf	125	cf
Infiltration BMP	Existing	7840 BENARES ST	6/14/2001		33.93886	-118.14578	246079	2000	sf	125	cf
Infiltration BMP	Existing	11706 RIVES	6/14/2001		33.93888	-118.14506	246079	1760	sf	110	cf
Infiltration BMP	Existing	7816 BENARES ST	6/14/2001		33.93896	-118.14553	246079	9600	sf	600	cf
Infiltration BMP	Existing	7812 BENARES ST	6/14/2001		33.93904	-118.14568	246079	1760	sf	110	cf
Infiltration BMP	Existing	11726 RIVES	6/14/2001		33.93904	-118.14614	246079	1920	sf	120	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7808 BENARES ST	6/14/2001		33.93911	-118.14583	246079	1760	sf	110	cf
Infiltration BMP	Existing	7808 BENARES ST	6/14/2001		33.93919	-118.14598	246079	1760	sf	110	cf
Infiltration BMP	Existing	7821 BENARES ST	6/14/2001		33.93921	-118.14506	246079	1872	sf	117	cf
Infiltration BMP	Existing	7804 BENARES ST	6/14/2001		33.93926	-118.14613	246079	9760	sf	610	cf
Infiltration BMP	Existing	7817 BENARES ST	6/14/2001		33.93931	-118.14525	246079	1760	sf	110	cf
Infiltration BMP	Existing	7813 BENARES ST	6/14/2001		33.93938	-118.14542	246079	1760	sf	110	cf
Infiltration BMP	Existing	7809 BENARES ST	6/14/2001		33.93945	-118.14557	246079	1760	sf	110	cf
Infiltration BMP	Existing	7805 BENARES ST	6/14/2001		33.93953	-118.14572	246079	1760	sf	110	cf
Infiltration BMP	Existing	7801 BENARES ST	6/14/2001		33.93961	-118.14587	246079	9600	sf	600	cf
Infiltration BMP	Existing	7140 FIRESTONE	10/3/2005		33.94707	-118.15469	246079	24048	sf	1503	cf
Infiltration BMP	Existing	8233 FIRESTONE	6/21/2010		33.94076	-118.13358	246102	91648	sf	5728	cf
Infiltration BMP	Existing	7814 FIRESTONE	2/14/2014		33.94418	-118.14232	246102	3000	sf	125	cf
Infiltration BMP	Existing	7676 FIRESTONE	2/26/2004		33.94527	-118.144	246102	213824	sf	13364	cf
Infiltration BMP	Existing	7201 FIRESTONE	4/19/2007		33.94821	-118.15273	246102	34352	sf	2147	cf
Infiltration BMP	Existing	7360 FLORENCE	6/21/2010		33.95872	-118.141	246102	14496	sf	906	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8129 FLORENCE	6/23/2010		33.95231	-118.12677	246103	8880	sf	555	cf
Infiltration BMP	Existing	8605 GALLATIN ROAD	2/14/2014		33.95768	-118.11432	246103	85792	sf	5362	cf
Infiltration BMP	Existing	9276 DOWNEY	1/4/2007		33.95901	-118.11926	246103	6400	sf	400	cf
Infiltration BMP	Existing	8801 LAKEWOOD	7/14/2006		33.96317	-118.11498	246106	18352	sf	1147	cf
Infiltration BMP	Existing	7880 TELEGRAPH	11/14/2004		33.97112	-118.12113	246111	123104	sf	7694	cf
Permeable Pavement	Existing	9449 IMPERIAL	6/22/2010		33.91809	-118.12656	245115	32160	sf	2010	cf
Permeable Pavement	Existing	9565 FIRESTONE	6/3/2008		33.93043	-118.11175	245119	18928	sf	1183	cf
Permeable Pavement	Existing	12628 PARAMOUNT	2/14/2014		33.92329	-118.15283	246077	15000	sf	284	cf
Permeable Pavement	Existing	11555 PARAMOUNT	2/14/2014		33.94116	-118.14067	246077	8125	sf	400	cf
Permeable Pavement	Existing	8043 SECOND ST	1/1/2009		33.94254	-118.13737	246102	105023	sf	6787	cf
Permeable Pavement	Existing	9250 LAKEWOOD	2/14/2014		33.95768	-118.1153	246103	24662	sf	939	cf
Regional Detention Facility	Existing	9341 IMPERIAL	5/6/2004		33.91918	-118.12898	245115	664624	sf	41539	cf
Regional Infiltration Facility	Existing	12074 LAKEWOOD	5/22/2005		33.9257	-118.13203	245115	960800	sf	60050	cf
Regional Infiltration Facility	Existing	12002 LAKEWOOD	5/22/2005		33.9261	-118.13169	245115	605264	sf	37829	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8764 FIRESTONE	8/14/2008	6523923.595890	6523923.595890	1798908.496460	245119	20064	sf	1254	cf
Infiltration BMP	Existing	9915 DOWNEY	9/27/2005	6523909.682530	6523909.682530	1805554.600030	246103	2265	sf	142	cf
Infiltration BMP	Existing	7602 RUNDELL	1/27/2006	6514863.657960	6514863.657960	1798182.489930	246079	2265	sf	142	cf
Infiltration BMP	Existing	10403 SAMOLINE	10/3/2005	6521224.982130	6521224.982130	1804890.047210	246102	2265	sf	142	cf
Infiltration BMP	Existing	12516 DOLAN	11/18/2005	6518146.741440	6518146.741440	1794105.551200	245115	1698	sf	106	cf
Infiltration BMP	Existing	7845 QUILL	3/28/2006	6515351.811960	6515351.811960	1796427.555720	246079	1698	sf	106	cf
Infiltration BMP	Existing	10435 BIRCHDALE	5/19/2005	6524444.362750	6524444.362750	1802478.415410	245119	1132	sf	71	cf
Infiltration BMP	Existing	8538 ALBIA	9/23/2005	6520089.101510	6520089.101510	1795567.094110	245115	566	sf	35	cf
Infiltration BMP	Existing	12159 CORNUTA	9/16/2005	6525392.928460	6525392.928460	1794233.560240	245114	566	sf	35	cf
Infiltration BMP	Existing	8064 DACOSTA	7/7/2005	6523365.354910	6523365.354910	1805913.806160	246103	566	sf	35	cf
Infiltration BMP	Existing	8551 DALEN	10/6/2005	6518205.327280	6518205.327280	1792517.271110	245115	566	sf	35	cf
Infiltration BMP	Existing	8318 DINSDALE	6/15/2006	6523907.628300	6523907.628300	1804895.972630	246103	566	sf	35	cf
Infiltration BMP	Existing	12641 DOLAN	9/2/2005	6517370.498610	6517370.498610	1793094.154440	245115	566	sf	35	cf
Infiltration BMP	Existing	12837 DOWNEY	6/13/2008	6516221.544620	6516221.544620	1792552.216840	246077	566	sf	35	cf
Infiltration BMP	Existing	12608 DUNROBIN	1/1/2007	6525044.715110	6525044.715110	1792041.222140	245114	566	sf	35	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7715 GAINFORD	5/9/2006	6521302.031220	6521302.031220	1807578.393730	246106	566	sf	35	cf
Infiltration BMP	Existing	12337 HORLEY	6/20/2007	6514828.837130	6514828.837130	1797233.894880	246079	566	sf	35	cf
Infiltration BMP	Existing	12619 IBBETSON	4/7/2008	6525826.717640	6525826.717640	1791950.694670	245114	566	sf	35	cf
Infiltration BMP	Existing	12142 MARBEL	5/5/2008	6521265.537710	6521265.537710	1794924.230550	245115	566	sf	35	cf
Infiltration BMP	Existing	12228 NORLAIN	6/24/2005	6513924.473210	6513924.473210	1798288.206130	246079	566	sf	35	cf
Infiltration BMP	Existing	11733 PATTON	12/9/2005	6521629.388810	6521629.388810	1797656.681610	245114	566	sf	35	cf
Infiltration BMP	Existing	11712 PRUESS	3/29/2006	6518005.349510	6518005.349510	1799785.098800	246077	566	sf	35	cf
Infiltration BMP	Existing	8605 SAMOLINE	10/23/2006	6525562.919850	6525562.919850	1810382.622670	246106	566	sf	35	cf
Infiltration BMP	Existing	7814 SPRINGER	7/20/2005	6515325.745000	6515325.745000	1796943.250000	246079	566	sf	35	cf
Infiltration BMP	Existing	7406 THIRD	9/23/2005	6517102.209740	6517102.209740	1803992.224080	246102	566	sf	35	cf
Infiltration BMP	Existing	8836 TWEEDY	8/21/2006	6524333.205540	6524333.205540	1809897.996880	246106	566	sf	35	cf
Infiltration BMP	Existing	9702 TWEEDY	8/30/2005	6522704.033740	6522704.033740	1807211.824630	246103	566	sf	35	cf
Infiltration BMP	Existing	11414 PARAMOUNT	11/17/2006	6519592.558830	6519592.558830	1800943.348310	245115	37135	sf	2321	cf
Infiltration BMP	Existing	8077 FLORENCE AV	1/1/2009	6523000.000000	6523000.000000	1805200.000000	246103	31872	sf	1992	cf
Infiltration BMP	Existing	8351 FLORENCE	11/29/2005	6524092.726100	6524092.726100	1804613.455750	246103	8252	sf	516	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11003 LAKEWOOD	1/1/2006	6524400.000000	6524400.000000	1799800.000000	245119	8252	sf	516	cf
Infiltration BMP	Existing	9288 LUBEC	6/21/2010	6528705.843900	6528705.843900	1803218.787040	245125	8252	sf	516	cf
Infiltration BMP	Existing	13240 BARLIN	6/24/2005	6517118.017720	6517118.017720	1789361.126310	245524	6189	sf	387	cf
Infiltration BMP	Existing	9802 BROOKSHIRE	4/24/2007	6525737.765210	6525737.765210	1805415.750650	246103	6189	sf	387	cf
Infiltration BMP	Existing	9026 SUVA	10/5/2006	6527186.692380	6527186.692380	1804858.393970	245125	6189	sf	387	cf
Infiltration BMP	Existing	7325 IRWINGROVE	4/27/2005	6518419.969630	6518419.969630	1807291.337240	246102	5158	sf	322	cf
Infiltration BMP	Existing	10064 PANGBORN	8/16/2005	6529846.676910	6529846.676910	1801177.429270	245125	5158	sf	322	cf
Infiltration BMP	Existing	8102 THIRD	3/4/2009	6520617.238210	6520617.238210	1801805.039980	246103	7616	sf	476	cf
Infiltration BMP	Existing	12200 BELLFLOWER	11/4/2008	6524061.916580	6524061.916580	1794195.827920	245114	4126	sf	258	cf
Infiltration BMP	Existing	9818 BIRCHDALE	12/28/2005	6526194.448530	6526194.448530	1804634.814020	245125	4126	sf	258	cf
Infiltration BMP	Existing	10419 BROOKSHIRE	7/30/2007	6523842.460000	6523842.460000	1803179.994160	245119	4126	sf	258	cf
Infiltration BMP	Existing	10432 BROOKSHIRE	2/14/2007	6523911.001360	6523911.001360	1803018.354450	245119	4126	sf	258	cf
Infiltration BMP	Existing	10329 CASANES	1/1/2006	6528565.218740	6528565.218740	1800358.453120	245126	4126	sf	258	cf
Infiltration BMP	Existing	13221 CORRIGAN	3/9/2006	6523120.117490	6523120.117490	1789965.324450	245114	4126	sf	258	cf
Infiltration BMP	Existing	8816 ELSTON	12/28/2005	6526840.850650	6526840.850650	1808666.263650	246103	4126	sf	258	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9278 GAINFORD	6/15/2005	6528421.969980	6528421.969980	1803000.469050	245125	4126	sf	258	cf
Infiltration BMP	Existing	7340 IRWINGROVE	12/6/2005	6518415.507880	6518415.507880	1806990.616650	246102	4126	sf	258	cf
Infiltration BMP	Existing	9055 IRWINGROVE	10/17/2006	6526414.238800	6526414.238800	1802422.724820	245119	4126	sf	258	cf
Infiltration BMP	Existing	9005 KRISTIN	1/1/2006	6524171.005660	6524171.005660	1809376.398810	246106	4126	sf	258	cf
Infiltration BMP	Existing	9015 KRISTIN	1/1/2006	6524137.396040	6524137.396040	1809320.713720	246106	4126	sf	258	cf
Infiltration BMP	Existing	10014 LA REINA	11/3/2005	6523603.973220	6523603.973220	1805275.605180	246103	4126	sf	258	cf
Infiltration BMP	Existing	8334 LEXINGTON	3/20/2006	6523900.000000	6523900.000000	1804200.000000	246103	4126	sf	258	cf
Infiltration BMP	Existing	7114 LUXOR	7/27/2005	6513446.571340	6513446.571340	1802395.175860	246100	4126	sf	258	cf
Infiltration BMP	Existing	10348 PANGBORN	10/12/2006	6529020.867850	6529020.867850	1800144.106260	245126	4126	sf	258	cf
Infiltration BMP	Existing	7268 PELLET	12/8/2005	6516203.991240	6516203.991240	1804244.566160	246104	4126	sf	258	cf
Infiltration BMP	Existing	9821 RIVES	9/12/2005	6521261.613640	6521261.613640	1807221.725140	246106	4126	sf	258	cf
Infiltration BMP	Existing	10427 STAMPS	2/27/2006	6523141.588150	6523141.588150	1803526.008280	246103	4126	sf	258	cf
Infiltration BMP	Existing	8325 TEXAS	8/30/2007	6520789.744350	6520789.744350	1799109.948610	245114	4126	sf	258	cf
Infiltration BMP	Existing	9211 ARRINGTON	6/21/2010	6527822.609270	6527822.609270	1805896.813180	245125	3095	sf	193	cf
Infiltration BMP	Existing	10372 BIRCHDALE	1/17/2006	6524786.108330	6524786.108330	1802711.833690	245119	2660	sf	166	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9509 BROCK	10/6/2005	6524084.133490	6524084.133490	1807438.122200	246103	3095	sf	193	cf
Infiltration BMP	Existing	9600 CORD	5/12/2008	6529842.639410	6529842.639410	1803668.379590	245125	3095	sf	193	cf
Infiltration BMP	Existing	10943 CORD	3/13/2007	6526539.555830	6526539.555830	1798046.595190	245119	3095	sf	193	cf
Infiltration BMP	Existing	12569 DOLAN	9/27/2006	6517675.526540	6517675.526540	1793796.546690	245115	3095	sf	193	cf
Infiltration BMP	Existing	9252A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9252B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9258A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9258B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9258C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9622 HALEDON	3/16/2006	6528283.868130	6528283.868130	1804260.791520	245125	3095	sf	193	cf
Infiltration BMP	Existing	11442 JULIUS	7/26/2007	6517126.240320	6517126.240320	1802109.297720	246079	3095	sf	193	cf
Infiltration BMP	Existing	10026 MATTOCK	1/1/2006	6530326.462180	6530326.462180	1801330.602850	245125	3095	sf	193	cf
Infiltration BMP	Existing	9303 PARAMOUNT	3/14/2006	6523934.101920	6523934.101920	1808355.150660	246106	3095	sf	193	cf
Infiltration BMP	Existing	8739 PARKCLIFF	1/23/2006	6516653.896010	6516653.896010	1788072.265990	245524	2063	sf	129	cf
Infiltration BMP	Existing	9303 PARROT	1/4/2007	6524270.384450	6524270.384450	1808221.036420	246106	3095	sf	193	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7313 PELLET	6/22/2010	6516478.702600	6516478.702600	1804386.841100	246104	3095	sf	193	cf
Infiltration BMP	Existing	10473 PICO VISTA	1/21/2009	6529579.260180	6529579.260180	1798825.132300	245126	3095	sf	193	cf
Infiltration BMP	Existing	7840 THIRD	8/29/2007	6519254.945150	6519254.945150	1802616.251380	246102	3095	sf	193	cf
Infiltration BMP	Existing	8347 VISTA DEL ROSA	7/26/2007	6527061.884710	6527061.884710	1808864.927170	246106	3095	sf	193	cf
Infiltration BMP	Existing	11632 ADENMOOR	6/15/2005	6524141.212380	6524141.212380	1797138.142940	245114	2063	sf	129	cf
Infiltration BMP	Existing	7124 ADWEN	12/20/2007	6513937.816490	6513937.816490	1803059.644840	246100	2063	sf	129	cf
Infiltration BMP	Existing	7258 ADWEN	1/3/2008	6515068.905460	6515068.905460	1802384.347520	246079	2063	sf	129	cf
Infiltration BMP	Existing	7646 ADWEN	10/6/2005	6517037.957040	6517037.957040	1801170.785850	246079	2063	sf	129	cf
Infiltration BMP	Existing	7702 ADWEN	5/11/2006	6517121.727310	6517121.727310	1801116.179360	246079	2063	sf	129	cf
Infiltration BMP	Existing	13032 AIRPOINT	5/14/2007	6517972.459000	6517972.459000	1790335.341940	245115	2063	sf	129	cf
Infiltration BMP	Existing	8455 ALAMEDA	8/7/2008	6519558.018350	6519558.018350	1795721.453060	245115	2063	sf	129	cf
Infiltration BMP	Existing	8632 ALAMEDA	11/2/2006	6520500.318510	6520500.318510	1795019.322380	245115	2063	sf	129	cf
Infiltration BMP	Existing	7945 ALBIA	10/11/2005	6516993.544600	6516993.544600	1797608.073070	246079	2063	sf	129	cf
Infiltration BMP	Existing	8704 ALBIA	5/28/2008	6520928.243910	6520928.243910	1795073.644330	245115	2063	sf	129	cf
Infiltration BMP	Existing	7845 ARNETT	6/18/2010	6518353.322440	6518353.322440	1801165.354440	246079	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9217 ARRINGTON	3/27/2006	6527795.727670	6527795.727670	1805838.303240	245125	2063	sf	129	cf
Infiltration BMP	Existing	7870 BAYSINGER	2/8/2008	6521311.922790	6521311.922790	1805484.679070	246102	2063	sf	129	cf
Infiltration BMP	Existing	9964 BELCHER	5/16/2007	6525622.979960	6525622.979960	1789815.793090	245113	2063	sf	129	cf
Infiltration BMP	Existing	12556 BELLDER	8/17/2007	6518567.857140	6518567.857140	1793310.793680	245115	2063	sf	129	cf
Infiltration BMP	Existing	11614 BELLFLOWER	11/7/2008	6523771.271210	6523771.271210	1797348.312220	245114	2063	sf	129	cf
Infiltration BMP	Existing	11802 BELLMAN	3/9/2007	6521898.080850	6521898.080850	1797268.375540	245114	2063	sf	129	cf
Infiltration BMP	Existing	7502 BENARES	1/30/2009	6515952.395710	6515952.395710	1801162.932420	246079	2063	sf	129	cf
Infiltration BMP	Existing	7824 BORSON	5/24/2007	6514090.231790	6514090.231790	1794571.039330	246077	2063	sf	129	cf
Infiltration BMP	Existing	7442 BROOKMILL	2/6/2006	6515991.568850	6515991.568850	1801492.813950	246079	2063	sf	129	cf
Infiltration BMP	Existing	9202 BUELL	7/21/2008	6526325.599230	6526325.599230	1799668.061170	245119	2063	sf	129	cf
Infiltration BMP	Existing	9340 BUELL	8/9/2006	6527287.659290	6527287.659290	1799162.594770	245126	2063	sf	129	cf
Infiltration BMP	Existing	8707 BYERS	3/15/2006	6521183.641890	6521183.641890	1796053.567730	245115	2063	sf	129	cf
Infiltration BMP	Existing	10446 CASANES	10/26/2006	6528470.793910	6528470.793910	1799828.787480	245126	2063	sf	129	cf
Infiltration BMP	Existing	10932 CASANES	11/17/2005	6527225.467210	6527225.467210	1797760.272650	245119	2063	sf	129	cf
Infiltration BMP	Existing	13341 CASTANA	10/28/2005	6517576.502130	6517576.502130	1788949.477410	245524	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7408 CECILIA	10/27/2005	6517829.130300	6517829.130300	1804625.827460	246102	2063	sf	129	cf
Infiltration BMP	Existing	7604 CECILIA	5/14/2007	6518455.494160	6518455.494160	1804215.794590	246102	2063	sf	129	cf
Infiltration BMP	Existing	9116 CHANEY	12/19/2005	6529189.877980	6529189.877980	1805493.817150	245125	2063	sf	129	cf
Infiltration BMP	Existing	8210 CHEYENNE	3/18/2008	6515440.785260	6515440.785260	1792057.306890	246077	2063	sf	129	cf
Infiltration BMP	Existing	9663 CLANCEY	8/17/2005	6527712.819630	6527712.819630	1804149.908320	245125	2063	sf	129	cf
Infiltration BMP	Existing	10708 CLANCEY	12/9/2005	6525546.299290	6525546.299290	1800088.746900	245119	2063	sf	129	cf
Infiltration BMP	Existing	8336 CLETA	5/8/2006	6520552.025180	6520552.025180	1798452.238760	245114	2063	sf	129	cf
Infiltration BMP	Existing	8557 CLETA	7/24/2006	6521804.225790	6521804.225790	1798033.515210	245114	2063	sf	129	cf
Infiltration BMP	Existing	8532 COLE	11/7/2005	6521000.000000	6521000.000000	1796400.000000	245115	2063	sf	129	cf
Infiltration BMP	Existing	9003 CORD	6/23/2010	6530731.156250	6530731.156250	1805583.409840	245127	2063	sf	129	cf
Infiltration BMP	Existing	9203 CORD	11/14/2008	6530209.591170	6530209.591170	1804419.169900	245125	2063	sf	129	cf
Infiltration BMP	Existing	13029 CORNUTA	5/17/2007	6525511.407030	6525511.407030	1790564.440990	245113	2063	sf	129	cf
Infiltration BMP	Existing	13102 CORNUTA	8/2/2007	6525701.503660	6525701.503660	1790504.914950	245113	2063	sf	129	cf
Infiltration BMP	Existing	13130 CORNUTA	6/25/2007	6525701.486250	6525701.486250	1790230.251310	245113	2063	sf	129	cf
Infiltration BMP	Existing	9245 DALEWOOD	9/23/2005	6532196.615620	6532196.615620	1804345.945760	245127	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	13440 DEMPSTER	10/26/2006	6516234.168650	6516234.168650	1789111.153470	245524	2063	sf	129	cf
Infiltration BMP	Existing	13448 DEMPSTER	5/10/2007	6516184.596670	6516184.596670	1789023.378330	245524	2063	sf	129	cf
Infiltration BMP	Existing	8125 DINSDALE	12/20/2005	6523223.693140	6523223.693140	1805447.514320	246103	2063	sf	129	cf
Infiltration BMP	Existing	10343 DOLAN	3/7/2007	6523688.489440	6523688.489440	1803733.392340	246103	2063	sf	129	cf
Infiltration BMP	Existing	10616 DOLAN	12/8/2005	6523091.688370	6523091.688370	1802186.196180	246103	2063	sf	129	cf
Infiltration BMP	Existing	8451 DONOVAN	10/20/2006	6518824.326830	6518824.326830	1794831.678890	245115	2063	sf	129	cf
Infiltration BMP	Existing	11915 DOWNEY	9/26/2007	6519404.158310	6519404.158310	1797577.606330	245115	2063	sf	129	cf
Infiltration BMP	Existing	12269 DOWNEY	3/16/2006	6518129.427940	6518129.427940	1795616.200900	246077	2063	sf	129	cf
Infiltration BMP	Existing	12631 DUNROBIN	1/14/2009	6524865.692630	6524865.692630	1791809.740080	245114	2063	sf	129	cf
Infiltration BMP	Existing	12644 DUNROBIN	12/27/2006	6525045.107610	6525045.107610	1791670.201830	245114	2063	sf	129	cf
Infiltration BMP	Existing	13212 DUNROBIN	3/6/2008	6525046.199690	6525046.199690	1790094.955960	245114	2063	sf	129	cf
Infiltration BMP	Existing	9018 EGLISE	6/18/2010	6530595.364130	6530595.364130	1805560.296250	245127	2063	sf	129	cf
Infiltration BMP	Existing	9252C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9252D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9252E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9254A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9258D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9258E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	8902 ELSTON	6/22/2010	6526760.905110	6526760.905110	1808606.155990	246103	2063	sf	129	cf
Infiltration BMP	Existing	8420 EUCALYPTUS	11/1/2007	6518268.185230	6518268.185230	1794519.531140	245115	2063	sf	129	cf
Infiltration BMP	Existing	8543 FARM	7/14/2008	6524366.648200	6524366.648200	1802748.102990	245119	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7963 FIFTH	4/13/2007	6520492.297340	6520492.297340	1803181.748460	246103	2063	sf	129	cf
Infiltration BMP	Existing	7606 FINEVALE	7/23/2007	6522317.087820	6522317.087820	1809781.757910	246111	2063	sf	129	cf
Infiltration BMP	Existing	8740 FIRESTONE	2/5/2008	6523707.154590	6523707.154590	1799037.579000	245119	2063	sf	129	cf
Infiltration BMP	Existing	8663 FONTANA	8/11/2005	6522041.808010	6522041.808010	1796935.622550	245114	2063	sf	129	cf
Infiltration BMP	Existing	7435 FOSTORIA	8/30/2005	6517713.795360	6517713.795360	1804555.032870	246102	2063	sf	129	cf
Infiltration BMP	Existing	7611 FOSTORIA	7/5/2007	6518456.715640	6518456.715640	1804071.041810	246102	2063	sf	129	cf
Infiltration BMP	Existing	8029 FOURTH	6/15/2006	6520786.200710	6520786.200710	1802533.409070	246103	2063	sf	129	cf
Infiltration BMP	Existing	8524 GAINFORD	6/27/2008	6525485.453790	6525485.453790	1804820.431910	245125	2063	sf	129	cf
Infiltration BMP	Existing	9332 GAINFORD	7/20/2006	6528750.550820	6528750.550820	1802746.272930	245125	2063	sf	129	cf
Infiltration BMP	Existing	9330 GALLATIN	8/2/2007	6529116.628720	6529116.628720	1804180.197000	245125	2063	sf	129	cf
Infiltration BMP	Existing	12271 GLYNN	10/18/2005	6518435.603700	6518435.603700	1795389.616520	245115	2063	sf	129	cf
Infiltration BMP	Existing	9123 HALEDON	1/23/2006	6528738.408770	6528738.408770	1805747.051990	245125	2063	sf	129	cf
Infiltration BMP	Existing	7915 HARPER	2/7/2006	6520609.146350	6520609.146350	1804298.454990	246102	2063	sf	129	cf
Infiltration BMP	Existing	9108 HASTY	8/23/2006	6531133.870830	6531133.870830	1805211.202040	245127	2063	sf	129	cf
Infiltration BMP	Existing	10840 HASTY	1/16/2008	6527245.272860	6527245.272860	1798387.513250	245119	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7468 HONDO	12/31/2008	6513888.485770	6513888.485770	1797503.008930	246079	2063	sf	129	cf
Infiltration BMP	Existing	7838 HONDO	2/26/2008	6515366.533450	6515366.533450	1796561.911100	246079	2063	sf	129	cf
Infiltration BMP	Existing	7926 HONDO	7/25/2006	6515828.269550	6515828.269550	1796282.236280	246079	2063	sf	129	cf
Infiltration BMP	Existing	12023 HORTON	10/5/2005	6515547.066470	6515547.066470	1799512.855270	246079	1032	sf	64	cf
Infiltration BMP	Existing	10234 JULIUS	11/5/2009	6519723.348540	6519723.348540	1806551.787860	246102	2063	sf	129	cf
Infiltration BMP	Existing	11828 JULIUS	1/3/2008	6515976.382140	6515976.382140	1800524.752810	246079	2063	sf	129	cf
Infiltration BMP	Existing	9256 KLINEDALE	12/4/2007	6531745.367500	6531745.367500	1804500.031620	245127	2063	sf	129	cf
Infiltration BMP	Existing	9452 KLINEDALE	4/24/2008	6531257.497660	6531257.497660	1803653.019950	245127	2063	sf	129	cf
Infiltration BMP	Existing	9031 LEMORAN	1/30/2009	6529792.995960	6529792.995960	1806045.812140	245125	2063	sf	129	cf
Infiltration BMP	Existing	9910 LESTERFORD	8/3/2005	6531140.582200	6531140.582200	1801442.142180	245125	2063	sf	129	cf
Infiltration BMP	Existing	8533 LOWMAN	1/3/2008	6525796.079270	6525796.079270	1810845.309540	246106	2063	sf	129	cf
Infiltration BMP	Existing	8349 LUBEC	12/27/2006	6524776.248350	6524776.248350	1805794.753990	246103	2063	sf	129	cf
Infiltration BMP	Existing	7630 LUXOR	6/27/2005	6516552.896900	6516552.896900	1800452.817120	246079	2063	sf	129	cf
Infiltration BMP	Existing	12342 MARBEL	3/23/2006	6520586.635090	6520586.635090	1793799.804370	245115	2063	sf	129	cf
Infiltration BMP	Existing	9045 MARGARET ST	1/1/2006	6524143.176440	6524143.176440	1798109.987740	245114	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10410 MATTOCK	10/2/2007	6529164.649420	6529164.649420	1799820.803610	245126	2063	sf	129	cf
Infiltration BMP	Existing	10615 MATTOCK	2/22/2006	6528479.681880	6528479.681880	1798952.207590	245126	2063	sf	129	cf
Infiltration BMP	Existing	9136 MELDAR	3/1/2007	6526738.891530	6526738.891530	1807241.651780	246103	2063	sf	129	cf
Infiltration BMP	Existing	7437 MULLER	10/3/2005	6518230.115820	6518230.115820	1805283.479580	246102	1032	sf	64	cf
Infiltration BMP	Existing	7452 MULLER	10/3/2005	6518271.461030	6518271.461030	1805049.518080	246102	2063	sf	129	cf
Infiltration BMP	Existing	10715 NEW	8/9/2007	6521988.945450	6521988.945450	1802370.638520	246103	2063	sf	129	cf
Infiltration BMP	Existing	10715 NEW	7/14/2008	6521988.945450	6521988.945450	1802370.638520	246103	2063	sf	129	cf
Infiltration BMP	Existing	10261 NEWVILLE	10/30/2007	6529641.666020	6529641.666020	1800383.942770	245126	2063	sf	129	cf
Infiltration BMP	Existing	10311 NEWVILLE	1/29/2009	6529538.574620	6529538.574620	1800214.882210	245126	2063	sf	129	cf
Infiltration BMP	Existing	10420 NEWVILLE	4/11/2008	6529346.061190	6529346.061190	1799529.176420	245126	2063	sf	129	cf
Infiltration BMP	Existing	10524 NEWVILLE	6/11/2007	6529062.272820	6529062.272820	1798916.257500	245126	2063	sf	129	cf
Infiltration BMP	Existing	9842 NORLAIN	3/9/2007	6519878.070320	6519878.070320	1807987.575840	246111	2063	sf	129	cf
Infiltration BMP	Existing	10403 PANGBORN	9/16/2005	6528806.561730	6528806.561730	1800136.574080	245126	2063	sf	129	cf
Infiltration BMP	Existing	10421 PANGBORN	6/5/2006	6528710.057740	6528710.057740	1799977.600600	245126	2063	sf	129	cf
Infiltration BMP	Existing	10903 PANGBORN	5/12/2008	6527497.056040	6527497.056040	1797964.159830	245119	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9508 PARAMOUNT	7/23/2007	6523724.334180	6523724.334180	1807653.518330	246106	2063	sf	129	cf
Infiltration BMP	Existing	9709 PARROT	6/20/2008	6523336.123150	6523336.123150	1806770.831150	246103	2063	sf	129	cf
Infiltration BMP	Existing	7107 PELLET	10/26/2005	6515228.221140	6515228.221140	1805197.090730	246104	2063	sf	129	cf
Infiltration BMP	Existing	10316 PICO VISTA	6/22/2010	6530326.941520	6530326.941520	1799752.739480	245126	2063	sf	129	cf
Infiltration BMP	Existing	10459 PICO VISTA	8/20/2008	6529643.308750	6529643.308750	1798930.291180	245126	2063	sf	129	cf
Infiltration BMP	Existing	11809 POMERING	1/25/2008	6515588.727520	6515588.727520	1800891.851040	246079	2063	sf	129	cf
Infiltration BMP	Existing	11821 POMERING	11/20/2008	6515535.205010	6515535.205010	1800794.072400	246079	2063	sf	129	cf
Infiltration BMP	Existing	9050 PRISCILLA	2/21/2007	6519218.937330	6519218.937330	1790014.532510	245115	2063	sf	129	cf
Infiltration BMP	Existing	8230 PURITAN	7/12/2007	6515756.650110	6515756.650110	1792196.388750	246077	2063	sf	129	cf
Infiltration BMP	Existing	8107 RAVILLER	6/22/2010	6524405.759790	6524405.759790	1808219.110840	246106	2063	sf	129	cf
Infiltration BMP	Existing	9940 RICHEON	12/26/2007	6520640.158150	6520640.158150	1807053.597690	246106	2063	sf	129	cf
Infiltration BMP	Existing	12015 RICHEON	6/21/2010	6515852.443580	6515852.443580	1799404.256870	246079	2063	sf	129	cf
Infiltration BMP	Existing	7336 RIO HONDO PL	12/26/2007	6516915.991390	6516915.991390	1804928.334260	246104	2063	sf	129	cf
Infiltration BMP	Existing	8418 RIVES	9/30/2005	6525367.917230	6525367.917230	1811575.863460	246106	1032	sf	64	cf
Infiltration BMP	Existing	11638 RIVES	11/2/2006	6517541.202300	6517541.202300	1800577.741160	246079	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11706 RIVES	10/16/2006	6517702.333530	6517702.333530	1800238.435400	246079	2063	sf	129	cf
Infiltration BMP	Existing	12436 ROSE	11/6/2006	6520776.455000	6520776.455000	1793075.765000	245115	2063	sf	129	cf
Infiltration BMP	Existing	12033 SAMOLINE	2/22/2008	6517025.771360	6517025.771360	1798249.691900	246079	2063	sf	129	cf
Infiltration BMP	Existing	12051 SAMOLINE	9/3/2008	6516919.542440	6516919.542440	1798077.846870	246079	2063	sf	129	cf
Infiltration BMP	Existing	12302 SAMOLINE	6/22/2010	6516399.204110	6516399.204110	1796321.463670	246077	2063	sf	129	cf
Infiltration BMP	Existing	7921 SECOND	2/15/2006	6519427.915180	6519427.915180	1802349.970040	246102	2063	sf	129	cf
Infiltration BMP	Existing	9700 SHELLEYFIELD	7/17/2008	6527622.312900	6527622.312900	1804250.399390	245125	2063	sf	129	cf
Infiltration BMP	Existing	10553 SHELLEYFIELD	6/11/2008	6525493.222190	6525493.222190	1800845.190450	245119	2063	sf	129	cf
Infiltration BMP	Existing	8732 SMALLWOOD	2/16/2006	6524307.398160	6524307.398160	1810444.440300	246106	2063	sf	129	cf
Infiltration BMP	Existing	8816 SMALLWOOD	10/11/2005	6524123.348010	6524123.348010	1810138.117570	246106	2063	sf	129	cf
Infiltration BMP	Existing	9127 SONGFEST	12/1/2005	6531508.595900	6531508.595900	1805094.820630	245127	2063	sf	129	cf
Infiltration BMP	Existing	9143 STEWART & GRAY	11/30/2005	6523803.019500	6523803.019500	1796254.085000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9211 STEWART & GRAY	11/27/2006	6524190.537790	6524190.537790	1796254.765000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9112 STOAKES	8/23/2006	6526782.391540	6526782.391540	1807626.036510	246103	2063	sf	129	cf
Infiltration BMP	Existing	9533 SUVA	6/27/2006	6530409.847860	6530409.847860	1802701.771860	245125	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9729 TRISTAN	10/18/2005	6526617.474570	6526617.474570	1804798.283870	245125	2063	sf	129	cf
Infiltration BMP	Existing	9216 TWEEDY	12/9/2005	6523630.155980	6523630.155980	1808715.397490	246106	2063	sf	129	cf
Infiltration BMP	Existing	13602 VERDURA	6/28/2007	6516296.473820	6516296.473820	1788728.235150	245524	2063	sf	129	cf
Infiltration BMP	Existing	10305 VULTEE	10/9/2006	6525949.622700	6525949.622700	1802510.250780	245119	2063	sf	129	cf
Infiltration BMP	Existing	10017 WILEY BURKE	6/22/2010	6520091.056520	6520091.056520	1807145.868160	246106	2063	sf	129	cf
Infiltration BMP	Existing	8538 ADOREE	9/26/2007	6517768.216360	6517768.216360	1792006.503470	245115	1032	sf	64	cf
Infiltration BMP	Existing	9407 ADOREE	1/1/2006	6522413.313750	6522413.313750	1791106.017430	245115	1032	sf	64	cf
Infiltration BMP	Existing	7134 ADWEN	1/1/2005	6514021.670500	6514021.670500	1803005.164870	246100	1032	sf	64	cf
Infiltration BMP	Existing	7343 ADWEN	9/4/2007	6515521.914470	6515521.914470	1802266.858280	246079	1032	sf	64	cf
Infiltration BMP	Existing	7743 ADWEN	12/5/2006	6517543.195590	6517543.195590	1801041.561520	246079	1032	sf	64	cf
Infiltration BMP	Existing	7802 ADWEN	10/18/2005	6517699.212930	6517699.212930	1800872.280990	246079	1032	sf	64	cf
Infiltration BMP	Existing	7828 ADWEN	8/4/2005	6517918.117250	6517918.117250	1800738.511970	246079	1032	sf	64	cf
Infiltration BMP	Existing	7852 ADWEN	1/9/2009	6518131.432520	6518131.432520	1800607.974520	246079	1032	sf	64	cf
Infiltration BMP	Existing	7855 ADWEN	11/23/2005	6518235.708380	6518235.708380	1800774.963010	246079	1032	sf	64	cf
Infiltration BMP	Existing	12823 AIRPOINT	6/29/2007	6518348.749200	6518348.749200	1791281.430170	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8441 ALAMEDA	10/31/2005	6519442.769190	6519442.769190	1795780.926380	245115	1032	sf	64	cf
Infiltration BMP	Existing	8549 ALAMEDA	6/23/2010	6520129.148230	6520129.148230	1795426.542360	245115	1032	sf	64	cf
Infiltration BMP	Existing	8448 ALBIA	1/1/2007	6519556.734390	6519556.734390	1795840.452920	245115	1032	sf	64	cf
Infiltration BMP	Existing	8528 ALBIA	2/27/2007	6520000.245000	6520000.245000	1795612.955000	245115	1032	sf	64	cf
Infiltration BMP	Existing	9718 ALIWIN	8/2/2005	6532030.038780	6532030.038780	1804115.104340	245127	1032	sf	64	cf
Infiltration BMP	Existing	7936 ALLENGROVE	1/22/2007	6524421.678930	6524421.678930	1809567.173140	246106	1032	sf	64	cf
Infiltration BMP	Existing	8116 ALLENGROVE	12/5/2005	6525137.825210	6525137.825210	1808747.451430	246106	1032	sf	64	cf
Infiltration BMP	Existing	9166 ANGELL	9/2/2008	6520625.089300	6520625.089300	1790394.866750	245115	1032	sf	64	cf
Infiltration BMP	Existing	9351 APPLEBY	1/3/2008	6529580.566170	6529580.566170	1804445.997380	245125	1032	sf	64	cf
Infiltration BMP	Existing	9520 ARDINE	10/6/2005	6527613.323800	6527613.323800	1797533.903060	245119	1032	sf	64	cf
Infiltration BMP	Existing	7814 ARNETT	6/22/2010	6517981.553910	6517981.553910	1801095.347060	246079	1032	sf	64	cf
Infiltration BMP	Existing	7815 ARNETT	6/22/2010	6518066.490340	6518066.490340	1801237.713920	246079	1032	sf	64	cf
Infiltration BMP	Existing	7832 ARNETT	1/11/2007	6518132.684800	6518132.684800	1801021.243050	246079	1032	sf	64	cf
Infiltration BMP	Existing	8241 ARNETT	11/29/2006	6520442.071210	6520442.071210	1799867.842140	245115	1032	sf	64	cf
Infiltration BMP	Existing	7743 BAIRNSDALE	5/16/2006	6523474.546480	6523474.546480	1810551.323320	246106	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12904 BARLIN	1/15/2009	6518150.890370	6518150.890370	1791163.941140	245115	1032	sf	64	cf
Infiltration BMP	Existing	13247 BARLIN	5/5/2005	6516868.829160	6516868.829160	1789428.146200	245524	1032	sf	64	cf
Infiltration BMP	Existing	7871 BAYSINGER	1/10/2007	6521422.493960	6521422.493960	1805635.813480	246102	1032	sf	64	cf
Infiltration BMP	Existing	8607 BAYSINGER	1/1/2005	6525304.240800	6525304.240800	1803291.716200	245119	1032	sf	64	cf
Infiltration BMP	Existing	9131 BAYSINGER	9/10/2008	6526918.982970	6526918.982970	1802474.767100	245119	1032	sf	64	cf
Infiltration BMP	Existing	9411 BAYSINGER	9/24/2007	6528736.042510	6528736.042510	1801262.782730	245126	1032	sf	64	cf
Infiltration BMP	Existing	9320 BELCHER	4/10/2007	6520600.361450	6520600.361450	1789754.109890	245115	1032	sf	64	cf
Infiltration BMP	Existing	9969 BELCHER	7/29/2009	6525669.288070	6525669.288070	1789992.480470	245113	1032	sf	64	cf
Infiltration BMP	Existing	10375 BELDER	6/22/2010	6522812.240000	6522812.240000	1803043.757460	246103	1032	sf	64	cf
Infiltration BMP	Existing	7441 BENARES	10/25/2005	6515921.019300	6515921.019300	1801396.174500	246079	1032	sf	64	cf
Infiltration BMP	Existing	7503 BENARES	1/16/2008	6516046.045620	6516046.045620	1801313.189720	246079	1032	sf	64	cf
Infiltration BMP	Existing	11014 BENFIELD	12/19/2005	6531918.630750	6531918.630750	1797937.959120	245122	1032	sf	64	cf
Infiltration BMP	Existing	8555 BIGBY	8/22/2005	6524606.668030	6524606.668030	1802914.545010	245119	1032	sf	64	cf
Infiltration BMP	Existing	9308 BIGBY	12/18/2008	6527591.908660	6527591.908660	1800839.109380	245126	1032	sf	64	cf
Infiltration BMP	Existing	9345 BIGBY	5/16/2006	6527999.312020	6527999.312020	1800803.102000	245126	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9389 BIGBY	9/20/2007	6528361.925530	6528361.925530	1800582.426270	245126	1032	sf	64	cf
Infiltration BMP	Existing	8246 BIRCHCREST	11/28/2005	6526713.325530	6526713.325530	1809350.628180	246106	1032	sf	64	cf
Infiltration BMP	Existing	10434 BIRCHDALE	12/2/2008	6524586.579650	6524586.579650	1802390.820140	245119	1032	sf	64	cf
Infiltration BMP	Existing	8812 BIRCHLEAF	5/3/2007	6527457.897210	6527457.897210	1808468.377860	246103	1032	sf	64	cf
Infiltration BMP	Existing	8912 BIRCHLEAF	10/9/2007	6527209.329660	6527209.329660	1808281.543500	246103	1032	sf	64	cf
Infiltration BMP	Existing	13330 BIXLER	3/21/2007	6516259.886220	6516259.886220	1789972.109000	245524	1032	sf	64	cf
Infiltration BMP	Existing	13411 BIXLER	9/30/2008	6515914.285010	6515914.285010	1789635.314360	245524	1032	sf	64	cf
Infiltration BMP	Existing	13425 BIXLER	8/17/2005	6515841.147610	6515841.147610	1789505.869380	245524	1032	sf	64	cf
Infiltration BMP	Existing	13454 BIXLER	5/10/2007	6515808.905200	6515808.905200	1789174.120800	245524	1032	sf	64	cf
Infiltration BMP	Existing	8220 BLANDWOOD	6/22/2010	6526086.691350	6526086.691350	1808873.058080	246103	1032	sf	64	cf
Infiltration BMP	Existing	12809 BLODGETT	1/1/2006	6518629.647540	6518629.647540	1791208.759970	245115	1032	sf	64	cf
Infiltration BMP	Existing	13026 BLODGETT	1/1/2005	6518225.401930	6518225.401930	1790248.943990	245115	1032	sf	64	cf
Infiltration BMP	Existing	13045 BLODGETT	10/6/2005	6517990.284020	6517990.284020	1790176.483690	245115	1032	sf	64	cf
Infiltration BMP	Existing	13114 BLODGETT	10/6/2005	6517888.613290	6517888.613290	1789931.616790	245115	1032	sf	64	cf
Infiltration BMP	Existing	7931 BORSON	9/6/2006	6514752.824370	6514752.824370	1794266.718830	246077	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8202 BORSON	6/5/2006	6516202.097710	6516202.097710	1793267.543860	246077	1032	sf	64	cf
Infiltration BMP	Existing	8428 BORSON	11/21/2008	6517449.915190	6517449.915190	1792528.167220	245115	1032	sf	64	cf
Infiltration BMP	Existing	8515 BORSON	3/14/2005	6517771.929480	6517771.929480	1792500.505870	245115	1032	sf	64	cf
Infiltration BMP	Existing	8345 BOYNE	6/18/2010	6519344.143470	6519344.143470	1796446.421390	245115	1032	sf	64	cf
Infiltration BMP	Existing	8402 BOYNE	1/1/2005	6519302.113240	6519302.113240	1796279.573520	245115	1032	sf	64	cf
Infiltration BMP	Existing	8525 BOYNE	7/20/2006	6520189.715440	6520189.715440	1796009.699660	245115	1032	sf	64	cf
Infiltration BMP	Existing	8528 BOYNE	2/22/2007	6520138.661540	6520138.661540	1795848.718800	245115	1032	sf	64	cf
Infiltration BMP	Existing	8613 BOYSON	1/1/2006	6520167.899980	6520167.899980	1794794.451220	245115	1032	sf	64	cf
Infiltration BMP	Existing	8647 BOYSON	7/29/2008	6520447.155570	6520447.155570	1794619.557270	245115	1032	sf	64	cf
Infiltration BMP	Existing	10216 BRANSCOMB	2/21/2007	6526794.108720	6526794.108720	1790310.156040	245113	1032	sf	64	cf
Infiltration BMP	Existing	10291 BRANSCOMB	7/25/2006	6527529.378260	6527529.378260	1790458.207730	245118	1032	sf	64	cf
Infiltration BMP	Existing	9624 BROCK	4/22/2005	6523849.153810	6523849.153810	1806723.688440	246103	1032	sf	64	cf
Infiltration BMP	Existing	12351 BROCK	9/3/2008	6516676.858850	6516676.858850	1795612.256100	246077	1032	sf	64	cf
Infiltration BMP	Existing	12608 BROCK	2/11/2005	6516008.590090	6516008.590090	1794308.259250	246077	1032	sf	64	cf
Infiltration BMP	Existing	8269 BROOKGREEN	1/1/2006	6526709.836510	6526709.836510	1808858.860970	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7847 BROOKMILL	6/21/2010	6518005.266020	6518005.266020	1800484.266850	246079	1032	sf	64	cf
Infiltration BMP	Existing	8025 BROOKPARK	1/1/2005	6525207.617130	6525207.617130	1809814.105880	246106	1032	sf	64	cf
Infiltration BMP	Existing	9707 BROOKSHIRE	3/14/2005	6525762.512240	6525762.512240	1805795.982660	246103	1032	sf	64	cf
Infiltration BMP	Existing	10429 BROOKSHIRE	1/19/2005	6523911.001360	6523911.001360	1803018.354450	245119	1032	sf	64	cf
Infiltration BMP	Existing	12404 BROOKSHIRE	6/25/2007	6518808.785660	6518808.785660	1794169.944640	245115	1032	sf	64	cf
Infiltration BMP	Existing	7622 BRUNACHE	10/31/2007	6515665.309920	6515665.309920	1799097.073030	246079	1032	sf	64	cf
Infiltration BMP	Existing	8216 BRUNACHE	11/6/2007	6518414.904440	6518414.904440	1797242.748270	245115	1032	sf	64	cf
Infiltration BMP	Existing	9033 BUCKLES	6/21/2010	6523179.898540	6523179.898540	1796909.863810	245114	1032	sf	64	cf
Infiltration BMP	Existing	7540 BUELL	1/1/2004	6518499.698980	6518499.698980	1804545.470300	246102	1032	sf	64	cf
Infiltration BMP	Existing	9330 BUELL	2/15/2006	6527195.126160	6527195.126160	1799219.087810	245126	1032	sf	64	cf
Infiltration BMP	Existing	9351 BUELL	6/21/2010	6527484.251630	6527484.251630	1799288.621620	245126	1032	sf	64	cf
Infiltration BMP	Existing	9634 BUELL	3/16/2006	6528774.281270	6528774.281270	1798139.573770	245126	1032	sf	64	cf
Infiltration BMP	Existing	9067 BUHMAN	11/20/2007	6530056.595350	6530056.595350	1805336.923900	245125	1032	sf	64	cf
Infiltration BMP	Existing	9208 BUHMAN	6/16/2008	6529799.831660	6529799.831660	1804544.819190	245125	1032	sf	64	cf
Infiltration BMP	Existing	10237 CASANES	3/23/2006	6528975.248660	6528975.248660	1801017.460740	245126	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10321 CASANES	1/1/2007	6528597.524650	6528597.524650	1800411.412530	245126	1032	sf	64	cf
Infiltration BMP	Existing	10403 CASANES	12/21/2005	6528532.829940	6528532.829940	1800305.536240	245126	1032	sf	64	cf
Infiltration BMP	Existing	10408 CASANES	1/1/2005	6528665.671960	6528665.671960	1800149.799930	245126	1032	sf	64	cf
Infiltration BMP	Existing	10812 CASANES	3/14/2005	6527610.698650	6527610.698650	1798391.295520	245119	1032	sf	64	cf
Infiltration BMP	Existing	10835 CASANES	4/1/2008	6527345.484730	6527345.484730	1798305.683780	245119	1032	sf	64	cf
Infiltration BMP	Existing	10944 CASANES	1/1/2006	6527151.352860	6527151.352860	1797710.972890	245119	1032	sf	64	cf
Infiltration BMP	Existing	8457 CAVEL	9/24/2007	6519984.576530	6519984.576530	1796420.555450	245115	1032	sf	64	cf
Infiltration BMP	Existing	9502 CECILIA	10/11/2007	6527927.079440	6527927.079440	1798327.652080	245126	1032	sf	64	cf
Infiltration BMP	Existing	9531 CECILIA	8/23/2006	6528208.236430	6528208.236430	1798317.933420	245126	1032	sf	64	cf
Infiltration BMP	Existing	9435 CEDARTREE	6/22/2010	6530636.457520	6530636.457520	1805866.234670	245127	1032	sf	64	cf
Infiltration BMP	Existing	9010 CHANEY	11/30/2005	6529789.693370	6529789.693370	1806340.793150	245125	1032	sf	64	cf
Infiltration BMP	Existing	9011 CHANEY	1/31/2006	6529640.900410	6529640.900410	1806424.653160	245125	1032	sf	64	cf
Infiltration BMP	Existing	9134 CHANEY	1/1/2005	6529119.825860	6529119.825860	1805332.958450	245125	1032	sf	64	cf
Infiltration BMP	Existing	10252 CHANEY	1/1/2006	6527373.631100	6527373.631100	1801932.130180	245119	1032	sf	64	cf
Infiltration BMP	Existing	10530 CHANEY	6/3/2008	6526461.472620	6526461.472620	1800532.795270	245119	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8355 CHARLOMA	9/16/2005	6524931.861530	6524931.861530	1806017.636180	246103	1032	sf	64	cf
Infiltration BMP	Existing	9037 CHARLOMA	9/25/2007	6527230.271760	6527230.271760	1804669.291940	245125	1032	sf	64	cf
Infiltration BMP	Existing	8565 CHEROKEE	2/14/2008	6524386.530150	6524386.530150	1802386.701010	245119	1032	sf	64	cf
Infiltration BMP	Existing	8030 CHEYENNE	1/1/2005	6514573.751210	6514573.751210	1792580.925090	246077	1032	sf	64	cf
Infiltration BMP	Existing	8117 CHEYENNE	4/10/2006	6515045.470000	6515045.470000	1792480.065000	246077	1032	sf	64	cf
Infiltration BMP	Existing	8418 CHEYENNE	1/1/2006	6516589.334020	6516589.334020	1791278.419980	245524	1032	sf	64	cf
Infiltration BMP	Existing	9303 CLANCEY	4/3/2006	6528228.489510	6528228.489510	1805319.961840	245125	1032	sf	64	cf
Infiltration BMP	Existing	10518 CLANCEY	3/9/2007	6526045.670270	6526045.670270	1800904.969960	245119	1032	sf	64	cf
Infiltration BMP	Existing	8316 CLETA	4/3/2007	6520383.826830	6520383.826830	1798544.940710	245114	1032	sf	64	cf
Infiltration BMP	Existing	8529 CLETA	1/1/2004	6521562.602410	6521562.602410	1798134.090240	245114	1032	sf	64	cf
Infiltration BMP	Existing	13113 COLDBROOK	6/13/2007	6524340.025750	6524340.025750	1790440.866070	245114	3095	sf	193	cf
Infiltration BMP	Existing	13227 COLDBROOK	2/22/2008	6524428.823880	6524428.823880	1789883.562480	245114	1032	sf	64	cf
Infiltration BMP	Existing	8554 COMOLETTE	6/21/2010	6517765.395020	6517765.395020	1791693.915800	245115	1032	sf	64	cf
Infiltration BMP	Existing	8417 CONKLIN	1/1/2006	6516931.143420	6516931.143420	1791819.671020	245524	1032	sf	64	cf
Infiltration BMP	Existing	7219 COOLGROVE	4/25/2006	6521787.460350	6521787.460350	1811479.001950	246111	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7605 COOLGROVE	6/22/2010	6522636.872680	6522636.872680	1810413.845850	246111	1032	sf	64	cf
Infiltration BMP	Existing	10210 CORD	2/12/2009	6528662.670970	6528662.670970	1801499.064930	245126	1032	sf	64	cf
Infiltration BMP	Existing	7706 COREY	6/22/2010	6515304.522120	6515304.522120	1798247.325380	246079	1032	sf	64	cf
Infiltration BMP	Existing	11708 CORRIGAN	5/30/2006	6523410.919990	6523410.919990	1796690.721900	245114	1032	sf	64	cf
Infiltration BMP	Existing	13227 CORRIGAN	4/11/2006	6523118.258510	6523118.258510	1789898.574120	245114	1032	sf	64	cf
Infiltration BMP	Existing	10809 CROSSDALE	1/30/2006	6532012.269030	6532012.269030	1798722.436870	245122	1032	sf	64	cf
Infiltration BMP	Existing	7803 DACOSTA	1/1/2006	6521705.534400	6521705.534400	1807011.928190	246106	1032	sf	64	cf
Infiltration BMP	Existing	7808 DACOSTA	3/29/2007	6521675.640660	6521675.640660	1806840.332210	246106	1032	sf	64	cf
Infiltration BMP	Existing	7826 DACOSTA	3/23/2007	6521825.889640	6521825.889640	1806744.301550	246106	1032	sf	64	cf
Infiltration BMP	Existing	8064 DACOSTA	1/6/2009	6523365.354910	6523365.354910	1805913.806160	246103	1032	sf	64	cf
Infiltration BMP	Existing	9242 DALEWOOD	5/17/2007	6532339.520890	6532339.520890	1804239.830010	245127	1032	sf	64	cf
Infiltration BMP	Existing	7044 DE PALMA	1/30/2006	6513058.006240	6513058.006240	1802286.102090	246100	1032	sf	64	cf
Infiltration BMP	Existing	7956 DE PALMA	7/28/2005	6517915.235930	6517915.235930	1799223.139650	246077	1032	sf	64	cf
Infiltration BMP	Existing	8232 DE PALMA	12/10/2008	6519342.730110	6519342.730110	1798392.424410	245115	1032	sf	64	cf
Infiltration BMP	Existing	13134 DEMING	2/6/2007	6518053.947000	6518053.947000	1789691.993030	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	13240 DEMING	8/12/2005	6518068.820530	6518068.820530	1789032.682680	245115	1032	sf	64	cf
Infiltration BMP	Existing	13415 DEMPSTER	1/1/2007	6516194.546390	6516194.546390	1789419.790430	245524	1032	sf	64	cf
Infiltration BMP	Existing	13434 DEMPSTER	1/12/2006	6516258.965410	6516258.965410	1789155.039770	245524	1032	sf	64	cf
Infiltration BMP	Existing	13452 DEMPSTER	9/20/2005	6516159.819690	6516159.819690	1788979.483200	245524	1032	sf	64	cf
Infiltration BMP	Existing	7324 DINSDALE	6/21/2010	6518936.024560	6518936.024560	1807958.155410	246106	1032	sf	64	cf
Infiltration BMP	Existing	8352 DINSDALE	12/19/2005	6524191.795240	6524191.795240	1804722.231880	246103	1032	sf	64	cf
Infiltration BMP	Existing	9325 DINSDALE	7/3/2007	6528635.640220	6528635.640220	1802187.000380	245125	1032	sf	64	cf
Infiltration BMP	Existing	9812 DOLAN	1/10/2007	6524918.033470	6524918.033470	1805427.859430	246103	1032	sf	64	cf
Infiltration BMP	Existing	10410 DOLAN	9/19/2007	6523686.660150	6523686.660150	1803351.652190	245119	1032	sf	64	cf
Infiltration BMP	Existing	12522 DOLAN	12/9/2005	6518109.498100	6518109.498100	1794046.260040	245115	1032	sf	64	cf
Infiltration BMP	Existing	12634 DOLAN	4/11/2006	6517527.198260	6517527.198260	1793053.966010	245115	1032	sf	64	cf
Infiltration BMP	Existing	12712 DOLAN	4/27/2005	6517393.756980	6517393.756980	1792842.640770	245115	1032	sf	64	cf
Infiltration BMP	Existing	8740 DONOVAN	11/2/2006	6520467.711390	6520467.711390	1793463.175520	245115	1032	sf	64	cf
Infiltration BMP	Existing	6408 DOS RIOS	3/7/2007	6523246.583700	6523246.583700	1811462.058000	246111	1032	sf	64	cf
Infiltration BMP	Existing	6420 DOS RIOS	7/14/2008	6523082.430580	6523082.430580	1811381.024700	246111	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	6449 DOS RIOS	8/23/2005	6522675.424950	6522675.424950	1811505.638050	246111	1032	sf	64	cf
Infiltration BMP	Existing	6481 DOS RIOS	8/8/2007	6522296.417970	6522296.417970	1811546.494500	246111	1032	sf	64	cf
Infiltration BMP	Existing	9532 DOWNEY	9/21/2007	6524828.225510	6524828.225510	1806555.186060	246103	1032	sf	64	cf
Infiltration BMP	Existing	12115 DOWNEY	8/12/2005	6518801.058860	6518801.058860	1796628.276370	245115	1032	sf	64	cf
Infiltration BMP	Existing	12116 DOWNEY	7/24/2008	6518985.048760	6518985.048760	1796501.621880	245115	1032	sf	64	cf
Infiltration BMP	Existing	12545 DOWNEY	7/7/2005	6517126.997680	6517126.997680	1794204.833310	246077	1032	sf	64	cf
Infiltration BMP	Existing	13620 DOWNEY	10/24/2007	6515777.167020	6515777.167020	1788934.803130	245524	1032	sf	64	cf
Infiltration BMP	Existing	9756 DOWNEY SANFORD BRIDGE	11/6/2008	6530232.905320	6530232.905320	1802732.275270	245125	1032	sf	64	cf
Infiltration BMP	Existing	12109 DUNROBIN	5/27/2008	6524849.554990	6524849.554990	1794742.565720	245114	1032	sf	64	cf
Infiltration BMP	Existing	12602 DUNROBIN	4/21/2008	6525045.021790	6525045.021790	1792096.938130	245114	1032	sf	64	cf
Infiltration BMP	Existing	13118 DUNROBIN	8/1/2008	6525045.611060	6525045.611060	1790357.500340	245114	1032	sf	64	cf
Infiltration BMP	Existing	13447 EARNSHAW	3/4/2005	6516486.580000	6516486.580000	1788881.960000	245524	1032	sf	64	cf
Infiltration BMP	Existing	12246 EASTBROOK	7/3/2007	6525290.855020	6525290.855020	1793729.113600	245114	1032	sf	64	cf
Infiltration BMP	Existing	13102 EASTBROOK	5/30/2006	6525376.065000	6525376.065000	1790509.718450	245114	1032	sf	64	cf
Infiltration BMP	Existing	13207 EASTBROOK	1/1/2006	6525181.215010	6525181.215010	1790147.343800	245114	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9010 EGLISE	6/22/2010	6530616.481070	6530616.481070	1805612.930940	245127	1032	sf	64	cf
Infiltration BMP	Existing	9124 EGLISE	1/1/2006	6530099.347460	6530099.347460	1804464.036140	245125	1032	sf	64	cf
Infiltration BMP	Existing	10228 EGLISE	6/16/2008	6528317.527320	6528317.527320	1801552.496190	245126	1032	sf	64	cf
Infiltration BMP	Existing	8432 EUCALYPTUS	6/21/2010	6518375.883890	6518375.883890	1794450.252220	245115	1032	sf	64	cf
Infiltration BMP	Existing	8451 EUCALYPTUS	11/5/2008	6518648.903650	6518648.903650	1794509.449160	245115	1032	sf	64	cf
Infiltration BMP	Existing	8449 EVEREST	9/20/2006	6518402.636450	6518402.636450	1794253.840980	245115	1032	sf	64	cf
Infiltration BMP	Existing	9036 FARM	1/1/2005	6525791.032450	6525791.032450	1801568.335890	245119	1032	sf	64	cf
Infiltration BMP	Existing	9068 FARM	1/1/2005	6526062.157630	6526062.157630	1801402.977290	245119	1032	sf	64	cf
Infiltration BMP	Existing	8334 FIFTH	6/24/2005	6522409.331110	6522409.331110	1801742.536430	245114	1032	sf	64	cf
Infiltration BMP	Existing	8540 FIFTH	1/1/2005	6523591.182480	6523591.182480	1801021.450470	245114	1032	sf	64	cf
Infiltration BMP	Existing	7238 FLORENCE	11/14/2005	6518231.298960	6518231.298960	1807648.949310	246104	1032	sf	64	cf
Infiltration BMP	Existing	8324 FONTANA	1/1/2006	6519936.868340	6519936.868340	1797701.691440	245115	1032	sf	64	cf
Infiltration BMP	Existing	7322 FOSTER BRIDGE	6/18/2010	6520302.817760	6520302.817760	1810322.849060	246111	1032	sf	64	cf
Infiltration BMP	Existing	7441 FOSTORIA	10/25/2005	6517764.674110	6517764.674110	1804520.953030	246102	1032	sf	64	cf
Infiltration BMP	Existing	7520 FOSTORIA	1/20/2006	6517974.460950	6517974.460950	1804167.759820	246102	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7639 FOSTORIA	7/27/2007	6518691.469740	6518691.469740	1803918.676960	246102	1032	sf	64	cf
Infiltration BMP	Existing	7915 FOURTH	5/29/2007	6519890.537430	6519890.537430	1803170.158590	246102	1032	sf	64	cf
Infiltration BMP	Existing	7922 FOURTH	1/1/2005	6519878.319950	6519878.319950	1802959.531390	246102	1032	sf	64	cf
Infiltration BMP	Existing	7411 FOURTH PL	9/10/2007	6517375.746060	6517375.746060	1804408.156270	246102	1032	sf	64	cf
Infiltration BMP	Existing	7519 FOURTH PL	6/23/2005	6517868.488420	6517868.488420	1804088.501010	246102	1032	sf	64	cf
Infiltration BMP	Existing	7329 GAINFORD	9/20/2007	6519599.973200	6519599.973200	1808409.397520	246111	1032	sf	64	cf
Infiltration BMP	Existing	7725 GAINFORD	6/21/2010	6521357.607460	6521357.607460	1807543.814610	246106	1032	sf	64	cf
Infiltration BMP	Existing	7735 GAINFORD	12/15/2006	6521461.236080	6521461.236080	1807480.220630	246106	1032	sf	64	cf
Infiltration BMP	Existing	7771 GAINFORD	12/3/2007	6521758.954890	6521758.954890	1807297.289390	246106	1032	sf	64	cf
Infiltration BMP	Existing	8353 GAINFORD	1/4/2007	6524689.963810	6524689.963810	1805534.024270	246103	1032	sf	64	cf
Infiltration BMP	Existing	8553 GAINFORD	4/7/2008	6525875.670020	6525875.670020	1804802.065800	245125	1032	sf	64	cf
Infiltration BMP	Existing	9114 GAINFORD	6/23/2010	6527375.967240	6527375.967240	1803418.253090	245125	1032	sf	64	cf
Infiltration BMP	Existing	8319 GALLATIN	6/23/2010	6525634.222480	6525634.222480	1807445.394810	246103	1032	sf	64	cf
Infiltration BMP	Existing	9069 GALLATIN	3/1/2005	6527846.830170	6527846.830170	1805432.059660	245125	1032	sf	64	cf
Infiltration BMP	Existing	9243 GALLATIN	6/19/2006	6528915.102070	6528915.102070	1804595.777040	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8408 GALT	6/18/2010	6520848.594160	6520848.594160	1798562.646220	245114	1032	sf	64	cf
Infiltration BMP	Existing	8435 GALT	12/27/2005	6521154.530230	6521154.530230	1798569.782020	245114	1032	sf	64	cf
Infiltration BMP	Existing	9119 GARNISH	6/22/2010	6529517.516530	6529517.516530	1805110.082900	245125	1032	sf	64	cf
Infiltration BMP	Existing	9136 GARNISH	2/5/2007	6529607.954040	6529607.954040	1804869.027300	245125	1032	sf	64	cf
Infiltration BMP	Existing	9024 GAYMONT	8/28/2007	6523451.624790	6523451.624790	1809501.434890	246111	1032	sf	64	cf
Infiltration BMP	Existing	12636 GLYNN	10/25/2005	6517337.921050	6517337.921050	1793251.757000	245524	1032	sf	64	cf
Infiltration BMP	Existing	12751 GLYNN	1/1/2005	6516780.406550	6516780.406550	1792749.927780	245524	1032	sf	64	cf
Infiltration BMP	Existing	12755 GLYNN	6/18/2010	6516753.778610	6516753.778610	1792707.557200	245524	1032	sf	64	cf
Infiltration BMP	Existing	12912 GLYNN	1/1/2005	6516567.905690	6516567.905690	1791996.175300	245524	1032	sf	64	cf
Infiltration BMP	Existing	8731 GUATEMALA	10/30/2008	6523507.693960	6523507.693960	1811098.218950	246106	1032	sf	64	cf
Infiltration BMP	Existing	9203 GUATEMALA	3/23/2006	6521893.308510	6521893.308510	1810154.570390	246111	1032	sf	64	cf
Infiltration BMP	Existing	9959 GUATEMALA	6/23/2010	6518699.649950	6518699.649950	1808234.818150	246111	1032	sf	64	cf
Infiltration BMP	Existing	13537 GUNDERSON	3/3/2008	6517350.406160	6517350.406160	1787757.556610	245524	1032	sf	64	cf
Infiltration BMP	Existing	13547 GUNDERSON	6/19/2006	6517298.502270	6517298.502270	1787667.099660	245524	1032	sf	64	cf
Infiltration BMP	Existing	11538 GURLEY	5/3/2005	6520211.328840	6520211.328840	1799382.602480	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11935 GURLEY	6/18/2010	6519051.777570	6519051.777570	1797582.114550	245115	1032	sf	64	cf
Infiltration BMP	Existing	12019 GURLEY	6/18/2010	6518869.145640	6518869.145640	1797295.091770	245115	1032	sf	64	cf
Infiltration BMP	Existing	12052 GURLEY	1/10/2006	6518841.793230	6518841.793230	1796925.916150	245115	1032	sf	64	cf
Infiltration BMP	Existing	12117 GURLEY	1/1/2007	6518497.250390	6518497.250390	1796711.283370	245115	1032	sf	64	cf
Infiltration BMP	Existing	9117 HALEDON	7/31/2006	6528761.573350	6528761.573350	1805801.190120	245125	1032	sf	64	cf
Infiltration BMP	Existing	10341 HALEDON	5/1/2006	6526657.457480	6526657.457480	1801653.926760	245119	1032	sf	64	cf
Infiltration BMP	Existing	10349 HALEDON	2/8/2005	6526618.690140	6526618.690140	1801591.635520	245119	1032	sf	64	cf
Infiltration BMP	Existing	10425 HALEDON	4/14/2005	6526424.760130	6526424.760130	1801280.406410	245119	1032	sf	64	cf
Infiltration BMP	Existing	10439 HALEDON	9/30/2005	6526346.747570	6526346.747570	1801155.573630	245119	1032	sf	64	cf
Infiltration BMP	Existing	10525 HALEDON	1/28/2005	6526113.410380	6526113.410380	1800804.505840	245119	1032	sf	64	cf
Infiltration BMP	Existing	10550 HALEDON	12/19/2005	6526112.578950	6526112.578950	1800485.376650	245119	1032	sf	64	cf
Infiltration BMP	Existing	9049 HALL ROAD	4/30/2008	6523684.587500	6523684.587500	1797586.831540	245114	1032	sf	64	cf
Infiltration BMP	Existing	7215 HANNON	12/19/2008	6521498.261440	6521498.261440	1811442.204100	246111	1032	sf	64	cf
Infiltration BMP	Existing	13005 HANWELL	2/11/2009	6519590.457150	6519590.457150	1789492.134120	245115	1032	sf	64	cf
Infiltration BMP	Existing	9022 HASTY	10/13/2005	6531232.650260	6531232.650260	1805433.916070	245127	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9205 HASTY	6/22/2010	6530848.690890	6530848.690890	1804978.371330	245127	1032	sf	64	cf
Infiltration BMP	Existing	9206 HASTY	1/1/2005	6531000.691980	6531000.691980	1804885.411940	245127	1032	sf	64	cf
Infiltration BMP	Existing	9241 HASTY	1/1/2006	6530719.487200	6530719.487200	1804649.180550	245127	1032	sf	64	cf
Infiltration BMP	Existing	7736 HONDO	2/8/2005	6514830.078530	6514830.078530	1796886.774430	246079	1032	sf	64	cf
Infiltration BMP	Existing	7753 HONDO	1/24/2007	6515005.269000	6515005.269000	1796951.957630	246079	1032	sf	64	cf
Infiltration BMP	Existing	7803 HONDO	10/11/2005	6515156.509020	6515156.509020	1796903.351830	246079	1032	sf	64	cf
Infiltration BMP	Existing	7808 HONDO	6/22/2010	6515109.805390	6515109.805390	1796717.393590	246079	1032	sf	64	cf
Infiltration BMP	Existing	7814 HONDO	7/25/2008	6515161.093050	6515161.093050	1796686.379320	246079	1032	sf	64	cf
Infiltration BMP	Existing	7920 HONDO	8/21/2006	6515777.018460	6515777.018460	1796313.217950	246079	1032	sf	64	cf
Infiltration BMP	Existing	7932 HONDO	1/1/2006	6515879.568480	6515879.568480	1796251.099580	246079	1032	sf	64	cf
Infiltration BMP	Existing	9008 HORLEY	7/19/2007	6523080.991430	6523080.991430	1809910.740800	246111	1032	sf	64	cf
Infiltration BMP	Existing	9838 HORLEY	7/3/2008	6521155.061500	6521155.061500	1807271.870840	246106	1032	sf	64	cf
Infiltration BMP	Existing	12307 HORLEY	1/1/2005	6514989.782150	6514989.782150	1797487.116040	246079	1032	sf	64	cf
Infiltration BMP	Existing	11427 HORTON	11/23/2005	6517266.456490	6517266.456490	1802136.009270	246079	1032	sf	64	cf
Infiltration BMP	Existing	11553 HORTON	4/21/2005	6516872.120940	6516872.120940	1801498.085040	246079	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11708 HORTON	10/25/2005	6516455.941870	6516455.941870	1800783.417100	246079	1032	sf	64	cf
Infiltration BMP	Existing	12646 IBBETSON	5/6/2005	6526008.756240	6526008.756240	1791650.535870	245114	1032	sf	64	cf
Infiltration BMP	Existing	8217 IMPERIAL	1/5/2009	6516889.628840	6516889.628840	1794092.786860	246077	1032	sf	64	cf
Infiltration BMP	Existing	7320 IRWINGROVE	1/1/2006	6518255.802480	6518255.802480	1807084.876440	246102	1032	sf	64	cf
Infiltration BMP	Existing	7710 IRWINGROVE	12/11/2007	6520151.425540	6520151.425540	1805902.138310	246102	1032	sf	64	cf
Infiltration BMP	Existing	12208 IZETTA	1/1/2006	6524718.745010	6524718.745010	1794118.344290	245114	1032	sf	64	cf
Infiltration BMP	Existing	12252 IZETTA	7/10/2008	6524718.900100	6524718.900100	1793666.382200	245114	1032	sf	64	cf
Infiltration BMP	Existing	12631 IZETTA	8/28/2007	6524602.625920	6524602.625920	1791809.267080	245114	1032	sf	64	cf
Infiltration BMP	Existing	10228 JULIUS	5/20/2008	6519748.327880	6519748.327880	1806603.074440	246102	1032	sf	64	cf
Infiltration BMP	Existing	10234 JULIUS	6/22/2010	6519723.348540	6519723.348540	1806551.787860	246102	1032	sf	64	cf
Infiltration BMP	Existing	11848 JULIUS	6/23/2010	6515875.825190	6515875.825190	1800351.825190	246079	1032	sf	64	cf
Infiltration BMP	Existing	11859 JULIUS	8/23/2005	6515676.490910	6515676.490910	1800355.137490	246079	1032	sf	64	cf
Infiltration BMP	Existing	11865 JULIUS	11/13/2006	6515650.173870	6515650.173870	1800309.916770	246079	1032	sf	64	cf
Infiltration BMP	Existing	12129 JULIUS	9/29/2005	6514728.334670	6514728.334670	1798846.683770	246079	1032	sf	64	cf
Infiltration BMP	Existing	9263 KLINEDALE	6/21/2010	6531573.525950	6531573.525950	1804517.918460	245127	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9205 LA REINA	11/27/2006	6525690.537020	6525690.537020	1808255.600740	246103	1032	sf	64	cf
Infiltration BMP	Existing	9251 LA REINA	8/10/2007	6525325.121400	6525325.121400	1807968.316200	246103	1032	sf	64	cf
Infiltration BMP	Existing	9260 LA REINA	6/14/2007	6525343.506110	6525343.506110	1807785.350080	246103	1032	sf	64	cf
Infiltration BMP	Existing	9633 LA REINA	9/24/2007	6524180.010720	6524180.010720	1806496.849820	246103	1032	sf	64	cf
Infiltration BMP	Existing	10026 LA REINA	1/1/2005	6523542.730590	6523542.730590	1805175.247470	246103	1032	sf	64	cf
Infiltration BMP	Existing	10219 LA REINA	5/25/2006	6522978.941790	6522978.941790	1804778.433210	246103	1032	sf	64	cf
Infiltration BMP	Existing	8346 LA VILLA	8/29/2005	6522426.709000	6522426.709000	1801414.465390	245114	1032	sf	64	cf
Infiltration BMP	Existing	9524 LA VILLA	9/27/2005	6527942.492070	6527942.492070	1797972.664540	245119	1032	sf	64	cf
Infiltration BMP	Existing	14305 LAKEWOOD	1/1/2006	6518183.322800	6518183.322800	1787270.059950	245524	1032	sf	64	cf
Infiltration BMP	Existing	8218 LANKIN	3/28/2006	6516908.705740	6516908.705740	1794755.893760	246077	1032	sf	64	cf
Infiltration BMP	Existing	13407 LAURELDALE	10/25/2005	6516128.982330	6516128.982330	1789557.891060	245524	1032	sf	64	cf
Infiltration BMP	Existing	11034 LE FLOSS	3/21/2008	6531318.633350	6531318.633350	1797718.334360	245124	1032	sf	64	cf
Infiltration BMP	Existing	9013 LEMORAN	3/16/2006	6529860.990680	6529860.990680	1806212.694780	245125	1032	sf	64	cf
Infiltration BMP	Existing	10036 LESTERFORD	1/11/2006	6530911.516090	6530911.516090	1801094.347740	245125	1032	sf	64	cf
Infiltration BMP	Existing	8355 LEXINGTON	6/15/2005	6523932.891700	6523932.891700	1804236.927600	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7432 LUBEC	7/8/2005	6519806.105180	6519806.105180	1808430.037290	246111	1032	sf	64	cf
Infiltration BMP	Existing	9318 LUBEC	1/1/2006	6528946.832250	6528946.832250	1803071.454980	245125	1032	sf	64	cf
Infiltration BMP	Existing	7341 LUXOR	9/30/2005	6515165.173860	6515165.173860	1801559.243950	246079	1032	sf	64	cf
Infiltration BMP	Existing	7743 LUXOR	8/18/2006	6517197.964320	6517197.964320	1800308.569440	246079	1032	sf	64	cf
Infiltration BMP	Existing	7809 LUXOR	1/1/2006	6517239.593210	6517239.593210	1799986.863830	246079	1032	sf	64	cf
Infiltration BMP	Existing	7982 LUXOR	7/3/2007	6518306.219270	6518306.219270	1799333.376300	246077	1032	sf	64	cf
Infiltration BMP	Existing	8509 LUXOR	12/31/2008	6521183.510000	6521183.510000	1797885.775000	245114	1032	sf	64	cf
Infiltration BMP	Existing	11505 MAC GOVERN	5/1/2006	6519990.708800	6519990.708800	1799977.759420	245115	1032	sf	64	cf
Infiltration BMP	Existing	11527 MAC GOVERN	11/19/2007	6519889.562820	6519889.562820	1799806.361750	245115	1032	sf	64	cf
Infiltration BMP	Existing	8518 MANATEE	4/27/2005	6521541.591450	6521541.591450	1798287.495050	245114	1032	sf	64	cf
Infiltration BMP	Existing	12306 MARBEL	12/29/2005	6520780.434840	6520780.434840	1794110.003960	245115	1032	sf	64	cf
Infiltration BMP	Existing	12322 MARBEL	8/24/2005	6520697.258530	6520697.258530	1793976.926170	245115	1032	sf	64	cf
Infiltration BMP	Existing	10423 MATTOCK	11/21/2008	6528946.576280	6528946.576280	1799798.739650	245126	1032	sf	64	cf
Infiltration BMP	Existing	10527 MATTOCK	1/11/2007	6528618.163260	6528618.163260	1799183.483330	245126	1032	sf	64	cf
Infiltration BMP	Existing	8602 MEADOW	2/28/2008	6519007.155950	6519007.155950	1793158.643900	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8606 MEADOW	10/26/2006	6519050.372960	6519050.372960	1793129.529230	245115	1032	sf	64	cf
Infiltration BMP	Existing	8739 MEADOW	12/17/2007	6520051.313480	6520051.313480	1792689.390880	245115	1032	sf	64	cf
Infiltration BMP	Existing	9106 MELDAR	4/23/2007	6526980.004600	6526980.004600	1807421.893550	246103	1032	sf	64	cf
Infiltration BMP	Existing	7819 MELVA	1/1/2005	6515811.952890	6515811.952890	1797638.263460	246079	1032	sf	64	cf
Infiltration BMP	Existing	8609 MELVA	4/6/2007	6520260.479750	6520260.479750	1795043.474460	245115	1032	sf	64	cf
Infiltration BMP	Existing	9558 METRO	4/3/2008	6531485.802060	6531485.802060	1804114.777900	245127	1032	sf	64	cf
Infiltration BMP	Existing	11711 MITLA	7/13/2005	6513453.724060	6513453.724060	1802912.278240	246100	1032	sf	64	cf
Infiltration BMP	Existing	11819 MORNING	6/21/2010	6517496.555960	6517496.555960	1799723.226450	246077	1032	sf	64	cf
Infiltration BMP	Existing	12070 MORNING	9/13/2006	6516788.931410	6516788.931410	1797957.975300	246079	1032	sf	64	cf
Infiltration BMP	Existing	8637 MORY	1/1/2005	6520217.929830	6520217.929830	1794453.857040	245115	1032	sf	64	cf
Infiltration BMP	Existing	10903 MYRTLE	10/25/2005	6520809.999180	6520809.999180	1802308.735020	246103	1032	sf	64	cf
Infiltration BMP	Existing	8208 NADA	6/29/2005	6518679.653960	6518679.653960	1797804.552950	245115	1032	sf	64	cf
Infiltration BMP	Existing	8249 NADA	2/12/2008	6519111.183860	6519111.183860	1797730.010570	245115	1032	sf	64	cf
Infiltration BMP	Existing	9458 NANCE	6/20/2005	6526752.832360	6526752.832360	1796717.105850	245119	1032	sf	64	cf
Infiltration BMP	Existing	10609 NEDRA	6/3/2005	6522752.614640	6522752.614640	1802538.434710	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10850 NEWVILLE	7/3/2007	6528159.933410	6528159.933410	1797635.549950	245119	1032	sf	64	cf
Infiltration BMP	Existing	7510 NOREN	5/23/2006	6520838.348300	6520838.348300	1809064.222230	246111	1032	sf	64	cf
Infiltration BMP	Existing	11720 NORLAIN	9/22/2006	6515696.110230	6515696.110230	1801264.632180	246079	1032	sf	64	cf
Infiltration BMP	Existing	12336 NORLAIN	8/1/2007	6513658.838460	6513658.838460	1797875.767390	246079	1032	sf	64	cf
Infiltration BMP	Existing	11628 OLD RIVER SCHOOL	1/1/2006	6515797.838400	6515797.838400	1801876.521840	246079	1032	sf	64	cf
Infiltration BMP	Existing	8521 ORANGE	3/9/2007	6519427.831130	6519427.831130	1794911.101980	245115	1032	sf	64	cf
Infiltration BMP	Existing	9255 ORIZABA	2/15/2006	6525108.451310	6525108.451310	1808168.208600	246103	1032	sf	64	cf
Infiltration BMP	Existing	9719 ORIZABA	8/8/2007	6523780.810110	6523780.810110	1806377.528150	246103	1032	sf	64	cf
Infiltration BMP	Existing	12615 ORIZABA	1/27/2006	6516062.877730	6516062.877730	1794206.618320	246077	1032	sf	64	cf
Infiltration BMP	Existing	8511 OTTO	4/12/2005	6525130.700850	6525130.700850	1804530.864040	245125	1032	sf	64	cf
Infiltration BMP	Existing	9933 PANGBORN	6/29/2006	6530067.434760	6530067.434760	1801915.181390	245125	1032	sf	64	cf
Infiltration BMP	Existing	10202 PANGBORN	1/1/2006	6529571.236640	6529571.236640	1801045.668670	245125	1032	sf	64	cf
Infiltration BMP	Existing	11009 PANGBORN	1/31/2007	6527339.080190	6527339.080190	1797691.116980	245119	1032	sf	64	cf
Infiltration BMP	Existing	9530 PARAMOUNT	7/14/2005	6523601.663290	6523601.663290	1807461.311510	246103	1032	sf	64	cf
Infiltration BMP	Existing	9624 PARAMOUNT	5/9/2005	6523328.526550	6523328.526550	1807031.980170	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8603 PARROT	3/14/2006	6526080.240790	6526080.240790	1809719.746830	246106	1032	sf	64	cf
Infiltration BMP	Existing	9625 PARROT	1/1/2005	6523451.735380	6523451.735380	1806960.011690	246103	1032	sf	64	cf
Infiltration BMP	Existing	9708 PARROT	6/29/2006	6523491.321500	6523491.321500	1806678.668660	246103	1032	sf	64	cf
Infiltration BMP	Existing	12045 PARROT	6/22/2010	6517861.439330	6517861.439330	1797868.798060	246077	1032	sf	64	cf
Infiltration BMP	Existing	12751 PARROT	12/14/2006	6515222.728500	6515222.728500	1793830.999240	246077	1032	sf	64	cf
Infiltration BMP	Existing	7130 PELLET	1/27/2005	6515276.387650	6515276.387650	1804845.311440	246104	1032	sf	64	cf
Infiltration BMP	Existing	7323 PELLET	1/1/2005	6516571.171210	6516571.171210	1804327.110650	246104	1032	sf	64	cf
Infiltration BMP	Existing	7354 PELLET	1/1/2006	6516665.448760	6516665.448760	1803945.359790	246102	1032	sf	64	cf
Infiltration BMP	Existing	7861 PHLOX	9/17/2007	6518688.116640	6518688.116640	1801430.417420	246079	1032	sf	64	cf
Infiltration BMP	Existing	10620 PICO VISTA	3/7/2007	6529428.403390	6529428.403390	1798283.402620	245126	1032	sf	64	cf
Infiltration BMP	Existing	10635 PICO VISTA	8/28/2007	6529197.816790	6529197.816790	1798270.093070	245126	1032	sf	64	cf
Infiltration BMP	Existing	7530 PIVOT	11/23/2005	6516899.016370	6516899.016370	1802660.318910	246079	1032	sf	64	cf
Infiltration BMP	Existing	7709 PIVOT	10/11/2005	6517859.569570	6517859.569570	1802212.124870	246079	1032	sf	64	cf
Infiltration BMP	Existing	7753 PIVOT	6/14/2005	6518241.212950	6518241.212950	1801966.921690	246079	1032	sf	64	cf
Infiltration BMP	Existing	11974 POMERING	6/18/2010	6515116.938670	6515116.938670	1799645.797070	246079	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8732 PRICHARD ST	1/12/2009	6516786.371080	6516786.371080	1788406.289900	245524	1032	sf	64	cf
Infiltration BMP	Existing	8734 PRICHARD ST	1/12/2009	6516831.574810	6516831.574810	1788380.860770	245524	1032	sf	64	cf
Infiltration BMP	Existing	8738 PRICHARD ST	1/12/2009	6516876.454020	6516876.454020	1788355.597890	245524	1032	sf	64	cf
Infiltration BMP	Existing	8740 PRICHARD ST	1/12/2009	6516921.333860	6516921.333860	1788330.343610	245524	1032	sf	64	cf
Infiltration BMP	Existing	8240 PRISCILLA	9/13/2007	6515555.844810	6515555.844810	1791697.292180	246077	1032	sf	64	cf
Infiltration BMP	Existing	9044 PRISCILLA	8/18/2005	6519169.042140	6519169.042140	1790017.667840	245115	1032	sf	64	cf
Infiltration BMP	Existing	9060 PRISCILLA	6/21/2010	6519318.719160	6519318.719160	1790008.270400	245115	1032	sf	64	cf
Infiltration BMP	Existing	11448 PRUESS	1/1/2006	6518742.114860	6518742.114860	1801046.878700	246077	1032	sf	64	cf
Infiltration BMP	Existing	11609 PRUESS	11/16/2006	6518299.675980	6518299.675980	1800455.121300	246077	1032	sf	64	cf
Infiltration BMP	Existing	11619 PRUESS	6/10/2005	6518270.484730	6518270.484730	1800355.677990	246077	1032	sf	64	cf
Infiltration BMP	Existing	11708 PRUESS	1/18/2005	6518033.994760	6518033.994760	1799832.073440	246077	1032	sf	64	cf
Infiltration BMP	Existing	8121 PURITAN	6/5/2006	6515245.448070	6515245.448070	1792698.037730	246077	1032	sf	64	cf
Infiltration BMP	Existing	7707 QUILL	6/1/2007	6514508.683200	6514508.683200	1796937.770200	246079	1032	sf	64	cf
Infiltration BMP	Existing	8108 QUOIT	6/5/2008	6516594.034560	6516594.034560	1795288.918170	246077	1032	sf	64	cf
Infiltration BMP	Existing	9109 RAVILLER	2/6/2007	6527953.464140	6527953.464140	1804924.402110	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9367 RAVILLER	1/1/2006	6529435.914270	6529435.914270	1803746.913820	245125	1032	sf	64	cf
Infiltration BMP	Existing	9728 RICHEON	6/18/2010	6521201.804800	6521201.804800	1807962.626360	246106	1032	sf	64	cf
Infiltration BMP	Existing	12217 RICHEON	1/1/2005	6514937.033870	6514937.033870	1797986.477150	246079	1032	sf	64	cf
Infiltration BMP	Existing	12336 RICHEON	1/10/2007	6514721.816510	6514721.816510	1797298.695230	246079	1032	sf	64	cf
Infiltration BMP	Existing	12342 RICHEON	1/1/2005	6514694.932100	6514694.932100	1797256.523880	246079	1032	sf	64	cf
Infiltration BMP	Existing	12352 RICHEON	10/30/2008	6514641.834370	6514641.834370	1797172.034360	246079	1032	sf	64	cf
Infiltration BMP	Existing	11010 RIO HONDO	2/6/2006	6514511.989690	6514511.989690	1805412.886430	246104	1032	sf	64	cf
Infiltration BMP	Existing	8515 RIVES	2/6/2006	6524958.575190	6524958.575190	1811619.081610	246111	1032	sf	64	cf
Infiltration BMP	Existing	8546 RIVES	6/14/2010	6524726.063490	6524726.063490	1811337.492550	246106	1032	sf	64	cf
Infiltration BMP	Existing	11828 RIVES	1/1/2006	6517020.372820	6517020.372820	1799741.223590	246079	1032	sf	64	cf
Infiltration BMP	Existing	12056 RIVES	10/7/2005	6516252.097820	6516252.097820	1798479.870770	246079	1032	sf	64	cf
Infiltration BMP	Existing	12213 RIVES	6/7/2007	6515544.034920	6515544.034920	1797794.303030	246079	1032	sf	64	cf
Infiltration BMP	Existing	12301 RIVES	1/27/2006	6515274.134590	6515274.134590	1797373.251430	246079	1032	sf	64	cf
Infiltration BMP	Existing	12542 ROSE	6/18/2010	6520775.320830	6520775.320830	1792425.734550	245115	1032	sf	64	cf
Infiltration BMP	Existing	7444 RUNDELL	9/28/2006	6514195.392880	6514195.392880	1798477.819400	246079	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7458 RUNDELL	1/1/2006	6514328.036950	6514328.036950	1798395.544300	246079	1032	sf	64	cf
Infiltration BMP	Existing	8734 RUPP	5/24/2007	6518769.625610	6518769.625610	1791861.464390	245115	1032	sf	64	cf
Infiltration BMP	Existing	9206 SAMOLINE	9/20/2006	6524105.922670	6524105.922670	1808777.784250	246106	1032	sf	64	cf
Infiltration BMP	Existing	9363 SAMOLINE	2/12/2009	6523342.697990	6523342.697990	1808041.206940	246106	1032	sf	64	cf
Infiltration BMP	Existing	9630 SAMOLINE	1/1/2006	6523000.405210	6523000.405210	1807164.143360	246103	1032	sf	64	cf
Infiltration BMP	Existing	12041 SAMOLINE	6/23/2010	6516971.702030	6516971.702030	1798170.274910	246079	1032	sf	64	cf
Infiltration BMP	Existing	10629 SHELLEYFIELD	6/21/2010	6525284.582980	6525284.582980	1800508.363190	245119	1032	sf	64	cf
Infiltration BMP	Existing	9118 SHERIDELL	6/22/2010	6528683.896100	6528683.896100	1805941.227670	245125	1032	sf	64	cf
Infiltration BMP	Existing	10042 SIDEVIEW	6/21/2010	6529464.806690	6529464.806690	1801729.923910	245125	1032	sf	64	cf
Infiltration BMP	Existing	8349 SIXTH	6/21/2010	6522706.066860	6522706.066860	1802231.249170	245114	1032	sf	64	cf
Infiltration BMP	Existing	8363 SIXTH	6/18/2010	6522832.335670	6522832.335670	1802150.209500	245114	1032	sf	64	cf
Infiltration BMP	Existing	8532 SIXTH	6/23/2010	6523697.106090	6523697.106090	1801388.440460	245119	1032	sf	64	cf
Infiltration BMP	Existing	8514 SMALLWOOD	8/24/2006	6525167.581560	6525167.581560	1811228.866910	246106	1032	sf	64	cf
Infiltration BMP	Existing	12007 SMALLWOOD	1/1/2005	6516682.861570	6516682.861570	1798786.226940	246079	1032	sf	64	cf
Infiltration BMP	Existing	12936 SMALLWOOD	7/31/2006	6513688.714060	6513688.714060	1793540.982580	246077	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9235 SONGFEST	6/14/2006	6531351.855720	6531351.855720	1804709.858310	245127	1032	sf	64	cf
Infiltration BMP	Existing	7939 SPRINGER	10/6/2006	6516193.792450	6516193.792450	1796630.732180	246079	1032	sf	64	cf
Infiltration BMP	Existing	9306 STAMPS	6/21/2010	6525546.826990	6525546.826990	1807197.501010	246103	1032	sf	64	cf
Infiltration BMP	Existing	10446 STAMPS	1/1/2005	6523214.650320	6523214.650320	1803242.228000	246103	1032	sf	64	cf
Infiltration BMP	Existing	10536 STAMPS	6/1/2006	6522871.528480	6522871.528480	1802783.838380	246103	1032	sf	64	cf
Infiltration BMP	Existing	13219 STANBRIDGE	9/17/2007	6522806.618420	6522806.618420	1790045.381220	245114	1032	sf	64	cf
Infiltration BMP	Existing	8723 STEWART & GRAY	2/11/2009	6522100.372490	6522100.372490	1796545.507760	245114	1032	sf	64	cf
Infiltration BMP	Existing	9028 STOAKES	8/17/2007	6527221.634250	6527221.634250	1807951.198320	246103	1032	sf	64	cf
Infiltration BMP	Existing	7809 SUVA	1/13/2009	6522703.875430	6522703.875430	1808490.998990	246106	1032	sf	64	cf
Infiltration BMP	Existing	7827 SUVA	1/1/2006	6522849.829890	6522849.829890	1808368.560310	246106	1032	sf	64	cf
Infiltration BMP	Existing	8564 SUVA	1/1/2006	6526403.328390	6526403.328390	1805373.281490	245125	1032	sf	64	cf
Infiltration BMP	Existing	9943 TECUM	4/11/2008	6519363.349470	6519363.349470	1808047.658450	246111	1032	sf	64	cf
Infiltration BMP	Existing	9636 TELEGRAPH	5/8/2006	6531995.042290	6531995.042290	1804929.677680	245128	1032	sf	64	cf
Infiltration BMP	Existing	7968 THIRD	6/21/2005	6519929.169700	6519929.169700	1802199.016820	246102	1032	sf	64	cf
Infiltration BMP	Existing	9819 TRISTAN	10/7/2005	6526302.584780	6526302.584780	1804524.383680	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9253 TRUE	1/1/2005	6531891.994890	6531891.994890	1804462.821310	245127	1032	sf	64	cf
Infiltration BMP	Existing	8843 TWEEDY	9/12/2006	6524140.679400	6524140.679400	1809940.135780	246106	1032	sf	64	cf
Infiltration BMP	Existing	9012 TWEEDY	1/1/2005	6523977.735950	6523977.735950	1809300.273240	246106	1032	sf	64	cf
Infiltration BMP	Existing	9029 TWEEDY	1/1/2006	6523763.012330	6523763.012330	1809288.681880	246106	1032	sf	64	cf
Infiltration BMP	Existing	9612 TWEEDY	6/22/2010	6522847.016620	6522847.016620	1807449.028980	246106	1032	sf	64	cf
Infiltration BMP	Existing	9636 TWEEDY	10/11/2005	6522732.626430	6522732.626430	1807259.266340	246103	1032	sf	64	cf
Infiltration BMP	Existing	9714 TWEEDY	7/24/2006	6522647.237500	6522647.237500	1807116.822930	246103	1032	sf	64	cf
Infiltration BMP	Existing	9718 TWEEDY	9/22/2008	6522619.325230	6522619.325230	1807068.990310	246103	1032	sf	64	cf
Infiltration BMP	Existing	9730 TWEEDY	6/18/2010	6522565.360970	6522565.360970	1806976.155270	246103	1032	sf	64	cf
Infiltration BMP	Existing	13409 VERDURA	1/1/2006	6516484.588360	6516484.588360	1789346.159960	245524	1032	sf	64	cf
Infiltration BMP	Existing	8607 VIA AMORITA	1/19/2006	6524994.226680	6524994.226680	1803003.226520	245119	1032	sf	64	cf
Infiltration BMP	Existing	9356 VIA AMORITA	4/27/2005	6528170.664540	6528170.664540	1800850.979140	245126	1032	sf	64	cf
Infiltration BMP	Existing	7402 VIA RIO NIDO	2/10/2005	6518371.376580	6518371.376580	1806186.704160	246102	1032	sf	64	cf
Infiltration BMP	Existing	8303 VISTA DEL RIO	5/1/2007	6526003.249760	6526003.249760	1808077.011440	246103	1032	sf	64	cf
Infiltration BMP	Existing	8303 VISTA DEL ROSA	4/26/2007	6526763.242710	6526763.242710	1809159.607970	246106	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8351 VISTA DEL ROSA	12/19/2005	6527091.635630	6527091.635630	1808824.632820	246106	2063	sf	129	cf
Infiltration BMP	Existing	10265 VULTEE	4/24/2006	6525980.530560	6525980.530560	1802568.772980	245119	1032	sf	64	cf
Infiltration BMP	Existing	10339 VULTEE	6/18/2010	6525804.209560	6525804.209560	1802209.879860	245119	1032	sf	64	cf
Infiltration BMP	Existing	12709 VULTEE	3/9/2007	6519587.948000	6519587.948000	1791264.714830	245115	1032	sf	64	cf
Infiltration BMP	Existing	12725 WHITEWOOD	7/26/2005	6520341.668580	6520341.668580	1791179.460770	245115	1032	sf	64	cf
Infiltration BMP	Existing	9702 WILEY BURKE	6/21/2010	6521126.099980	6521126.099980	1808337.656530	246106	1032	sf	64	cf
Infiltration BMP	Existing	9750 WILEY BURKE	12/11/2006	6520822.729060	6520822.729060	1807995.132410	246106	1032	sf	64	cf
Infiltration BMP	Existing	9925 WILEY BURKE	1/10/2007	6520271.299840	6520271.299840	1807447.007570	246106	1032	sf	64	cf
Infiltration BMP	Existing	10540 WILEY BURKE	6/21/2007	6519089.326110	6519089.326110	1805048.306870	246102	1032	sf	64	cf
Infiltration BMP	Existing	10643 WOODRUFF	1/1/2006	6526887.322420	6526887.322420	1799535.375650	245119	1032	sf	64	cf
Infiltration BMP	Existing	7515 YANKEY	10/24/2006	6515115.108440	6515115.108440	1798924.389740	246079	1032	sf	64	cf
Infiltration BMP	Existing	10047 CASANES	1/1/2006	6529512.635540	6529512.635540	1801587.658100	245125	1032	sf	64	cf
Infiltration BMP	Existing	9220 CORD	1/1/2004	6530296.778820	6530296.778820	1804178.901350	245125	1032	sf	64	cf
Infiltration BMP	Existing	10040 MATTOCK	1/1/2006	6530247.042350	6530247.042350	1801200.601240	245125	1032	sf	64	cf
Infiltration BMP	Existing	10018 PANGBORN	1/1/2006	6530084.251260	6530084.251260	1801567.525640	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12053 PATTON	10/19/2004	6520642.037410	6520642.037410	1796050.004800	245115	1032	sf	64	cf
Infiltration BMP	Existing	12048 SAMOLINE	3/20/2007	6517021.712450	6517021.712450	1798014.455830	246079	2063	sf	129	cf
Infiltration BMP	Existing	7879 FLORENCE	2/14/2014	6521700.000000	6521700.000000	1806100.000000	246103	16504	sf	1032	cf
Infiltration BMP	Existing	9020 FIRESTONE	9/12/2008	6524113.023390	6524113.023390	1798572.164290	245119	70288	sf	4393	cf
Infiltration BMP	Existing	7910 FIRESTONE	6/28/2005	6519165.968790	6519165.968790	1801736.513180	246102	55686	sf	3480	cf
Infiltration BMP	Existing	7252 FIRESTONE	5/19/2004	6515489.000650	6515489.000650	1803082.633110	246079	36224	sf	2264	cf
Infiltration BMP	Existing	12256 PARAMOUNT	3/13/2006	6516813.225030	6516813.225030	1796497.685630	246077	34112	sf	2132	cf
Infiltration BMP	Existing	9462 FIRESTONE BL	2/14/2014	6526885.862260	6526885.862260	1797100.585140	245119	35437	sf	2215	cf
Infiltration BMP	Existing	8250 FIRESTONE BLVD	2/14/2014	6521000.000000	6521000.000000	1800300.000000	245115	59085	sf	3693	cf
Infiltration BMP	Existing	8018 TELEGRAPH	8/20/2004	6526800.000000	6526800.000000	1809400.000000	246106	35437	sf	2215	cf
Infiltration BMP	Existing	7447 FIRESTONE BLVD	7/9/2009	6516971.590923	6516971.590923	1803474.089243	246102	43124	sf	2192	cf
Infiltration BMP	Existing	9126 FLORENCE	4/25/2008	6526980.883730	6526980.883730	1802613.015890	245119	29248	sf	1828	cf
Infiltration BMP	Existing	11111 OLD RIVER SCHOOL	6/15/2004	6515500.000000	6515500.000000	1803800.000000	246102	27843	sf	1740	cf
Infiltration BMP	Existing	9634 WASHBURN	5/25/2004	6526574.558590	6526574.558590	1794738.334020	245118	35712	sf	2232	cf
Infiltration BMP	Existing	9475 FIRESTONE	9/20/2004	6527102.470060	6527102.470060	1797292.175990	245119	25078	sf	1567	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9125 IMPERIAL	9/17/2007	6520700.000000	6520700.000000	1792100.000000	245115	53104	sf	3319	cf
Infiltration BMP	Existing	11231 RIVES	4/25/2006	6518392.506170	6518392.506170	1802335.247680	246102	20250	sf	1266	cf
Infiltration BMP	Existing	7936 QUILL	8/23/2006	6515830.400000	6515830.400000	1795880.196930	246079	18984	sf	1187	cf
Infiltration BMP	Existing	8337 FONTANA	8/11/2005	6520206.194620	6520206.194620	1797870.434810	245114	36672	sf	2292	cf
Infiltration BMP	Existing	10225 LESTERFORD	6/22/2010	6530244.844140	6530244.844140	1800567.187010	245126	17718	sf	1107	cf
Infiltration BMP	Existing	7915 FLORENCE	8/11/2009	6522019.025220	6522019.025220	1805973.779210	246103	20192	sf	1262	cf
Infiltration BMP	Existing	11229 PARAMOUNT	3/16/2004	6519482.925030	6519482.925030	1801457.806750	246102	16453	sf	1028	cf
Infiltration BMP	Existing	8103 COLE	5/1/2007	6518213.448370	6518213.448370	1798049.118910	246077	0	sf	0	cf
Infiltration BMP	Existing	8722 BOYNE	7/1/2008	6521213.643060	6521213.643060	1795216.473800	245115	11390	sf	712	cf
Infiltration BMP	Existing	10612 LESTERFORD	6/14/2006	6529218.389270	6529218.389270	1798513.115960	245126	11390	sf	712	cf
Infiltration BMP	Existing	8444 LEXINGTON	4/24/2006	6524361.433930	6524361.433930	1803767.599820	246103	11390	sf	712	cf
Infiltration BMP	Existing	13221 BARLIN	10/10/2006	6516992.431610	6516992.431610	1789646.610200	245524	10125	sf	633	cf
Infiltration BMP	Existing	9611 GARNISH	6/7/2007	6529217.309540	6529217.309540	1803965.758960	245125	10125	sf	633	cf
Infiltration BMP	Existing	7118 PELLET	12/3/2008	6515184.074160	6515184.074160	1804905.113850	246104	10125	sf	633	cf
Infiltration BMP	Existing	9325 RIVES AM	2/14/2014	6522517.375370	6522517.375370	1808878.723180	246111	10125	sf	633	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9371 SUVA	3/13/2007	6529247.009310	6529247.009310	1803484.685240	245125	10125	sf	633	cf
Infiltration BMP	Existing	8556 FLORENCE	1/1/2006	6525137.675720	6525137.675720	1803770.147850	245125	8859	sf	554	cf
Infiltration BMP	Existing	9755 IMPERIAL	3/29/2006	6525700.000000	6525700.000000	1792200.000000	245114	8859	sf	554	cf
Infiltration BMP	Existing	10000 IMPERIAL	3/29/2006	6527246.839530	6527246.839530	1791706.604350	245118	8859	sf	554	cf
Infiltration BMP	Existing	10030 LESTERFORD	6/21/2010	6530953.991420	6530953.991420	1801165.004470	245125	8859	sf	554	cf
Infiltration BMP	Existing	7235 LUXOR	12/12/2005	6514593.326010	6514593.326010	1801941.887350	246079	8859	sf	554	cf
Infiltration BMP	Existing	8115 STEWART & GRAY	3/25/2009	6518648.406750	6518648.406750	1798495.150040	246077	11760	sf	735	cf
Infiltration BMP	Existing	9804 BROOKSHIRE	5/2/2007	6525737.765210	6525737.765210	1805415.750650	246103	7594	sf	475	cf
Infiltration BMP	Existing	7830 DANVERS	12/18/2008	6523967.248740	6523967.248740	1810379.348050	246106	7594	sf	475	cf
Infiltration BMP	Existing	8357 FLORENCE	11/29/2005	6524137.162990	6524137.162990	1804589.285090	246103	7594	sf	475	cf
Infiltration BMP	Existing	8562 FLORENCE	1/1/2006	6525210.620820	6525210.620820	1803736.004200	245125	7594	sf	475	cf
Infiltration BMP	Existing	10735 LAKEWOOD	1/19/2007	6524698.379320	6524698.379320	1800460.893140	245119	8640	sf	540	cf
Infiltration BMP	Existing	9732 ORIZABA	6/5/2008	6523842.356050	6523842.356050	1806158.297200	246103	7594	sf	475	cf
Infiltration BMP	Existing	12066 SAMOLINE	6/18/2010	6517119.562750	6517119.562750	1797806.070750	246079	7594	sf	475	cf
Infiltration BMP	Existing	7711 SECOND	6/21/2010	6518493.103400	6518493.103400	1802942.740750	246102	7594	sf	475	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9517 STOAKES	6/21/2010	6525287.319840	6525287.319840	1806612.266920	246103	7594	sf	475	cf
Infiltration BMP	Existing	12133 ANDERBERG	6/26/2009	6518010.879310	6518010.879310	1796818.463370	245115	6328	sf	396	cf
Infiltration BMP	Existing	9115 BROCK	6/21/2010	6524898.717190	6524898.717190	1808433.166330	246106	6328	sf	396	cf
Infiltration BMP	Existing	9541 CECILIA	6/23/2010	6528302.087900	6528302.087900	1798262.111790	245126	6328	sf	396	cf
Infiltration BMP	Existing	10243 CORD	11/4/2008	6528334.164460	6528334.164460	1801344.678940	245126	6328	sf	396	cf
Infiltration BMP	Existing	13108 CORNUTA	6/21/2010	6525701.475550	6525701.475550	1790449.882450	245113	6328	sf	396	cf
Infiltration BMP	Existing	8129 DACOSTA	8/5/2008	6523736.839560	6523736.839560	1805716.362640	246103	6328	sf	396	cf
Infiltration BMP	Existing	7247 DINWIDDIE	6/22/2010	6515896.418780	6515896.418780	1804170.223670	246104	6328	sf	396	cf
Infiltration BMP	Existing	12002A DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	6328	sf	396	cf
Infiltration BMP	Existing	12002C DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	6328	sf	396	cf
Infiltration BMP	Existing	8529 EUCALYPTUS	6/18/2010	6519136.171020	6519136.171020	1794210.333930	245115	6328	sf	396	cf
Infiltration BMP	Existing	9204 LA REINA	6/22/2010	6525799.255250	6525799.255250	1808110.827020	246103	6328	sf	396	cf
Infiltration BMP	Existing	9241 LUBEC	6/21/2010	6528410.398740	6528410.398740	1803633.947240	245125	6328	sf	396	cf
Infiltration BMP	Existing	10051 MATTOCK	9/25/2008	6530040.953970	6530040.953970	1801237.222590	245125	6328	sf	396	cf
Infiltration BMP	Existing	12273 PLANETT	6/21/2010	6518942.439290	6518942.439290	1795136.426680	245115	6328	sf	396	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9075 RAVILLER	4/9/2007	6527819.498980	6527819.498980	1805031.907810	245125	6328	sf	396	cf
Infiltration BMP	Existing	7149 ADWEN	5/31/2006	6514275.907390	6514275.907390	1803122.312290	246079	5062	sf	316	cf
Infiltration BMP	Existing	8703 ALAMEDA	9/14/2005	6520830.700880	6520830.700880	1795016.469260	245115	4594	sf	287	cf
Infiltration BMP	Existing	9242 APPLEBY	11/21/2008	6528866.478730	6528866.478730	1804798.824690	245125	5062	sf	316	cf
Infiltration BMP	Existing	9926 BELLDER	3/19/2007	6525715.329050	6525715.329050	1804487.716960	245125	5062	sf	316	cf
Infiltration BMP	Existing	11715 BELLFLOWER	6/15/2009	6523530.688010	6523530.688010	1796655.823230	245114	5062	sf	316	cf
Infiltration BMP	Existing	8019 BERGMAN	10/22/2008	6517711.829130	6517711.829130	1797726.503570	246077	5062	sf	316	cf
Infiltration BMP	Existing	8417 BIGBY	7/23/2007	6523908.146010	6523908.146010	1803525.055670	245119	5062	sf	316	cf
Infiltration BMP	Existing	10004 BIRCHDALE	1/23/2006	6525798.638290	6525798.638290	1803985.957400	245125	5062	sf	316	cf
Infiltration BMP	Existing	9951 BROOKSHIRE	6/18/2010	6525004.036100	6525004.036100	1804835.952720	246103	5062	sf	316	cf
Infiltration BMP	Existing	10927 BROOKSHIRE AV	2/14/2014	6522640.981090	6522640.981090	1800949.695110	245114	5062	sf	316	cf
Infiltration BMP	Existing	10304 CLANCEY	9/19/2008	6526762.243870	6526762.243870	1802017.295250	245119	5062	sf	316	cf
Infiltration BMP	Existing	7213 DINWIDDIE	6/21/2010	6515644.523280	6515644.523280	1804333.457340	246104	5062	sf	316	cf
Infiltration BMP	Existing	9245 DOWNEY	9/19/2007	6525582.317560	6525582.317560	1807792.114420	246103	5062	sf	316	cf
Infiltration BMP	Existing	12002B DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	5062	sf	316	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12002D DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	5062	sf	316	cf
Infiltration BMP	Existing	10250 EGLISE AV	2/14/2014	6528202.138900	6528202.138900	1801366.096440	245126	5062	sf	316	cf
Infiltration BMP	Existing	8719 ELMONT	6/18/2010	6526144.563940	6526144.563940	1809393.110180	246106	5062	sf	316	cf
Infiltration BMP	Existing	9355 FLORENCE	7/30/2007	6528769.559400	6528769.559400	1801814.385750	245125	5062	sf	316	cf
Infiltration BMP	Existing	9252 GALLATIN	3/29/2006	6528859.757520	6528859.757520	1804394.594600	245125	5062	sf	316	cf
Infiltration BMP	Existing	9553 GALLATIN	7/28/2004	6530910.776140	6530910.776140	1803037.898220	245125	5062	sf	316	cf
Infiltration BMP	Existing	9724 GARNISH	1/14/2008	6529062.109120	6529062.109120	1803453.035240	245125	5062	sf	316	cf
Infiltration BMP	Existing	8610 GUATEMALA	10/24/2006	6524386.905480	6524386.905480	1811339.167280	246106	5062	sf	316	cf
Infiltration BMP	Existing	10214 HORLEY	8/14/2007	6520372.544870	6520372.544870	1806355.591210	246102	5062	sf	316	cf
Infiltration BMP	Existing	10513 JULIUS	1/22/2009	6518877.932890	6518877.932890	1805532.376750	246102	5062	sf	316	cf
Infiltration BMP	Existing	9204 LA REINA	4/18/2007	6525799.255250	6525799.255250	1808110.827020	246103	5062	sf	316	cf
Infiltration BMP	Existing	9528 LEMORAN	8/29/2008	6529000.799820	6529000.799820	1804066.473220	245125	5062	sf	316	cf
Infiltration BMP	Existing	7334 LUXOR	4/25/2007	6514999.892740	6514999.892740	1801407.207050	246079	5062	sf	316	cf
Infiltration BMP	Existing	9226 MANZANAR	7/8/2005	6526470.419470	6526470.419470	1806685.422630	246103	5062	sf	316	cf
Infiltration BMP	Existing	10524 MATTOCK	2/5/2009	6528788.349750	6528788.349750	1799096.345380	245126	5062	sf	316	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12123 ORIZABA	12/28/2005	6517943.193960	6517943.193960	1797041.752750	245115	5062	sf	316	cf
Infiltration BMP	Existing	7130 PELLET	6/4/2008	6515276.387650	6515276.387650	1804845.311440	246104	5062	sf	316	cf
Infiltration BMP	Existing	8322 PURITAN	6/14/2007	6516164.281440	6516164.281440	1791774.558840	245524	5062	sf	316	cf
Infiltration BMP	Existing	7312 RIO FLORA	6/18/2010	6516577.089870	6516577.089870	1804589.040390	246104	5062	sf	316	cf
Infiltration BMP	Existing	9331 SAMOLINE	2/17/2006	6523511.819100	6523511.819100	1808307.819060	246106	5062	sf	316	cf
Infiltration BMP	Existing	8015 SEVENTH	8/16/2005	6521322.893520	6521322.893520	1803640.949260	246103	5062	sf	316	cf
Infiltration BMP	Existing	7821 SIXTH	12/6/2005	6519846.881130	6519846.881130	1804004.436800	246102	5062	sf	316	cf
Infiltration BMP	Existing	8409 SIXTH	12/10/2008	6523050.669740	6523050.669740	1802016.668700	245114	5062	sf	316	cf
Infiltration BMP	Existing	9317 STAMPS	1/30/2007	6525356.702810	6525356.702810	1807182.805460	246103	5062	sf	316	cf
Infiltration BMP	Existing	9322 STAMPS	3/16/2006	6525453.602600	6525453.602600	1807062.934260	246103	5062	sf	316	cf
Infiltration BMP	Existing	10443 STAMPS	5/21/2008	6523061.022110	6523061.022110	1803394.248860	246103	5062	sf	316	cf
Infiltration BMP	Existing	10517 STAMPS	6/18/2010	6522812.240000	6522812.240000	1803043.757460	246103	5062	sf	316	cf
Infiltration BMP	Existing	9444 STOAKES	5/22/2007	6525587.983230	6525587.983230	1806625.551490	246103	5062	sf	316	cf
Infiltration BMP	Existing	8329 VISTA DEL RIO	6/18/2010	6526300.133280	6526300.133280	1808123.116520	246103	5062	sf	316	cf
Infiltration BMP	Existing	8368 VISTA DEL RIO	6/1/2007	6526427.553640	6526427.553640	1807729.596630	246103	5062	sf	316	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8543 ALBIA	1/1/2006	6520215.566510	6520215.566510	1795689.212970	245115	3797	sf	237	cf
Infiltration BMP	Existing	7162 BENARES	1/1/2008	6514067.610360	6514067.610360	1802493.217160	246079	3797	sf	237	cf
Infiltration BMP	Existing	12812 BLODGETT	6/8/2009	6518629.647540	6518629.647540	1791208.759970	245115	3797	sf	237	cf
Infiltration BMP	Existing	9503 BROCK AV	2/14/2014	6524115.247920	6524115.247920	1807488.010330	246106	3797	sf	237	cf
Infiltration BMP	Existing	9045 BUCKLES	12/11/2008	6523278.581350	6523278.581350	1796905.300470	245114	3797	sf	237	cf
Infiltration BMP	Existing	10045 CHANEY	7/5/2007	6527656.534860	6527656.534860	1802672.871800	245125	3797	sf	237	cf
Infiltration BMP	Existing	8714 CHEROKEE	5/1/2007	6525056.428300	6525056.428300	1801833.489170	245119	3797	sf	237	cf
Infiltration BMP	Existing	10729 CLANCEY	7/5/2007	6525292.127080	6525292.127080	1799996.460370	245119	3797	sf	237	cf
Infiltration BMP	Existing	8215 COMOLETTE	5/18/2006	6516024.585540	6516024.585540	1792904.896040	246077	3563	sf	223	cf
Infiltration BMP	Existing	7809 DACOSTA	10/5/2007	6521756.096640	6521756.096640	1806979.884160	246106	3797	sf	237	cf
Infiltration BMP	Existing	10424 DOLAN AV	2/14/2014	6523609.999510	6523609.999510	1803226.099470	245119	3797	sf	237	cf
Infiltration BMP	Existing	12337 DUNROBIN	6/21/2010	6524854.924990	6524854.924990	1793158.910710	245114	3797	sf	237	cf
Infiltration BMP	Existing	13234 DUNROBIN	9/30/2005	6525046.618370	6525046.618370	1789885.630870	245114	3797	sf	237	cf
Infiltration BMP	Existing	12612 EASTBROOK	5/30/2006	6525374.680490	6525374.680490	1791988.629320	245114	3797	sf	237	cf
Infiltration BMP	Existing	9400 FLORENCE	7/8/2005	6528900.299250	6528900.299250	1801380.002980	245126	3797	sf	237	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7823 FOURTH PL	9/16/2005	6519381.530610	6519381.530610	1803107.418050	246102	3797	sf	237	cf
Infiltration BMP	Existing	7826 GAINFORD	10/13/2005	6521963.408230	6521963.408230	1806968.662960	246106	3797	sf	237	cf
Infiltration BMP	Existing	7909 GALLATIN	4/27/2006	6523955.572760	6523955.572760	1809190.106160	246106	3797	sf	237	cf
Infiltration BMP	Existing	9118 GARNISH	6/21/2010	6529677.777690	6529677.777690	1805040.238300	245125	3797	sf	237	cf
Infiltration BMP	Existing	12752 GLYNN	6/18/2010	6516929.257070	6516929.257070	1792615.717350	245524	3797	sf	237	cf
Infiltration BMP	Existing	9116 HALEDON	3/2/2006	6528925.738880	6528925.738880	1805732.953010	245125	3797	sf	237	cf
Infiltration BMP	Existing	12819 IBBETSON	11/23/2005	6525827.025010	6525827.025010	1791350.711010	245114	3797	sf	237	cf
Infiltration BMP	Existing	9528 LEMORAN	8/26/2008	6528914.390000	6528914.390000	1804053.870620	245125	3797	sf	237	cf
Infiltration BMP	Existing	10514 LESTERFORD	2/14/2006	6529382.491640	6529382.491640	1798787.162960	245126	3797	sf	237	cf
Infiltration BMP	Existing	9030 LUBEC	2/9/2006	6526996.357320	6526996.357320	1804242.372880	245125	3797	sf	237	cf
Infiltration BMP	Existing	9264 LUBEC	4/19/2006	6528519.099740	6528519.099740	1803331.221940	245125	3797	sf	237	cf
Infiltration BMP	Existing	8545 LUBEC ST	2/14/2014	6525866.355120	6525866.355120	1805123.134500	246103	3797	sf	237	cf
Infiltration BMP	Existing	9247 MANZANAR	10/30/2006	6526227.935330	6526227.935330	1806695.994430	246103	3797	sf	237	cf
Infiltration BMP	Existing	7866 MELVA	6/20/2006	6516126.027390	6516126.027390	1797191.628010	246079	3797	sf	237	cf
Infiltration BMP	Existing	12109 MORNING	5/16/2006	6516408.716280	6516408.716280	1797765.727430	246079	3797	sf	237	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7332 NADA	6/18/2007	6514319.703850	6514319.703850	1800394.247560	246079	3797	sf	237	cf
Infiltration BMP	Existing	7334 NADA	6/18/2007	6514319.703850	6514319.703850	1800394.247560	246079	3797	sf	237	cf
Infiltration BMP	Existing	9821 NEWVILLE	7/30/2007	6530987.438110	6530987.438110	1802116.080780	245125	3797	sf	237	cf
Infiltration BMP	Existing	10268 NEWVILLE	4/24/2007	6529747.604150	6529747.604150	1800228.046080	245126	3797	sf	237	cf
Infiltration BMP	Existing	12280 ORIZABA	6/18/2010	6517505.248620	6517505.248620	1795784.740290	246077	3797	sf	237	cf
Infiltration BMP	Existing	10404 PANGBORN	6/18/2010	6528952.556500	6528952.556500	1800031.154520	245126	3797	sf	237	cf
Infiltration BMP	Existing	12531 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	3797	sf	237	cf
Infiltration BMP	Existing	12537 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	3797	sf	237	cf
Infiltration BMP	Existing	11994 POMERING	2/23/2005	6514993.390330	6514993.390330	1799517.781680	246079	3797	sf	237	cf
Infiltration BMP	Existing	9525 QUINN	2/8/2007	6528803.711540	6528803.711540	1799421.544220	245126	3797	sf	237	cf
Infiltration BMP	Existing	8048 QUOIT	1/21/2009	6516443.407630	6516443.407630	1795348.218010	246077	3797	sf	237	cf
Infiltration BMP	Existing	12326 SAMOLINE	8/29/2008	6516269.535370	6516269.535370	1796118.615320	246077	3797	sf	237	cf
Infiltration BMP	Existing	12504 SMALLWOOD	9/30/2008	6515227.996100	6515227.996100	1795705.820110	246079	3797	sf	237	cf
Infiltration BMP	Existing	9520 STEWART & GRAY	4/10/2008	6526628.650930	6526628.650930	1796061.800920	245118	3797	sf	237	cf
Infiltration BMP	Existing	7411 THIRD	6/2/2006	6517216.302090	6517216.302090	1804140.837740	246102	3797	sf	237	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12706 WHITEWOOD	9/20/2007	6520505.791550	6520505.791550	1791390.733010	245115	3797	sf	237	cf
Infiltration BMP	Existing	9049 HALL ROAD	2/9/2007	6523684.587500	6523684.587500	1797586.831540	245114	2531	sf	158	cf
Infiltration BMP	Existing	7118 ADWEN	1/27/2006	6513895.884030	6513895.884030	1803086.756410	246100	2531	sf	158	cf
Infiltration BMP	Existing	13202 BARLIN	2/14/2007	6517303.317510	6517303.317510	1789688.349400	245524	2531	sf	158	cf
Infiltration BMP	Existing	10216 BELLMAN	1/5/2009	6525703.110200	6525703.110200	1803293.056930	245119	2531	sf	158	cf
Infiltration BMP	Existing	11809 BELLMAN	2/8/2006	6521732.804620	6521732.804620	1797303.369450	245114	2531	sf	158	cf
Infiltration BMP	Existing	7117 BENARES	8/10/2006	6513814.981610	6513814.981610	1802936.506930	246079	2531	sf	158	cf
Infiltration BMP	Existing	9108 BIGBY	11/23/2005	6526215.785230	6526215.785230	1801649.270450	245119	2531	sf	158	cf
Infiltration BMP	Existing	10213 BIRCHDALE	4/19/2006	6525304.414970	6525304.414970	1803562.084330	245119	2531	sf	158	cf
Infiltration BMP	Existing	9004 BIRCHLEAF	3/7/2007	6527047.235450	6527047.235450	1808159.837050	246103	2531	sf	158	cf
Infiltration BMP	Existing	13126 BLODGETT	8/18/2005	6517829.686700	6517829.686700	1789824.186060	245115	2531	sf	158	cf
Infiltration BMP	Existing	9508 BROCK	2/27/2006	6524228.012180	6524228.012180	1807355.118100	246103	2531	sf	158	cf
Infiltration BMP	Existing	7418 BROOKMILL	7/25/2008	6515791.043440	6515791.043440	1801624.672750	246079	2531	sf	158	cf
Infiltration BMP	Existing	12201 BROOKSHIRE	6/22/2010	6519506.452440	6519506.452440	1795585.950880	245115	2531	sf	158	cf
Infiltration BMP	Existing	7942 BRUNACHE	11/28/2005	6517219.149000	6517219.149000	1798061.073260	246079	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9349 CECILIA	9/25/2008	6527282.306940	6527282.306940	1798988.874460	245126	2531	sf	158	cf
Infiltration BMP	Existing	9365 CECILIA	6/18/2010	6527411.791310	6527411.791310	1798910.665650	245126	2531	sf	158	cf
Infiltration BMP	Existing	9608 CECILIA	1/1/2007	6528406.351870	6528406.351870	1798010.127160	245126	2531	sf	158	cf
Infiltration BMP	Existing	9624 CEDARTREE	8/8/2005	6531911.946630	6531911.946630	1804673.812930	245127	2531	sf	158	cf
Infiltration BMP	Existing	8519 CLETA	9/10/2007	6521470.081710	6521470.081710	1798172.541560	245114	2531	sf	158	cf
Infiltration BMP	Existing	7803 CONKLIN	9/2/2005	6513317.560580	6513317.560580	1793980.901190	246077	2297	sf	144	cf
Infiltration BMP	Existing	12816 CORNUTA	10/9/2006	6525701.592160	6525701.592160	1791350.505200	245114	2531	sf	158	cf
Infiltration BMP	Existing	8018 DANVERS	1/26/2009	6524882.345060	6524882.345060	1809453.159850	246106	2531	sf	158	cf
Infiltration BMP	Existing	8517 DEVENIR	10/11/2005	6517399.640210	6517399.640210	1791811.493450	245115	2531	sf	158	cf
Infiltration BMP	Existing	8049 DINSDALE	6/15/2006	6522974.989820	6522974.989820	1805624.556380	246103	2531	sf	158	cf
Infiltration BMP	Existing	9317 DINSDALE	11/5/2008	6528560.545810	6528560.545810	1802232.852640	245125	2531	sf	158	cf
Infiltration BMP	Existing	8510 DONOVAN	7/5/2005	6519046.837890	6519046.837890	1794446.597550	245115	2531	sf	158	cf
Infiltration BMP	Existing	8415 DONOVAN ST	2/14/2014	6518508.946270	6518508.946270	1795018.898890	245115	2531	sf	158	cf
Infiltration BMP	Existing	9635 DOWNEY	7/15/2004	6524420.085960	6524420.085960	1806308.452290	246103	2531	sf	158	cf
Infiltration BMP	Existing	9830 DOWNEY	1/1/2006	6524176.121770	6524176.121770	1805651.929490	246103	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12718 DOWNEY	8/30/2007	6516814.229160	6516814.229160	1793075.140590	245524	2531	sf	158	cf
Infiltration BMP	Existing	12650 DUNROBIN	7/27/2007	6525045.587920	6525045.587920	1791614.482510	245114	2531	sf	158	cf
Infiltration BMP	Existing	9067 EGLISE	9/30/2005	6530265.716940	6530265.716940	1805184.414240	245127	2531	sf	158	cf
Infiltration BMP	Existing	9131 EGLISE	1/16/2009	6529904.336320	6529904.336320	1804464.041860	245125	2531	sf	158	cf
Infiltration BMP	Existing	8573 ELEVENTH	4/24/2006	6525253.900610	6525253.900610	1803595.328980	245119	2531	sf	158	cf
Infiltration BMP	Existing	9061 FARM ST	2/14/2014	6526099.027600	6526099.027600	1801582.141470	245119	2531	sf	158	cf
Infiltration BMP	Existing	7936 FOURTH	1/26/2006	6520005.666040	6520005.666040	1802880.634680	246103	2531	sf	158	cf
Infiltration BMP	Existing	7829 FOURTH PL	2/14/2014	6519381.530610	6519381.530610	1803107.418050	246102	2531	sf	158	cf
Infiltration BMP	Existing	7528 GAINFORD	6/18/2010	6520331.076350	6520331.076350	1807734.704270	246106	1266	sf	79	cf
Infiltration BMP	Existing	8150 GALLATIN	1/14/2008	6524851.065410	6524851.065410	1807922.731550	246103	2531	sf	158	cf
Infiltration BMP	Existing	9068 GALLATIN	7/18/2005	6527754.167230	6527754.167230	1805244.499940	245125	2531	sf	158	cf
Infiltration BMP	Existing	12703 GLENSHIRE	8/18/2006	6520090.968440	6520090.968440	1791341.816710	245115	2531	sf	158	cf
Infiltration BMP	Existing	8703 GUATEMALA	6/18/2010	6523747.929510	6523747.929510	1811239.685330	246111	2531	sf	158	cf
Infiltration BMP	Existing	9903 GUATEMALA	6/21/2010	6519189.043810	6519189.043810	1808530.913060	246111	2531	sf	158	cf
Infiltration BMP	Existing	9208 HALEDON	3/29/2007	6528788.981770	6528788.981770	1805412.621690	245125	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9083 HALL	12/8/2005	6524025.781090	6524025.781090	1797583.104370	245114	2531	sf	158	cf
Infiltration BMP	Existing	10348 HASTY	9/14/2006	6528480.545700	6528480.545700	1800482.839460	245126	2531	sf	158	cf
Infiltration BMP	Existing	7844 HONDO	7/8/2005	6515417.898670	6515417.898670	1796530.778030	246079	2531	sf	158	cf
Infiltration BMP	Existing	9244 HORLEY	6/22/2006	6522498.248530	6522498.248530	1809199.750130	246111	2531	sf	158	cf
Infiltration BMP	Existing	12612 IBBETSON	2/9/2007	6526008.655610	6526008.655610	1792000.536540	245114	2531	sf	158	cf
Infiltration BMP	Existing	7214 IRWINGROVE	8/17/2007	6517736.835580	6517736.835580	1807424.228480	246104	2531	sf	158	cf
Infiltration BMP	Existing	10209 JULIUS	6/21/2010	6519702.452650	6519702.452650	1806880.883230	246102	2531	sf	158	cf
Infiltration BMP	Existing	10341 JULIUS	6/4/2008	6519700.000000	6519700.000000	1806100.000000	246102	2531	sf	158	cf
Infiltration BMP	Existing	12313 JULIUS	6/21/2010	6514155.209020	6514155.209020	1797936.932020	246079	2531	sf	158	cf
Infiltration BMP	Existing	7944 KINGBEE	5/31/2007	6516311.045420	6516311.045420	1796702.710410	246079	2531	sf	158	cf
Infiltration BMP	Existing	9605 LA REINA	6/18/2010	6524325.141120	6524325.141120	1806744.664340	246103	2531	sf	158	cf
Infiltration BMP	Existing	10074 LESTERFORD	4/12/2006	6530716.286370	6530716.286370	1800772.683680	245125	2531	sf	158	cf
Infiltration BMP	Existing	9626 LUBEC	6/21/2005	6530889.535260	6530889.535260	1801910.718740	245125	2531	sf	158	cf
Infiltration BMP	Existing	7156 LUXOR	10/28/2005	6513800.826420	6513800.826420	1802169.595300	246100	2531	sf	158	cf
Infiltration BMP	Existing	9202 MANZANAR	4/13/2004	6526663.177850	6526663.177850	1806830.315690	246103	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9020 MARGARET	10/2/2006	6523822.925930	6523822.925930	1798066.530690	245114	2531	sf	158	cf
Infiltration BMP	Existing	9127 MELDAR	4/29/2004	6526710.714590	6526710.714590	1807437.827920	246103	2531	sf	158	cf
Infiltration BMP	Existing	11814 MORNING	9/2/2005	6517648.916460	6517648.916460	1799680.107480	246077	2531	sf	158	cf
Infiltration BMP	Existing	7440 MULLER	11/7/2006	6518162.654940	6518162.654940	1805120.460880	246102	2531	sf	158	cf
Infiltration BMP	Existing	12334 ORIZABA	5/5/2005	6517231.678930	6517231.678930	1795384.927500	246077	2531	sf	158	cf
Infiltration BMP	Existing	9311 OTTO	2/2/2008	6528809.245500	6528809.245500	1802513.951810	245125	2531	sf	158	cf
Infiltration BMP	Existing	10436 PANGBORN	7/6/2006	6528781.443840	6528781.443840	1799746.387720	245126	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12531 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12531 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12537 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12537 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	9008 PARROT	6/22/2010	6524997.125330	6524997.125330	1808680.720210	246106	2531	sf	158	cf
Infiltration BMP	Existing	9530 PARROT	10/11/2006	6523866.950960	6523866.950960	1807305.627380	246103	2531	sf	158	cf
Infiltration BMP	Existing	7125 PELLET	11/21/2005	6515366.521160	6515366.521160	1805107.133170	246104	2531	sf	158	cf
Infiltration BMP	Existing	7335 PELLET	2/15/2007	6516661.302200	6516661.302200	1804268.401510	246104	2531	sf	158	cf
Infiltration BMP	Existing	7348 PELLET	6/22/2010	6516619.400060	6516619.400060	1803975.379460	246102	2531	sf	158	cf
Infiltration BMP	Existing	10433 PICO VISTA	6/21/2010	6529704.381130	6529704.381130	1799155.408730	245126	2531	sf	158	cf
Infiltration BMP	Existing	7629 PIVOT	6/4/2008	6517523.064870	6517523.064870	1802428.507060	246079	2531	sf	158	cf
Infiltration BMP	Existing	11962 POMERING	2/24/2006	6515175.131420	6515175.131420	1799743.806870	246079	2531	sf	158	cf
Infiltration BMP	Existing	8133 PRISCILLA	6/22/2010	6515078.400000	6515078.400000	1792153.440000	246077	2531	sf	158	cf
Infiltration BMP	Existing	7603 QUILL	2/28/2007	6514155.935840	6514155.935840	1797151.984960	246079	2531	sf	158	cf
Infiltration BMP	Existing	11539 RICHEON	7/8/2005	6517174.382020	6517174.382020	1801464.078770	246079	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	6545 RIVERGROVE	10/11/2005	6520696.757140	6520696.757140	1811248.378990	246111	2531	sf	158	cf
Infiltration BMP	Existing	9320 SAMOLINE	11/3/2006	6523716.410960	6523716.410960	1808296.703240	246106	2531	sf	158	cf
Infiltration BMP	Existing	9602 SAMOLINE	11/23/2005	6523146.135200	6523146.135200	1807399.732010	246103	2531	sf	158	cf
Infiltration BMP	Existing	12015 SAMOLINE	9/29/2008	6517129.601540	6517129.601540	1798409.043860	246079	2531	sf	158	cf
Infiltration BMP	Existing	12048 SAMOLINE	6/22/2010	6517021.712450	6517021.712450	1798014.455830	246079	2531	sf	158	cf
Infiltration BMP	Existing	7962 SECOND	10/3/2007	6519694.108620	6519694.108620	1801968.426700	246102	2531	sf	158	cf
Infiltration BMP	Existing	7712 SEVERY ST	1/1/2008	6524575.222650	6524575.222650	1807124.160130	246103	2531	sf	158	cf
Infiltration BMP	Existing	7331 SHADYOAK	1/16/2009	6521597.847660	6521597.847660	1810725.646550	246111	2531	sf	158	cf
Infiltration BMP	Existing	9103 SHERIDELL	10/29/2007	6528594.889520	6528594.889520	1806159.584670	245125	2531	sf	158	cf
Infiltration BMP	Existing	8345 SIXTH	4/23/2008	6522663.428460	6522663.428460	1802257.170290	245114	2531	sf	158	cf
Infiltration BMP	Existing	9124 STOAKES	4/29/2004	6526659.033140	6526659.033140	1807538.875170	246103	2531	sf	158	cf
Infiltration BMP	Existing	9906 TECUM	8/26/2008	6519710.324270	6519710.324270	1808196.223590	246111	2531	sf	158	cf
Infiltration BMP	Existing	9520 TELEGRAPH	12/4/2008	6531301.476840	6531301.476840	1805512.099740	245127	2531	sf	158	cf
Infiltration BMP	Existing	8302 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1840	sf	115	cf
Infiltration BMP	Existing	8304 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8306 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8308 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8310 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8312 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8314 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8316 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8318 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8320 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8322 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8324 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8326 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8328 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8330 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8332 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8334 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8336 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8338 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8340 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8342 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8344 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8346 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8348 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8350 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8352 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	7438 THIRD	11/10/2005	6517353.808450	6517353.808450	1803828.489190	246102	2531	sf	158	cf
Infiltration BMP	Existing	7955 THIRD	1/30/2006	6519871.299810	6519871.299810	1802440.525110	246103	2531	sf	158	cf
Infiltration BMP	Existing	9819 TRISTAN	11/19/2007	6526302.584780	6526302.584780	1804524.383680	245125	2531	sf	158	cf
Infiltration BMP	Existing	8555 VIA AMORITA	10/27/2008	6524751.467620	6524751.467620	1803150.610950	245119	2531	sf	158	cf
Infiltration BMP	Existing	9631 WILEY BURKE	3/27/2006	6521095.475640	6521095.475640	1808618.175130	246106	2531	sf	158	cf
Infiltration BMP	Existing	10419 WILEY BURKE	3/7/2008	6519382.492080	6519382.492080	1805731.311650	246102	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7319 ADWEN	2/22/2006	6515346.754980	6515346.754980	1802425.342900	246079	1266	sf	79	cf
Infiltration BMP	Existing	13033 AIRPOINT	6/14/2010	6517837.198260	6517837.198260	1790420.981040	245115	1266	sf	79	cf
Infiltration BMP	Existing	8446 ALAMEDA	6/24/2005	6519341.878190	6519341.878190	1795502.737620	245115	1266	sf	79	cf
Infiltration BMP	Existing	9336 APPLEBY	3/9/2006	6529377.514420	6529377.514420	1804389.744220	245125	1266	sf	79	cf
Infiltration BMP	Existing	9540 ARDINE	1/1/2006	6527800.346060	6527800.346060	1797420.079620	245119	1266	sf	79	cf
Infiltration BMP	Existing	7849 ARNETT	7/8/2005	6518395.700160	6518395.700160	1801138.921810	246079	1266	sf	79	cf
Infiltration BMP	Existing	8645 BAYSINGER	11/10/2005	6525612.031290	6525612.031290	1803108.706240	245119	1266	sf	79	cf
Infiltration BMP	Existing	9210 BELCHER	10/12/2006	6519891.840050	6519891.840050	1789806.904790	245115	1266	sf	79	cf
Infiltration BMP	Existing	9245 BELCHER	9/4/2007	6520247.532430	6520247.532430	1789967.036150	245115	1266	sf	79	cf
Infiltration BMP	Existing	10234 BELCHER	6/18/2010	6527119.239350	6527119.239350	1789810.183210	245113	1266	sf	79	cf
Infiltration BMP	Existing	10285 BELCHER	6/21/2010	6527612.081010	6527612.081010	1789959.646450	245118	1266	sf	79	cf
Infiltration BMP	Existing	10028 BELLDER	1/1/2006	6525360.965940	6525360.965940	1803913.208580	245125	1266	sf	79	cf
Infiltration BMP	Existing	10304 BELLMAN	6/1/2005	6525418.498520	6525418.498520	1803041.069680	245119	1266	sf	79	cf
Infiltration BMP	Existing	11014 BENFIELD	6/24/2008	6531918.630750	6531918.630750	1797937.959120	245122	1266	sf	79	cf
Infiltration BMP	Existing	9324 BIRCHBARK	10/7/2005	6524879.129350	6524879.129350	1807661.831210	246103	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7847 BLANDWOOD	6/29/2006	6525016.522210	6525016.522210	1811074.341940	246106	1266	sf	79	cf
Infiltration BMP	Existing	8415 BORSON	10/9/2006	6517421.536650	6517421.536650	1792735.849280	245115	1266	sf	79	cf
Infiltration BMP	Existing	8710 BOYNE	6/29/2006	6521119.595500	6521119.595500	1795272.757840	245115	1266	sf	79	cf
Infiltration BMP	Existing	8910 BROCK	2/3/2009	6525582.226600	6525582.226600	1808734.892600	246106	1266	sf	79	cf
Infiltration BMP	Existing	9702 BROCK	9/25/2006	6523765.203820	6523765.203820	1806580.253440	246103	1266	sf	79	cf
Infiltration BMP	Existing	9730 BROCK	10/16/2009	6523625.354460	6523625.354460	1806340.478590	246103	1266	sf	79	cf
Infiltration BMP	Existing	7550 BROOKMILL	9/25/2006	6516432.435790	6516432.435790	1801137.496710	246079	1266	sf	79	cf
Infiltration BMP	Existing	10360 BROOKSHIRE	8/2/2005	6524254.056510	6524254.056510	1803200.425100	245119	1266	sf	79	cf
Infiltration BMP	Existing	9336 BUELL	5/4/2007	6527241.052050	6527241.052050	1799190.479610	245126	1266	sf	79	cf
Infiltration BMP	Existing	9408 BUELL	1/1/2007	6527563.840160	6527563.840160	1798993.546660	245126	1266	sf	79	cf
Infiltration BMP	Existing	10210 CASANES	7/20/2005	6529273.829610	6529273.829610	1801143.143100	245125	1266	sf	79	cf
Infiltration BMP	Existing	10308 CASANES	6/9/2005	6528827.020030	6528827.020030	1800415.364480	245126	1266	sf	79	cf
Infiltration BMP	Existing	10845 CASANES	12/4/2007	6527288.943480	6527288.943480	1798213.890680	245119	1266	sf	79	cf
Infiltration BMP	Existing	10922 CASANES	8/3/2005	6527279.490710	6527279.490710	1797849.792160	245119	1266	sf	79	cf
Infiltration BMP	Existing	8715 CAVEL	6/22/2010	6521261.550160	6521261.550160	1795688.489420	245115	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9707 CEDARTREE	5/25/2006	6532283.863380	6532283.863380	1804587.051690	245127	1266	sf	79	cf
Infiltration BMP	Existing	10260 CHANEY	6/21/2010	6527337.911630	6527337.911630	1801874.691650	245119	1266	sf	79	cf
Infiltration BMP	Existing	10362 CHANEY	9/4/2007	6526983.558290	6526983.558290	1801306.071650	245119	1266	sf	79	cf
Infiltration BMP	Existing	9246 CLANCEY	5/1/2007	6528479.118010	6528479.118010	1805448.947460	245125	1266	sf	79	cf
Infiltration BMP	Existing	10546 CLANCEY	5/26/2005	6525904.831900	6525904.831900	1800674.595520	245119	1266	sf	79	cf
Infiltration BMP	Existing	12658 COLDBROOK	6/25/2009	6524501.637760	6524501.637760	1791525.543010	245114	1266	sf	79	cf
Infiltration BMP	Existing	8111 COMOLETTE	12/18/2006	6515465.796840	6515465.796840	1793242.397990	246077	1266	sf	79	cf
Infiltration BMP	Existing	8140 COMOLETTE	12/2/2008	6515640.775000	6515640.775000	1792943.865000	246077	1266	sf	79	cf
Infiltration BMP	Existing	8316 COMOLETTE	5/23/2005	6516475.681440	6516475.681440	1792370.081790	245524	1266	sf	79	cf
Infiltration BMP	Existing	9325 CORD	3/21/2008	6529940.912480	6529940.912480	1803762.584020	245125	1266	sf	79	cf
Infiltration BMP	Existing	7732 COREY	1/8/2009	6515481.796500	6515481.796500	1798137.416600	246079	1266	sf	79	cf
Infiltration BMP	Existing	11810 CORRIGAN	3/4/2009	6523411.287590	6523411.287590	1796210.739300	245114	1266	sf	79	cf
Infiltration BMP	Existing	10925 CROSSDALE	6/9/2005	6532012.125130	6532012.125130	1798163.740010	245122	1266	sf	79	cf
Infiltration BMP	Existing	7757 DACOSTA	6/7/2005	6521506.383470	6521506.383470	1807138.583520	246106	1266	sf	79	cf
Infiltration BMP	Existing	8324 DAVIS	6/15/2005	6520852.481770	6520852.481770	1799213.987880	245114	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8517 DEVENIR	2/19/2008	6517399.640210	6517399.640210	1791811.493450	245115	1266	sf	79	cf
Infiltration BMP	Existing	7345 DINSDALE	9/29/2005	6519203.299320	6519203.299320	1808002.090250	246111	1266	sf	79	cf
Infiltration BMP	Existing	8330 DINSDALE	6/21/2010	6524002.238290	6524002.238290	1804838.107610	246103	1266	sf	79	cf
Infiltration BMP	Existing	10340 DOLAN	8/15/2007	6523856.967630	6523856.967630	1803630.622810	245119	1266	sf	79	cf
Infiltration BMP	Existing	12260 DOLAN	4/5/2006	6518910.565000	6518910.565000	1795264.305000	245115	1266	sf	79	cf
Infiltration BMP	Existing	12521 DOLAN	7/19/2007	6517914.404040	6517914.404040	1794175.419610	245115	1266	sf	79	cf
Infiltration BMP	Existing	12621 DOLAN	8/17/2007	6517501.190610	6517501.190610	1793293.644730	245115	1266	sf	79	cf
Infiltration BMP	Existing	12308 DOWNEY	4/19/2007	6518251.608680	6518251.608680	1795363.261670	245115	1266	sf	79	cf
Infiltration BMP	Existing	12532 DOWNEY	10/11/2005	6517442.718730	6517442.718730	1794104.887260	245115	1266	sf	79	cf
Infiltration BMP	Existing	12820 DOWNEY	5/17/2007	6516486.923440	6516486.923440	1792584.707230	245524	1266	sf	79	cf
Infiltration BMP	Existing	12603 DUNROBIN	6/22/2010	6524864.880980	6524864.880980	1792095.613000	245114	1266	sf	79	cf
Infiltration BMP	Existing	12643 DUNROBIN	11/21/2006	6524865.889210	6524865.889210	1791696.268120	245114	1266	sf	79	cf
Infiltration BMP	Existing	12818 DUNROBIN	12/15/2006	6525044.191110	6525044.191110	1791331.787300	245114	1266	sf	79	cf
Infiltration BMP	Existing	12823 DUNROBIN	2/12/2008	6524866.593650	6524866.593650	1791299.463030	245114	1266	sf	79	cf
Infiltration BMP	Existing	13024 DUNROBIN	5/24/2005	6525048.058670	6525048.058670	1790633.750860	245114	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	13240 DUNROBIN	10/1/2008	6525046.731200	6525046.731200	1789833.348360	245114	1266	sf	79	cf
Infiltration BMP	Existing	13638 EARNSHAW	9/16/2005	6516330.576340	6516330.576340	1788317.037630	245524	1266	sf	79	cf
Infiltration BMP	Existing	12155 EASTBROOK	9/16/2005	6525128.882510	6525128.882510	1794289.182720	245114	2297	sf	144	cf
Infiltration BMP	Existing	9125 EGLISE	1/24/2007	6529928.564580	6529928.564580	1804520.963270	245125	1266	sf	79	cf
Infiltration BMP	Existing	10213 EGLISE	10/14/2008	6528271.447820	6528271.447820	1801803.093100	245126	1266	sf	79	cf
Infiltration BMP	Existing	8331 EVEREST	2/21/2007	6517984.856770	6517984.856770	1794526.994330	245115	1266	sf	79	cf
Infiltration BMP	Existing	9037 FARM	6/18/2010	6525882.141210	6525882.141210	1801714.480720	245119	1266	sf	79	cf
Infiltration BMP	Existing	9542 FARM	11/15/2005	6529019.221950	6529019.221950	1799423.700160	245126	1266	sf	79	cf
Infiltration BMP	Existing	8445 FIFTH	6/24/2005	6523180.907390	6523180.907390	1801530.163340	245114	1266	sf	79	cf
Infiltration BMP	Existing	8529 FIFTH	9/23/2005	6523578.003250	6523578.003250	1801288.543780	245114	1266	sf	79	cf
Infiltration BMP	Existing	9221 FOSTER	2/16/2008	6519835.324440	6519835.324440	1789377.664880	245115	1266	sf	79	cf
Infiltration BMP	Existing	9303 FOSTER	8/9/2006	6520280.515660	6520280.515660	1789513.941670	245115	1266	sf	79	cf
Infiltration BMP	Existing	9536 FOSTORIA	10/13/2005	6527900.524680	6527900.524680	1797686.001250	245119	1266	sf	79	cf
Infiltration BMP	Existing	7339 GAINFORD	11/5/2007	6519739.997490	6519739.997490	1808338.936030	246111	1266	sf	79	cf
Infiltration BMP	Existing	8426 GAINFORD	1/7/2008	6524961.213810	6524961.213810	1805124.602410	246103	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9315 GAINFORD	7/5/2005	6528715.710300	6528715.710300	1803034.881460	245125	1266	sf	79	cf
Infiltration BMP	Existing	9641 GAINFORD	10/16/2006	6530976.949360	6530976.949360	1801752.372100	245125	1266	sf	79	cf
Infiltration BMP	Existing	9357 GALLATIN	4/17/2006	6529509.957360	6529509.957360	1804133.004270	245125	1266	sf	79	cf
Infiltration BMP	Existing	8411 GALT	7/18/2007	6520931.662600	6520931.662600	1798681.676310	245114	1266	sf	79	cf
Infiltration BMP	Existing	8125 GARDENDALE	10/3/2007	6514840.842010	6514840.842010	1791988.219650	246077	1266	sf	79	cf
Infiltration BMP	Existing	7553 GLENCLIFF	11/5/2008	6521939.189570	6521939.189570	1809565.009220	246111	1266	sf	79	cf
Infiltration BMP	Existing	12615 GURLEY	9/8/2008	6516705.632650	6516705.632650	1793818.816440	246077	1266	sf	79	cf
Infiltration BMP	Existing	10557 HALEDON	3/22/2006	6525946.687500	6525946.687500	1800529.637640	245119	1266	sf	79	cf
Infiltration BMP	Existing	10714 HALEDON	7/11/2008	6525734.412480	6525734.412480	1799854.605530	245119	1266	sf	79	cf
Infiltration BMP	Existing	9101 HALL	7/19/2007	6524088.768660	6524088.768660	1797585.986810	245114	1266	sf	79	cf
Infiltration BMP	Existing	7416 HONDO	11/21/2007	6513414.170490	6513414.170490	1797767.919490	246079	1266	sf	79	cf
Infiltration BMP	Existing	7927 HONDO	1/8/2007	6515926.722240	6515926.722240	1796435.751150	246079	1266	sf	79	cf
Infiltration BMP	Existing	9228 HORLEY	7/20/2005	6522584.029360	6522584.029360	1809343.702000	246111	1266	sf	79	cf
Infiltration BMP	Existing	9929 HORLEY	6/23/2005	6520827.895940	6520827.895940	1807104.698370	246106	1266	sf	79	cf
Infiltration BMP	Existing	12316 HORLEY	1/1/2007	6515085.680000	6515085.680000	1797312.060000	246079	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11544 HORTON	5/1/2006	6517050.314050	6517050.314050	1801482.158860	246079	1266	sf	79	cf
Infiltration BMP	Existing	12619 IBBETSON	12/26/2007	6525826.717640	6525826.717640	1791950.694670	245114	1266	sf	79	cf
Infiltration BMP	Existing	12816 IBBETSON	11/23/2005	6526008.922590	6526008.922590	1791350.504040	245114	1266	sf	79	cf
Infiltration BMP	Existing	9030 IOWA	8/29/2007	6523719.000250	6523719.000250	1797706.215730	245114	1266	sf	79	cf
Infiltration BMP	Existing	9036 IOWA	1/23/2006	6523761.535660	6523761.535660	1797679.990250	245114	1266	sf	79	cf
Infiltration BMP	Existing	7214 IRWINGROVE	2/7/2008	6517736.835580	6517736.835580	1807424.228480	246104	1266	sf	79	cf
Infiltration BMP	Existing	7425 IRWINGROVE	11/22/2005	6519037.305040	6519037.305040	1806826.286520	246102	1266	sf	79	cf
Infiltration BMP	Existing	7431 IVO	5/23/2005	6520452.019960	6520452.019960	1808862.657860	246106	1266	sf	79	cf
Infiltration BMP	Existing	12258 IZETTA	11/19/2008	6524718.529730	6524718.529730	1793607.751080	245114	1266	sf	79	cf
Infiltration BMP	Existing	11427 JULIUS	10/6/2005	6517068.729490	6517068.729490	1802337.821610	246079	1266	sf	79	cf
Infiltration BMP	Existing	7863 KINGBEE	6/2/2005	6515998.395150	6515998.395150	1797104.463380	246079	1266	sf	79	cf
Infiltration BMP	Existing	10633 LA REINA	6/7/2005	6521844.406030	6521844.406030	1802801.159980	246103	1266	sf	79	cf
Infiltration BMP	Existing	10726 LA REINA	9/20/2005	6521763.725850	6521763.725850	1802369.001800	246103	1266	sf	79	cf
Infiltration BMP	Existing	10717 LAKEWOOD	1/1/2005	6524762.764130	6524762.764130	1800632.321080	245119	1266	sf	79	cf
Infiltration BMP	Existing	13229 LAKEWOOD	8/30/2005	6518145.854860	6518145.854860	1789091.323220	245115	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8248 LANKIN	5/16/2007	6517152.534650	6517152.534650	1794608.293130	246077	1266	sf	79	cf
Infiltration BMP	Existing	13413 LAURELDALE	9/4/2007	6516097.983610	6516097.983610	1789503.029570	245524	1266	sf	79	cf
Infiltration BMP	Existing	9040 LEMORAN	9/16/2005	6529896.207920	6529896.207920	1805874.052840	245125	1266	sf	79	cf
Infiltration BMP	Existing	10225 LESTERFORD	12/22/2005	6530244.844140	6530244.844140	1800567.187010	245126	1266	sf	79	cf
Infiltration BMP	Existing	10415 LESTERFORD	6/22/2010	6529502.521580	6529502.521580	1799500.525910	245126	1266	sf	79	cf
Infiltration BMP	Existing	10730 LESTERFORD	6/8/2005	6528927.837490	6528927.837490	1798058.051080	245126	1266	sf	79	cf
Infiltration BMP	Existing	8020 LUBEC	3/8/2007	6523117.786070	6523117.786070	1806398.918760	246103	1266	sf	79	cf
Infiltration BMP	Existing	9230 LUBEC	9/30/2005	6528205.943320	6528205.943320	1803519.420650	245125	1266	sf	79	cf
Infiltration BMP	Existing	7259 LUXOR	1/1/2007	6514801.884280	6514801.884280	1801808.218080	246079	1266	sf	79	cf
Infiltration BMP	Existing	7315 LUXOR	3/16/2006	6514953.117040	6514953.117040	1801695.155730	246079	1266	sf	79	cf
Infiltration BMP	Existing	8444 LUXOR	11/10/2005	6520775.356850	6520775.356850	1797851.842110	245114	1266	sf	79	cf
Infiltration BMP	Existing	9102 MANZANAR	7/20/2005	6527192.246670	6527192.246670	1807219.965690	246103	1266	sf	79	cf
Infiltration BMP	Existing	10434 MANZANAR	6/7/2005	6523771.930100	6523771.930100	1803007.033470	245119	1266	sf	79	cf
Infiltration BMP	Existing	11109 MARBEL	7/20/2006	6523692.717760	6523692.717760	1799490.635090	245119	1266	sf	79	cf
Infiltration BMP	Existing	12108 MARBEL	1/31/2006	6521445.538760	6521445.538760	1795214.942010	245115	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7830 MELVA	1/1/2006	6515802.415360	6515802.415360	1797387.108860	246079	1266	sf	79	cf
Infiltration BMP	Existing	7844 MELVA	1/5/2006	6515910.196660	6515910.196660	1797321.983490	246079	1266	sf	79	cf
Infiltration BMP	Existing	12120 MORNING	8/14/2008	6516533.621320	6516533.621320	1797558.681060	246079	1266	sf	79	cf
Infiltration BMP	Existing	7339 NADA	7/8/2005	6514489.286480	6514489.286480	1800567.411080	246079	1266	sf	79	cf
Infiltration BMP	Existing	7351 NADA	6/23/2008	6514590.536380	6514590.536380	1800503.774190	246079	1266	sf	79	cf
Infiltration BMP	Existing	8202 NADA	1/9/2006	6518631.371590	6518631.371590	1797835.542430	245115	1266	sf	79	cf
Infiltration BMP	Existing	7415 NOREN	7/26/2005	6520794.671000	6520794.671000	1809286.272790	246111	1266	sf	79	cf
Infiltration BMP	Existing	9921 NORLAIN	11/3/2008	6519614.140210	6519614.140210	1807835.435830	246111	1266	sf	79	cf
Infiltration BMP	Existing	8127 ORANGE	6/23/2010	6517401.744430	6517401.744430	1796403.841780	246077	1266	sf	79	cf
Infiltration BMP	Existing	9554 ORIZABA	8/19/2005	6524235.753500	6524235.753500	1806817.618650	246103	1266	sf	79	cf
Infiltration BMP	Existing	12333 ORIZABA	1/23/2006	6517077.475660	6517077.475660	1795538.435260	246077	1266	sf	79	cf
Infiltration BMP	Existing	10834 PANGBORN	9/17/2007	6527760.431910	6527760.431910	1798051.772160	245119	1266	sf	79	cf
Infiltration BMP	Existing	7156 PELLET	6/22/2010	6515507.126970	6515507.126970	1804695.751890	246104	1266	sf	79	cf
Infiltration BMP	Existing	9466 PELLET	5/26/2005	6527082.799410	6527082.799410	1797550.782940	245119	1266	sf	79	cf
Infiltration BMP	Existing	10238 PICO VISTA	7/22/2008	6530559.495000	6530559.495000	1800212.246520	245126	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7706 PIVOT	6/18/2010	6517776.543940	6517776.543940	1802077.153370	246079	1266	sf	79	cf
Infiltration BMP	Existing	11951 POMERING	6/18/2010	6515072.562230	6515072.562230	1799936.867790	246079	1266	sf	79	cf
Infiltration BMP	Existing	12010 POMERING	9/20/2005	6514897.027930	6514897.027930	1799318.472210	246079	1266	sf	79	cf
Infiltration BMP	Existing	7803 PURITAN	6/22/2010	6513186.710850	6513186.710850	1793767.422040	246077	1266	sf	79	cf
Infiltration BMP	Existing	8249 QUOIT	5/17/2007	6517406.484080	6517406.484080	1795006.472870	246077	1266	sf	79	cf
Infiltration BMP	Existing	8506 RAVILLER	6/22/2010	6526200.032280	6526200.032280	1805944.598850	246103	1266	sf	79	cf
Infiltration BMP	Existing	9441 RAVILLER	10/7/2005	6529831.524430	6529831.524430	1803323.207760	245125	1266	sf	79	cf
Infiltration BMP	Existing	7110 RIO FLORA	6/1/2010	6515643.202310	6515643.202310	1805187.382260	246104	1266	sf	79	cf
Infiltration BMP	Existing	7371 RIO HONDO PL	7/11/2005	6517283.740950	6517283.740950	1804924.767440	246104	1266	sf	79	cf
Infiltration BMP	Existing	10802 RIVES	3/23/2007	6519422.470020	6519422.470020	1803623.413330	246102	1266	sf	79	cf
Infiltration BMP	Existing	11916 RIVES	2/6/2007	6516737.168290	6516737.168290	1799258.165990	246079	1266	sf	79	cf
Infiltration BMP	Existing	10912 RYERSON	7/14/2005	6515882.754330	6515882.754330	1804962.955590	246104	1266	sf	79	cf
Infiltration BMP	Existing	9505 SAMOLINE	6/21/2010	6523279.038200	6523279.038200	1807936.970620	246106	1266	sf	79	cf
Infiltration BMP	Existing	9631 SAMOLINE	9/4/2007	6522855.010000	6522855.010000	1807250.890000	246103	1266	sf	79	cf
Infiltration BMP	Existing	12030 SAMOLINE	9/23/2005	6517133.868790	6517133.868790	1798177.361600	246079	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12238 SAMOLINE	9/8/2006	6516738.176240	6516738.176240	1796883.684630	246079	1266	sf	79	cf
Infiltration BMP	Existing	7915 SECOND	3/23/2006	6519374.854020	6519374.854020	1802382.905560	246102	1266	sf	79	cf
Infiltration BMP	Existing	7816 SEVENTH	3/27/2007	6519884.790380	6519884.790380	1804163.292550	246102	1266	sf	79	cf
Infiltration BMP	Existing	8646 SEVENTH	1/3/2006	6524439.566780	6524439.566780	1801605.289810	245119	1266	sf	79	cf
Infiltration BMP	Existing	9225 SIDEVIEW	4/24/2006	6531114.889310	6531114.889310	1804872.365930	245127	1266	sf	79	cf
Infiltration BMP	Existing	8810 SMALLWOOD	6/20/2005	6524153.815510	6524153.815510	1810188.858090	246106	1266	sf	79	cf
Infiltration BMP	Existing	9264 SONGFEST	6/10/2008	6531394.983570	6531394.983570	1804360.661210	245127	1266	sf	79	cf
Infiltration BMP	Existing	7838 SPRINGER	11/21/2006	6515530.871940	6515530.871940	1796818.950680	246079	1266	sf	79	cf
Infiltration BMP	Existing	7844 SPRINGER	3/18/2008	6515582.250000	6515582.250000	1796787.835000	246079	1266	sf	79	cf
Infiltration BMP	Existing	10517 STAMPS	8/18/2005	6522812.240000	6522812.240000	1803043.757460	246103	1266	sf	79	cf
Infiltration BMP	Existing	9520 STEWART & GRAY	2/27/2009	6526628.650930	6526628.650930	1796061.800920	245118	1266	sf	79	cf
Infiltration BMP	Existing	8840 STOAKES	7/15/2005	6527643.045070	6527643.045070	1808263.273840	245125	1266	sf	79	cf
Infiltration BMP	Existing	11831 SUSAN	5/25/2006	6514568.915250	6514568.915250	1801466.560490	246079	1266	sf	79	cf
Infiltration BMP	Existing	8354 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8356 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8358 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8360 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8362 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8364 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8366 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8368 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	7420 THIRD	9/20/2007	6517202.761340	6517202.761340	1803926.714420	246102	1266	sf	79	cf
Infiltration BMP	Existing	7964 THIRD	2/21/2006	6519886.681280	6519886.681280	1802225.378910	246102	1266	sf	79	cf
Infiltration BMP	Existing	9532 TWEEDY	4/20/2007	6523025.939870	6523025.939870	1807743.953100	246106	1266	sf	79	cf
Infiltration BMP	Existing	7347 VIA RIO NIDO	8/1/2007	6518199.953350	6518199.953350	1806523.073370	246104	1266	sf	79	cf
Infiltration BMP	Existing	10419 WILEY BURKE	1/2/2008	6519382.492080	6519382.492080	1805731.311650	246102	1266	sf	79	cf
Infiltration BMP	Existing	10442 WILEY BURKE	1/1/2007	6519428.439440	6519428.439440	1805422.866650	246102	1266	sf	79	cf
Infiltration BMP	Existing	12639 WOODRUFF	12/22/2006	6526127.737740	6526127.737740	1791800.878460	245113	1266	sf	79	cf
Infiltration BMP	Existing	12356 DOWNEY	4/29/2004	6518006.757310	6518006.757310	1794978.083160	245115	5062	sf	316	cf
Infiltration BMP	Existing	10613 NEWVILLE	4/21/2004	6528761.027810	6528761.027810	1798786.621380	245126	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10627 OLD RIVER SCHOOL	7/24/2003	6515233.048270	6515233.048270	1805631.128330	246104	174752	sf	10922	cf
Infiltration BMP	Existing	9215 HALL	12/9/2002	6524758.793890	6524758.793890	1797647.866960	245113	74592	sf	4662	cf
Infiltration BMP	Existing	10933 LAKEWOOD BLVD	10/5/2005	6524600.000000	6524600.000000	1800100.000000	245119	6400	sf	400	cf
Infiltration BMP	Existing	12322 SAMOLINE	7/8/2005	6516301.814120	6516301.814120	1796169.128220	246077	4256	sf	266	cf
Infiltration BMP	Existing	12731 LAKEWOOD	9/17/2003	6519215.285000	6519215.285000	1791371.090000	245115	2128	sf	133	cf
Infiltration BMP	Existing	12739 LAKEWOOD	9/17/2003	6519200.000000	6519200.000000	1791100.000000	245115	2128	sf	133	cf
Infiltration BMP	Existing	8927 BIRCHLEAF	7/11/2006	6527008.160170	6527008.160170	1808327.449830	246103	1056	sf	66	cf
Infiltration BMP	Existing	11929 POMERING	5/1/2006	6515108.241040	6515108.241040	1800149.473170	246079	1056	sf	66	cf
Infiltration BMP	Existing	12240 WOODRUFF	3/19/2010	6526758.991120	6526758.991120	1793878.747920	245118	300224	sf	18764	cf
Infiltration BMP	Existing	12222 WOODRUFF	9/14/2009	6526625.121210	6526625.121210	1794009.479990	245118	70200	sf	4388	cf
Infiltration BMP	Existing	7624 FIRESTONE	1/1/2008	6517500.000000	6517500.000000	1802600.000000	246079	41632	sf	2602	cf
Infiltration BMP	Existing	7714 STEWART & GRAY	4/9/2007	6516397.756580	6516397.756580	1799563.749470	246079	30016	sf	1876	cf
Infiltration BMP	Existing	9637 LAKEWOOD	10/2/2008	6526780.802630	6526780.802630	1805111.536210	245125	15136	sf	946	cf
Infiltration BMP	Existing	12428 BENEDICT	6/14/2007	6525687.022380	6525687.022380	1792528.538110	245114	8080	sf	505	cf
Infiltration BMP	Existing	7774 DINSDALE	2/14/2014	6521332.495780	6521332.495780	1806385.183840	246103	4680	sf	293	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8030 IMPERIAL HWY	2/14/2014	6515729.368090	6515729.368090	1794471.493939	246077	41789	sf	2000	cf
Infiltration BMP	Existing	9623 IMPERIAL HWY	2/14/2014	6524482.209740	6524482.209740	1792569.983950	245114	35408	sf	2213	cf
Infiltration BMP	Existing	10531 LAKEWOOD BL	2/14/2014	6525178.634060	6525178.634060	1801497.338680	245119	5840	sf	365	cf
Infiltration BMP	Existing	8121 FOURTH ST	2/14/2014	6521147.926450	6521147.926450	1802216.858440	246103	4680	sf	293	cf
Infiltration BMP	Existing	8123 FOURTH ST	2/14/2014	6521147.926450	6521147.926450	1802216.858440	246103	4680	sf	293	cf
Infiltration BMP	Existing	8555 TENTH ST	2/14/2014	6524962.328390	6524962.328390	1803501.510410	245119	4680	sf	293	cf
Infiltration BMP	Existing	9356 BUELL ST	2/14/2014	6527425.774610	6527425.774610	1799078.145910	245126	3120	sf	195	cf
Infiltration BMP	Existing	8449 COLE ST	2/14/2014	6520362.597670	6520362.597670	1796910.373080	245115	1560	sf	98	cf

D1.3. City of Lakewood

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Filterra Tree Wells (2)		Paramount & Arbor	33.843398	-118.159673	445521				
Infiltration BMP	Existing	Retention Basin at Cherry Cove Park			33.850296	-118.165478	446014				

D1.4. City of Paramount

Type of BMP	Existing or Planned ?	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioswales	Existing	Landscape Swale	2012	Texaco/Alondra	33.889066	-118.171849	606071	37,500	sf	2109	cf
Bioswales	Existing	Landscape Swale	2012	Orange/Windmill	33.891602	-118.177436	606072	0.6	ac	1470	cf

D1.5. City of Pico Rivera

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Site-Scale Detention Basin	Existing	French drains at Smith Park	2013	6016 Rosemead Blvd				16	ac		
Site-Scale Detention Basin	Existing	French drains at Rio Vista	2013	Coffman Pico Road				7	ac		
Bioswales	Existing	Beverly Boulevard medians	2012	Beverly Blvd				5280	sf		
Permeable Pavement	Existing	Pico Park permeable pavement	2012	9528 Beverly Blvd				12	ac		
Bioswales	Existing	Telegraph Road medians	2013	Telegraph Rd from Rosemead Blvd to Eastside limit				5280	sf		
Bioswales	Planned	Paramount Blvd medians	2016	Paramount Blvd from Whittier Blvd to Mines Ave				5280	sf		
Infiltration BMPs	Planned	Two (2) Filterra Systems	2016	various				1	ac		
Infiltration BMPs	Existing	City of Pico Rivera City Hall	2011	8615 Passons Blvd				2.75	ac		
Infiltration BMPs	Existing	Rivera Park	2012	9530 Shade Lane				16	ac		

D1.6. City of Signal Hill

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration		Palm Drive Business Center	2/19/2008	2445 N Palm Drive	33.801973	-118.157962	775510	1	ac		
Bioretention / Biofiltration		Aragon Townhomes & Duplexes (City View)	3/9/2007	1902 (1890) Oribaza Ave	33.790924	-118.156725	776003	93,780	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2755 California Avenue	33.807881	-118.181769	776011	9,583	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2756 California Avenue	33.807881	-118.181769	776011	17,424	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2757 California Avenue	33.807881	-118.181769	776011	33,106	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2758 California Avenue	33.807881	-118.181769	776011	10,454	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2759 California Avenue	33.807881	-118.181769	776011	78,486	sf		
Bioretention / Biofiltration		2-Story Building and Parking Lot	12/28/2010	2653 Walnut Avenue	33.805754	-118.171978	776012	0.51	ac		
Bioretention / Biofiltration		EDCO Administrative Terminal	8/1/2011	950 27th Street	33.806179	-118.1812	776012	9583	sf	0.06	cfs
Bioretention / Biofiltration		EDCO Administrative Terminal	8/2/2011	951 27th Street	33.806179	-118.1812	776012	17424	sf	0.08	cfs
Bioretention / Biofiltration		EDCO Administrative Terminal	8/3/2011	952 27th Street	33.806179	-118.1812	776012	33106	sf	0.14	cfs
Bioretention / Biofiltration		EDCO Administrative Terminal	8/4/2011	953 27th Street	33.806179	-118.1812	776012	10454	sf	0.08	cfs
Bioretention / Biofiltration		Fantasy Castle	6/30/2009	2801 Walnut Ave	33.808289	118.171777		1,584	sf		
Bioswales	Existing	Fresh and Easy Neighborhood Market	11/16/2010	3300 Atlantic Avenue	33.817504	-118.184643	485510	18,000	sf	931	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioswales	Existing	Fresh and Easy Neighborhood Market	11/17/2010	3301 Atlantic Avenue	33.817504	-118.184643	485510	120	sf	7	cf
Bioswales	Existing	Fresh and Easy Neighborhood Market	11/18/2010	3302 Atlantic Avenue	33.817504	-118.184643	485510	10,904	sf	542	cf
Bioswales	Existing	Signal Hill Police Station and Emergency Operation	5/26/2011	2745 Walnut Avenue	33.807067	-118.171984	775510	115,870	sf		
Bioswales	Existing	Jack in the Box	10/21/2008	802 Spring Street	33.812049	-118.182595	775510	12,000	sf		
Bioswales		Boiler Tech Warehouse	10/2/2009	2503 Cerritos Avenue	33.802564	-118.177391	776002	6,754	sf		
Bioswales		Aragon Townhomes & Duplexes (City View)	3/11/2007	1904 (1890) Oribaza Ave	33.790924	-118.156725	776003	31,100	sf		
Bioswales		Fantasy Castle	6/29/2009	2800 Walnut Ave	33.808289	118.171777		32,883	sf		
Flow-Through Treatment BMP	Existing	Petco, Party City	3/3/2009	3100 Atlantic Ave	33.813946	-118.184789	485510				
Flow-Through Treatment BMP	Existing	Petco, Party City	3/4/2009	3101 Atlantic Ave	33.813946	-118.184789	485510				
Flow-Through Treatment BMP	Existing	The Home Depot		3100 Atlantic Avenue	33.813946	-118.184789	485510	3.65	ac		
Flow-Through Treatment BMP	Existing	The Home Depot		3101 Atlantic Avenue	33.813946	-118.184789	485510	7.99	ac		
Flow-Through Treatment BMP	Existing	The Home Depot		3102 Atlantic Avenue	33.813946	-118.184789	485510	3.28	ac		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	The Home Depot		3103 Atlantic Avenue	33.813946	-118.184789	485510	4.79	ac		
Flow-Through Treatment BMP		Palm Drive Business Center	2/20/2008	2446 N Palm Drive	33.801973	-118.157962	775510	7,000	sf		
Flow-Through Treatment BMP	Existing	Fresh & Easy	11/17/2009	2475 Cherry Avenue	33.802363	-118.168152	775510	0.68	ac		
Flow-Through Treatment BMP	Existing	Fresh & Easy	11/18/2009	2476 Cherry Avenue	33.802363	-118.168152	775510	0.58	ac		
Flow-Through Treatment BMP	Existing	US Bank	9/17/2008	2615 Cherry Ave	33.804856	-118.167999	775510	18732	sf		
Flow-Through Treatment BMP	Existing	Signal Hill Industrial Center		2665-2745 Temple Ave	33.80648	-118.159782	775510	143,312	sf		
Flow-Through Treatment BMP	Existing	Tanker Interior Washing Facility		1710 E 29th Street	33.80935	-118.170824	775510	10,000	sf		
Flow-Through Treatment BMP	Existing	Delius Restaurant	7/14/2006	2951 Cherry Ave	33.81111	-118.168077	775510	32,000	sf		
Flow-Through Treatment BMP	Existing	Jack in the Box	10/20/2008	801 Spring Street	33.812049	-118.182595	775510	12,000	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Target (T-2319)	2/13/2007	950 E 33rd Street	33.816767	-118.181488	775510	178,600	sf		
Flow-Through Treatment BMP	Existing	Hawk Industries	5/8/2007	1245 E. 23rd Street	33.799126	-118.17577	776002	27,322	sf		
Flow-Through Treatment BMP	Existing	Hawk Industries	5/9/2007	1246 E. 23rd Street	33.799126	-118.17577	776002	1575	sf		
Flow-Through Treatment BMP		Boiler Tech Warehouse	9/30/2009	2501 Cerritos Avenue	33.802564	-118.177391	776002	6,754	sf		
Flow-Through Treatment BMP	Existing	Las Brisas II Community Housing	1/11/2006	2400-2418 California Ave	33.803504	-118.180639	776002	16,247	sf		
Flow-Through Treatment BMP	Existing	Las Brisas II Community Housing	1/12/2006	2400-2418 California Ave	33.803504	-118.180639	776002	25,047	sf		
Flow-Through Treatment BMP	Existing	Villagio	12/5/2005	2550 Gundry Ave	33.803577	-118.173289	776002	61,000	sf		
Flow-Through Treatment BMP	Existing	Villagio	12/6/2005	2551 Gundry Ave	33.803577	-118.173289	776002	30,492	sf		
Flow-Through Treatment BMP	Existing	Villagio	12/7/2005	2552 Gundry Ave	33.803577	-118.173289	776002	4,356	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP		Aragon Townhomes & Duplexes (City View)	3/6/2007	1899 (1890) Oribaza Ave	33.790924	-118.156725	776003	31,350	sf		
Flow-Through Treatment BMP		Aragon Townhomes & Duplexes (City View)	3/7/2007	1900 (1890) Oribaza Ave	33.790924	-118.156725	776003	63,400	sf		
Flow-Through Treatment BMP		In-N-Out Burger	5/27/2011	799 E. Spring Street	33.812066	-118.183197	776011	65,220	sf		
Flow-Through Treatment BMP		Shoreline Fabricators	8/1/2007	2652 Gundry Ave	33.805493	-118.173804	776012	16,300	sf		
Flow-Through Treatment BMP		Shoreline Fabricators	8/2/2007	2653 Gundry Ave	33.805493	-118.173804	776012	1,395	sf		
Flow-Through Treatment BMP		2-Story Building and Parking Lot	12/29/2010	2654 Walnut Avenue	33.805754	-118.171978	776012				
Flow-Through Treatment BMP		Islamic Center	5/29/2009	996 27th St	33.806216	-118.180729	776012	5000	sf		
Flow-Through Treatment BMP		Crescent Square Development	8/10/2007	1600-1799 Green House Place				136,955	sf		
Infiltration BMPs	Existing	Fresh & Easy	11/19/2009	2477 Cherry Avenue	33.802363	-118.168152	775510	76,143	sf		
Infiltration BMPs	Existing	US Bank	9/19/2008	2617 Cherry Ave	33.804856	-118.167999	775510	18732	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMPs	Planned	Applebee's	3/12/2013	899 E. Spring Street	33.812089	-118.181855	775510	23,580	sf		
Infiltration BMPs	Existing	Hawk Industries	5/10/2007	1247 E. 23rd Street	33.799126	-118.17577	776002	27,322	sf		
Infiltration BMPs		Boiler Tech Warehouse	10/1/2009	2502 Cerritos Avenue	33.802564	-118.177391	776002	6,754	sf		
Infiltration BMPs		Pacific Walk	1/4/2011	PCH and Orizaba Avenue	33.789847	-118.156748	776003	100,200	sf		
Infiltration BMPs		Pacific Walk	1/5/2011	PCH and Orizaba Avenue	33.789847	-118.156748	776003	149,015	sf		
Infiltration BMPs		Pacific Walk	1/6/2011	PCH and Orizaba Avenue	33.789847	-118.156748	776003	1,300	sf		
Infiltration BMPs		Aragon Townhomes & Duplexes (City View)	3/8/2007	1901 (1890) Oribaza Ave	33.790924	-118.156725	776003	94,750	sf		
Infiltration BMPs		Aragon Townhomes & Duplexes (City View)	3/10/2007	1903 (1890) Oribaza Ave	33.790924	-118.156725	776003	93,780	sf		
Infiltration BMPs	Planned	Willow Street Medical Office Building	12/9/2013	845 E. Willow Street	33.804664	-118.182279	776009	22,651	sf	1095	cf
Infiltration BMPs	Planned	Willow Street Medical Office Building	12/10/2013	846 E. Willow Street	33.804664	-118.182279	776009	37,304	sf	1890	cf
Infiltration BMPs		In-N-Out Burger	5/28/2011	800 E. Spring Street	33.812066	-118.183197	776011	65,220	sf	3425	cf
Infiltration BMPs		Shoreline Fabricators	8/3/2007	2654 Gundry Ave	33.805493	-118.173804	776012	16,300	sf		
Infiltration BMPs		Islamic Center	5/28/2009	995 27th St	33.806216	-118.180729	776012	5000	sf		
Infiltration BMPs	Existing	A & A Ready Mix Concrete	8/1/2007	900 E. Patterson	33.806664	-118.182206	776012	2	ac		
Permeable Pavement	Existing	US Bank	9/18/2008	2616 Cherry Ave	33.804856	-118.167999	775510	60	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Permeable Pavement	Existing	Hawk Industries	5/11/2007	1248 E. 23rd Street	33.799126	-118.17577	776002	5,628	sf		

D1.7. City of South Gate

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration		Self Storage	9/15/2008	2405 Southern Ave	33.953436	-118.229363	796034	0.25	ac		
Bioretention / Biofiltration		Hollydale Plaza	3/30/2010	12222 Garfield Avenue	33.915655	-118.168383	796076	15,278	sf		
Bioretention / Biofiltration		Atlantic Avenue Improvements	4/21/2010	Atlantice from Abbott to Firestone	33.943066	-118.181112	796084	7.44	ac		
Bioretention / Biofiltration	Planned	azalea	11/25/2012	4641 Firestone Blvd.	33.952413	-118.187909	796084	7,328	sf	0.22	cfs
Bioswales		South Gate McDonald's	9/30/2013	3313 Tweedy Boulevard	33.945113	-118.211464	796034	5,119	sf		
Bioswales		South Gate McDonald's	10/1/2013	3314 Tweedy Boulevard	33.945113	-118.211464	796034	5,545	sf		
Bioswales		Commercial Center	10/4/2010	9200 Califlornia Avenue	33.950805	-118.206221	796034	12,367	sf		
Bioswales		Commercial Center	10/5/2010	9201 Califlornia Avenue	33.950805	-118.206221	796034	4,263	sf		
Bioswales		Hot Mix Asphalt Plant	5/11/2001	5626 Southern Avenue	33.944913	-118.168148	796083	2.7	ac		
Bioswales		Goals Soccer Centers - South Gate	2/9/2010	9599 Pinehurst Avenue	33.945107	-118.182378	796084	53,142	sf		
Flow-Through Treatment BMP	Existing	South Gate McDonald's	9/26/2013	3309 Tweedy Boulevard	33.945113	-118.211464	796034	2,394	sf		
Flow-Through Treatment BMP		South Gate McDonald's	9/28/2013	3311 Tweedy Boulevard	33.945113	-118.211464	796034	2,436	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Walgreens	7/24/2006	9830 Long Beach	33.946082	-118.215937	796034	48,725	sf		
Flow-Through Treatment BMP	Existing	King's Car Wash	11/29/2006	9801-9807 Long Beach Blvd	33.946452	-118.216775	796034	10,461	sf		
Flow-Through Treatment BMP		King's Car Wash	12/1/2006	9801-9807 Long Beach Blvd	33.946452	-118.216775	796034				
Flow-Through Treatment BMP	Existing	Sarina Townhomes	2/12/2007	9321 State Street	33.950368	-118.21325	796034	14,375	sf		
Flow-Through Treatment BMP		Commercial Center	10/6/2010	9202 Califlornia Avenue	33.950805	-118.206221	796034	16,630	sf		
Flow-Through Treatment BMP		Office Bldg	12/20/2007	3830 Firestone Blvd	33.953324	-118.201934	796034	1,000	sf		
Flow-Through Treatment BMP		Office Bldg	12/21/2007	3831 Firestone Blvd	33.953324	-118.201934	796034	112,000	sf		
Flow-Through Treatment BMP		Office Bldg	12/20/2007	3800 Firestone Blvd	33.95348	-118.202386	796034	1,000	sf		
Flow-Through Treatment BMP		Office Bldg	12/21/2007	3801 Firestone Blvd	33.95348	-118.202386	796034	112,000	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Planned	Calden Court Appartments	9/27/2013	8901 Calden Avenue	33.95515	-118.228736	796034	219,543	sf		
Flow-Through Treatment BMP		Hollydale Plaza	3/31/2010	12223 Garfield Avenue	33.915655	-118.168383	796076	27,381	sf		
Flow-Through Treatment BMP	Existing	Sherwin Inc	4/10/2007	5530 Borwick Ave	33.925749	-118.172611	796082	7,892	sf		
Flow-Through Treatment BMP		Hot Mix Asphalt Plant	5/10/2001	5625 Southern Avenue	33.944913	-118.168148	796083	9.5	ac		
Flow-Through Treatment BMP		Atlantic Avenue Improvements	4/22/2010	Atlantice from Abbott to Firestone	33.943066	-118.181112	796084	13.32	ac		
Flow-Through Treatment BMP		Goals Soccer Centers - South Gate	2/11/2010	9601 Pinehurst Avenue	33.945107	-118.182378	796084	70,036	sf		
Flow-Through Treatment BMP		Goals Soccer Centers - South Gate	2/12/2010	9602 Pinehurst Avenue	33.945107	-118.182378	796084	37,897	sf		
Flow-Through Treatment BMP		Goals Soccer Centers - South Gate	2/13/2010	9603 Pinehurst Avenue	33.945107	-118.182378	796084	63,400	sf		
Flow-Through Treatment BMP	Planned	azalea	11/24/2012	4640 Firestone Blvd.	33.952413	-118.187909	796084	1,583,819	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Interior Removal Specialist Demolition	5/21/2007	9309 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Interior Removal Specialist Demolition	5/22/2007	9310 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Interior Removal Specialist Demolition	5/23/2007	9311 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Interior Removal Specialist Demolition	5/24/2007	9312 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Petrochem Manufacturing	12/18/2006	8401 Quartz	33.957949	-118.191835	796090	162,305	sf		
Flow-Through Treatment BMP		Petrochem Manufacturing	12/19/2006	8402 Quartz	33.957949	-118.191835	796090	51,401	sf		
Infiltration BMPs		South Gate McDonald's	9/27/2013	3310 Tweedy Boulevard	33.945113	-118.211464	796034	2,394	sf		
Infiltration BMPs		South Gate McDonald's	9/29/2013	3312 Tweedy Boulevard	33.945113	-118.211464	796034	2,436	sf		
Infiltration BMPs		South Gate McDonald's	10/4/2013	3317 Tweedy Boulevard	33.945113	-118.211464	796034	3,743	sf		
Infiltration BMPs		King's Car Wash	11/30/2006	9801-9807 Long Beach Blvd	33.946452	-118.216775	796034	3,047	sf		
Infiltration BMPs		Sarina Townhomes	2/13/2007	9322 State Street	33.950368	-118.21325	796034	17,519	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMPs		Office Bldg	12/22/2007	3832 Firestone Blvd	33.953324	-118.201934	796034	112,000	sf		
Infiltration BMPs		Office Bldg	12/22/2007	3802 Firestone Blvd	33.95348	-118.202386	796034	112,000	sf		
Infiltration BMPs	Existing	Family Dollar	10/8/2012	3610 Firestone	33.95374	-118.204546	796034		sf		
Infiltration BMPs	Planned	Calden Court Appartments	9/28/2013	8902 Calden Avenue	33.95515	-118.228736	796034	219,543	sf		
Infiltration BMPs		South Gate Ward Building New Parking Lot	10/15/2010	2771 Liberty Boulevard	33.961969	-118.220918	796034	14,811	sf		
Infiltration BMPs		Sherwin Inc	4/11/2007	5531 Borwick Ave	33.925749	-118.172611	796082	7,892	sf		
Infiltration BMPs		Atlantic Avenue Improvements	4/23/2010	Atlantice from Abbott to Firestone	33.943066	-118.181112	796084	22,400	sf		
Infiltration BMPs		Batting Cages	11/4/2010	9599 Pinehurst Avenue	33.945107	-118.182378	796084	7,953	sf		
Infiltration BMPs		Goals Soccer Centers - South Gate	2/10/2010	9600 Pinehurst Avenue	33.945107	-118.182378	796084	113	sf		
Infiltration BMPs		Goals Soccer Centers - South Gate	2/14/2010	9604 Pinehurst Avenue	33.945107	-118.182378	796084	171,333	sf		
Infiltration BMPs	Planned	azalea	11/19/2012	4635 Firestone Blvd.	33.952413	-118.187909	796084	444,636	sf	31,365	cf
Infiltration BMPs	Planned	azalea	11/20/2012	4636 Firestone Blvd.	33.952413	-118.187909	796084	110,869	sf	12,946	cf
Infiltration BMPs	Planned	azalea	11/21/2012	4637 Firestone Blvd.	33.952413	-118.187909	796084	582,860	sf	72,234	cf
Infiltration BMPs	Planned	azalea	11/22/2012	4638 Firestone Blvd.	33.952413	-118.187909	796084	222,727	sf	25,348	cf
Infiltration BMPs	Planned	azalea	11/23/2012	4639 Firestone Blvd.	33.952413	-118.187909	796084	222,727	sf	64,314	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMPs	Existing	New South Central Properties, LLC	5/28/2009	8600 Rheem Ave	33.955566	-118.192042	796084	20,960	sf		
Infiltration BMPs		LA Water	8/4/2010	9415 Burtis	33.947369	-118.176109	796350	154,538	sf		
Permeable Pavement		South Gate McDonald's	10/2/2013	3315 Tweedy Boulevard	33.945113	-118.211464	796034	8,697	sf		
Permeable Pavement		South Gate McDonald's	10/3/2013	3316 Tweedy Boulevard	33.945113	-118.211464	796034	3,550	sf		

D1.8. City of Whittier

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration	Planned	GWT Biolswale	2014	Greenway Trail from to	33.972121	-118.044253	895098				
Bioretention / Biofiltration	Planned	Whittier Blvd Widening and Bioswale	2017	Whittier Blvd from to							
Green Streets (Describe)	Planned	Lower Uptown reverse drains	2014	Milton, Newlin, Comstock from La Cuarta to Walnut	33.970199	-118.039721	895098		TBD		TBD
Site-Scale Detention Basin	Existing	Police Building and City Hall Storm Drainage	2010	13230 Penn St	33.974748	-118.03371	895098				

Attachment E: SUPPORTING CALIBRATION DATA

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

January 15, 2015

RB-AR11940

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1. Lower San Gabriel River

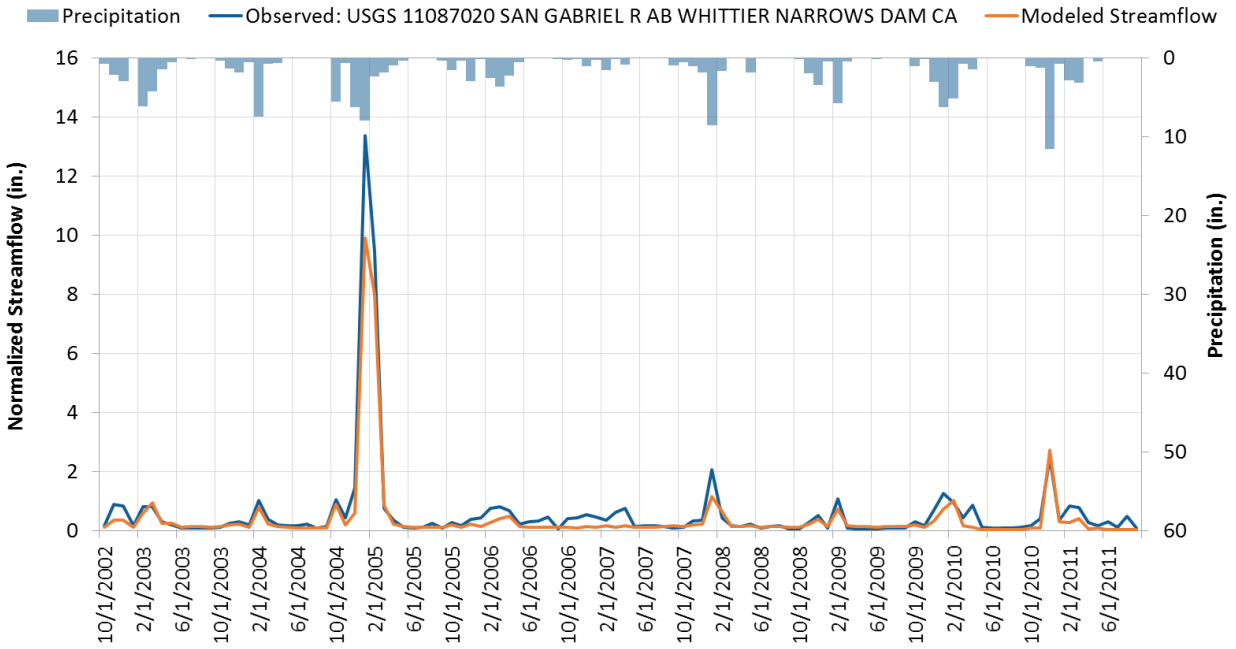


Figure 1. Monthly hydrograph for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

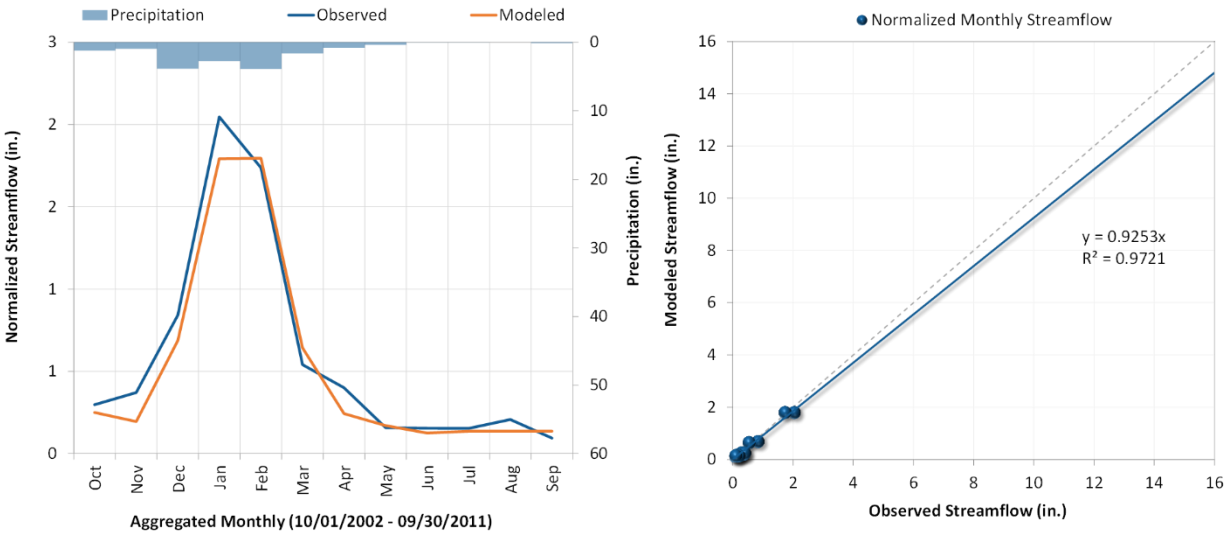


Figure 2. Aggregated monthly hydrograph for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

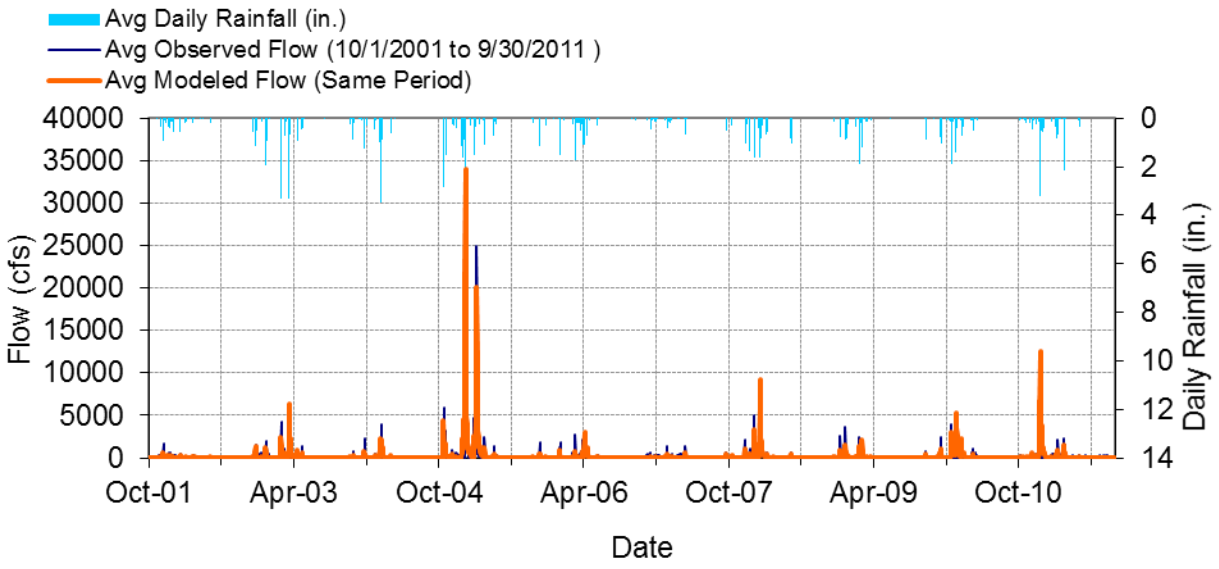


Figure 3. Mean daily flow for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

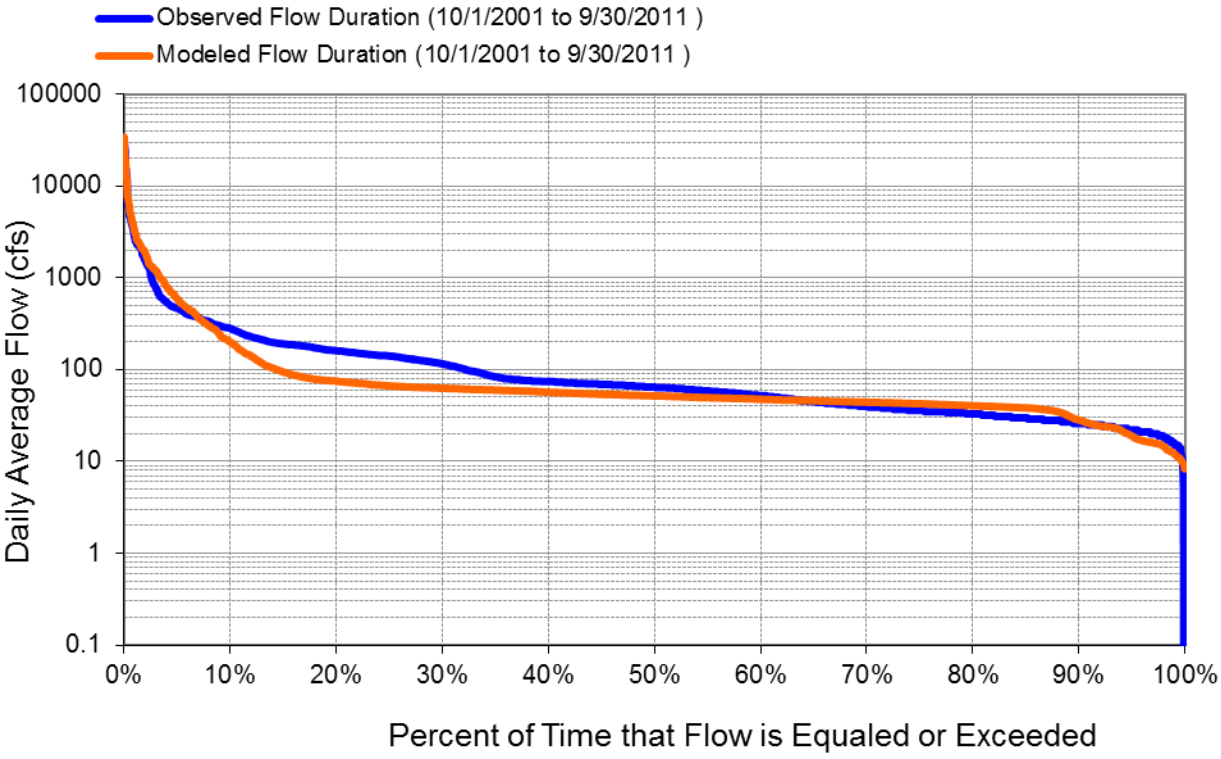


Figure 4. Daily flow exceedance for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

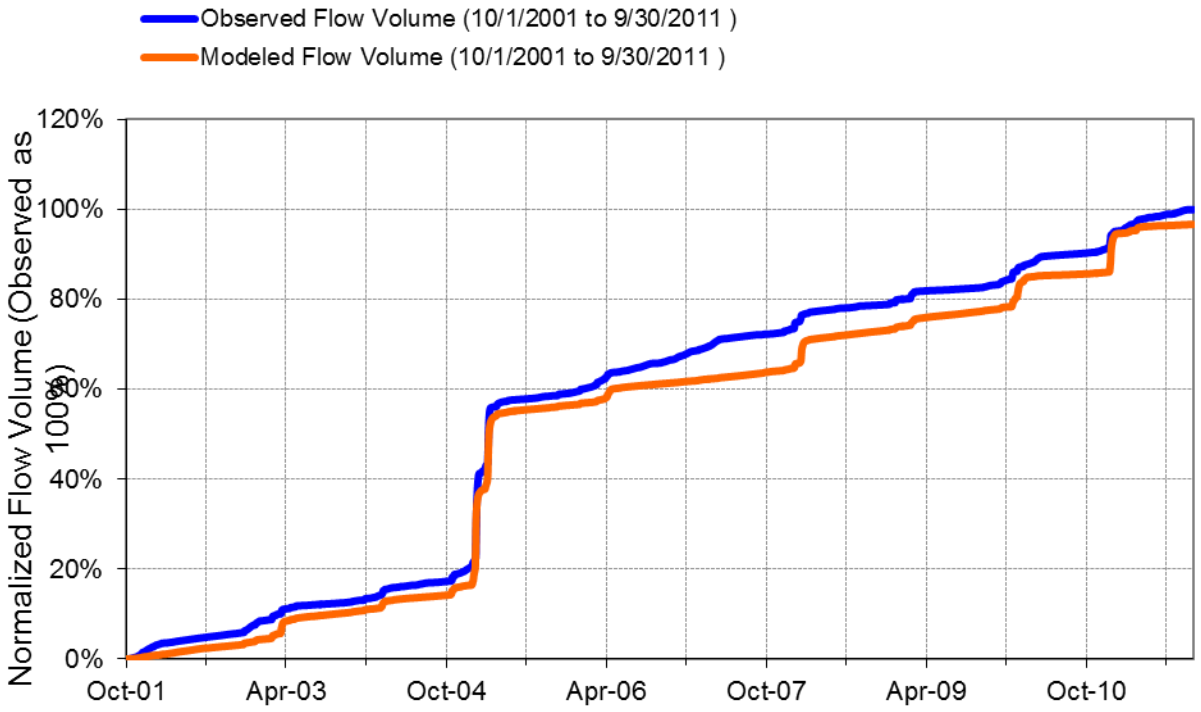


Figure 5. Flow accumulation for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

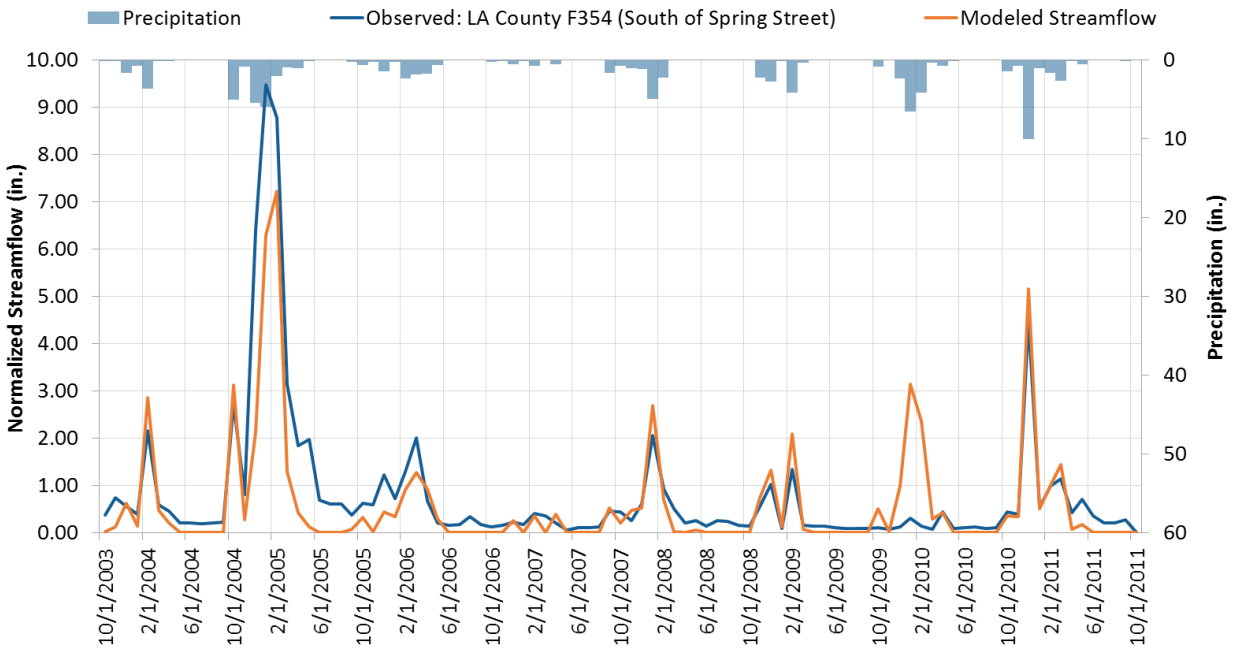


Figure 6. Monthly hydrograph for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

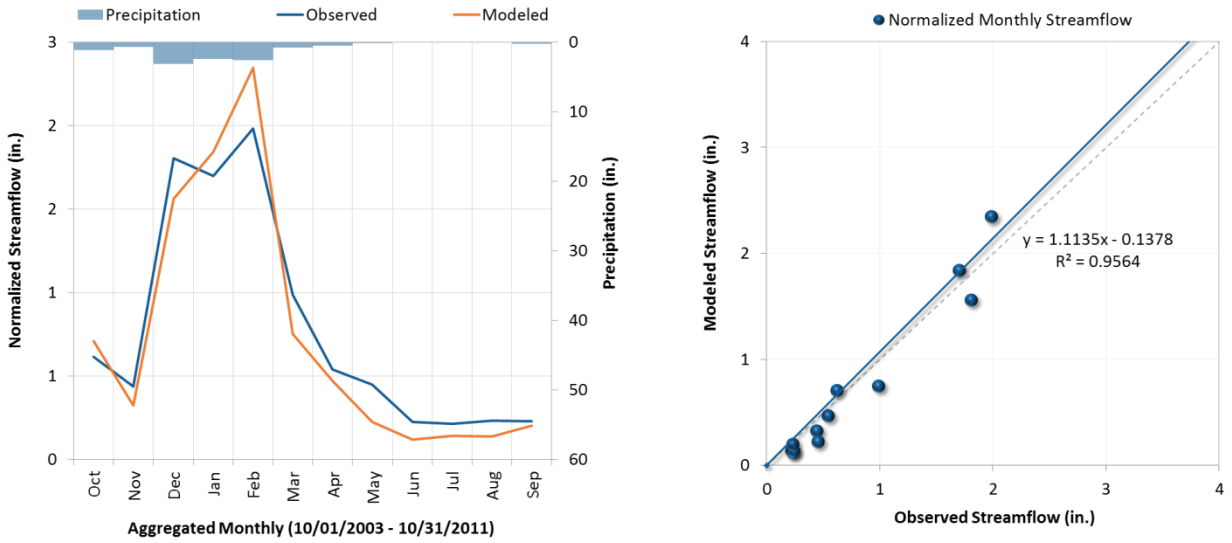


Figure 7. Aggregated monthly hydrograph for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

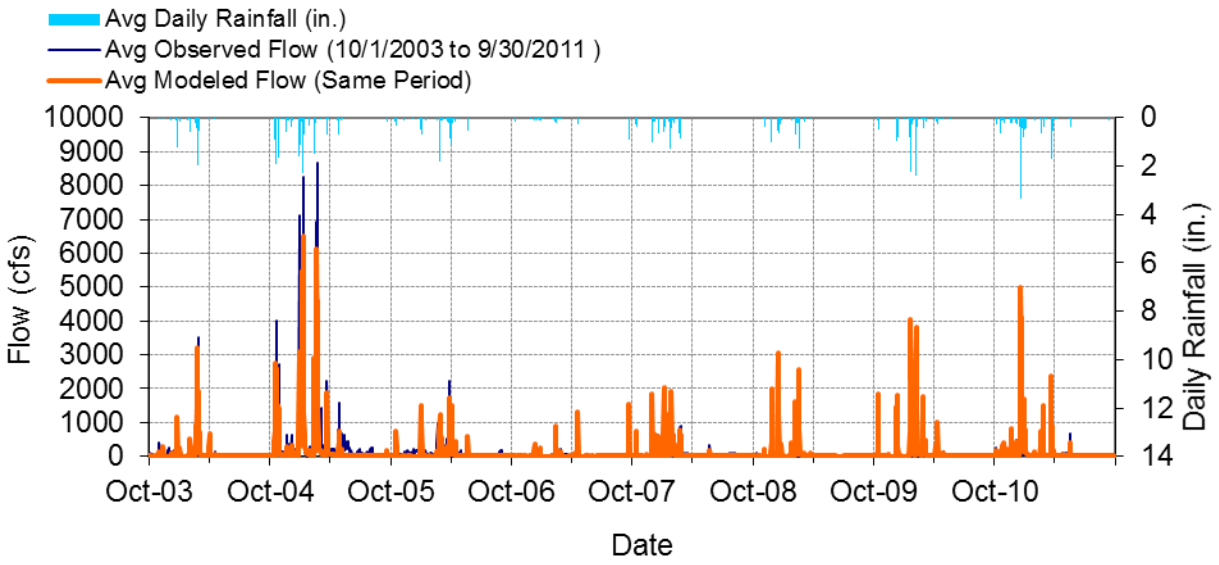


Figure 8. Mean daily flow for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

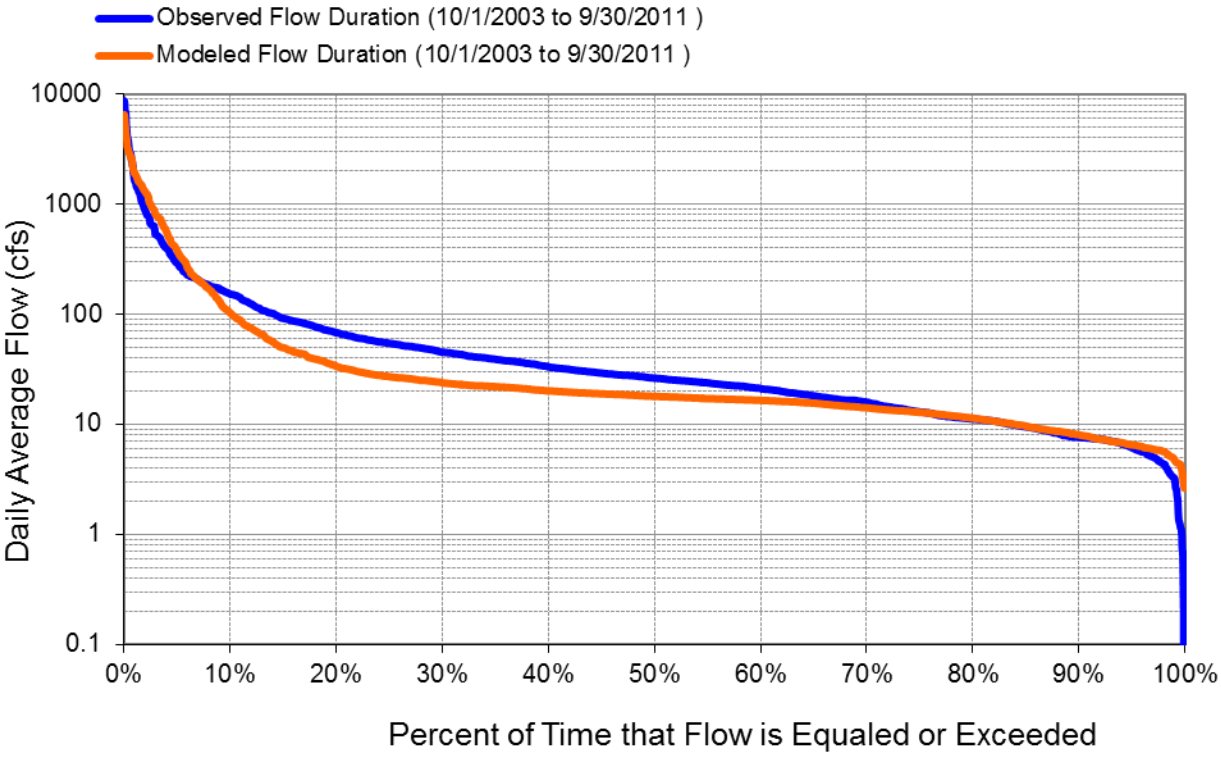


Figure 9. Daily flow exceedance for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

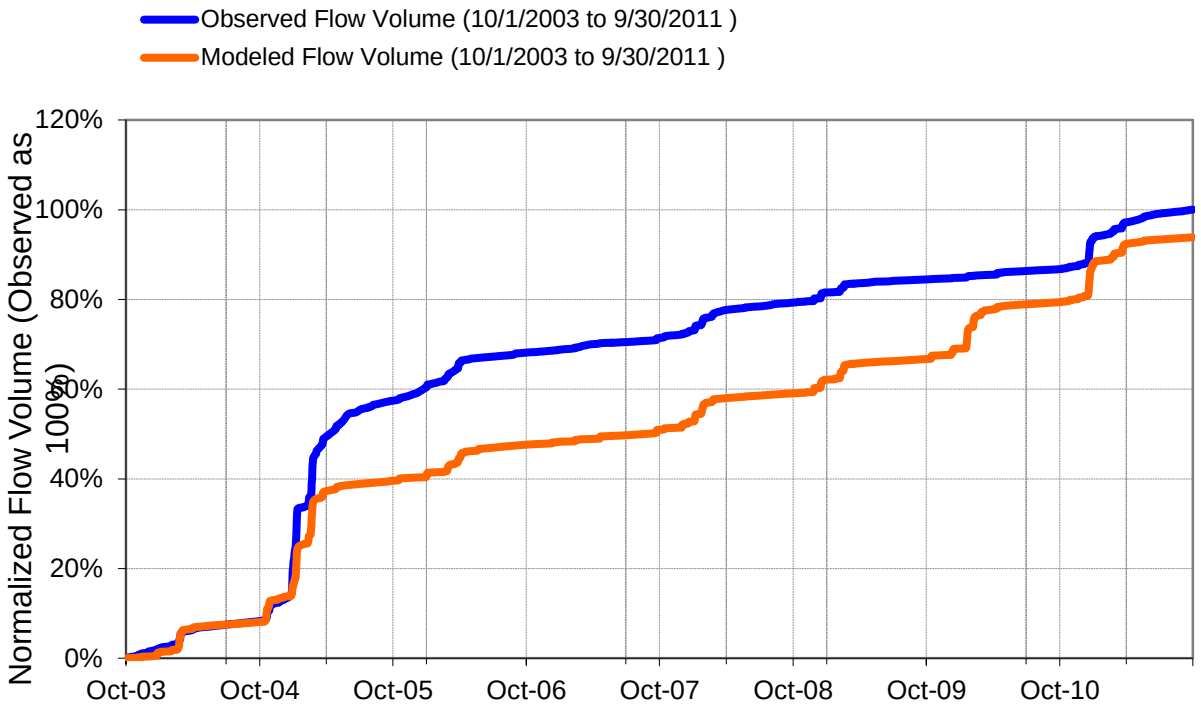


Figure 10. Flow accumulation for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

Table 1. Summary of water quality data evaluated for the Lower San Gabriel River

Gage	Constituent	Minimum	Q1	Median	Q3	Maximum
S14	Total Copper (ug/l)	5.0	10.5	13.1	23.9	81.4
S13	Total Copper (ug/l)	0.5	11.8	28.1	48.3	351.0
S14	Total Lead (ug/l)	0.7	1.4	2.9	8.2	56.0
S13	Total Lead (ug/l)	0.2	1.1	10.2	19.2	147.0
S14	TSS (mg/L)	5.0	16.8	38.0	169.8	1258.0
S13	TSS (mg/L)	1.0	48.0	97.0	230.5	1556.0
S14	Total Zinc (ug/l)	19.8	36.6	61.0	86.9	440.0
S13	Total Zinc (ug/l)	1.0	62.0	135.0	241.5	2010.0
S14	Fecal Coliform (MPN/100mL)	20	300	1,300	50,000	16,000,000
S13	FC (MPN/100mL)	20	1,300	16,000	90,000	2,200,000
S14	Total Nitrogen (mg/l)	-	-	-	-	-
S13	Total Nitrogen (mg/l)	-	-	-	-	-
S14	Total Phosphorous (mg/l)	0.05	0.11	0.18	0.41	0.86
S13	Total Phosphorous (mg/l)	-	-	-	-	-

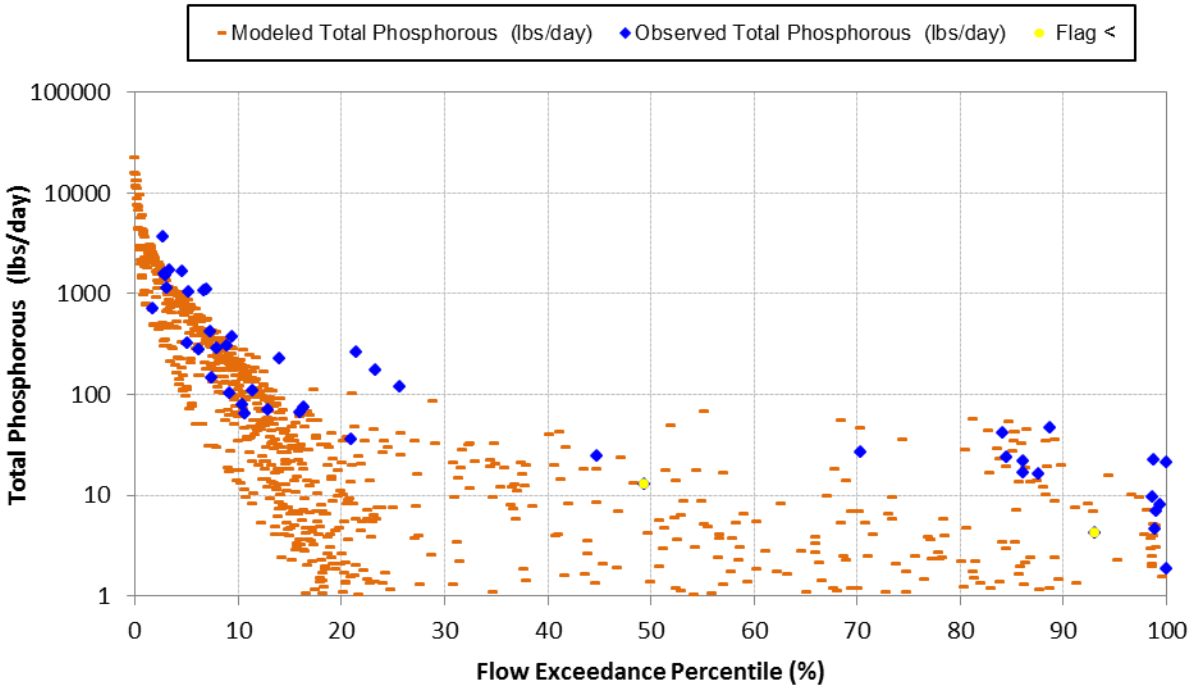


Figure 11. Simulated vs. observed load duration plots for Total Phosphorous (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

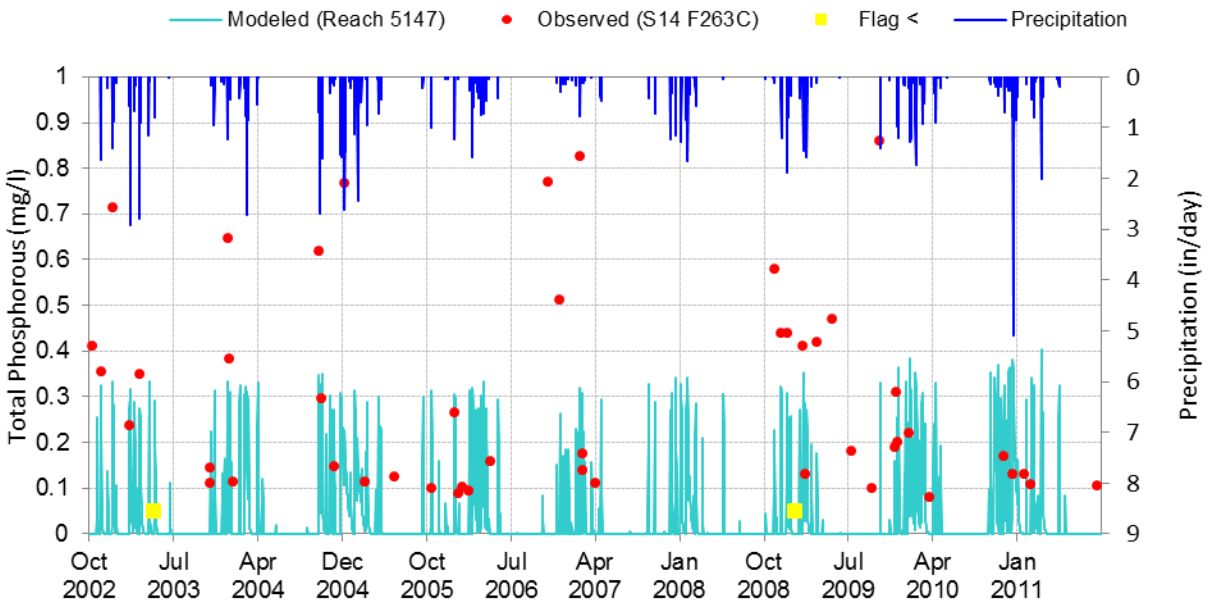


Figure 12. Simulated vs. observed time series plots for Total Phosphorous (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

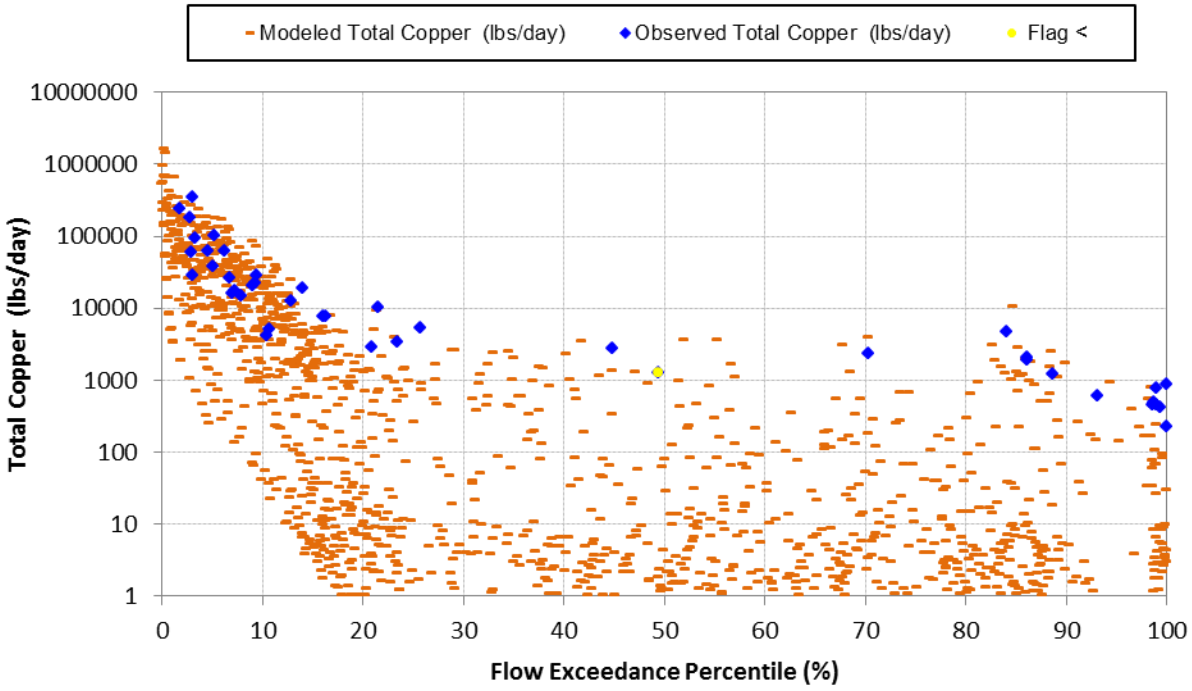


Figure 13. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

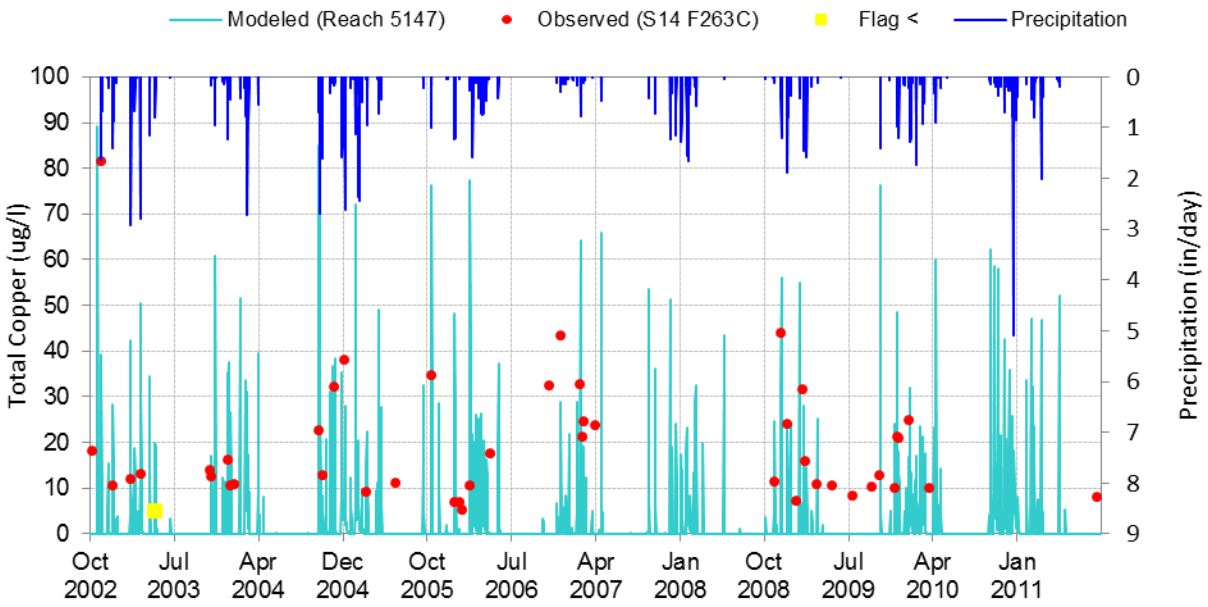


Figure 14. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

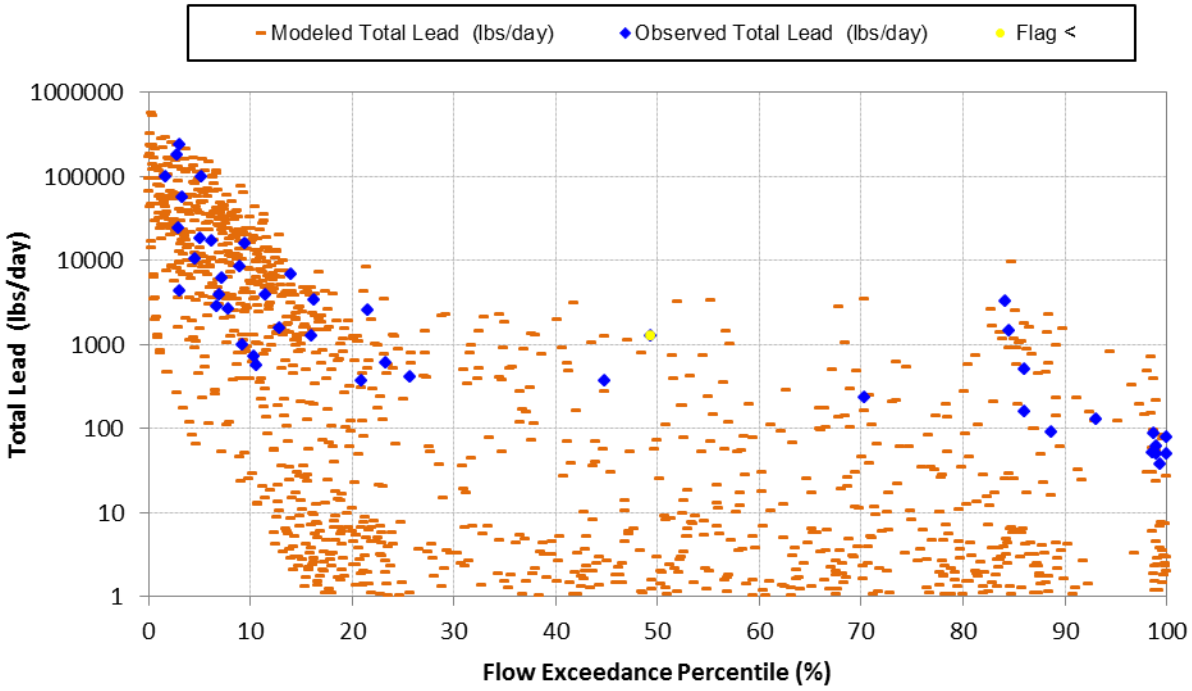


Figure 15. Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

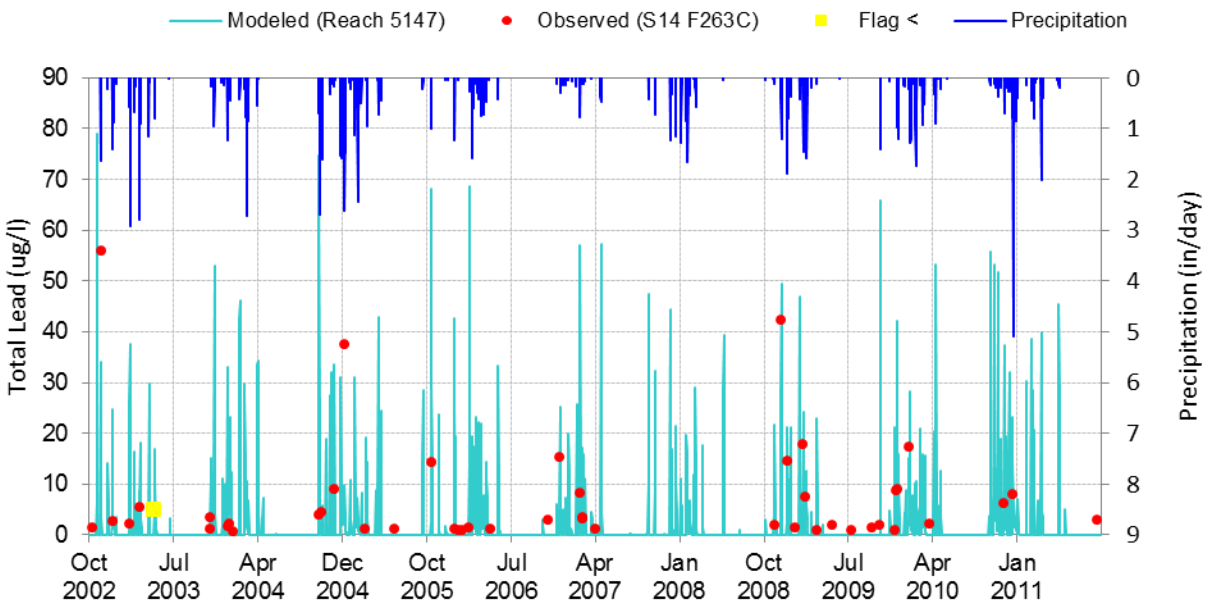


Figure 16. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

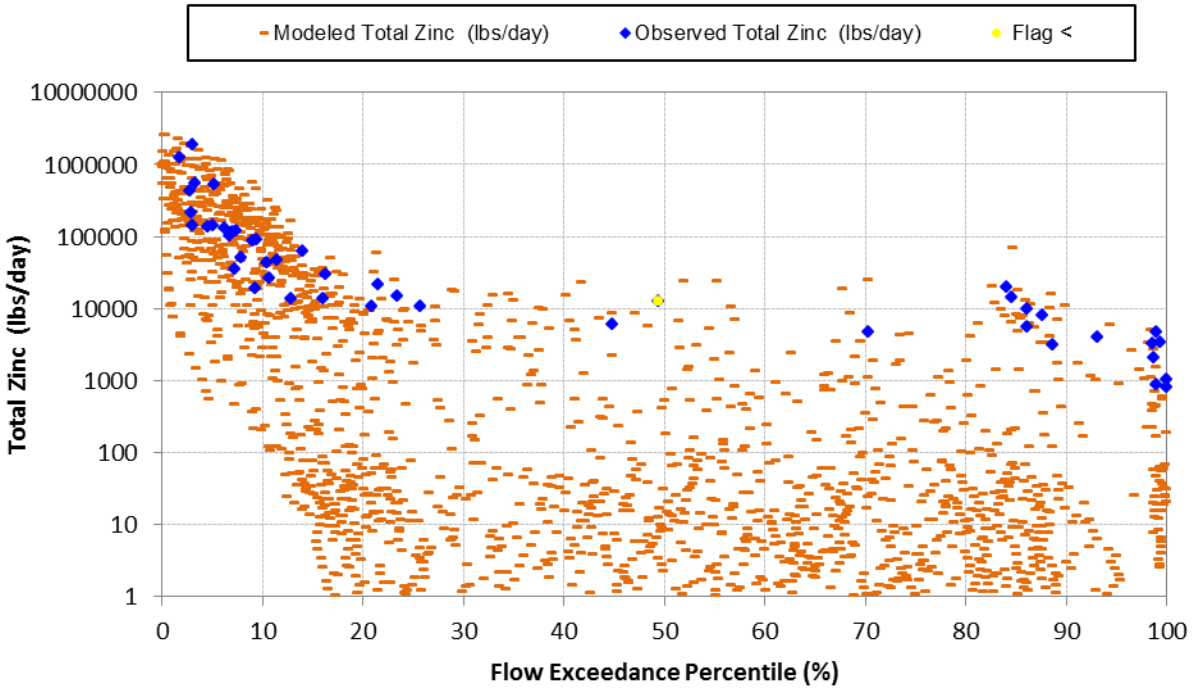


Figure 17. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

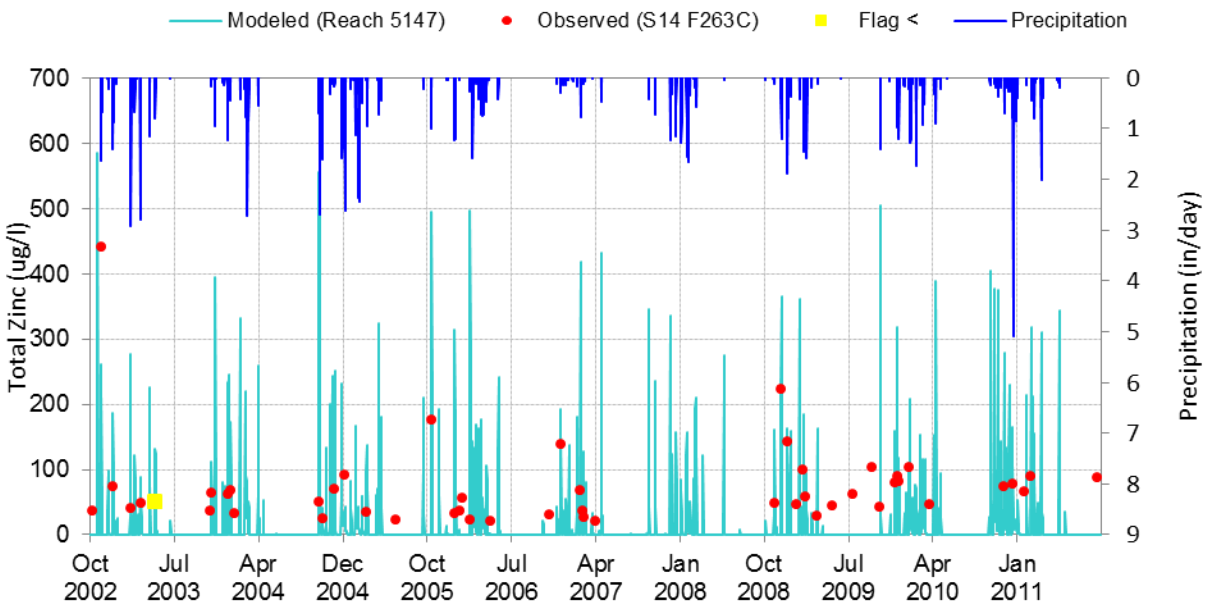


Figure 18. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

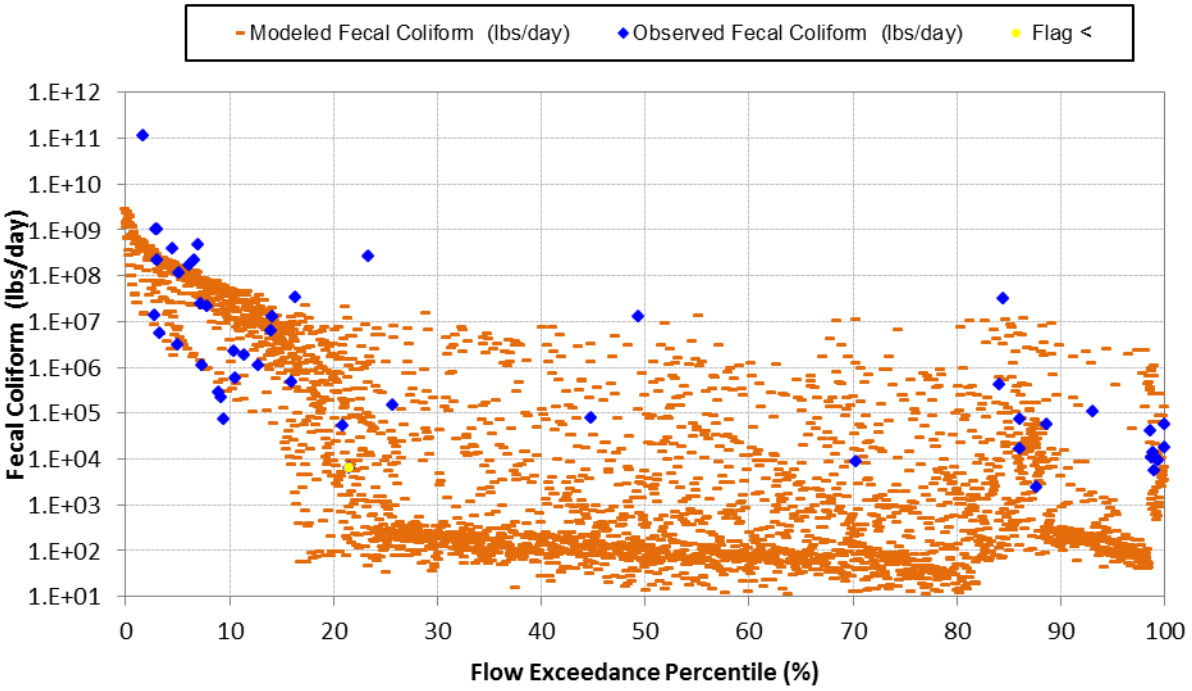


Figure 19. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011).

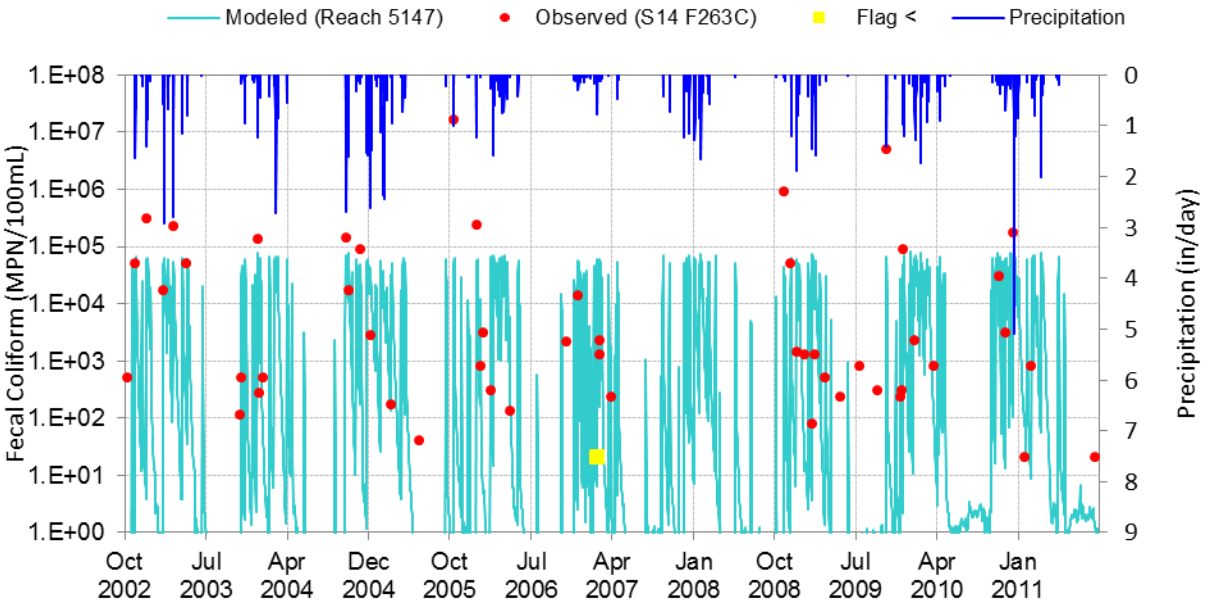


Figure 20. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011).

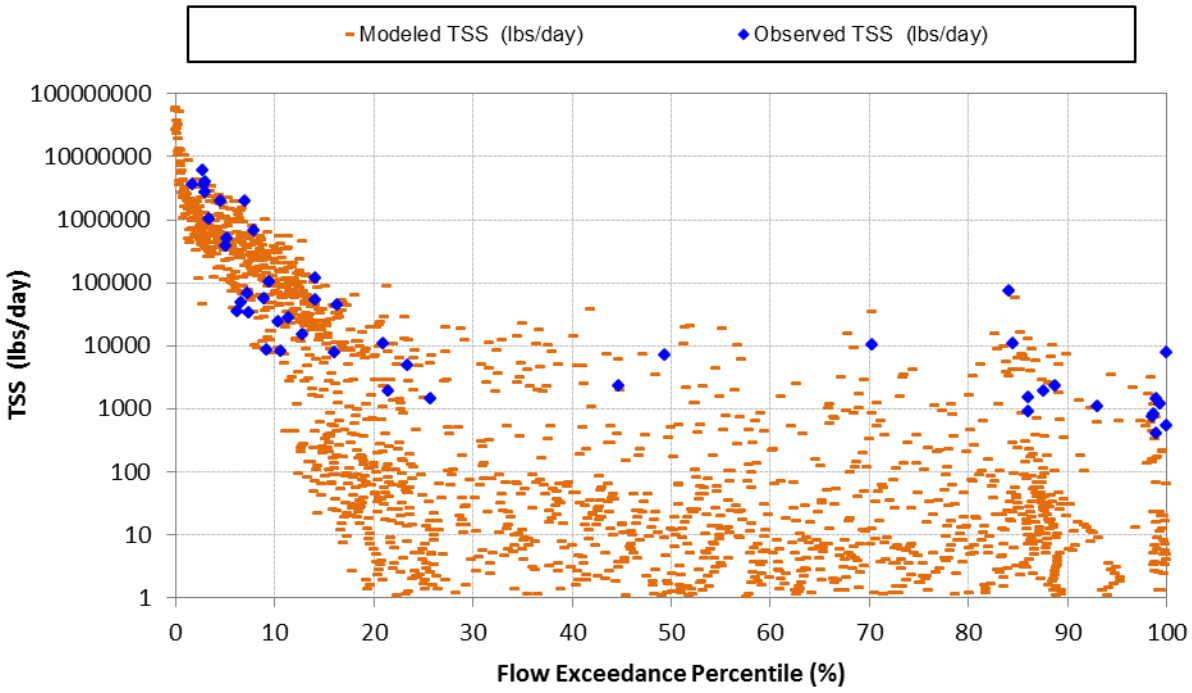


Figure 21. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011).

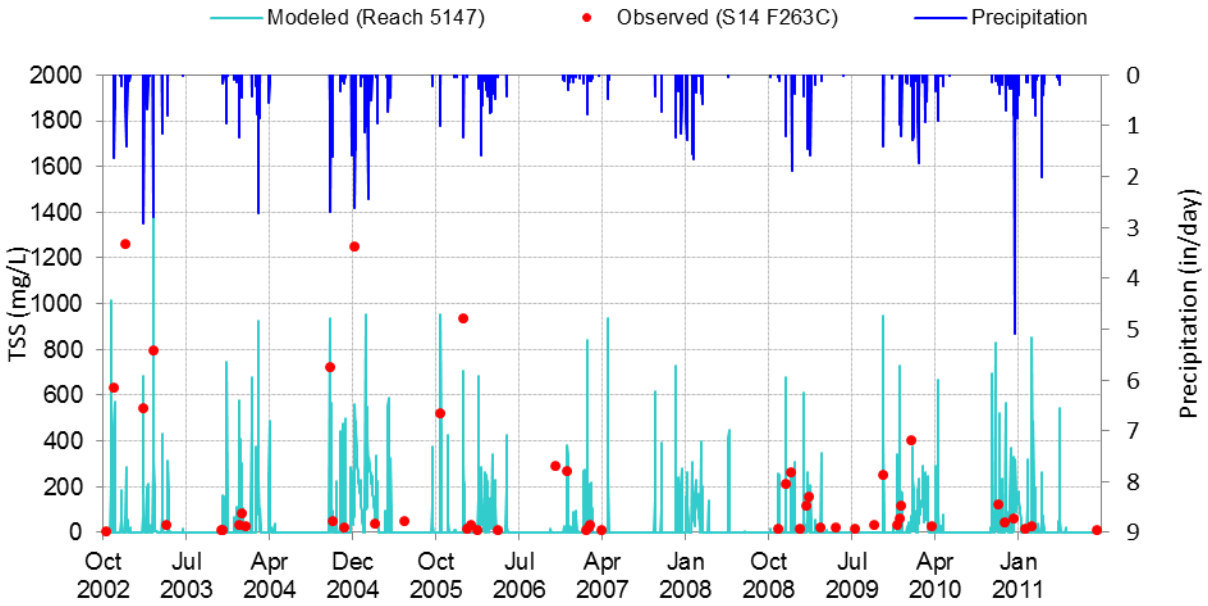


Figure 22. Simulated vs. observed time series plots for Total Sediment (10/1/2002 through 9/30/2011).

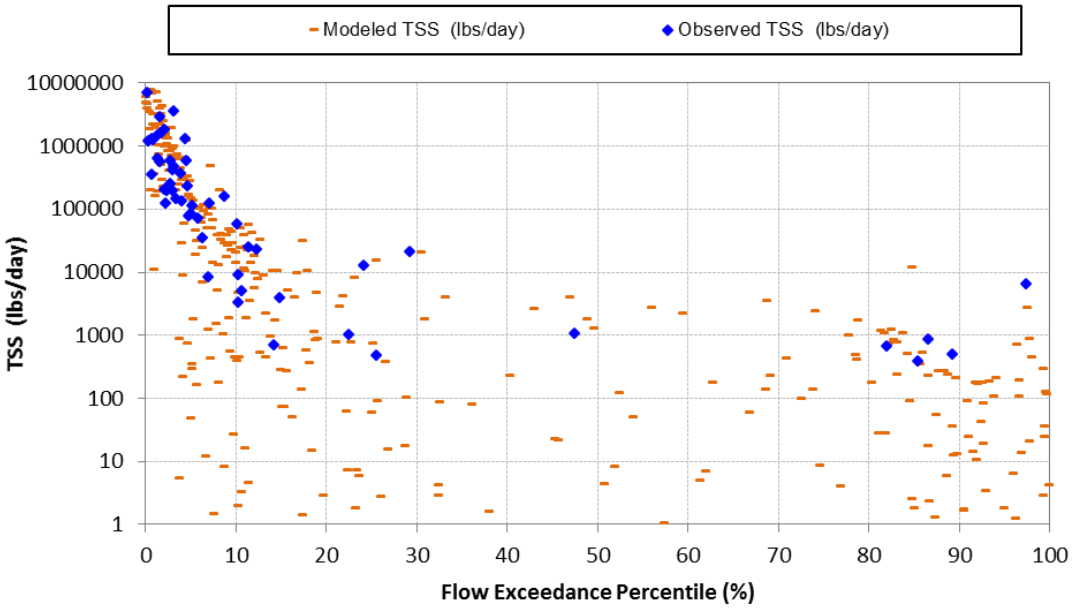


Figure 23. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

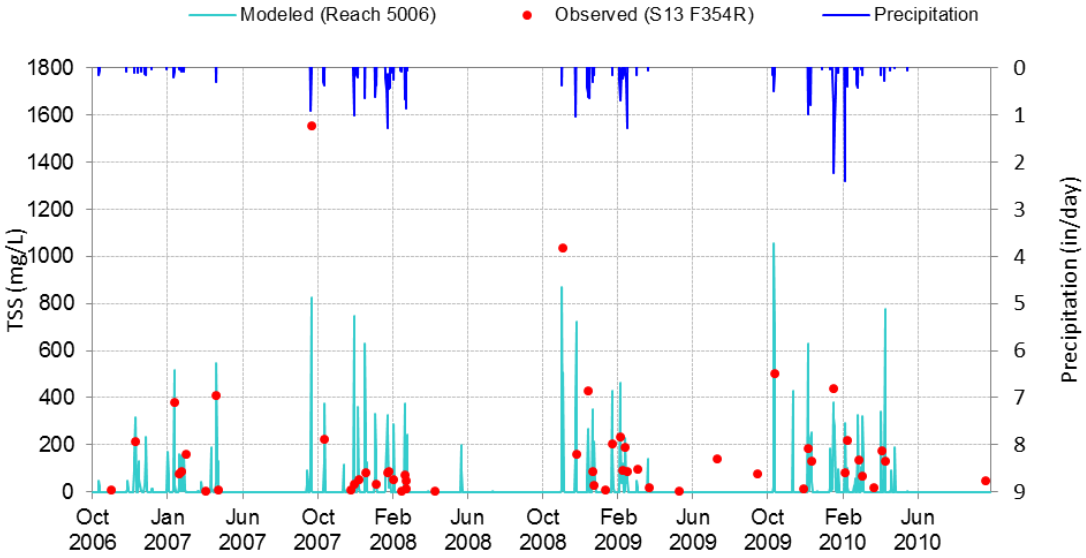


Figure 24. Simulated vs. observed timeseries plots for Total Sediment (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

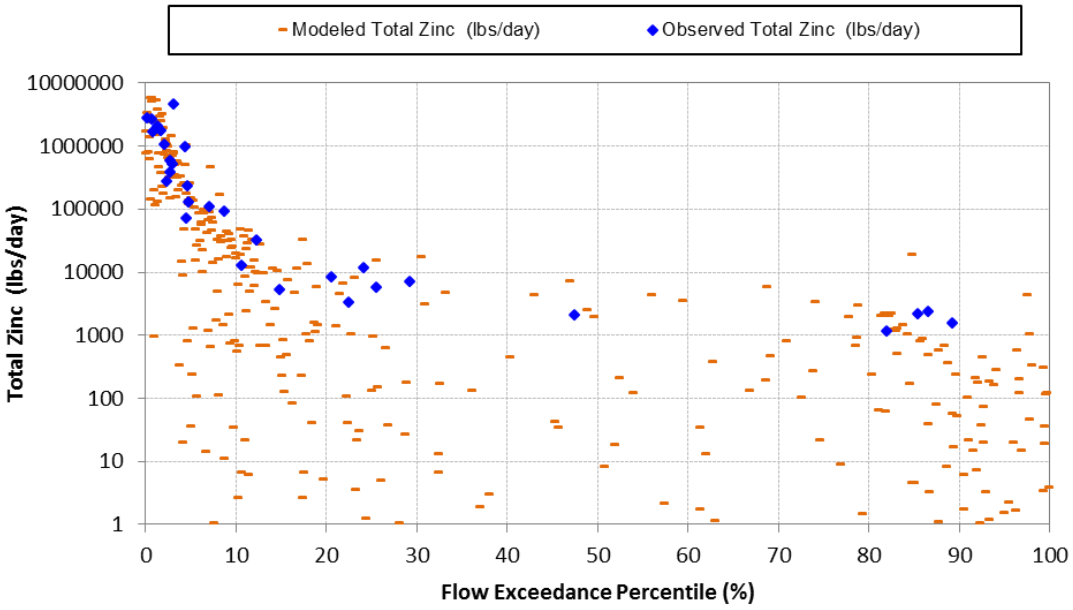


Figure 25. Simulated vs. observed load duration plots for Total Zinc (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

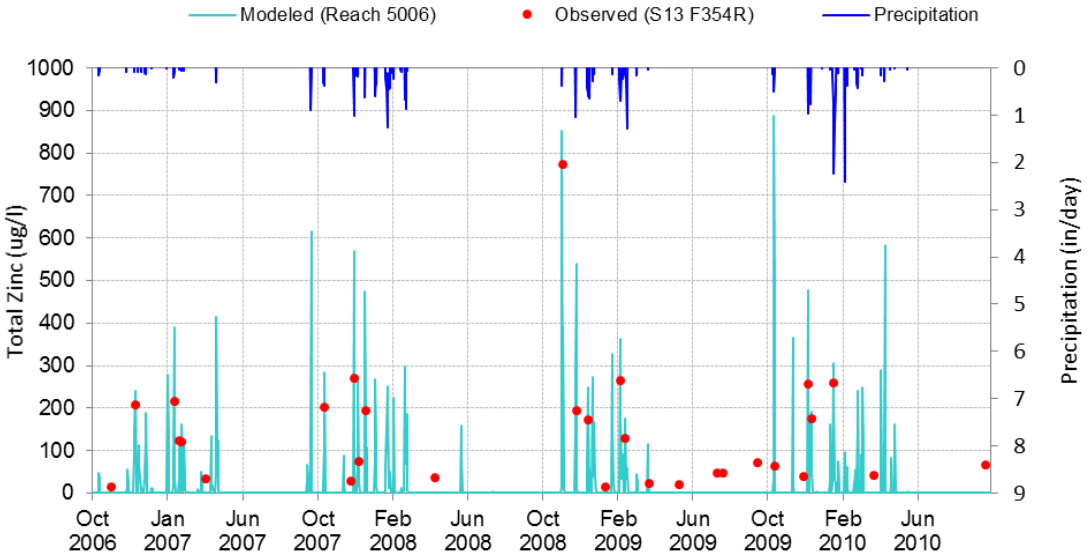


Figure 26. Simulated vs. observed timeseries plots for Total Zinc (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

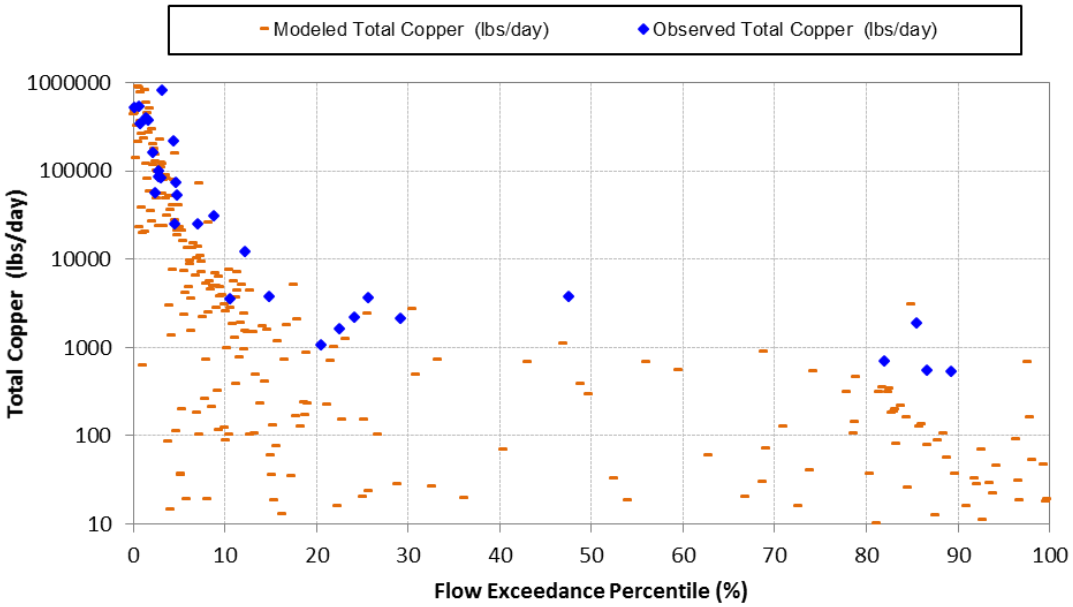


Figure 27. Simulated vs. observed load duration plots for Total Copper (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

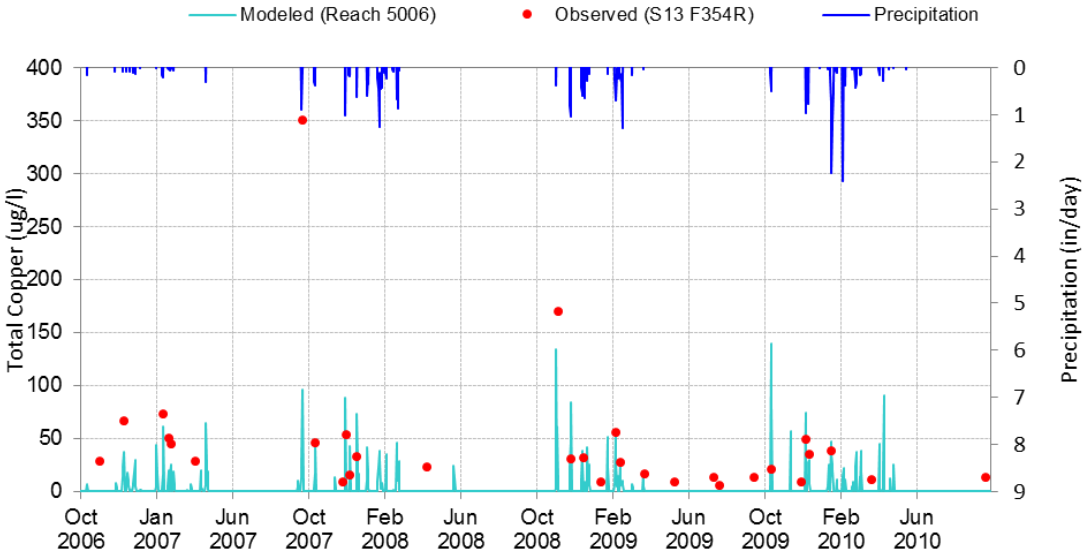


Figure 28. Simulated vs. observed timeseries plots for Total Copper (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

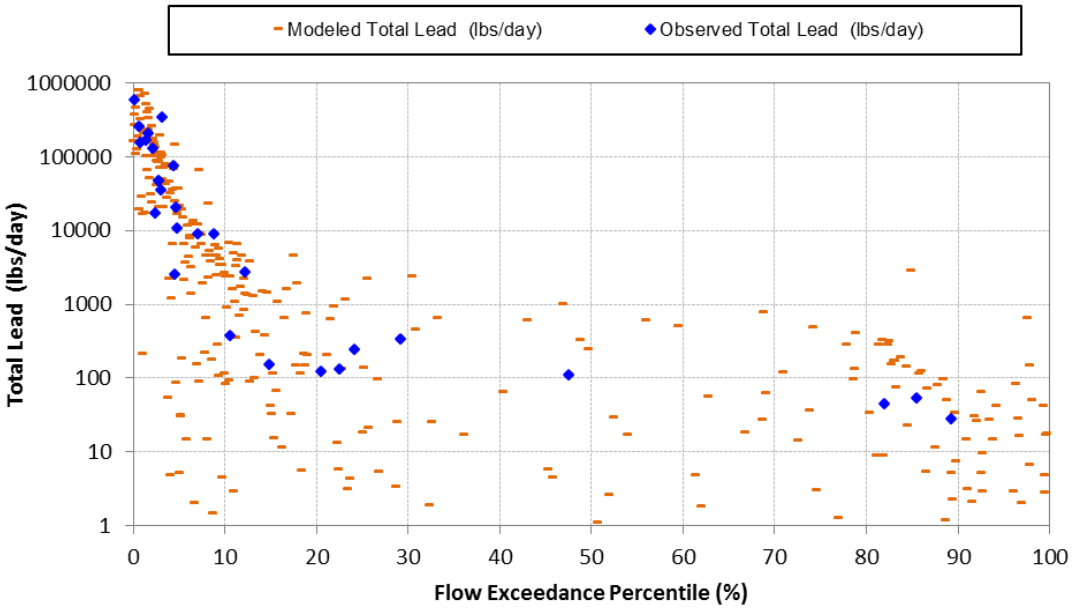


Figure 29 Simulated vs. observed load duration plots for Total Lead (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

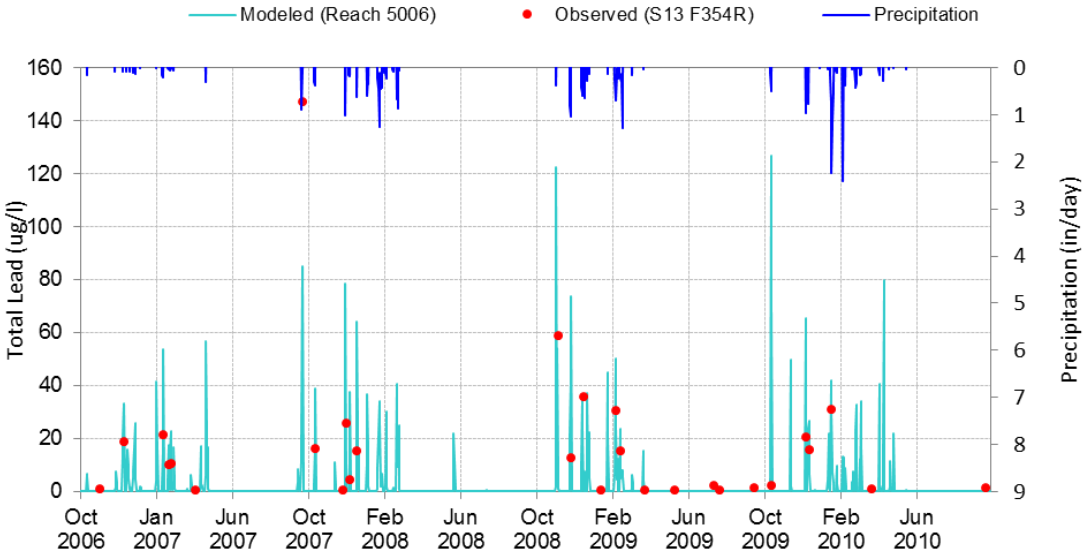


Figure 30. Simulated vs. observed timeseries plots for Total Lead (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

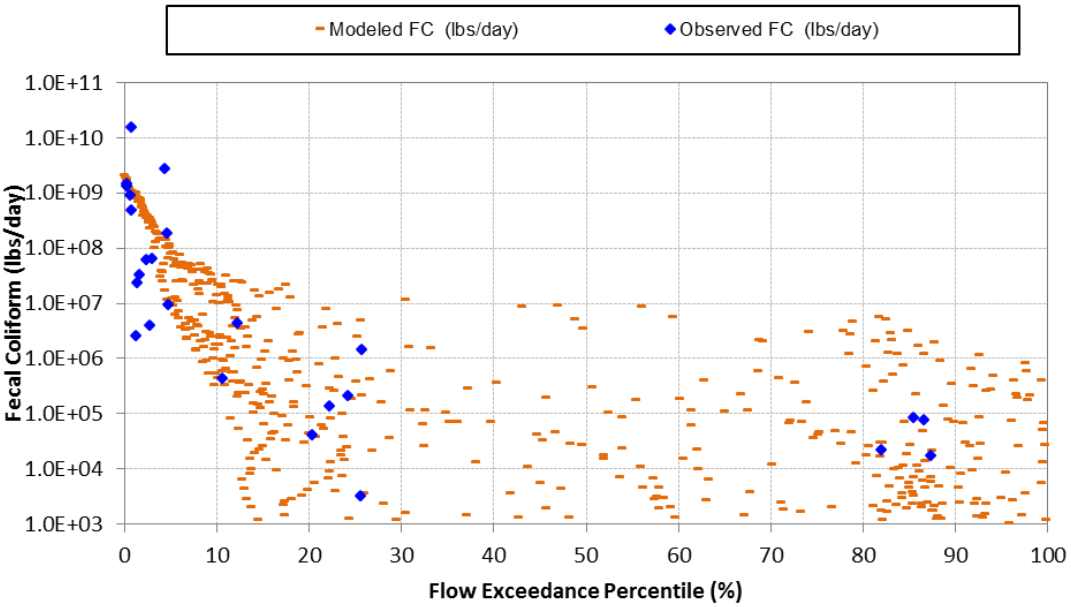


Figure 31. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

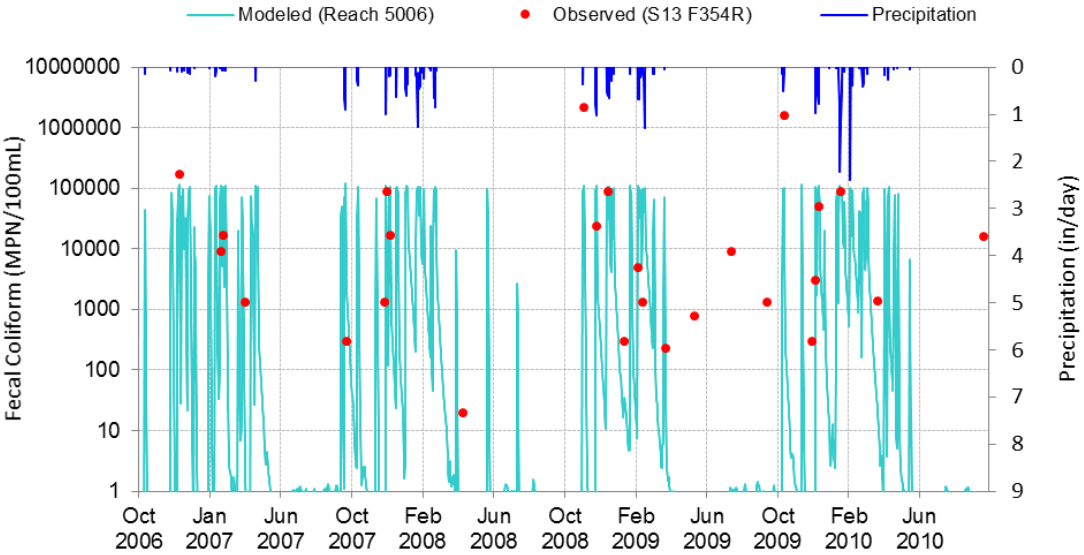


Figure 32. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

2. Lower Los Angeles River

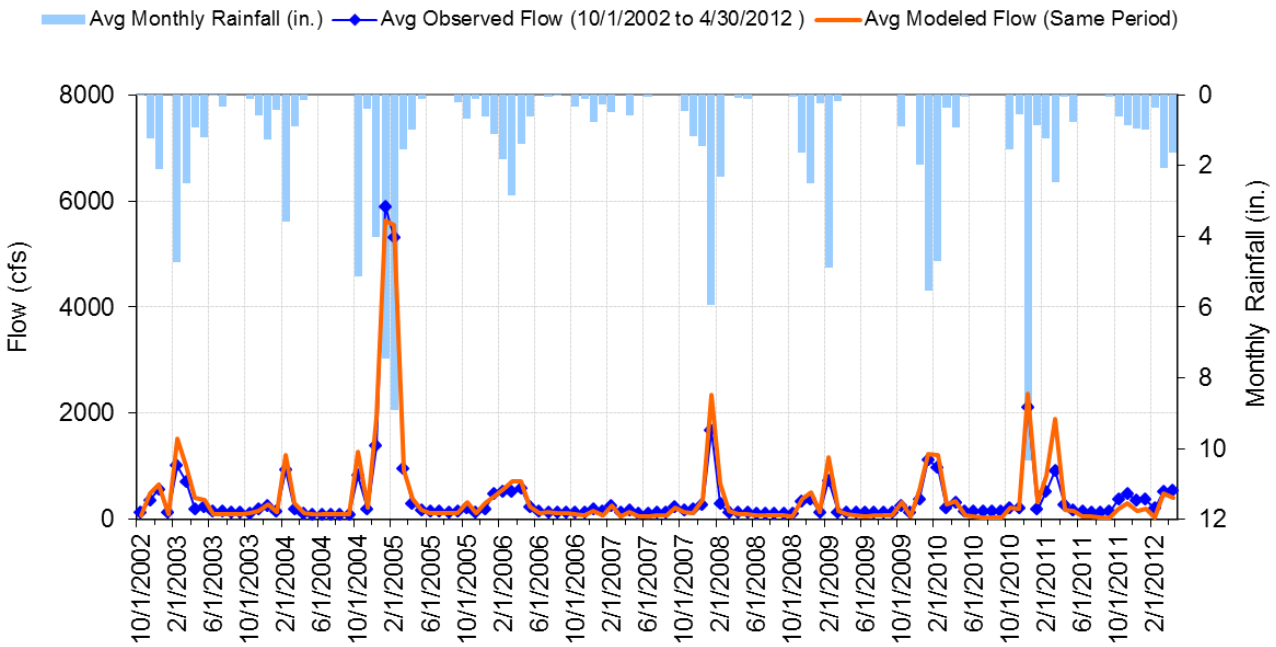


Figure 33. Monthly hydrograph for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

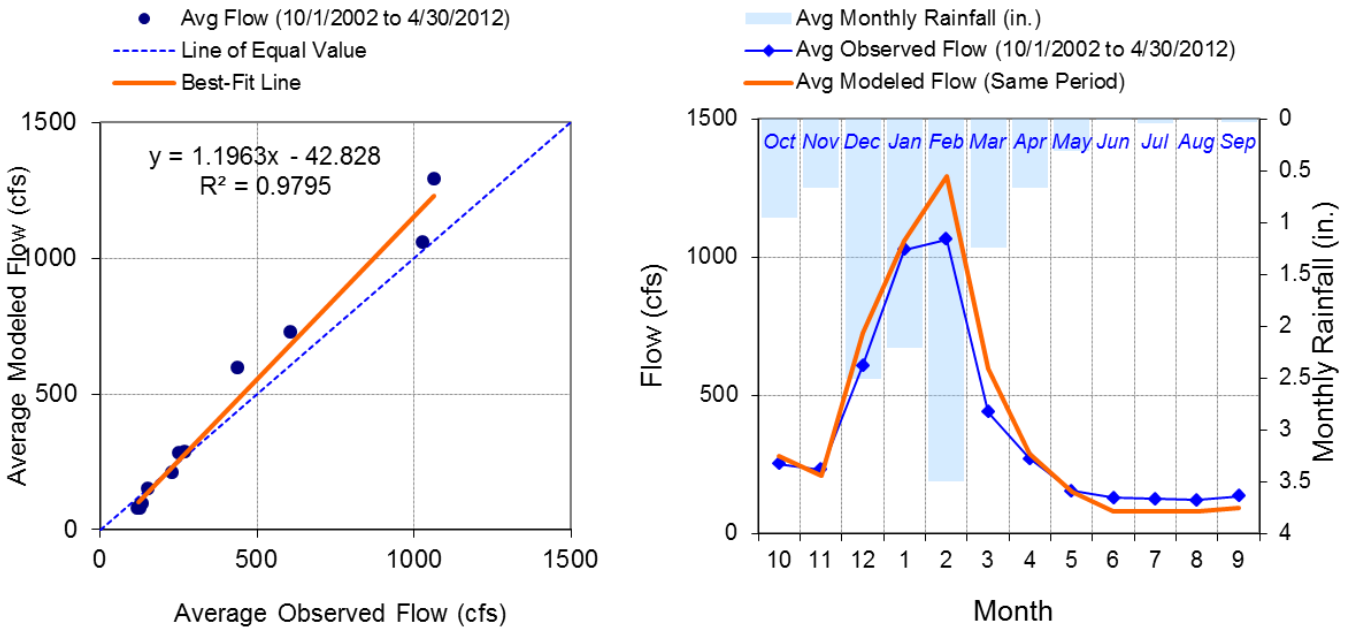


Figure 34. Aggregated monthly hydrograph for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

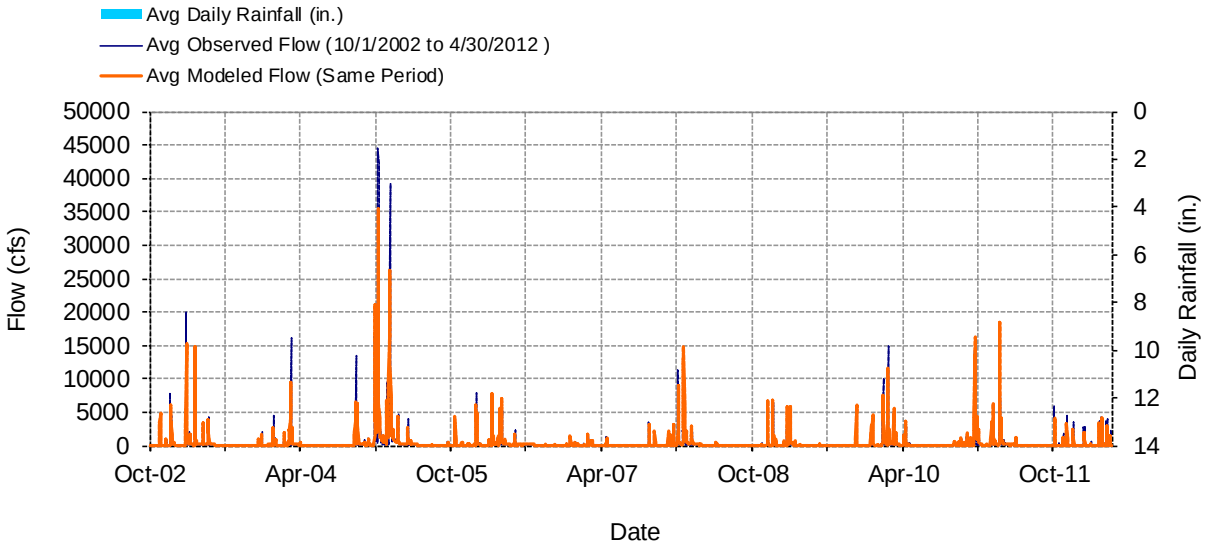


Figure 35. Mean daily flow for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

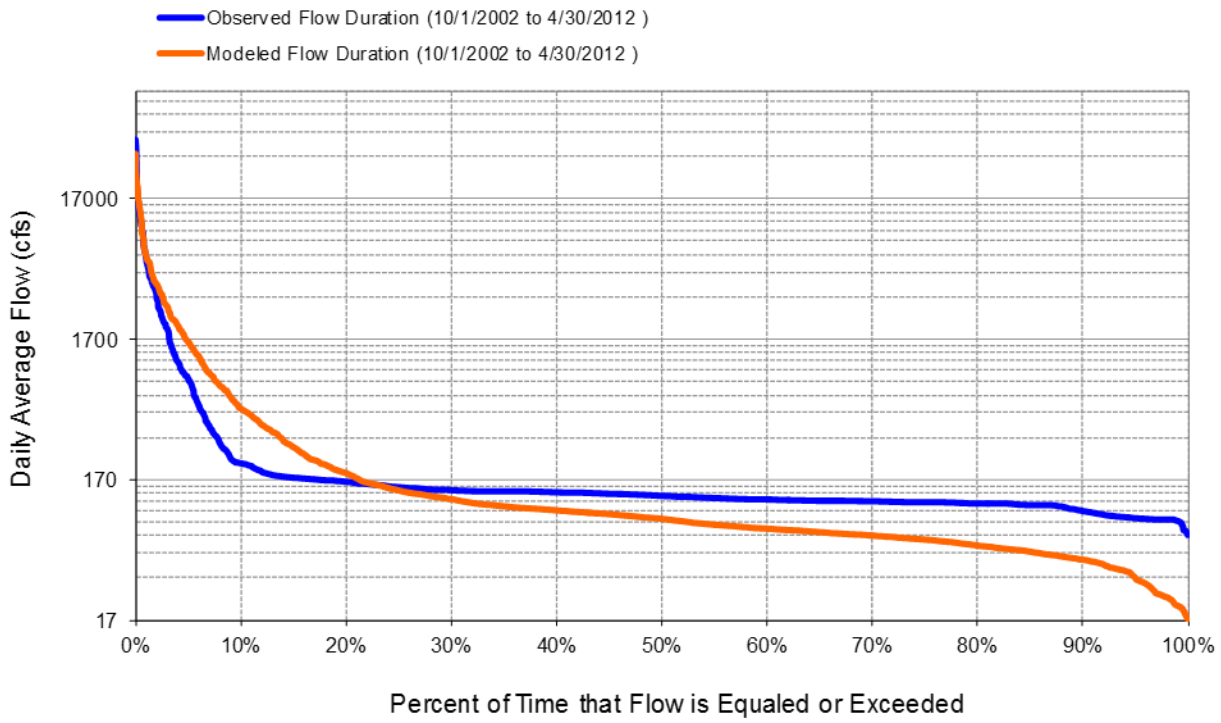


Figure 36. Daily flow exceedance for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

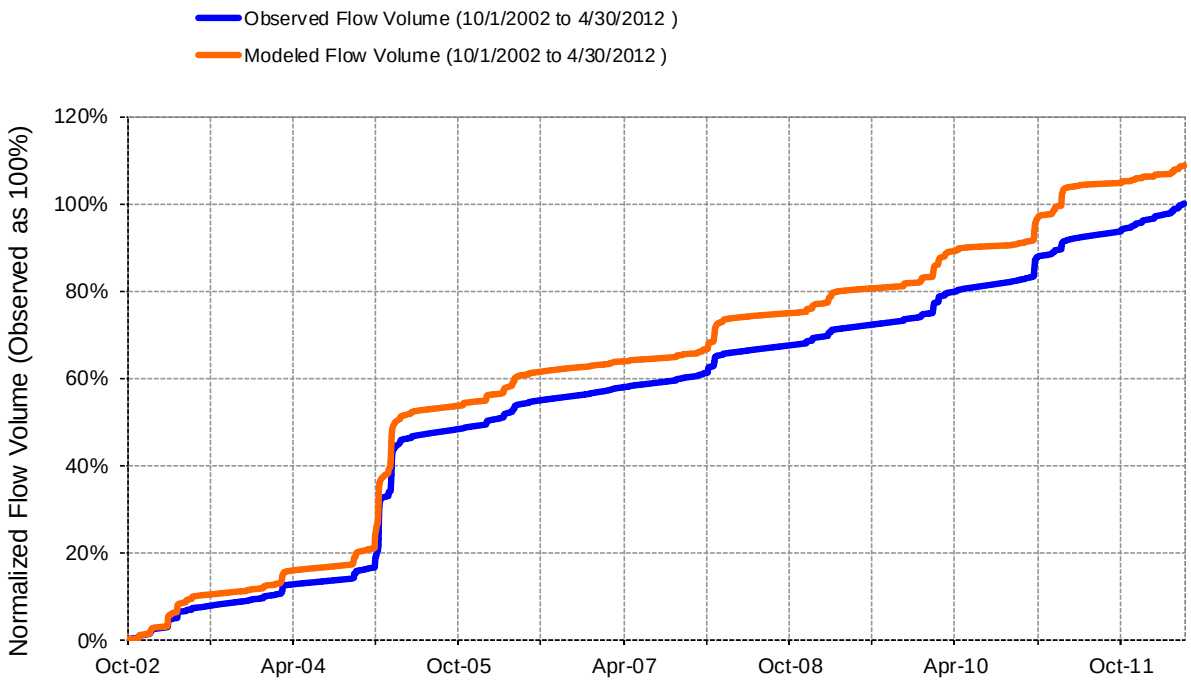


Figure 37. Flow accumulation for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

Table 2. Summary of water quality data evaluated for the Lower Los Angeles River

Gage	Constituent	Minimum	Q1	Median	Q3	Maximum
S10	Total Copper (ug/l)	0.5	12.975	25.8	49.55	424
S10	Total Lead (ug/l)	0.2	2.45	15.6	35.775	1070
S10	TSS (mg/L)	1	63	142.5	295	2280
S10	Total Zinc (ug/l)	22.3	63.85	124	261.75	2590
S10	Fecal Coliform (MPN/100mL)	20	500	24000	240000	24000000
S10	Total Nitrogen (mg/l)	0.03	0.60245	1.064	1.725	6.75
S10	Total Phosphorous (mg/l)	0.05	0.24	0.3785	0.538	8.24

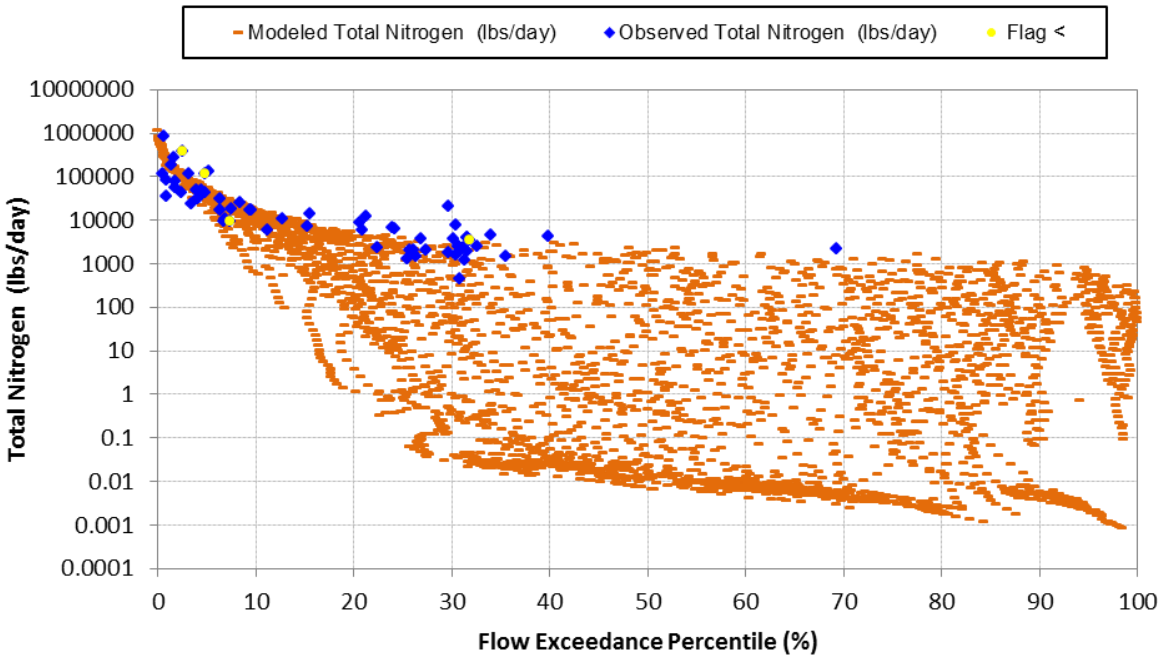


Figure 38. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

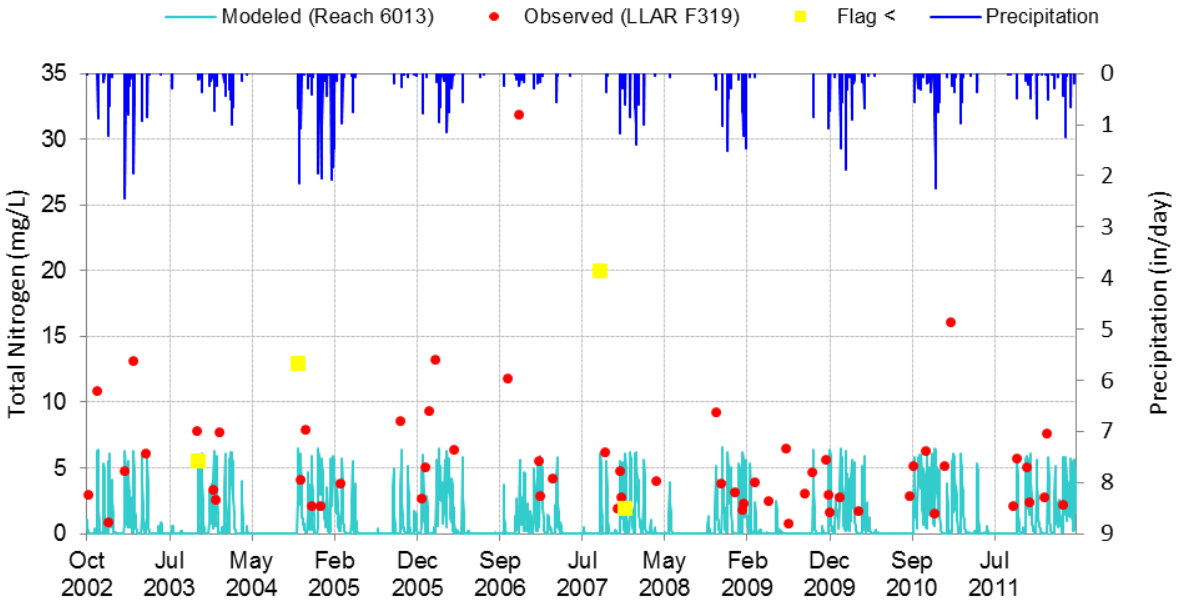


Figure 39. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

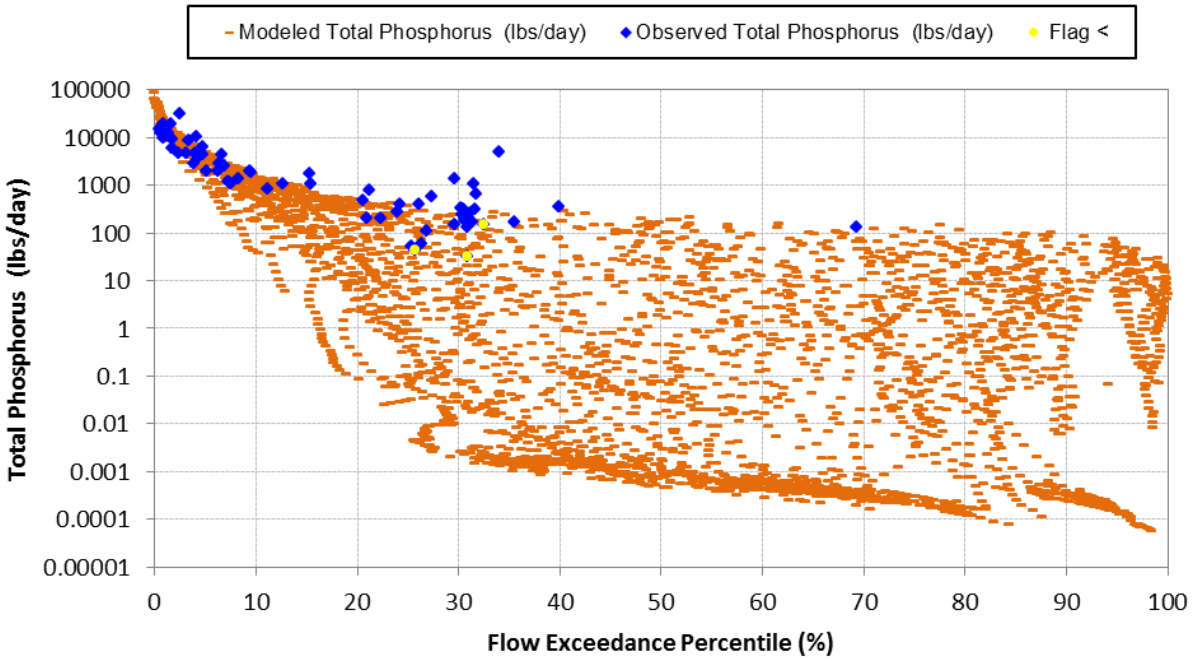


Figure 40. Simulated vs. observed load duration plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

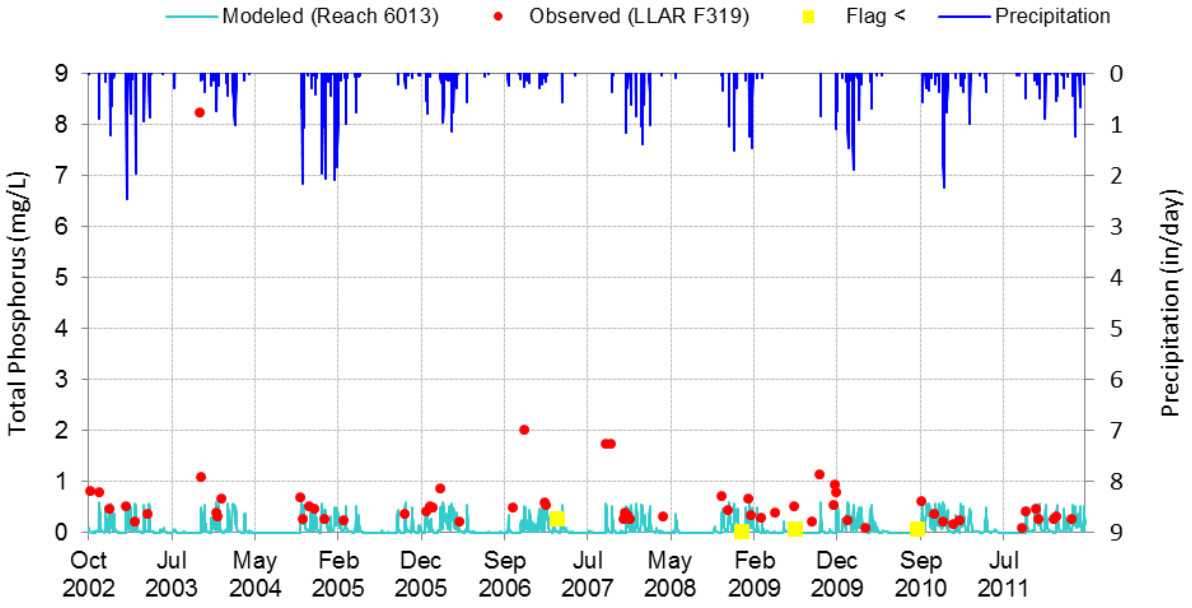


Figure 41. Simulated vs. observed time series plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

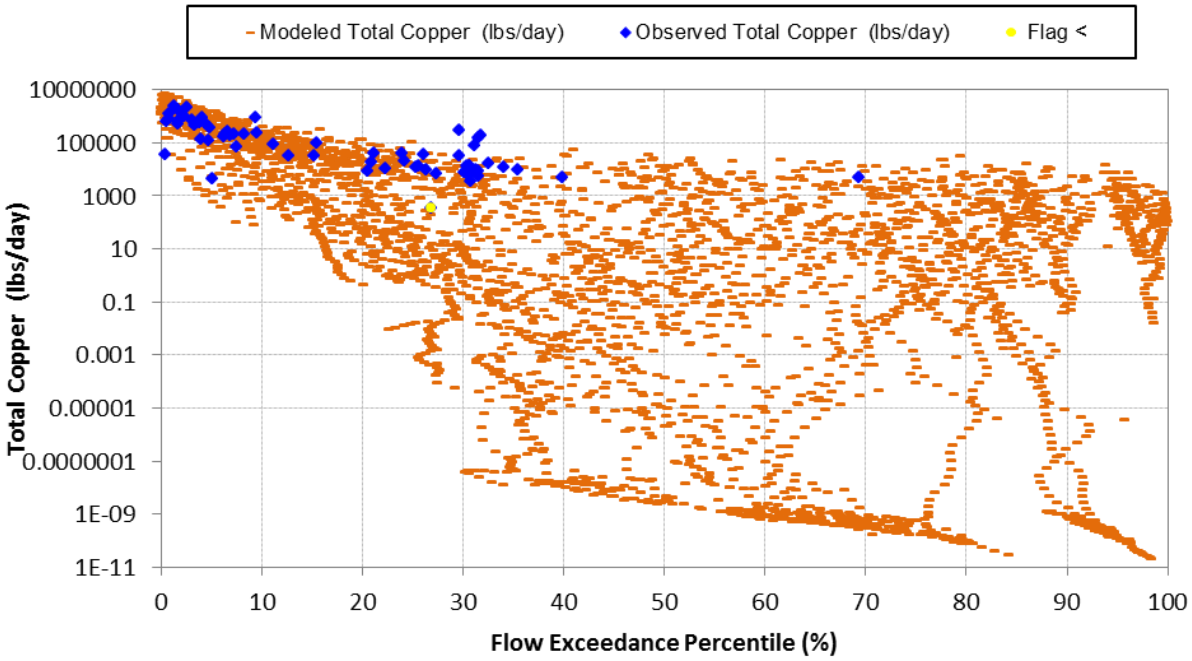


Figure 42. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

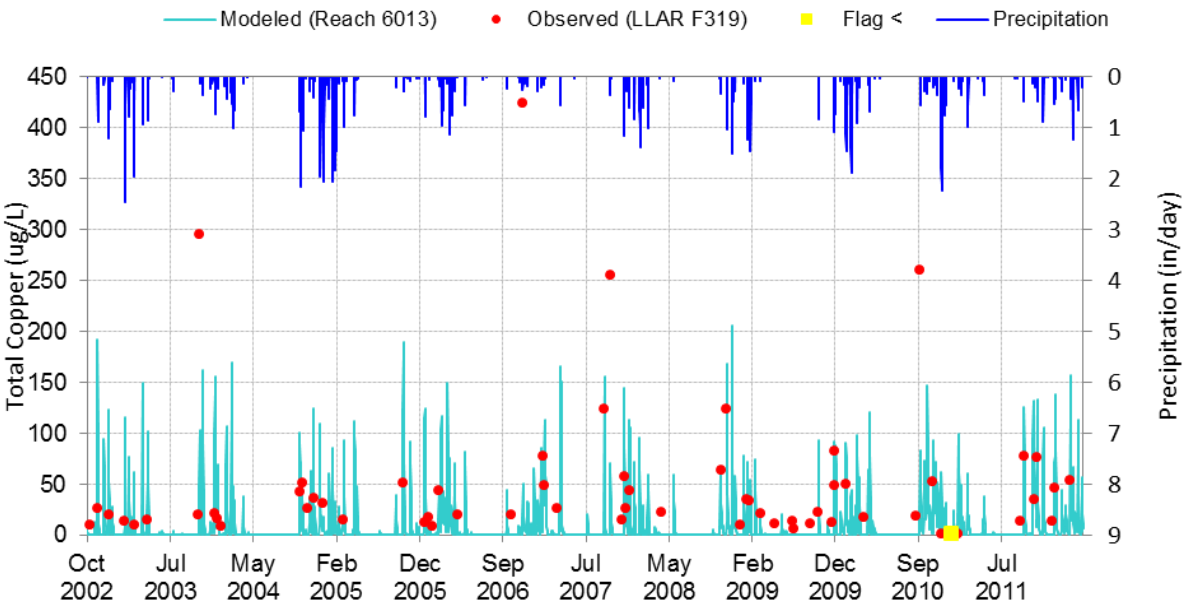


Figure 43. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

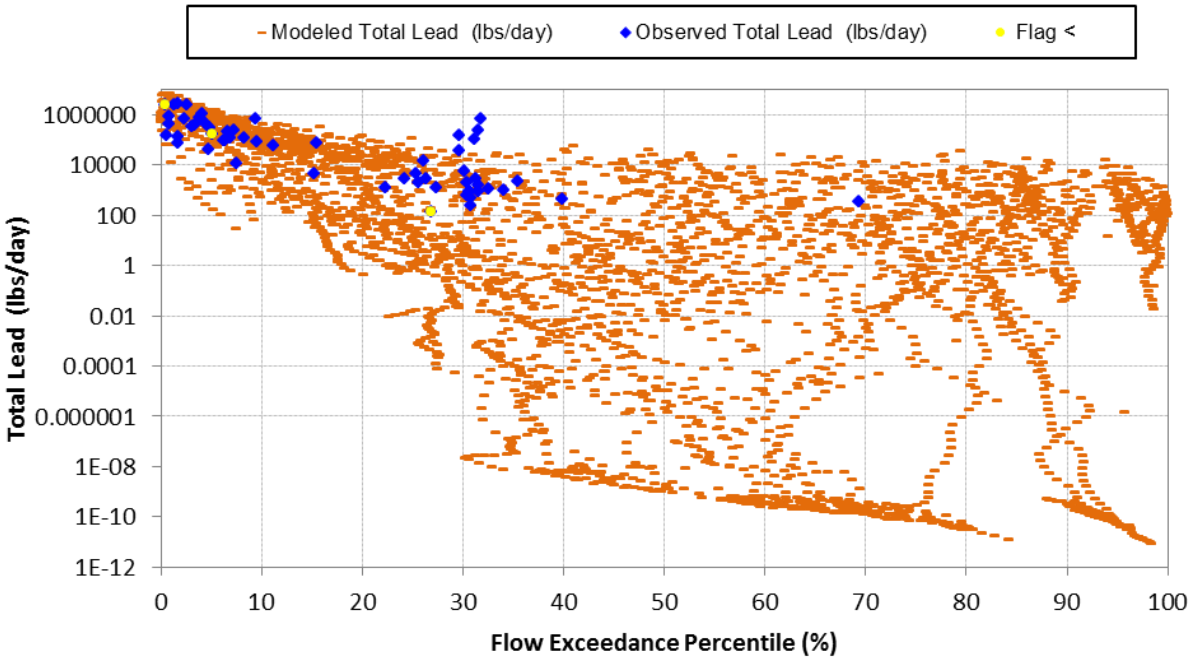


Figure 44. Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

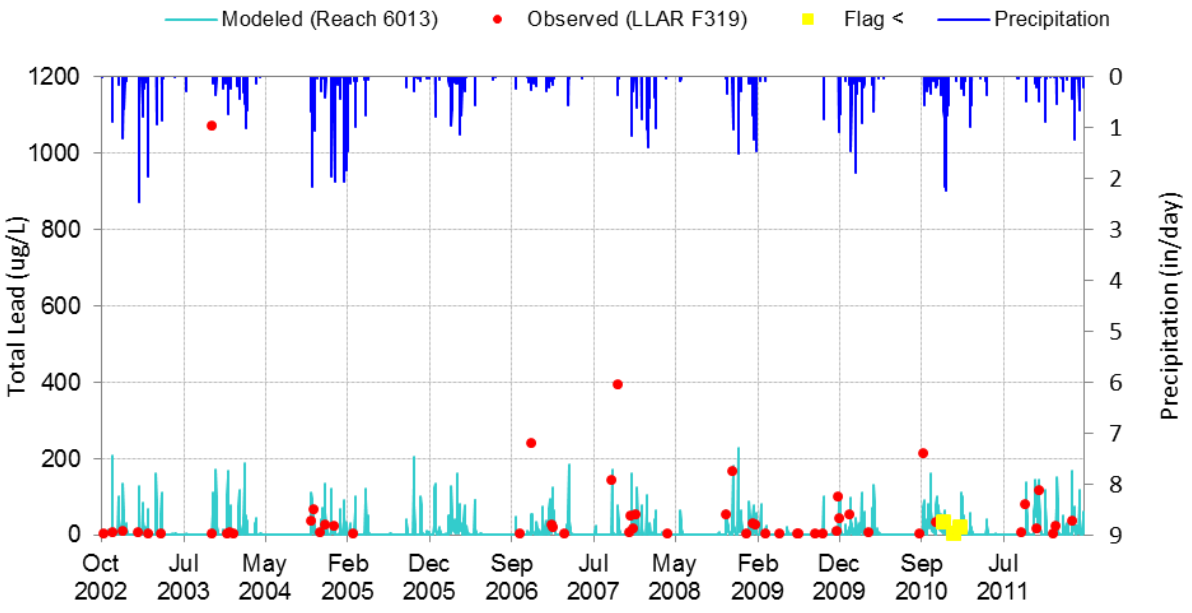


Figure 45. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

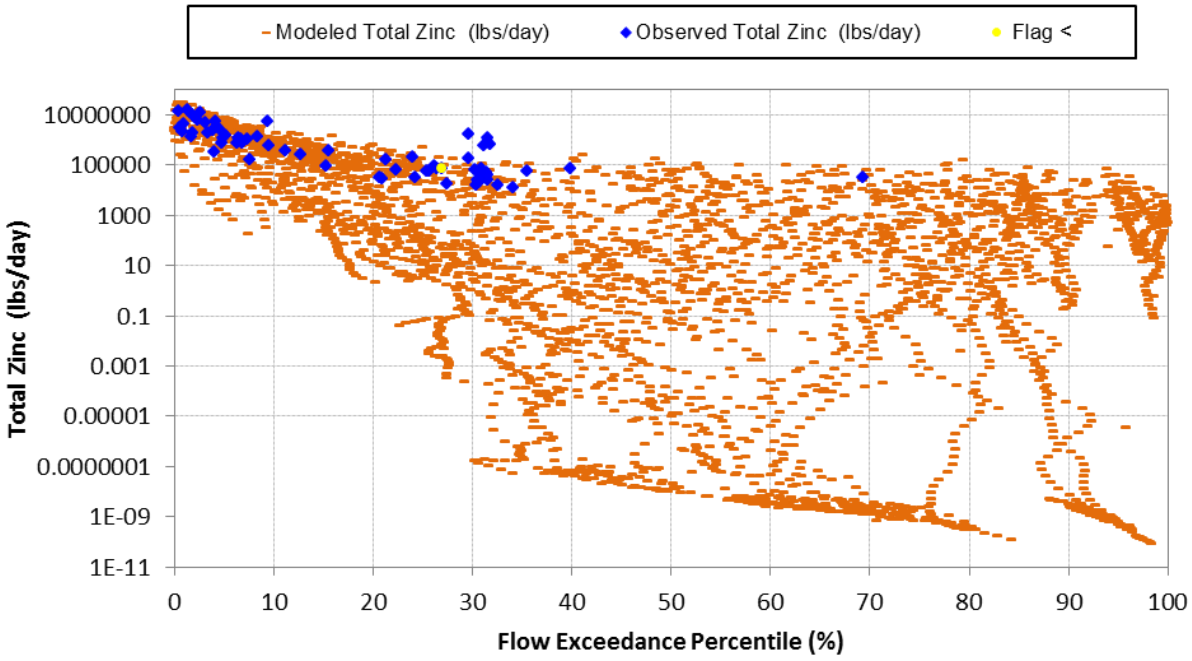


Figure 46. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

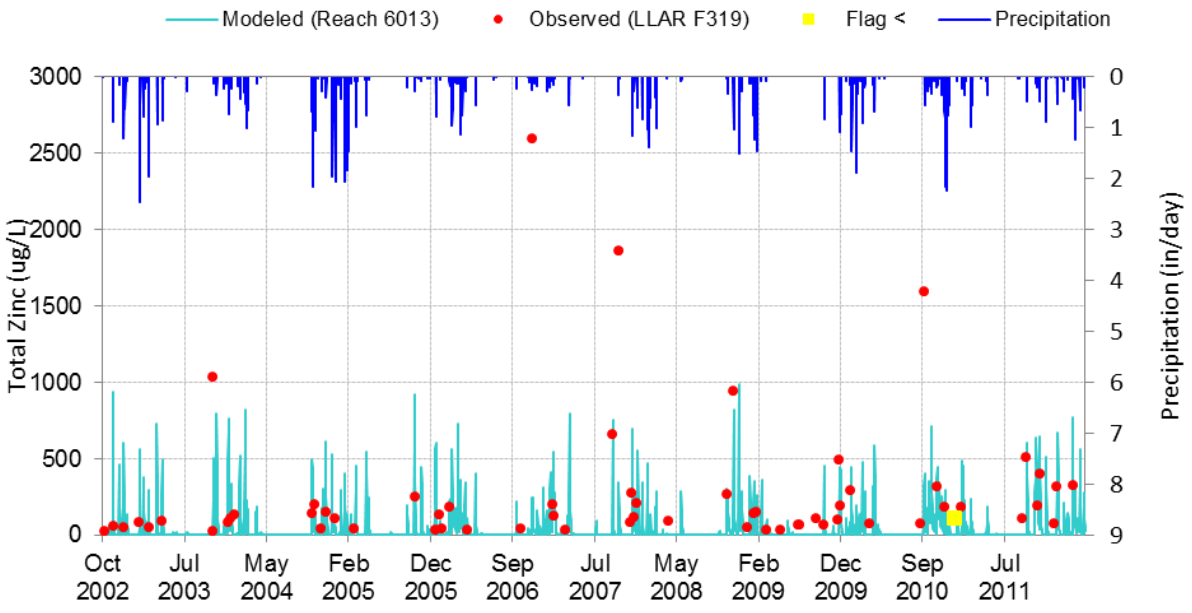


Figure 47. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

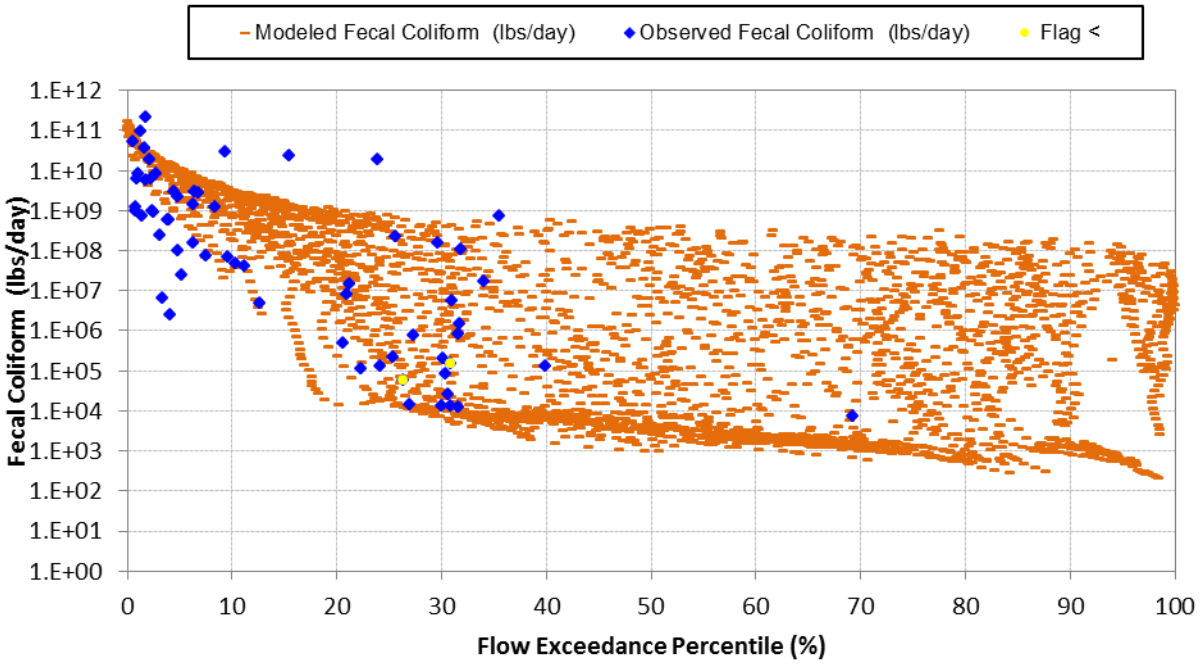


Figure 48. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

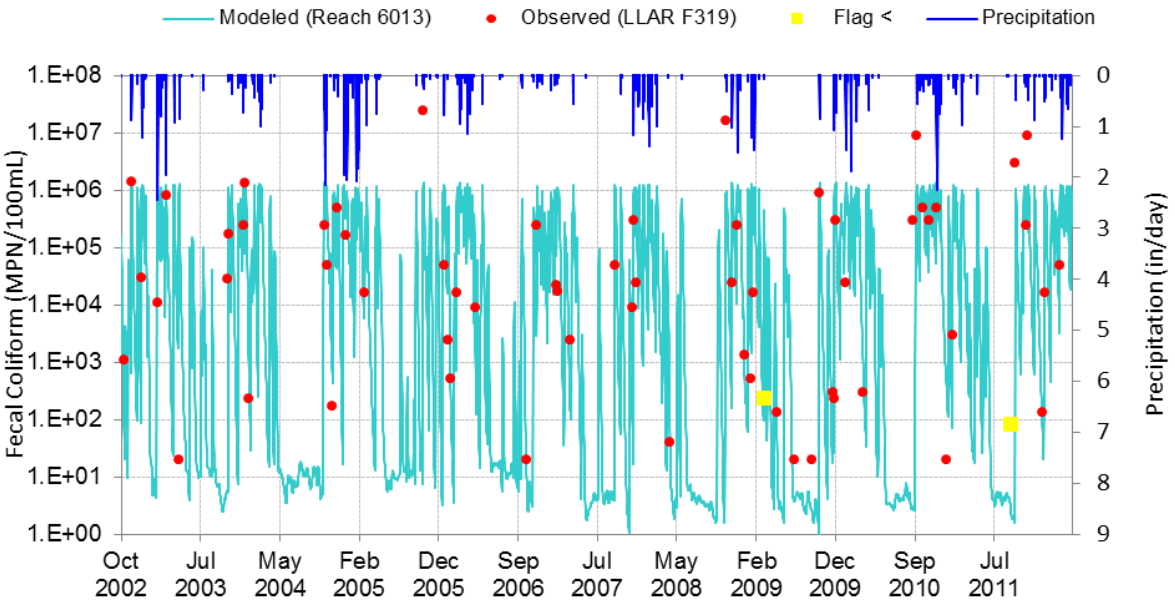


Figure 49. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

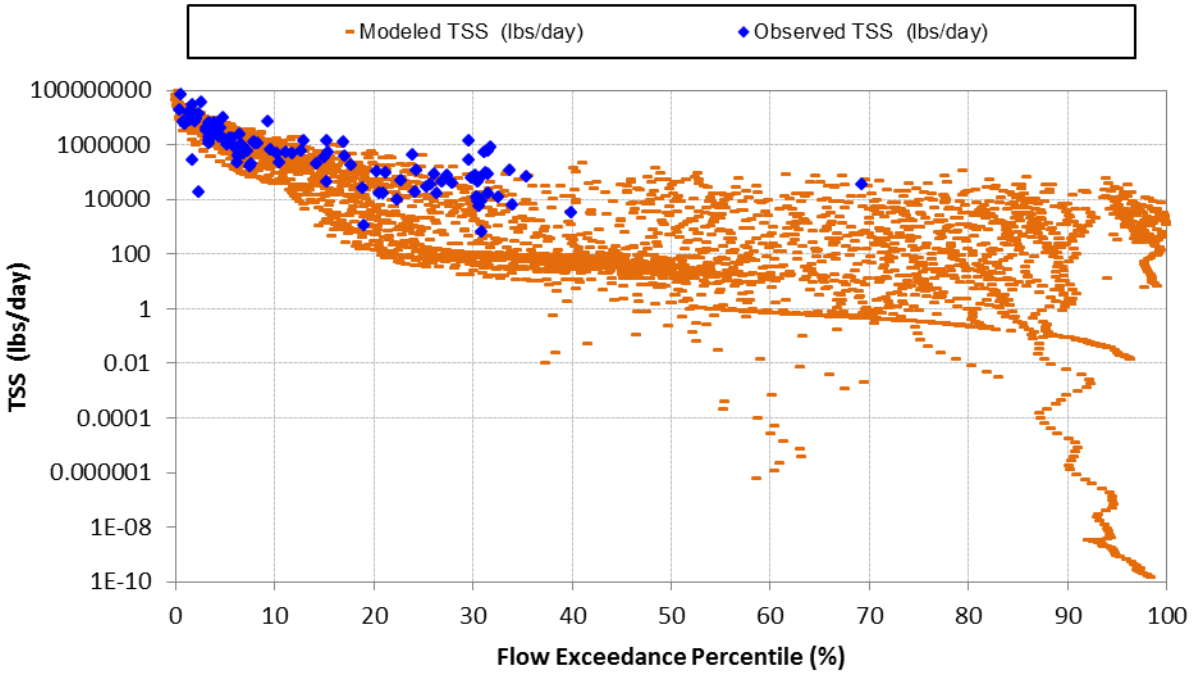


Figure 50. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

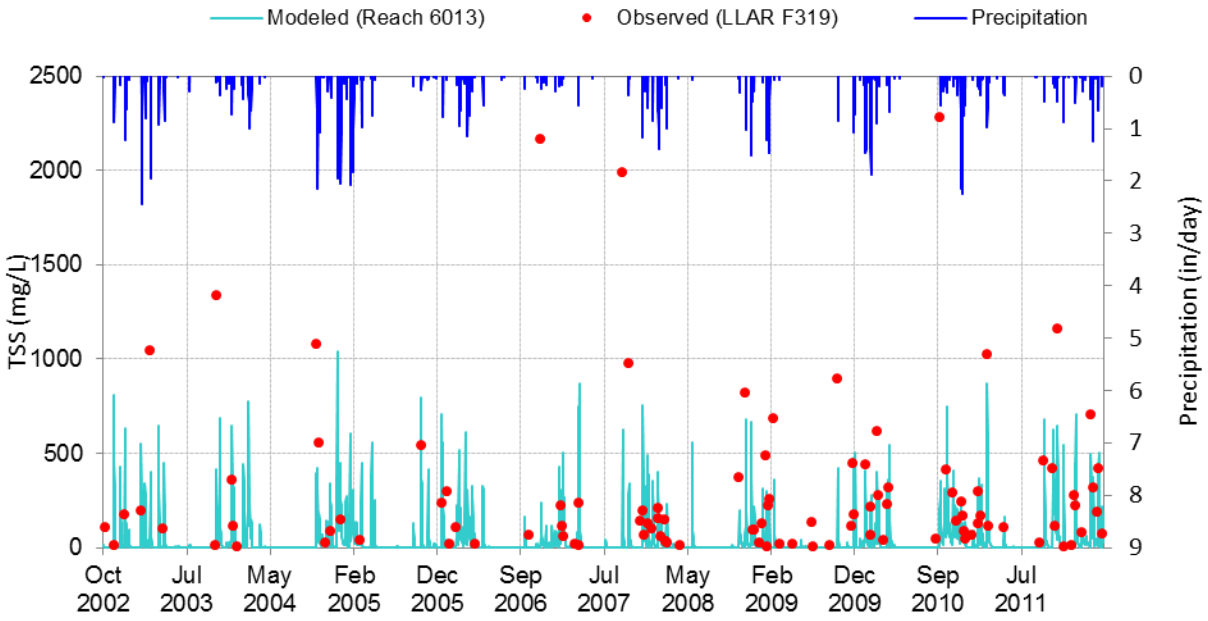


Figure 51. Simulated vs. observed time series plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

3. Los Cerritos Channel

Table 3. Summary of water quality data evaluated for Los Cerritos Channel

Gage	Constituent	Minimum	Q1	Median	Q3	Maximum
Stearns St.	Total Copper (ug/l)	8.4	17.25	25	43.5	240
Stearns St.	Total Lead (ug/l)	0.78	3.025	17	41.75	370
Stearns St.	TSS (mg/L)	2	52.5	110	210	1700
Stearns St.	Total Zinc (ug/l)	9.5	33	180	390	2600
Stearns St.	Fecal Coliform (MPN/100mL)	18	2275	8000	28500	1600000
Stearns St.	Total Nitrogen (mg/l)	0.9	2.147	3.292	4.532	23.7
Stearns St.	Total Phosphorous (mg/l)	0.083	0.22	0.53	0.91	6.2

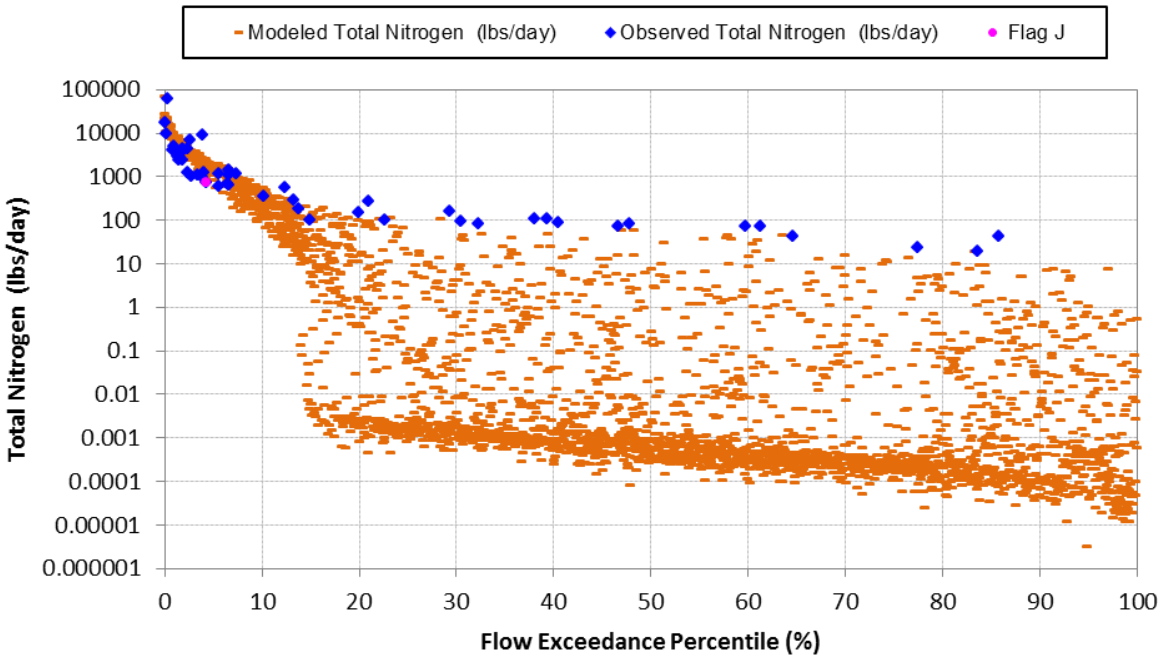


Figure 52. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

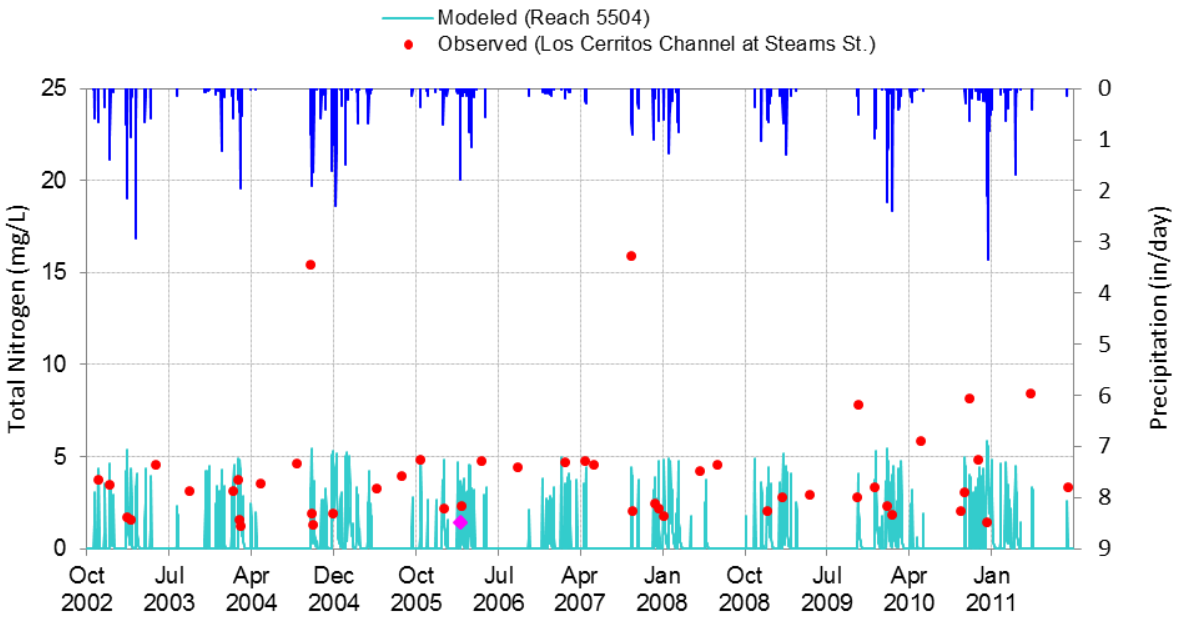


Figure 53. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

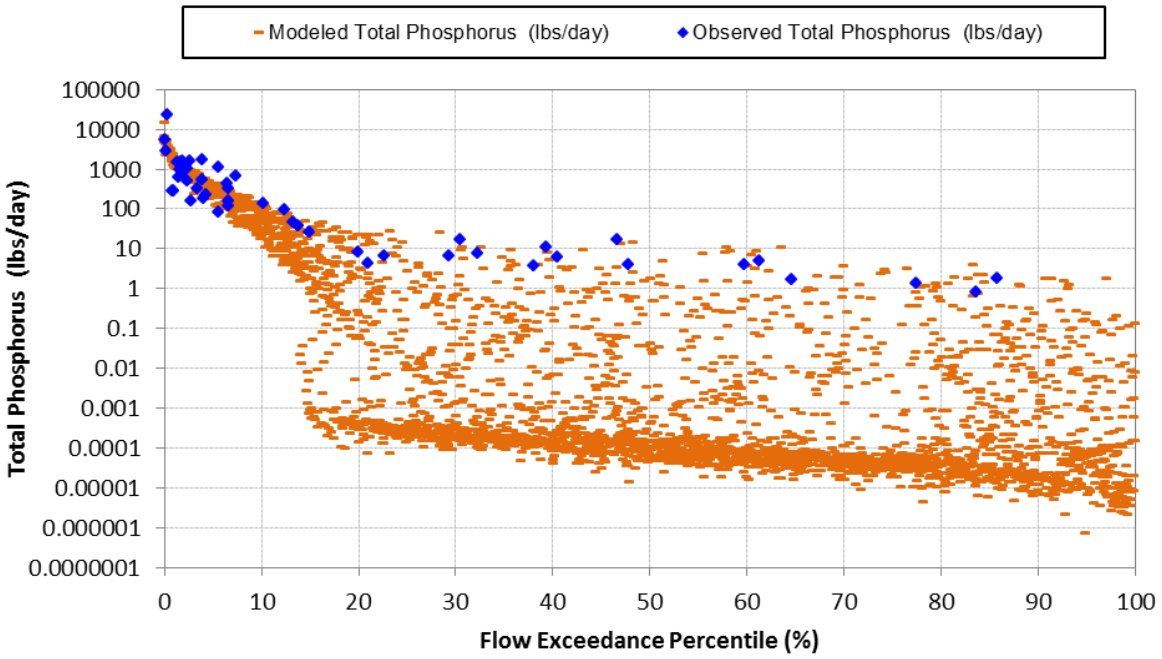


Figure 54. Simulated vs. observed load duration plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

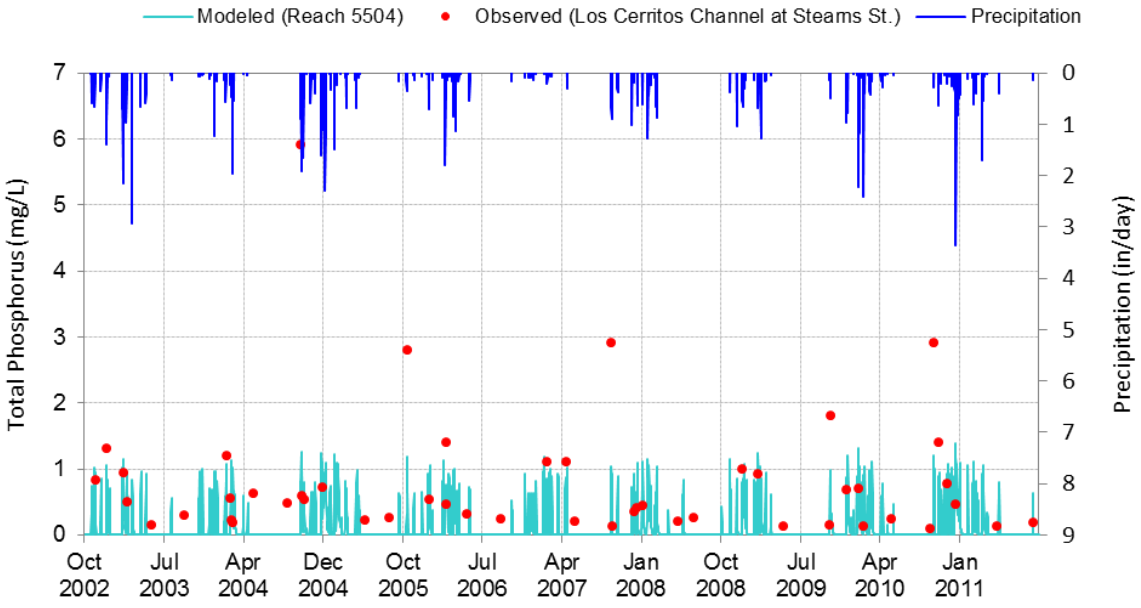


Figure 55. Simulated vs. observed time series plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

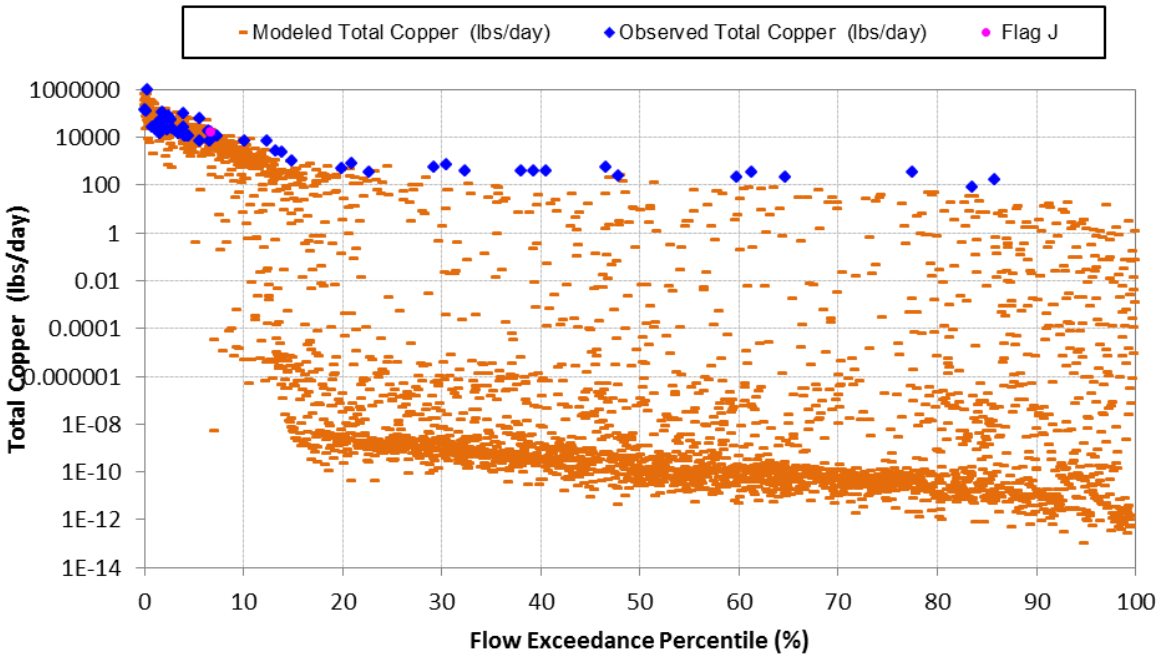


Figure 56. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

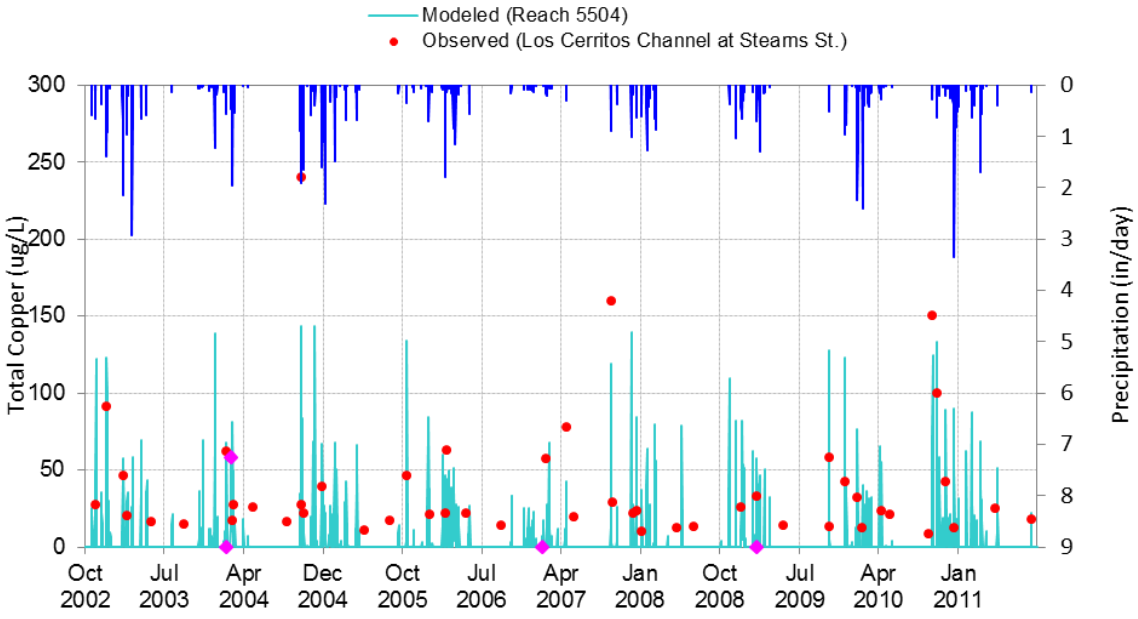


Figure 57. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

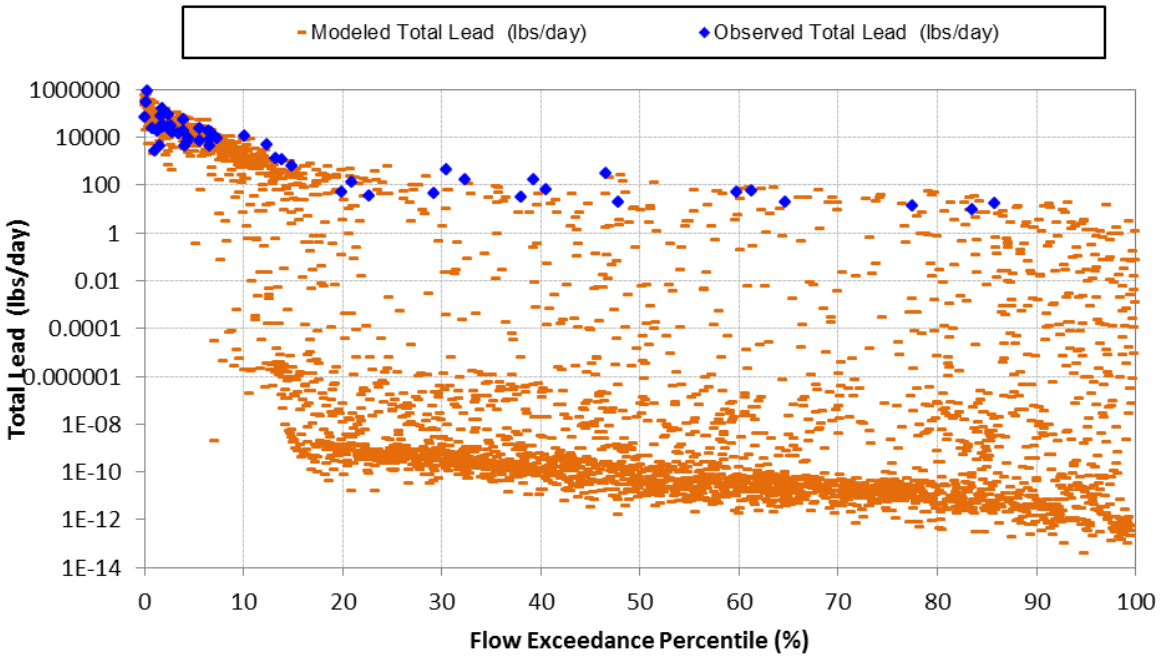


Figure 58. Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

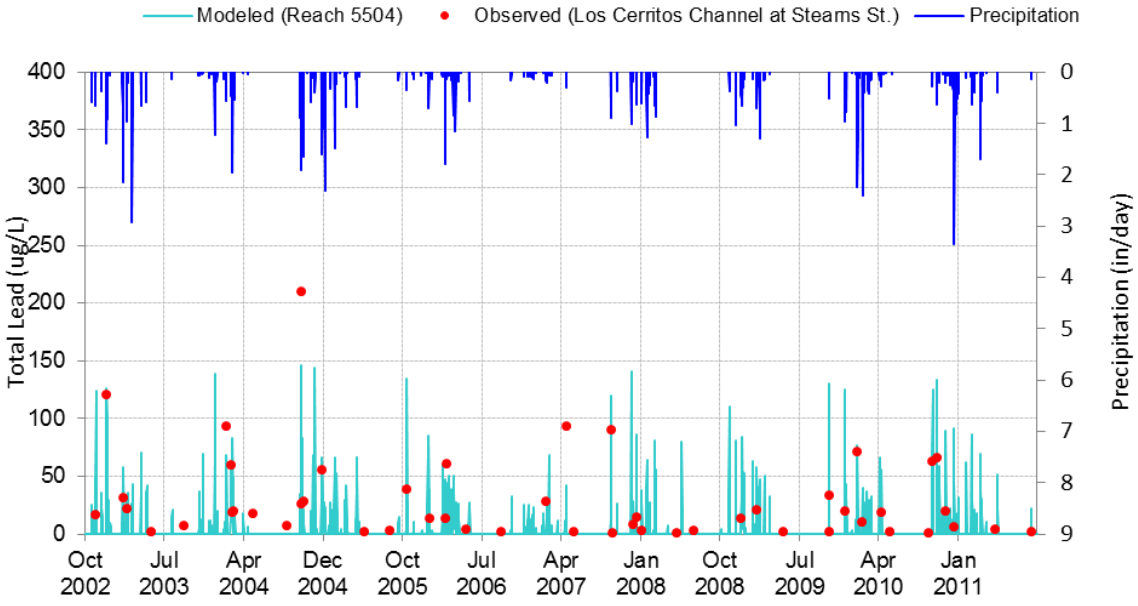


Figure 59. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

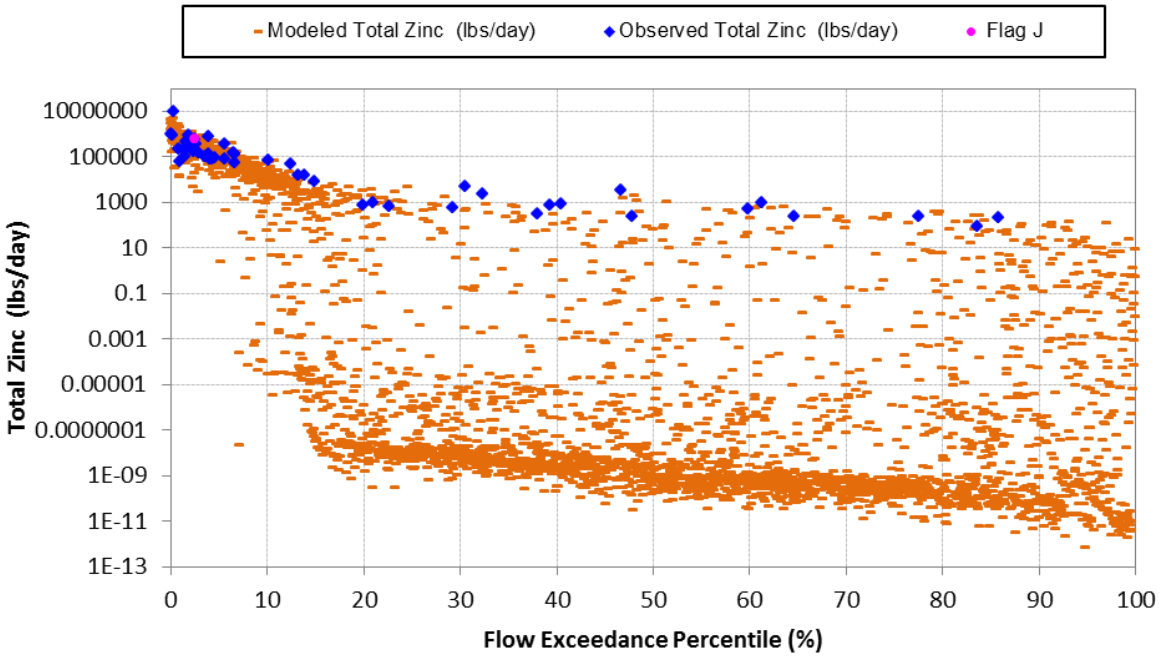


Figure 60. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

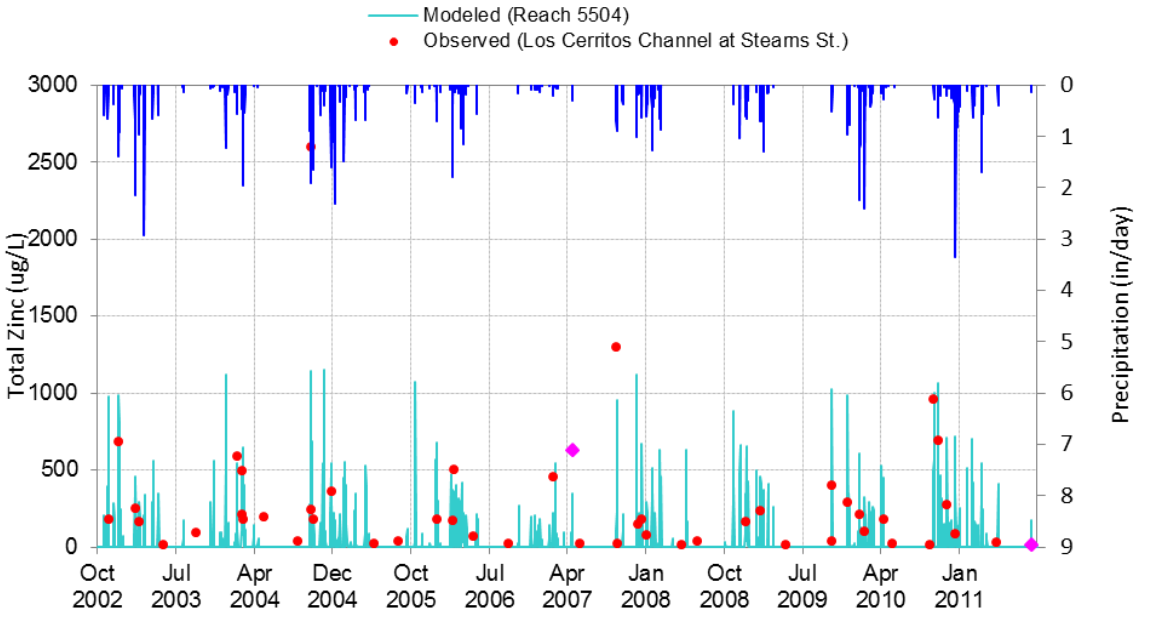


Figure 61. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

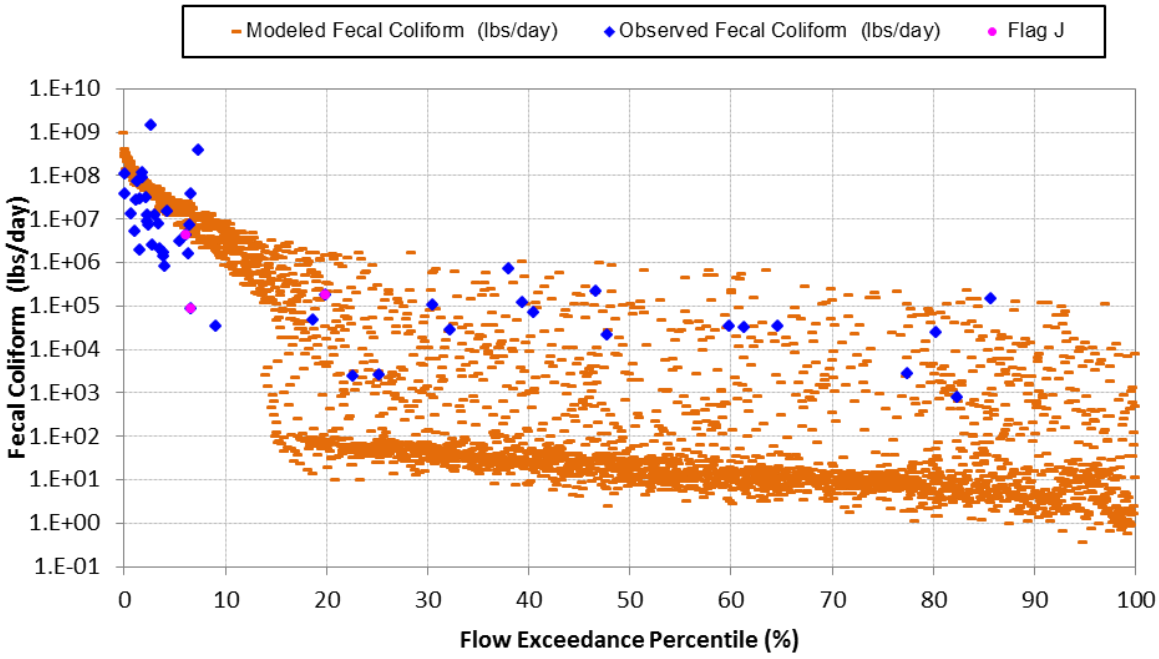


Figure 62. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

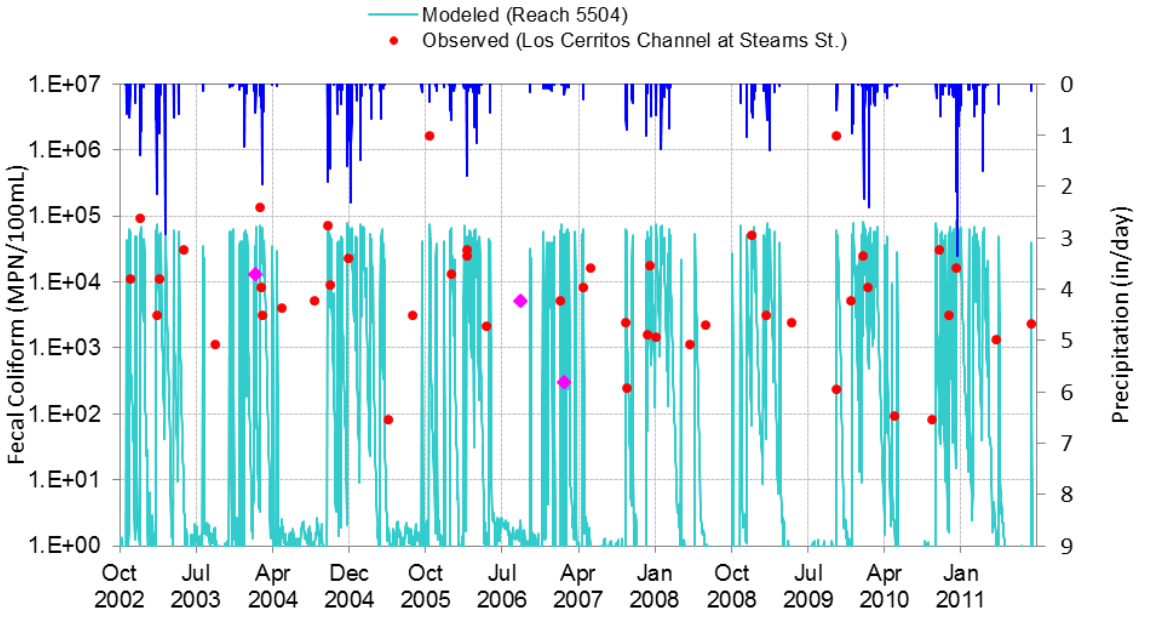


Figure 63. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

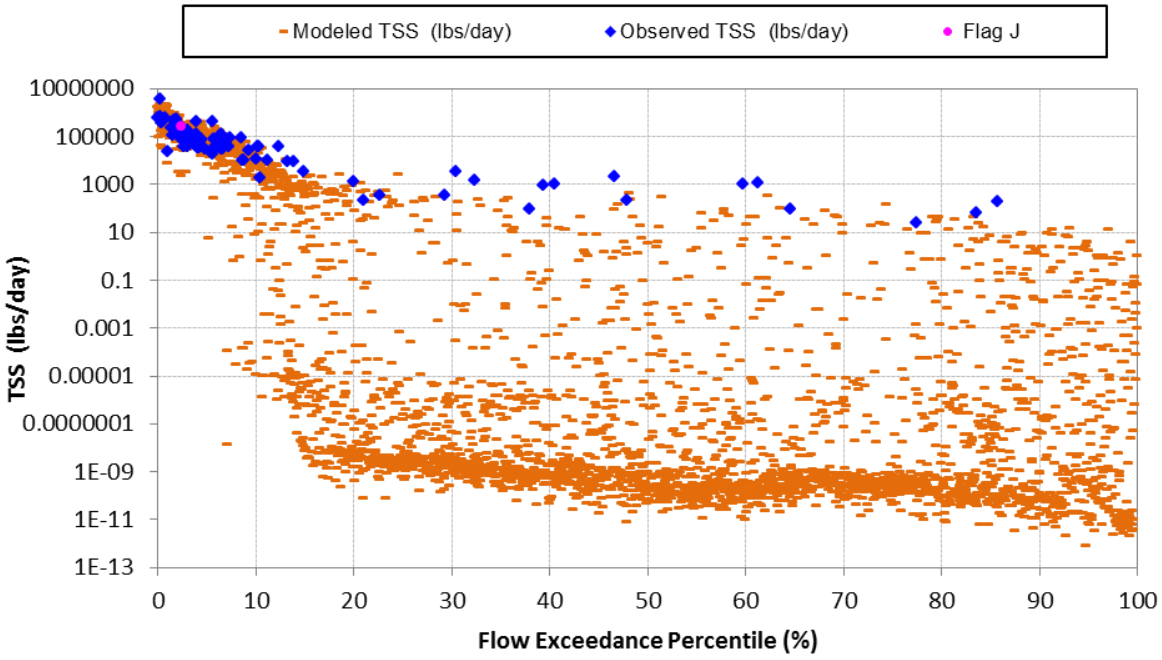


Figure 64. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

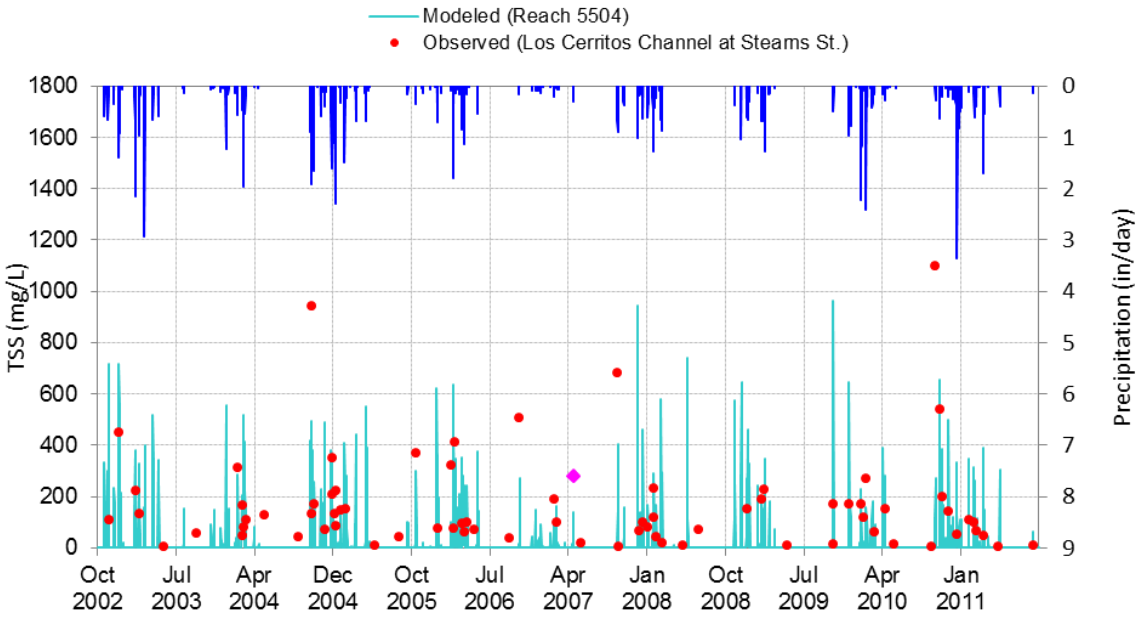


Figure 65. Simulated vs. observed time series plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

Attachment F: Modeled Existing Versus Allowable Pollutant Loadings Plots

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

January 15, 2015

RB-AR11981

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Figure 5. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2006 through 9/30/2011) at Coyote Creek mass emission station S13. 6

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Figure 9. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10. 9

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Figure 11. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station. 11

Figure 12. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station. 11

1. Lower San Gabriel River

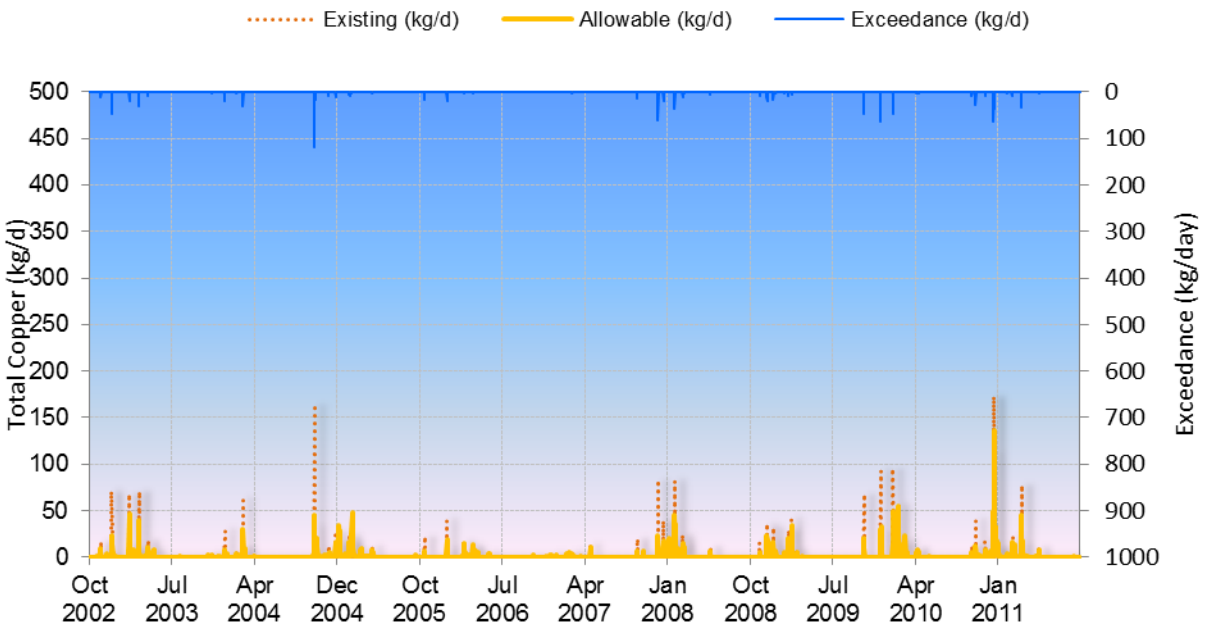


Figure 1. Modeled existing vs. allowable observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

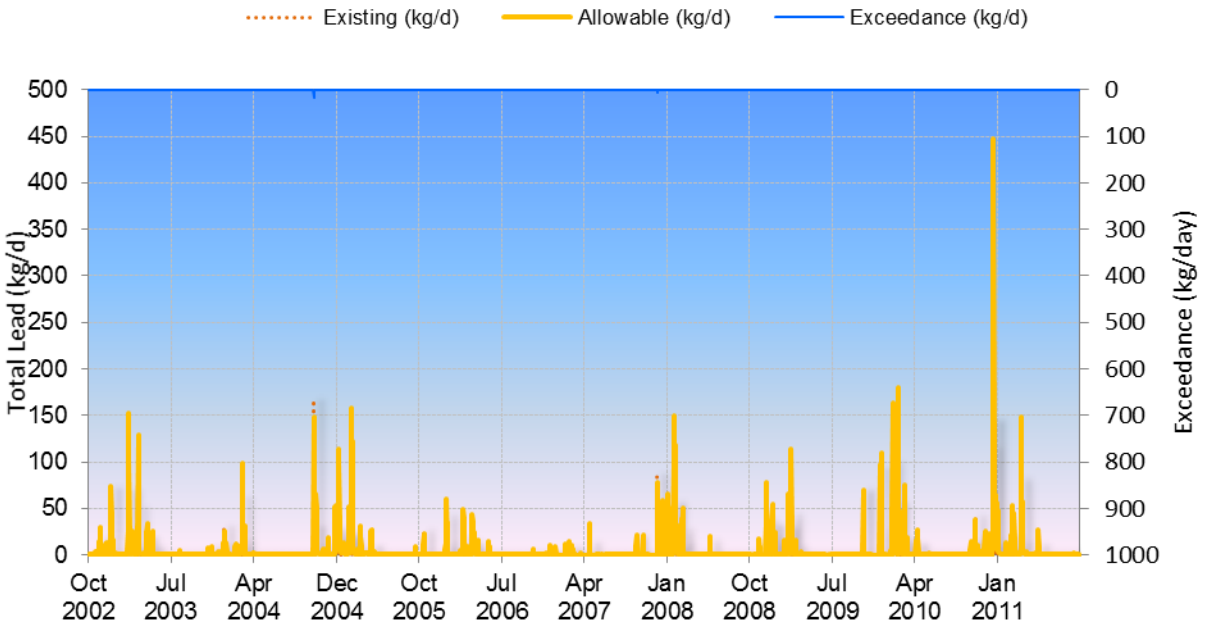


Figure 2. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

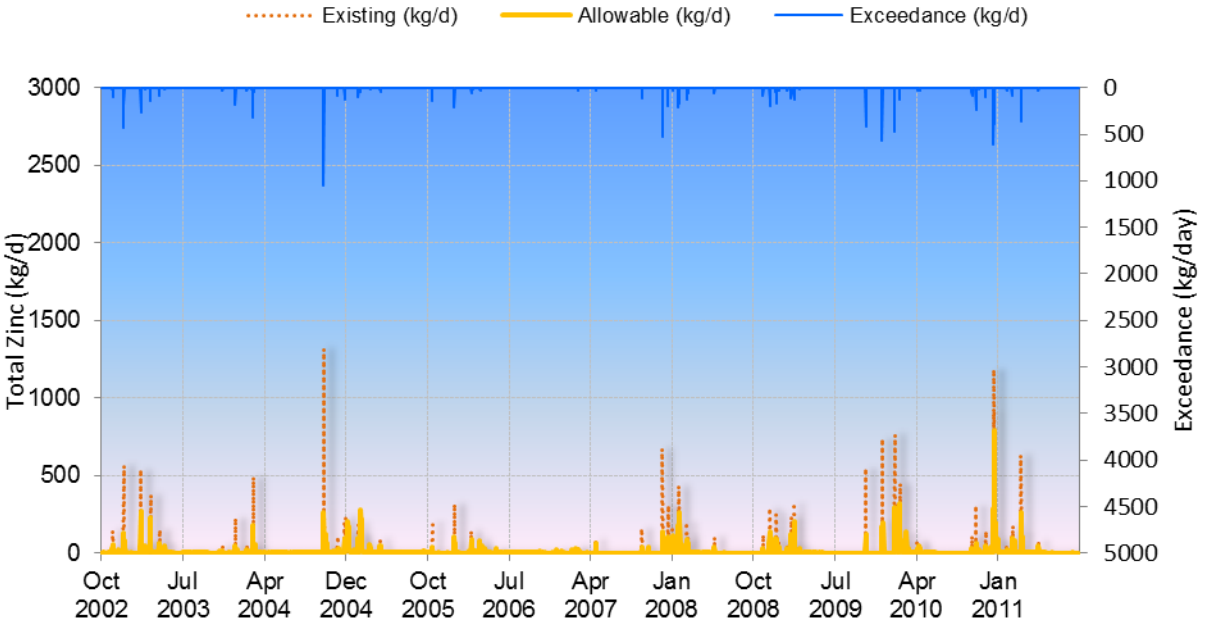


Figure 3. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

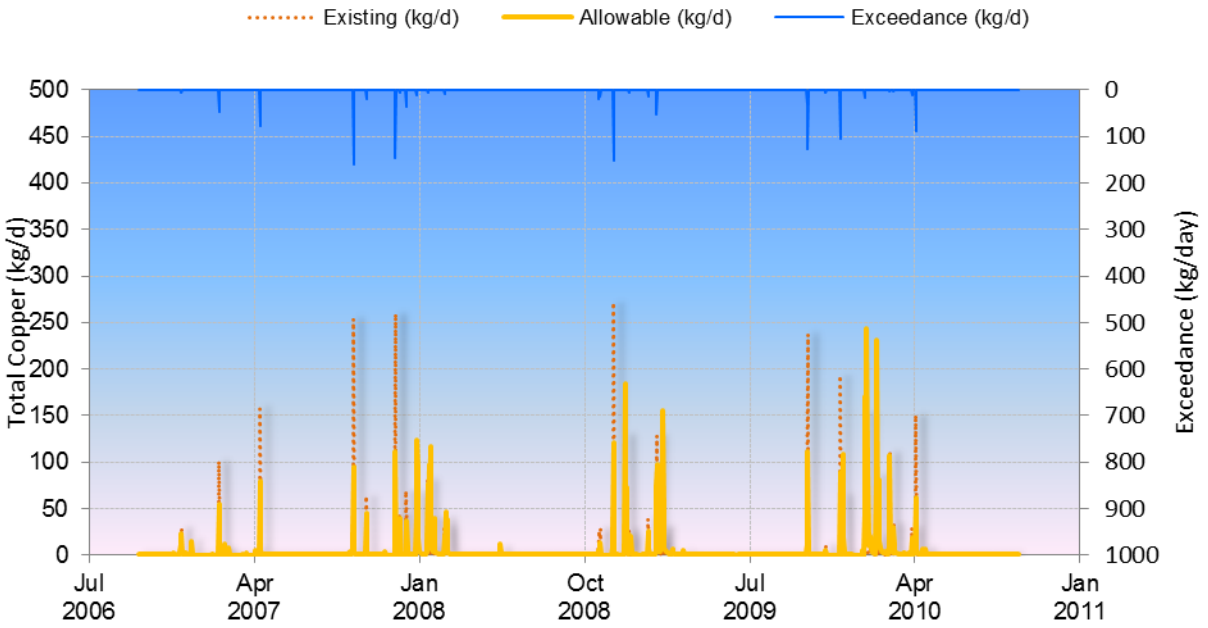


Figure 4. Modeled existing vs. allowable observed timeseries plots for Total Copper (10/1/2006 through 9/30/2011) at Coyote Creek mass emission station S13.

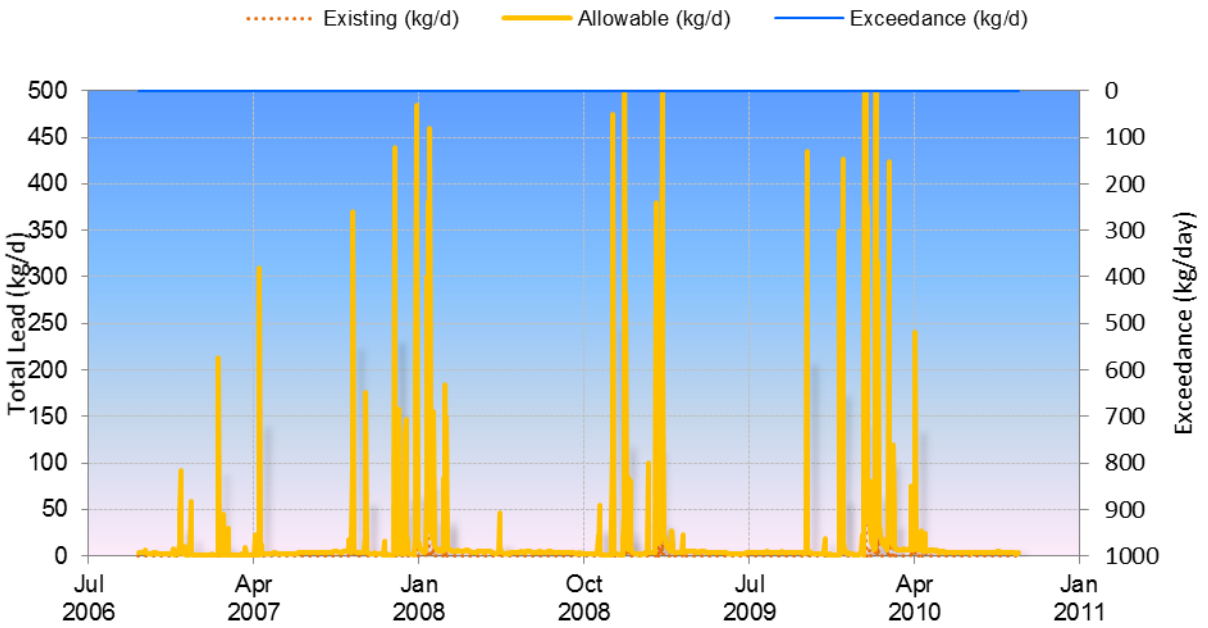


Figure 5. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2006 through 9/30/2011) at Coyote Creek mass emission station S13.

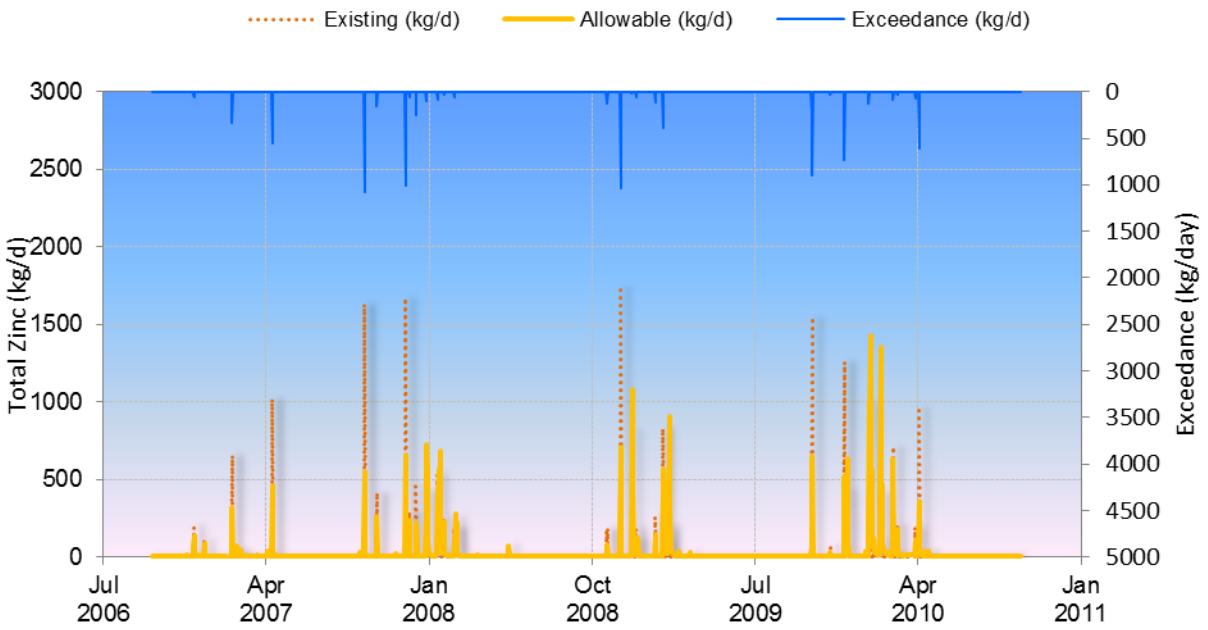


Figure 6. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2006 through 9/30/2011) at Coyote Creek mass emission station S13.

2. Lower Los Angeles River

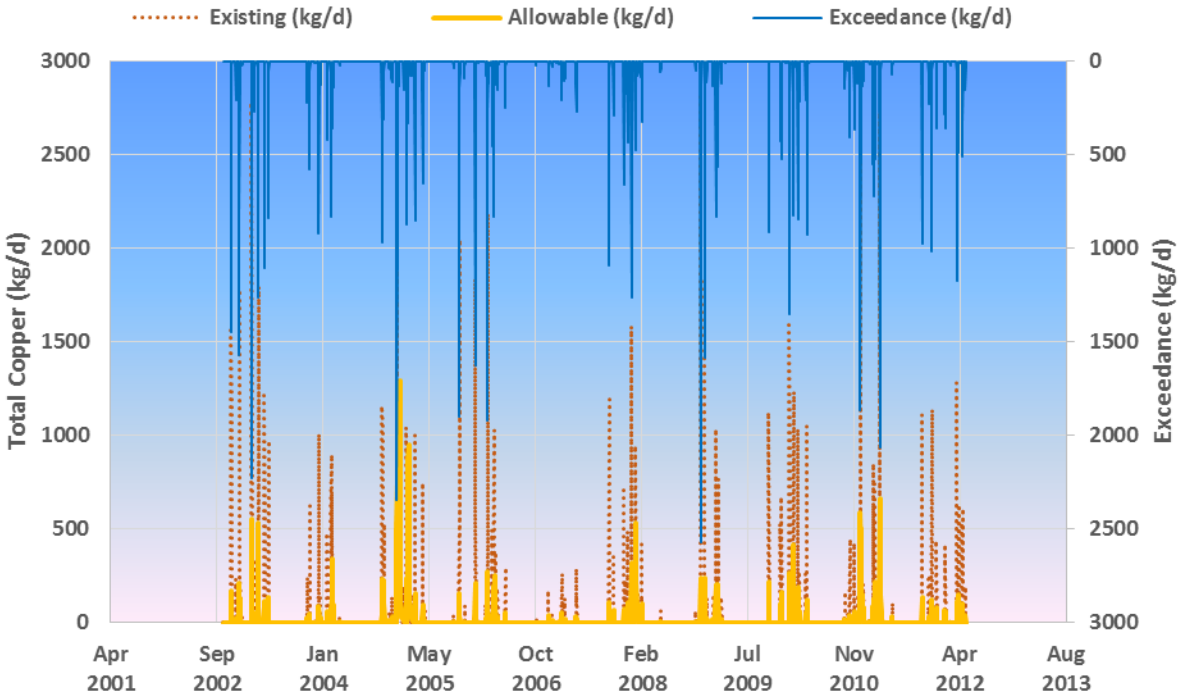


Figure 7. Modeled existing vs. allowable observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

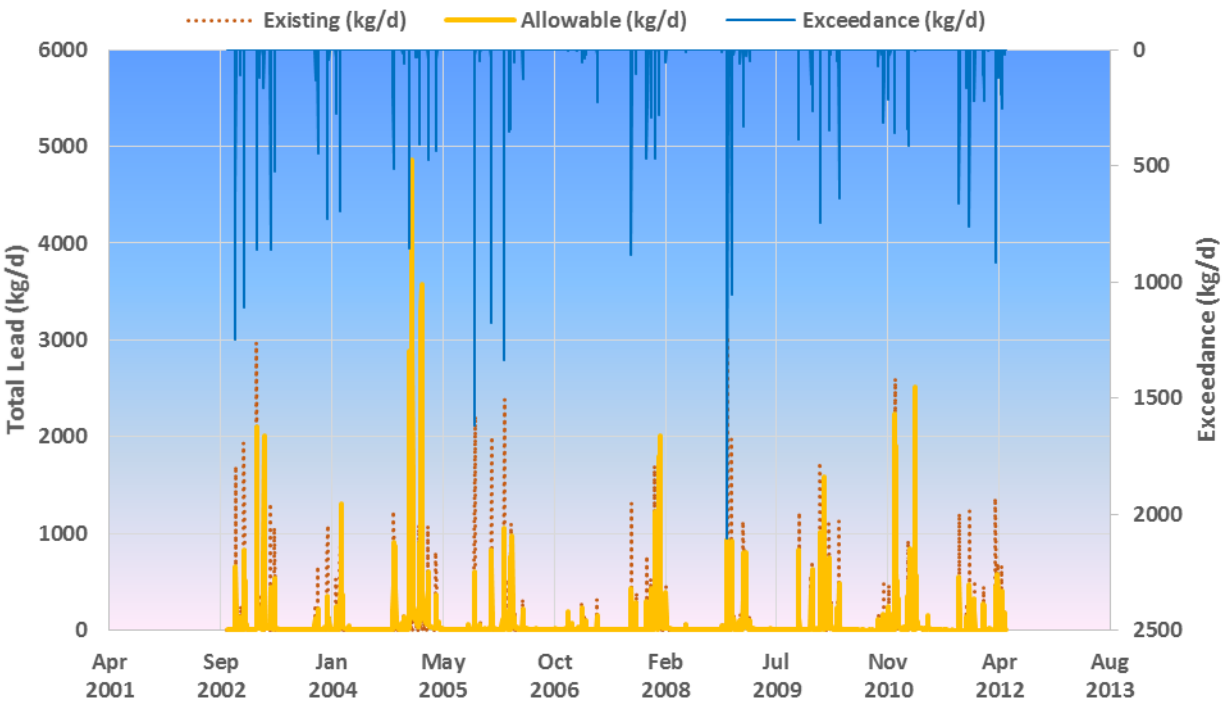


Figure 8. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

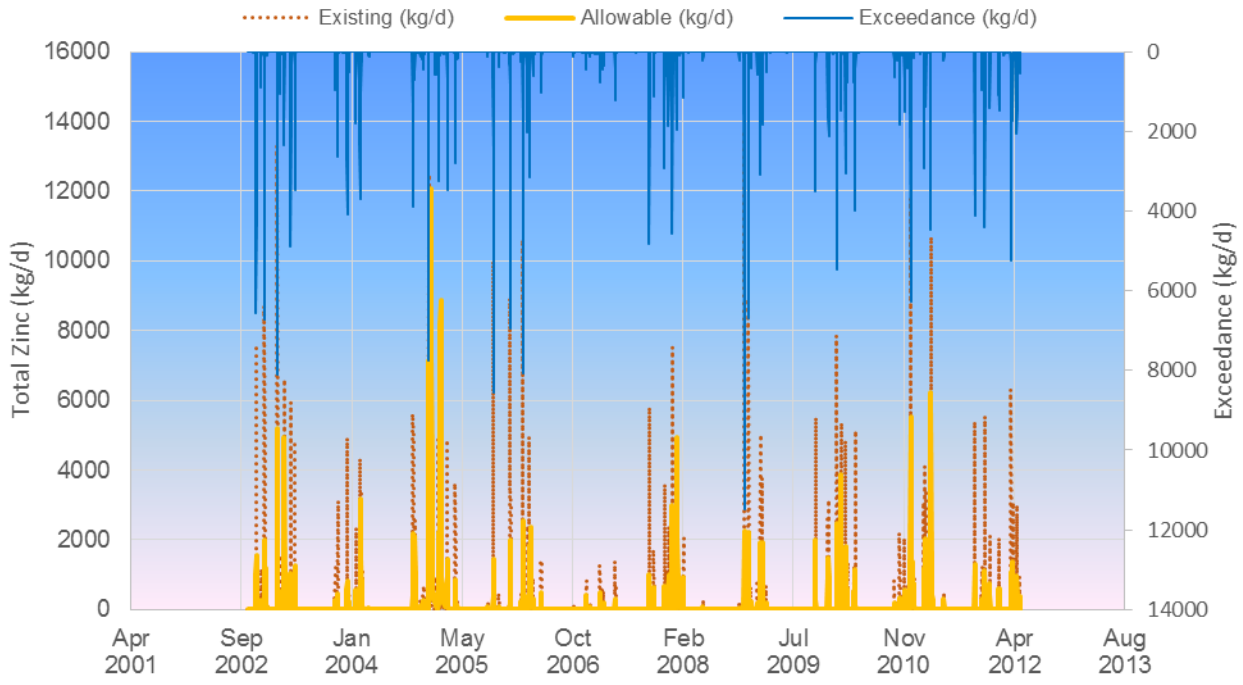


Figure 9. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

3. Los Cerritos Channel

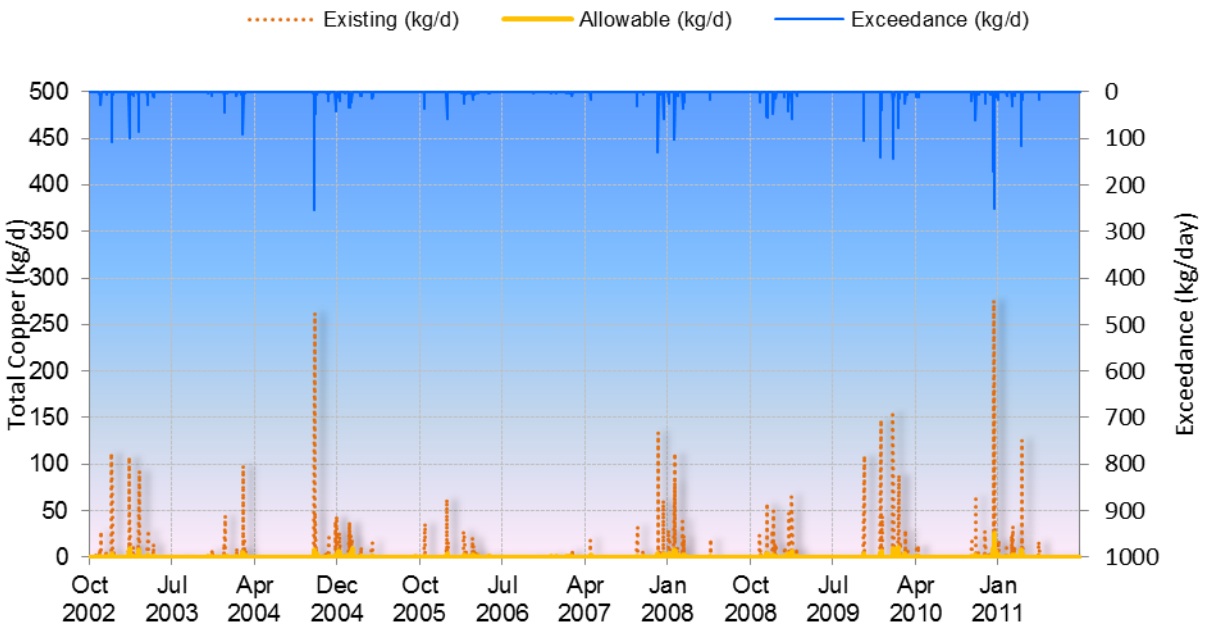


Figure 10. Modeled existing vs. allowable observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

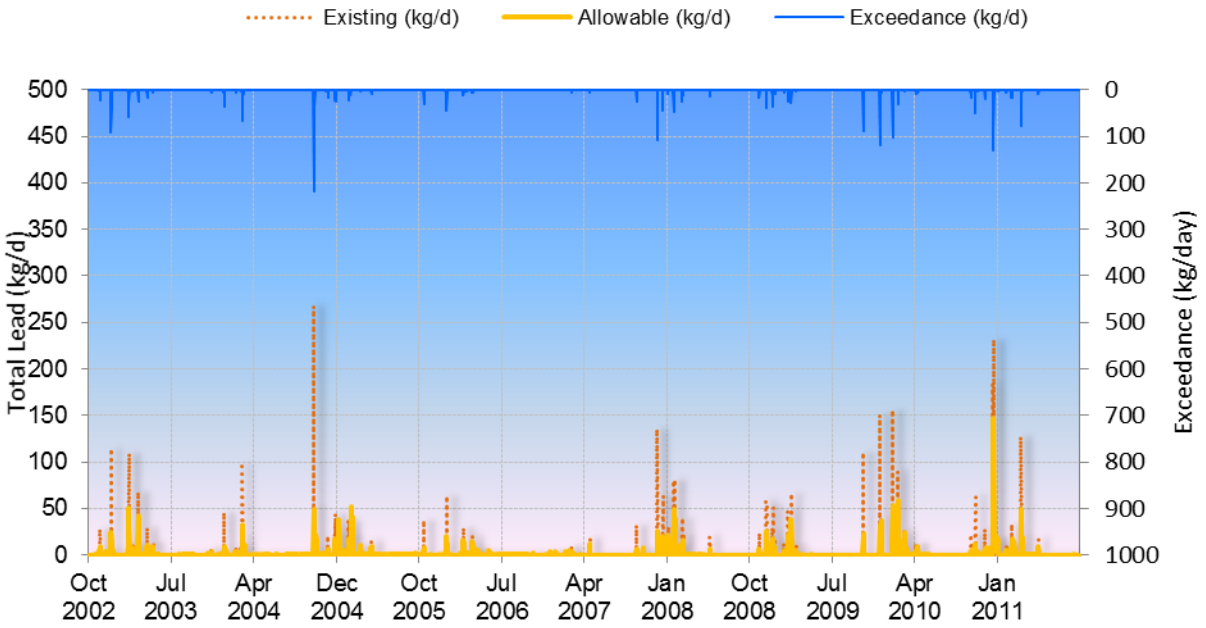


Figure 11. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

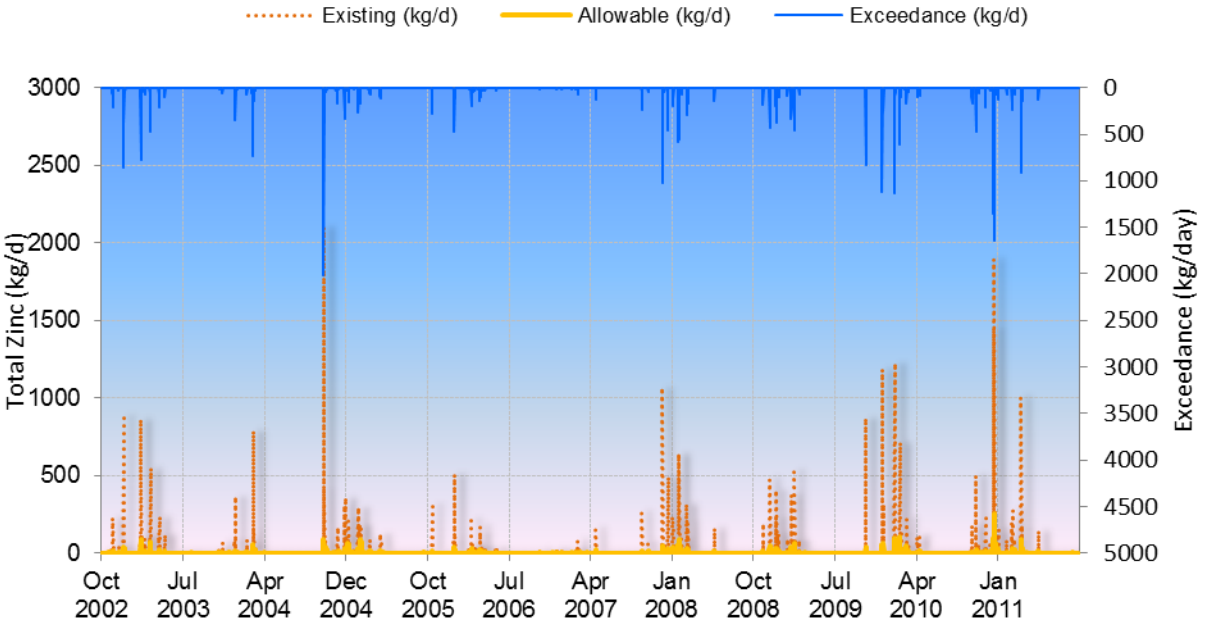


Figure 12. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

Watershed Management Program Appendix 7

A-7-1 Legal Authority Letters

City of Downey

FUTURE UNLIMITED

YVETTE M. ABICH GARCIA
City Attorney

December 12, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013-1105

RE: Legal Authority Certification for the City of Downey

Dear Mr. Unger:

As the City Attorney for the City of Downey, I have reviewed the City's existing ordinances, applicable statutes, and/or applicable contracts and have determined that as of the date of this letter, the City can operate pursuant to the legal authority required in 40 CFR 122.26(d)(2)(i)(A)-(F) and Part VI.A.2 of Order No. R4-2012-0175, issued by the Regional Water Quality Control Board – Los Angeles Region ("RWQCB"), adopted on December 28, 2012 and entitled "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach (MS4)" [NPDES No. CAS004001] (the "2012 NPDES Permit"). Enforcement of the City's storm water ordinances can be completed administratively or, if necessary, through the judicial system.

This letter is limited to the matters contained herein, and should not be read as expressing any opinion on any other matter except on the matters expressly set forth herein.

Please call the undersigned if you have any questions.

Sincerely,

CITY OF DOWNEY

Yvette M. Abich Garcia
City Attorney

cc: John L. Hunter & Associates

RB-AR11993

COUNTY OF LOS ANGELES
OFFICE OF THE COUNTY COUNSEL
648 KENNETH HAHN HALL OF ADMINISTRATION
500 WEST TEMPLE STREET
LOS ANGELES, CALIFORNIA 90012-2713

TELEPHONE
(213) 974-1923
FACSIMILE
(213) 687-7337
TDD
(213) 633-0901

JOHN F. KRATTLI
County Counsel

December 16, 2013

Mr. Samuel Unger, P.E., Executive Officer
California Regional Water Quality Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-2343

Attention: Mr. Ivar Ridgeway

Re: Certification By Legal Counsel For Los Angeles County Flood Control District's Annual Report

Dear Mr. Unger:

Pursuant to the requirements of Part VI(A)(2)(b) of Order No. R4-2012-0175 (the "Order"), the Office of the County Counsel of the County of Los Angeles makes the following certification in support of the Annual Report of the Los Angeles County Flood Control District ("LACFCD"):

Certification Pursuant To Order Part VI(A)(2)(b)

"*Each Permittee must submit a statement certified by its chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and this Order.*"

LACFCD has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order.

Order Part VI(A)(2)(b)(i)

"*Citation of applicable municipal ordinances or other appropriate legal authorities and their relationship to the requirements of 40 CFR §122.26(d)(2)(i)(A-F) and this Order*"

Citations Of Applicable Ordinances Or Other Legal Authorities

Although many portions of State law, the Charter of the County of Los Angeles, the Los Angeles County Code and LACFCD's Flood Control District Code ("Code") are potentially applicable to the implementation and enforcement of these requirements, the primary applicable laws and ordinances are as follows:

Los Angeles County Code, Title 12, Chapter 12.80 STORMWATER AND RUNOFF POLLUTION CONTROL, including:

§12.80.010 - §12.80.360 Definitions

§12.80.370 Short title.

§12.80.380 Purpose and intent.

§12.80.390 Applicability of this chapter.

§12.80.400 Standards, guidelines and criteria.

§12.80.410 Illicit discharges prohibited.

§12.80.420 Installation or use of illicit connections prohibited.

§12.80.430 Removal of illicit connection from the storm drain system.

§12.80.440 Littering and other discharge of polluting or damaging substances prohibited.

§12.80.450 Stormwater and runoff pollution mitigation for construction activity.

§12.80.460 Prohibited discharges from industrial or commercial activity.

§12.80.470 Industrial/commercial facility sources required to obtain a NPDES permit.

§12.80.480 Public facility sources required to obtain a NPDES permit.

§12.80.490 Notification of uncontrolled discharges required.

§12.80.500 Good housekeeping provisions.

§12.80.510 Best management practices for construction activity.

§12.80.520 Best management practices for industrial and commercial facilities.

§12.80.530 Installation of structural BMPs.

§12.80.540 BMPs to be consistent with environmental goals.

§12.80.550 Enforcement—Director's powers and duties.

§12.80.560 Identification for inspectors and maintenance personnel.

§12.80.570 Obstructing access to facilities prohibited.

§12.80.580 Inspection to ascertain compliance—Access required.

§12.80.590 Interference with inspector prohibited.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.80.650 Conflicts with other code sections.

§12.80.660 Severability.

§12.80.700 Purpose.

§12.80.710 Applicability.

§12.80.720 Registration required.

§12.80.730 Exempt facilities.

§12.80.740 Certificate of inspection—Issuance by the director.

§12.80.750 Certificate of inspection—Suspension or revocation.

§12.80.760 Certificate of inspection—Termination.

§12.80.770 Service fees.

§12.80.780 Fee schedule.

§12.80.790 Credit for overlapping inspection programs.

§12.80.800 Annual review of fees.

Los Angeles County Code, Title 12, Chapter 12.84 LOW IMPACT DEVELOPMENT STANDARDS, including:

§12.84.410 Purpose.

§12.84.420 Definitions.

§12.84.430 Applicability.

§12.84.440 Low Impact Development Standards.

§12.84.445 Hydromodification Control.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Los Angeles County Code, Title 22 PLANNING AND ZONING, Part 6 ENFORCEMENT PROCEDURES, including:

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

Los Angeles County Code, Title 26 BUILDING CODE, including:

§26.103 Violations And Penalties

§26.104 Organization And Enforcement

§26.105 Appeals Boards

§26.106 Permits

§26.107 Fees

§26.108 Inspections

LACFCD Code Chapter 21 - STORMWATER AND RUNOFF POLLUTION CONTROL including:

§21.01 Purpose and Intent

§21.03 Definitions

§21.05 Standards, Guidelines, and Criteria

§21.07 Prohibited Discharges

§21.09 Installation or Use of Illicit Connections Prohibited

§21.11 Littering Prohibited

§21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity

§21.15 Notification of Uncontrolled Discharges Required

§21.17 Requirement to Monitor and Analyze

§21.19 Conflicts With Other Code Sections

§21.21 Severability

§21.23 Violation a Public Nuisance

California Government Code §6502

California Government Code §23004

California Water Code §8100 *et. seq.*

Relationship Of Applicable Ordinances Or Other Legal Authorities To The Requirements of 40 CFR §122.26(d)(2)(i)(A-F) And The Order

Although, depending upon the particular issue, there may be multiple ways in which particular sections of the County of Los Angeles' ordinances, LACFCD's ordinances, and statutes relate to the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order, the table below indicates the basic relationship with Part VI(A)(2)(a) of the Order:

Order Part VI(A)(2)(a) Items	**Primary Applicable Ordinance/Statute**
i. Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.450 [construction] §12.80.460 [industrial and commercial] §12.80.470 and .480 [industrial and commercial NPDES requirements] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§26.104 [enforcement] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
ii. Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited] LACFCD Code: §21.07 Prohibited Discharges
iii. Prohibit and eliminate illicit discharges and illicit connections to the MS4.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.420 [illicit connections prohibited] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.23 Violation a Public Nuisance

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
iv. Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.440 [littering and other polluting prohibited] LACFCD Code: §19.07 Interference With or Placing Obstructions, Refuse, Contaminating Substances, or Invasive Species in Facilities Prohibited §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
v. Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows).	Los Angeles County Code: §12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.620 [nuisance abatement] §12.80.635 [violation penalty]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§12.80.640 [penalties not exclusive] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties] §26.104 [enforcement] §26.106 [permits] §26.108 [inspections] LACFCD Code: §19.11 Violation a Public Nuisance §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.19 Conflicts With Other Code Sections §21.23 Violation a Public Nuisance
vi. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.	Same as item v., above
vii. Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Copermittees.	California Government Code §6502 California Government Code §23004
viii. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation.	California Government Code §6502 California Government Code §23004
ix. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4.	Los Angeles County Code: §12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.80.620 [nuisance abatement] §12.80.635 [violation penalty] §12.80.640 [penalties not exclusive] §22.60.380 [enforcement.] §26.106 [permits] §26.108 [inspections]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
x. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations.	Los Angeles County Code: §12.80.450 [construction mitigation] §12.80.500 [good housekeeping practices] §12.80.510 [construction BMPs] §12.80.520 [industrial/commercial BMPs] §12.84.440 [LID standards] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
xi. Require that structural BMPs are properly operated and maintained.	Los Angeles County Code: §12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.23 Violation a Public Nuisance
xii. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.	Los Angeles County Code: §12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance

Order Part VI(A)(2)(b)(ii)

"*Identification of the local administrative and legal procedures available to mandate compliance with applicable municipal ordinances identified in subsection (i) above and therefore with the conditions of this Order, and a statement as to whether enforcement actions can be completed administratively or whether they must be commenced and completed in the judicial system.*"

The local administrative and legal procedures available to mandate compliance with the above ordinances are specified in those ordinances, particularly in:

Los Angeles County Code:

§12.80.550 Enforcement—Director's powers and duties.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Title 26, §103 Violations And Penalties

Title 26, §104 Organization And Enforcement

Title 26, §105 Appeals Boards

Title 26, §106 Permits

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

LACFCD Code:

§21.05 Standards, Guidelines, and Criteria

§21.07 Prohibited Discharges

§21.09 Installation or Use of Illicit Connections Prohibited

§21.11 Littering Prohibited

§21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity

§21.15 Notification of Uncontrolled Discharges Required

§21.17 Requirement to Monitor and Analyze

§21.23 Violation a Public Nuisance

LACFCD attempts to first resolve each enforcement action administratively. However, the above cited ordinances also provide LACFCD with the authority to pursue such actions in the judicial system as necessary.

Very truly yours,

JOHN F. KRATTLI
County Counsel

By
JUDITH A. FRIES
Principal Deputy County Counsel
Public Works Division

JAF:jyj

STEVEN N. SKOLNIK

Attorney at Law
15332 Antioch Street, #436
Pacific Palisades, California 90272
Telephone: (310) 459-3418 Facsimile: (310) 606-2775
E-Mail: sskolniklaw@gmail.com

December 9, 2013

Lisa Rapp, Director of Public Works
City of Lakewood
5050 Clark Avenue
Lakewood, CA 90712

Re: Order No. R4-2012-0175
NPDES No. CAS004001

Dear Ms. Rapp:

In my capacity as City Attorney for the City of Lakewood (the "City"), I hereby confirm that the City has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR @ 122.26(d)(2)(i)(A-F) and the Order referenced above. Such legal authority is derived from Article 11, Section 7 of the California Constitution, Section 13002 of the California Water Code, and Section 5801 of the Lakewood Municipal Code, which incorporates by reference the pertinent provisions of the Los Angeles County Code.

The City is authorized to take enforcement action by administrative proceedings or in the judicial system.

Very truly yours,

Steven N. Skolnik

ALESHIRE & WYNDER LLP
ATTORNEYS AT LAW

Respond to Orange County
Fred Galante
fgalante@awattorneys.com
Direct (949) 250-5410

Orange County
18881 Von Karman Ave., Suite 1700
Irvine, CA 92612
P 949.223.1170 • F 949.223.1180

Los Angeles
2361 Rosecrans Ave., Suite 475
El Segundo, CA 90245
P 310.527.6660 • F 310.532.7395

Inland Empire
3880 Lemon Street, Suite 520
Riverside, CA 92501
P 951. 241.7338 • F 951.300.0985

Central Valley
2125 Kern Street, Suite 307
Fresno, CA 93721
P 559.445.1580 • F 888.519.9160

awattorneys.com

December 6, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013-1105

Re: Statement of Legal Authority

Dear Mr. Unger:

This letter is provided to serve as the Statement of Legal Authority for the City of Lynwood (the "City") that must be submitted with its Annual Report pursuant to Part VI.A.2.b. of Order No. R4-2012-0175 for NPDES Permit No. CAS004001. As legal counsel for the City, I am of the considered legal opinion that it has all the necessary legal authority to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order during the reporting period of July 1, 2012 through June 30, 2013, to the extent permitted by State and Federal law, subject to the limitations on municipal action under the California and United States Constitutions.

Per the requirement in Part VI.A.2.b.i., here are citations to the City's Municipal Code, Chapters 14-12 Stormwater and Urban Runoff Pollution Control and 14-13 Standard Urban Storm Water Mitigation Plan for Storm Water Pollution Control Measures for Development Planning and Construction Activities, for each of the following requirements found in Part VI.A.2.a:

i. *Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.*

   Municipal Code Sections: 14-12.9 Requirements For Industrial And Commercial Discharges And Construction Activities

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ii. *Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.*

Municipal Code Section: 14-12.6 Prohibited Activities

iii. *Prohibit and eliminate illicit discharges and illicit connections to the MS4.*

Municipal Code Section: 14-12.6 Prohibited Activities

iv. *Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.*

Municipal Code Section: 14-12.6 Prohibited Activities

v. *Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);*

Municipal Code Sections: 14-12.3 Purpose And Intent and 14-12.10 Enforcement

vi. *Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.*

Municipal Code Sections: 14-12.10 Enforcement and 14-13.4 Authority To Inspect And Enforce Storm Water Pollution Control Measures

vii. *Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;*

Municipal Code Sections: 14-12.2 Findings and 14-12.6 Prohibited Activities

viii. *Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;*

Municipal Code Sections: 14-12.2 Findings and 14-12.6 Prohibited Activities

ix. *Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4;*

Municipal Code Sections: 14-12.3 Purpose And Intent, 14-12.10 Enforcement, and 14-13.4 Authority To Inspect And Enforce Storm Water Pollution Control Measures

x. *Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;*

Municipal Code Section: 14-12.8 Good Housekeeping Provisions

xi. *Require that structural BMPs are properly operated and maintained;*

Municipal Code Sections: 14-13.1 Purpose And Scope and 14-13.2 Authority

xii. *Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.*

Municipal Code Sections: 14-13.1 Purpose And Scope and 14-13.2 Authority

Per the requirement in Part VI.A.2.b.ii., the City's legal procedures available to mandate compliance with applicable municipal ordinances identified in the above section, and therefore with the conditions of the Order, can be found in Municipal Code Section 14-12.10 Enforcement. Here is the text of that provision:

14-12.10 Enforcement:

a. Violations Deemed A Public Nuisance:

1. Any condition that is caused or permitted to exist in violation of any of the provisions of this Section is hereby determined to be a threat to the public health, safety, and welfare, is deemed to be a public nuisance, and may be abated by any authorized enforcement officer. In addition, a civil or criminal action to abate, enjoin, or otherwise compel the cessation of that nuisance may be initiated by the City Attorney.

2. The cost of abatement will be borne by the owner of the property. The cost of abatement will be invoiced to the owner of the property in the manner provided by law or ordinance for the recovery of nuisance abatement costs.

3. If any violation of this Section constitutes a seasonal and recurrent nuisance, the Director of Public Works will give written notice of that nuisance. The failure of any person to take appropriate action to prevent stormwater pollution after written notice of a determination under this Subsection constitutes a public nuisance and a violation of this Section.

b. Concealment: Causing, permitting, aiding, abetting, or concealing a violation of any provision of this Section constitutes a violation of that provision.

c. Civil Actions: In addition to all other remedies provided in this Subsection, any violation of this Section may be enforced by civil action brought by the City. In any such action, the City may seek, as appropriate, any or all of the following remedies:

1. A temporary or permanent injunction, or both.

2. Assessment of the violator for the costs of any investigation, inspection, or monitoring survey that led to the determination of the violation, and for the reasonable costs of preparing and bringing legal action under this subsection.

3. Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation.

4. Compensatory damages for the loss of or destruction to water quality, wildlife, and fish and aquatic life.

d. Administrative Enforcement Powers: In addition to the other enforcement powers and remedies established by this Section, an authorized enforcement officer has the authority to use the following administrative remedies:

1. Cease And Desist Orders: When an authorized enforcement officer finds that a discharge has taken place or is likely to take place in violation of this Section, the officer may issue an order to cease and desist such discharge, or any practice or operation that is likely to cause such discharge, and direct that the responsible persons: a) comply with the requirement; b) comply with a time schedule for compliance; and c) take appropriate action to prevent the violation from recurring.

2. Notice To Clean: Whenever an authorized enforcement officer finds any oil, earth, debris, grass, weeds, dead trees, tin cans, rubbish, refuse, waste, or any other material of any kind, upon the sidewalk abutting or adjoining any parcel of land, or upon any parcel of land or grounds, that may result in pollutants entering the Municipal Stormwater System or a nonstormwater discharge to the Municipal Stormwater System, the enforcement officer may give notice to the owner or occupant of the adjacent property to remove such oil, earth, debris, grass, weeds, dead trees, tin cans, rubbish, refuse, waste or other material. The recipient of that notice must undertake the removal activities described in the notice.

e. Penalties: Violation of this Section constitutes a misdemeanor and is punishable as provided in Section 1-5 of this Code.

f. Permit Revocation: If the City makes a provision of this Section or any identified BMP a condition of approval for the issuance of a permit or license, any person in violation of that condition is subject to the permit revocation procedures set forth in this Code.

g. Remedies: Remedies under this Section are in addition to and do not supersede or limit any and all other remedies, civil or criminal. The remedies provided for in this Section are cumulative and not exclusive.

Thus, enforcement actions can be completed administratively or judicially if necessary.

Please contact the undersigned if you have any questions.

Sincerely,

ALESHIRE & WYNDER, LLP

Fred Galante
City Attorney for the City of Lynwood

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STATEMENT OF LEGAL AUTHORITY

Pursuant to Part VI.A.2.b. of Order No. R4-2012-0175, the City of Paramount has all the necessary legal authority to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order during the reporting period of July 1, 2012 through June 30, 2013. This is made evident by municipal code citation to each of the following requirements found in Part VI.A.2.a:

1. Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial or commercial activity and control the quality of storm water discharged from industrial and commercial sites. This requirement applies both to industrial and commercial sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.
   Municipal Code Section: Sec. 48-3.5. Prohibited discharges from industrial or commercial activity
2. Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited
3. Prohibit and eliminate illicit discharges and illicit connections to the MS4.
   Municipal Code Section: Sec. 48-3. Illicit discharges prohibited and Sec. 48-3.1. Installation or use of illicit connections prohibited
4. Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited
5. Require compliance with applicable Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);
   Municipal Code Section: Sec. 48-3.8. Notification of uncontrolled discharges required.
6. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.
   Municipal Code Section: Sec. 48-5. Enforcement - Director's powers and duties
7. Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited and Sec. 48-2.1. Purpose and Intent.
8. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited and Sec. 48-2.1. Purpose and Intent.

9. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4;
   Municipal Code Section: Sec. 48-5.3. Inspection to ascertain compliance - Access
10. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;
    Municipal Code Section: Sec. 48-5.4. Notice to correct violations - Director may take action
11. Require that structural BMPs are properly operated and maintained.
    Municipal Code Section: Sec. 48-4.1. Best management practices for construction activity, 48-42, best managerial practices for industrial and commercial facilities.
12. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.
    Municipal Code Section: Sec. 48-4.3. Installation of structural BMPs

The City of Paramount legal procedures available to mandate compliance with applicable municipal ordinances identified in the above section, and therefore with the conditions of the Order, can be found in Section *Sec. 48-5. Enforcement - Director's powers and duties*. Violations of this section are deemed a "Public Nuisance" in section 48-5.5, where any discharge in violation of this chapter, any illicit connection, and/or any violation of runoff management requirements shall constitute a threat to public health and safety.

Signature: _____
John E. Cavanaugh, City Attorney

Date: 12-3-13

ALVAREZ-GLASMAN & COLVIN

ATTORNEYS AT LAW

13181 Crossroads Parkway North
Suite 400-West Tower
City of Industry, CA 91746
Tel: 562.699.5500
Fax: 562.692.2244
www.agclawfirm.com

December 13, 2013

Sam Unger, P.E., Executive Officer
California Regional Water Quality
Control Board -- Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-1105

Subject: Certification of Legal Authority

Dear Mr. Unger:

Alvarez-Glasman & Colvin serves as the City Attorney's Office for the City of Pico Rivera. As the City Attorney for the City of Pico Rivera (the "City"), I am aware of the following legal authority requirements specified in VI.A.2.b, of the MS4 Permit for Los Angeles County, Order No. R4-2012-0175, NPDES Permit No. CAS004001:

Each Permittee must submit a statement certified by its chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order. Each Permittee shall submit this certification annually as part of its Annual Report beginning with the first Annual Report required under this Order. These statements must include:

i. Citation of applicable municipal ordinances or other appropriate legal authorities and their relationship to the requirements of 40 CFR § 122.26(d)(2)(i)(A)-(F) and of this Order; and

ii. Identification of the local administrative and legal procedures available to mandate compliance with applicable municipal ordinances identified in subsection (i) above and therefore with the conditions of this Order, and a statement as to whether enforcement actions can be completed administratively or whether they must be commenced and completed in the judicial system.

The City has the legal authority to require compliance with the requirements associated with 40 CFR § 122.26(d)(2)(i)(A-F) and applicable provisions of the Order per Chapter 16.04 Storm Water and Urban Runoff Pollution Prevention of the City of Pico Rivera Municipal Code. The City has had such legal authority since 2002.

The City's Municipal Code provides for both administrative enforcement and legal enforcement of violations, which may result in administrative, civil, or criminal penalties. Section 16.04.140 provides that in the event the City serves a person with a notice of violation, and that person fails to comply within the given time period, the City has multiple remedies which are not listed to be exclusive or exhaustive, including: seeking prosecution of violations as a misdemeanor resulting in fines or imprisonment; seeking restitution of costs incurred by the City in the investigation and enforcement of compliance; and prosecution of violations as nuisance abatement resulting in liens and cost recovery.

Should you have any questions regarding this matter, please feel free to contact Deputy City Attorney Teresa Chen at (562) 699-5500.

Sincerely,

ALVAREZ-GLASMAN & COLVIN

Arnold M. Alvarez-Glasman
City Attorney

ALESHIRE & WYNDER LLP
ATTORNEYS AT LAW

Respond to Orange County
David J. Aleshire
daleshire@awattorneys.com
Direct (949) 250-5409

Orange County
18881 Von Karman Ave., Suite 1700
Irvine, CA 92612
P 949.223.1170 • F 949.223.1180

Los Angeles
2361 Rosecrans Ave., Suite 475
El Segundo, CA 90245
P 310.527.6660 • F 310.532.7395

Inland Empire
3880 Lemon Street, Suite 520
Riverside, CA 92501
P 951. 241.7338 • F 951.300.0985

Central Valley
2125 Kern Street, Suite 307
Fresno, CA 93721
P 559.445.1580 • F 888.519.9160

awattorneys.com

December 3, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013-1105

Re: Legal Authority Statement

Dear Mr. Unger:

This letter is provided to serve as the Statement of Legal Authority for the City of Signal Hill (the "City") that must be submitted with its Annual Report pursuant to Part VI.A.2.b. of Order No. R4-2012-0175 for NPDES Permit No. CAS004001. As legal counsel for the City, I have determined that it has all the necessary legal authority to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order during the reporting period of July 1, 2012 through June 30, 2013, to the extent permitted by State and Federal law, subject to the limitations on municipal action under the California and United States Constitutions.

Per the requirement in Part VI.A.2.b.i., here are citations to the City's Municipal Code for each of the following requirements found in Part VI.A.2.a:

i. *Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.*

   Municipal Code Sections: 12.16.060 Illicit discharges, 12.16.100 Compliance with state and federal discharge requirements, and 12.16.112 Construction pollutant reduction

ii. *Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.*

Municipal Code Section: 12.16.060 Illicit discharges

iii. *Prohibit and eliminate illicit discharges and illicit connections to the MS4.*

Municipal Code Sections: 12.16.050 Illicit connections prohibited and 12.16.060 Illicit discharges

iv. *Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.*

Municipal Code Sections: 12.16.060 Illicit discharges and 12.16.080 Littering

v. *Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);*

Municipal Code Section: 12.16.120 Inspection and enforcement

vi. *Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.*

Municipal Code Section: 12.16.120 Inspection and enforcement

vii. *Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;*

Municipal Code Sections: 12.16.020 Purpose and intent and 12.16.120 Inspection and enforcement

viii. *Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;*

Municipal Code Sections: 12.16.020 Purpose and intent and 12.16.120 Inspection and enforcement

ix. *Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take*

measurements, review and copy records, and require regular reports from entities discharging into its MS4;

Municipal Code Section: 12.16.120 Inspection and enforcement

x. *Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;*

Municipal Code Sections: 12.16.060 Illicit discharges, 12.16.114 New development/redevelopment pollutant reduction, and 12.16.116 Small site new development/ redevelopment pollutant reduction

xi. *Require that structural BMPs are properly operated and maintained;*

Municipal Code Sections: 12.16.114 New development/redevelopment pollutant reduction and 12.16.116 Small site new development/ redevelopment pollutant reduction

xii. *Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.*

Municipal Code Section: 12.16.114 New development/redevelopment pollutant reduction and 12.16.116 Small site new development/ redevelopment pollutant reduction

Per the requirement in Part VI.A.2.b.ii., the City's legal procedures available to mandate compliance with applicable municipal ordinances identified in the above section, and therefore with the conditions of the Order, can be found in Municipal Code Section 12.16.120 Inspection and enforcement. Here is the relevant text of that provision:

"12.16.120 Inspection and enforcement.

[...]

B. Enforcement.

1. Any violation of this chapter is a misdemeanor and shall be punishable by either a fine of up to one thousand dollars or six months in the county jail, or both.

2. Any person who may otherwise be charged with a misdemeanor as a result of a violation of this chapter may be charged, at the discretion of the prosecuting attorney, with an infraction punishable by a fine of not more than one

hundred dollars for the first violation, two hundred dollars for the second violation, and two hundred fifty dollars for each additional violation thereafter.

3. As a part of any sentence or other penalty imposed or the award of any damage, the court may also order that restitution be paid to the City or any injured person, or, in the case of a violator who is a minor, by the minor's parent or lawfully designated guardian or custodian. Restitution may include the amount of any reward.

4. Any person violating the provisions of this chapter shall reimburse the City for any and all costs incurred by the City in responding to, investigating, assessing, monitoring, treating, cleaning, removing, or remediating any Illicit Discharge or Pollutant from the municipal storm drain system; rectifying any Illicit Connection; or remediating any violation of this chapter.

Such costs to be paid to the City include all administrative expenses and all legal expenses, including costs and attorneys' fees, in obtaining compliance, and in litigation including all costs and attorneys' fees on any appeal. The costs to be recovered in this Section 12.16.120 shall be recoverable from any and all persons violating this chapter.

5. In the event any violation of this chapter constitutes an imminent danger to public health, safety, or the environment, the City Manager or Director, or any authorized agent thereof, may enter upon the premises from which the violation emanates, abate the violation and danger created to the public safety or the environment, and restore any premises affected by the alleged violation, without notice to or consent from the owner or occupant of the premises. An imminent danger shall include but is not limited to exigent circumstances created by the Discharge of Pollutants, where such Discharge presents a significant and immediate threat to the public health or safety, or the environment.

6. Violations of this chapter may further be deemed to be a public nuisance which may be abated by administrative or civil or criminal action in accordance with the terms and provisions of this code and state law.

7. All costs and fees incurred by the City as a result of any violation of this chapter which constitute a nuisance, including all administrative fees and expenses and legal fees and expenses, shall become a lien against the subject premises from which the nuisance emanated and a personal obligation against the owner, in accordance with Government Code Sections 38773.1 and 38773.5. The owner of record of the premises subject to any lien shall receive notice of the lien prior to recording, as required by Government Code Section 38773.1. The City Attorney is authorized to collect nuisance abatement costs or enforce a nuisance lien in an action brought for money judgment, or by delivery to the county

assessor of a special assessment against the premises in accordance with the conditions and requirements of Government Code Section 38773.5.

8. Any person acting in violation of this chapter may also be acting in violation of the Clean Water Act or the California Porter-Cologne Act (California Water Code Section 13000 et seq.) and the regulations thereunder, and other laws and regulations, and may be subject to damages, fines and penalties, including civil liability under such other laws. The City Attorney is authorized to file a citizen's suit pursuant to the Clean Water Act, seeking penalties, damages and orders compelling compliance and appropriate relief.

9. The City Attorney is authorized to file in a court of competent jurisdiction a civil action seeking an injunction against any violation or threatened or continuing violation of this chapter. Any temporary, preliminary or permanent injunction issued pursuant hereto may include an order for reimbursement to the City for all costs incurred in enforcing this chapter, including costs of inspection, investigation, monitoring, treatment, abatement, removal or remediation undertaken by or at the expense of the city, and may include all legal expenses and fees and any and all costs incurred relating to the restoration or remediation of the environment.

10. Each separate Discharge in violation of this chapter and each day a violation of this chapter exists, without correction, shall constitute a new and separate violation punishable as a separate infraction, misdemeanor and/or civil violation.

11. Whenever necessary, interagency coordination will be employed to enforce the provisions of this chapter.

12. The City may utilize any and all other remedies as otherwise provided by law."

Thus, enforcement actions can be completed administratively or judicially if necessary.

Please contact the undersigned if you have any questions.

Sincerely,

ALESHIRE & WYNDER, LLP

David J. Aleshire
City Attorney for the City of Signal Hill

City of South Gate

8650 CALIFORNIA AVENUE • SOUTH GATE, CA 90280-3075 • (323) 563-9538
FAX (323) 357-9643

RAUL SALINAS
CITY ATTORNEY

December 3, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013-1105

RE: Legal Authority Certification for the City of South Gate

Dear Mr. Unger:

As legal counsel for the City of South Gate, I have reviewed its existing ordinances including Title 6 (Health and Sanitation), Chapter 6.67 (Storm Drains), of the South Gate Municipal Code, and have determined that the City can operate pursuant to the legal authority required in 40 CFR 122.26(d)(2)(Storm Water discharge applicable to State NPDES programs), including subdivision 122.26(d)(2)(i)(A)-(F), and Part VI.A.2 of Order No. R4-2012-0175, issued by the Regional Water Quality Control Board – Los Angeles Region ("RWQCB"), adopted on December 28, 2012 and entitled "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County.

Enforcement of the City's stormwater ordinances can be completed administratively or, if necessary, through the judicial system.

Please call the undersigned if you have any questions.

Sincerely,

CITY OF SOUTH GATE

Raul F. Salinas, City Attorney

cc: John L. Hunter & Associates

WMP Comments		
Permit Provision	**Regional Water Board Staff Comment**	**Watershed Group Response**
Part VI.C.1.d (Purpose of Watershed Program, Page 47)	Section 1.1 of the draft WMP states, "the goal of these requirements is to reduce the discharge of pollutants from MS4s to the maximum extent practicable." The goal of the three permits and of a WMP is broader than presented (p. 1-1). Per part VI.C.1.d of the LA County MS4 Permit, the goals of the Watershed Management Programs are to "…ensure the discharges from the Permittee's MS4: (i) achieve applicable water quality-based effluent limitations in Part VI.E and Attachment L through R pursuant to the corresponding compliance schedules, (ii) do not cause or contribute to exceedances of receiving water limitations in Parts V.A and VI.E and Attachments L through R, and (iii) do not include non-storm water discharges that are effectively prohibited pursuant to Part III.A. The programs shall also ensure that controls are implemented to reduce the discharge of pollutants to the maximum extent practicable (MEP) pursuant to Part IV.A.1." The revised WMP needs to acknowledge the broader goals set forth in the permit.	The language in 1.1 has been revised accordingly. The broader goals are also (and were previously) listed in Sections 1.2.3-1.2.4.
Part VI.C.5.a.iii.(1)(a)(v) (Source Assessment, page 60)	The MS4 Permit requires that TMDL source investigations be considered in the source assessment. Although several TMDLs are discussed in Section 2.2, others with potentially useful insights such as the Los Angeles River metals TMDL were not. The group should consider the source investigations from all relevant TMDLs for possible insights into important sources that might be useful in designing an effective program.	Section 2.3 has been revised to incorporate existing TMDL source investigations.
Part VI.C.5.a.iii.(1)(a)(vi) (Source Assessment, page 60)	The MS4 Permit requires the source assessment to include data and conclusions from watershed model results. The Regional Water Board did not find any responsive information in the draft WMP and any available information should be noted in the final WMP. For example, relevant findings presented in the implementation plans for the LA River metals TMDL submitted in the October 2010 by Reach 1 and Compton Creek participating jurisdictions and Reach 2 participating jurisdictions should be included.	Section 2.3 has been revised to incorporate data and conclusions from existing watershed model results.
Part VI.C.5.a.iii.(1)(a)(vii) (Source Assessment, page 60)	The MS4 Permit requires a map of the MS4 including major outfalls and major structural controls. Appendix H of the CIMP provides maps showing the major outfalls and Appendix D of the draft WMP provides a tabular list of existing and proposed BMPs. The revised WMP should include a map (or GIS project file) of these BMPs as well. Also, the outfall database should be submitted with the revised WMP. In addition, Section VII.A of Attachment E to the MS4 permit requires maps of the drainage areas associated with the outfalls and these were not provided. Section 1.3.2 of the WMP does note that 53 catchments are located in the watershed, and maps showing these drainage areas should be provided. If these are not readily available, a process and timeline for developing this spatial information should be included in the revised WMP.	A map of existing structural controls has been added to Section 3.4.2.3. The major outfall database will be included with the CIMP resubmittal. The following language has been added to Section 1.3.2: Drainage areas for individual outfalls are not readily available at this time. Defining these areas would require significant resources. The Group proposes to provide drainages areas for major outfalls with significant discharges and outfalls where stormwater monitoring (as part of the CIMP) will be conducted. To complete this task, existing drainage maps from the Flood Control District or the cities will be recalled and converted to GIS project files. This task will be completed within one year of WMP approval.

WMP Comments		
Permit Provision	**Regional Water Board Staff Comment**	**Watershed Group Response**
Part VI.C.5.a.iv.(1) (Prioritization, page 60)	The MS4 Permit requires a strategy to implement pollutant controls necessary to achieve WQBELs and/or receiving water limitations (RWLs) with compliance deadlines that have already passed and limitations have not been achieved. The LA River metals TMDL includes interim wet and dry water quality-based effluent limitations with a compliance deadline of January 2012; the WMP needs to address the compliance status of the Permittees with these limitations, and ensure compliance. In Section 3.4.1.6, the draft WMP states, "[a]s recognized by the footnote in Attachment K-4 of the Permit, the Participating Agencies have entered into an Amended Consent Decree with the United States and the State of California, including the Regional Board, pursuant to which the Regional Board has released the Participating Agencies from responsibility for toxic pollutants in the Dominguez Channel and the Greater Los Angeles and Long Beach Harbors." This statement misinterprets the Regional Water Board's findings. Footnote 1 to Table K-4 of the LA County MS4 Permit states, "[t]he requirements of this Order to implement the obligations of this TMDL do not apply to a Permittee has been released from that obligation pursuant to the Amended Consent Decree entered in United States v. Montrose Chemical Corp, Case No. 90-3122 AAH (JRx)." As stated in the responses to comments received on the Dominguez Channel and Greater Harbor Water Toxic Pollutants TMDL, "…primarily one pollutant, DDT, is associated with the Superfund site and also addressed by the TMDL. The TMDL addresses numerous pollutants and utilizes a different process than Superfund. The other pollutants – heavy metals, PAHs, PCBs and other legacy pesticides are not within Superfund's focus at the Montrose OU2 site…" Further, the WQBELs in Attachment N, Part E of the LA County MS4 Permit and Part VIII.P of the Long Beach MS4 Permit are for ongoing discharges from the MS4, not for the historic contamination of the bed sediments. Therefore, the statement in the draft WMP incorrectly concludes that the aforementioned Consent Decree releases MS4 Permittees from any obligation to implement the WQBELs in the MS4 permits.	Section 3.4.1.3 has been revised to address the 2012 interim metals WQBELs. Regarding Section 3.4.1.6, the language in the Revised WMP has been revised.
Part VI.C.5.a.iv.(2)(a) (Prioritization, page 60)	Where data indicate impairment of exceedances of the RWLs and the findings from the source assessment implicate discharges from the MS4, the Permit requires a strategy for controlling pollutants that is sufficient to achieve compliance as soon as possible. Although Section 3 includes a compliance strategy, the program needs to more clearly demonstrate that the compliance schedule (Section 5) ensures compliance is "as soon as possible."	Section 5 has been modified to more clearly demonstrate that compliance is "as soon as possible". The revised WMP has increased the degree of clarity and specificity regarding schedules and actions for the current and next permit terms. The Group considers this effort to be the maximum practicable considering the associated uncertainties. Greater certainty will be provided through the adaptive management process.

WMP Comments		
Permit Provision	**Regional Water Board Staff Comment**	**Watershed Group Response**
Part VI.C.5.b.iv.(5)(c) (Selection of Watershed Control Measures, page 64)	For waterbody-pollutant combinations not addressed by TMDLs, the MS4 Permit requires that the plan demonstrate using the reasonable assurance analysis (RAA) that the activities and control measures to be implemented will achieve applicable receiving water limitations as soon as possible. The RAA demonstrates the control measures would be adequate to comply with the limitations/deadlines for the "limiting pollutants" for TMDLs and concludes that this will ensure compliance for all other pollutants of concern. However, it does not address the question of whether compliance with limitations for pollutants not addressed by TMDLs could be achieved in a shorter time frame.	Section 5 has been modified to more clearly demonstrate that the compliance schedule is as soon as possible for pollutants not addressed by TMDLs.
Part VI>C>5.b.iv.(4)(b)-(c) (Selection of Watershed Control Measures, page 63)	The MS4 Permit requires that the WMP provide specific with regard to structural and non-structural BMPs, including the number, type, and location(s), etc. adequate to assess compliance. In a number cases, additional specificity on the number, type and general location(s) of watershed control measures as well as the timing of implementation for each is needed. (Regional Water Board staff notes, for example, that many watershed control measures in the implementation schedule only reference the year (or years) that a measure or milestones will be implemented. This should be revised to include more specific and/or exact dates where appropriate.) Additionally, many watershed control measures in the implementation schedule are ongoing measures that are not new interim milestones (e.g. MCMs, implementation of SB 346, enhanced street sweeping, etc.). For transparency, Regional Water Board staff recommends that ongoing measures clearly be separated from interim milestones for structural controls and non-structural BMPs in the implementation schedule. Regional Water Board staff recognizes uncertainties may complicate establishment of specific implementation dates, however there should at least be more specificity on actions within the current and next permit terms. <u>Green Street Conversion:</u> The RAA identifies potential areas for green street conversion and assumes a 30% conversion of the road length in the suitable areas; however, the specific locations and projects are not identified. Although it may not be possible to provide detailed information on specific projects at this time, the WMP should at least commit to the construction of the necessary number of projects to ensure compliance with permit requirements per applicable compliance schedules. <u>Reduction from New Non-structural Controls:</u> The WMP assumes a 10% pollutant reduction from new non-structural controls. Although 10% is a modest fraction of the overall controls necessary, additional support	Section 5 has been modified to increase the degree of clarity and specificity regarding schedules and actions for the current and next permit terms. The Group considers this effort to be the maximum practicable considering the associated uncertainties. Greater certainty will be provided through the adaptive management process. The ongoing nonstructural measures listed in Table 5.1 have been clearly separated from the new measures. Section 4.3 has been added to the WMP to address the comment regarding the 10% pollution reduction assumption for new non-structural controls.

WMP Comments		
Permit Provision	**Regional Water Board Staff Comment**	**Watershed Group Response**
	for this assumption should be provided, or as part of the adaptive management process, the Permittees should commit to evaluate this assumption during program implementation and develop alternate controls if it becomes apparent that the assumption is not supported.	
Part VI.C.5.b.iv.(4)(b)-(c) (Selection of Watershed Control Measures, page 63)	<u>Reduction in Irrigation Runoff:</u> For dry weather, the WMP assumes a 25% reduction in irrigation (which results in a 60% reduction in pollutant discharges); additional support should be provided for this assumption, or as part of the adaptive management process, the Permittees need to commit to evaluate this assumption during program implementation and develop alternate controls if it becomes apparent that the assumption is not supported. <u>Regional BMPs:</u> Section 1.4.2 of Attachment A to the RAA points out that additional potential regional BMPs were identified to provide the remaining BMP volume noted in Table 9-4. It indicates they can be found in Section 4 of the WMP (Actually, they are found in Section 3). The RAA should clarify that sufficient sites were identified so that the remaining necessary BMP volume can be achieved by those sites that were not "excluded for privacy." <u>Industrial Facilities:</u> The draft WMP, including the RAA, excludes stormwater runoff from non-MS4 facilities within the WMA from the stormwater treatment target. In particular, industrial facilities that are permitted by the Water Boards under the Industrial General Permit or an individual stormwater permit were identified and subtracted from the treatment target. Regional Water Board staff recognizes that this was done with the assumption that these industrial facilities will retain their runoff and/or eliminate their cause/contribution to receiving water exceedances, as required by their respective NPDES permit. However, it is important that the Permittees actions under its Industrial/Commercial Facilities Program – including tracking critical industrial sources, educating industrial facilities regarding BMP requirements, and inspecting industrial facilities – ensure that all industrial facilities are implementing BMPs as required. <u>Caltrans facilities:</u> The draft WMP, including the RAA, takes a similar approach for areas under the jurisdiction of the California Department of Transportation (Caltrans). Caltrans facilities that are permitted under the Caltrans MS4 permit (Order No. 2012-0011-DWQ) were also identified and subtracted from the treatment target.	<u>Reduction in Irrigation Runoff</u> Section 4.2.1 has been added to the WMP to include the additional support for the assumed 25% reduction in irrigation. <u>Regional BMPs:</u> Though specific addresses were not provided in the WMP, these locations are still potential sites for regional structural BMPs and may be used as such. The complete list of potential sites in Section 3 of the WMP, including those where the address has been excluded for privacy, provide the necessary BMP volume needed as established through the RAA. <u>Industrial Facilities:</u> The WMP commits to implementing the MCMs, which includes the Industrial/Commercial Facilities Program. In addition 1) the WMP includes a facility prioritization scheme to increase program effectiveness, and 2) template documents to aid in proper implementation are included as an attachment to the WMP. These efforts ensure that all industrial facilities are implementing BMPs as required. <u>Caltrans facilities:</u> As noted in the Regional Board comment, the Group has taken the initial steps to collaborate with Caltrans, who is a participant in the Group. Coordinated effort between Caltrans and the Group will continue with implementation of the WMP.

WMP Comments		
Permit Provision	**Regional Water Board Staff Comment**	**Watershed Group Response**
	It should be noted that the Amendment to the Caltrans Permit (Order WQ 2014-0077-DWQ) includes provisions to address TMDL requirements throughout the state. Revisions to Attachment IV of the Caltrans Permit require that Caltrans prioritize all TMDLs for implementation of source control measures and BMPs, with prioritization being "consistent with the final TMDL deadlines to the extent feasible." Additionally, the Caltrans Permit also includes provisions for collaborative implementation through Cooperative Implementation Agreements between Caltrans and other responsible entities to conduct work to comply with a TMDL. By contributing funds to Cooperative Implementation Agreements and/or the Cooperative Implementation Grant Program, Caltrans may receive credit for compliance units, which are needed for compliance under the Caltrans Permit. In a similar manner, the LA County MS4 permit includes provisions for Permittees to control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other MS4 owners – such as Caltrans – to successfully implement the provisions of the Order (see Parts VI.A.2.a.viii and VI.A.4.a.iii). Therefore, the permittees should ensure that they are closely coordinating with appropriate Caltrans District staff regarding the identification and implementation of watershed control measures to achieve water quality requirements (i.e. applicable Receiving Water Limitations and WQBELs). Regional Water Board Staff recognizes that the Group has taken the initial steps for such collaboration since Caltrans participates in the Group and the draft WMP notes Caltrans in its strategies for runoff reduction and total suspended solids reduction.	
Part VI.C.5.b.iv.(4)(c) (Selection of Watershed Control Measures – SB 346 Copper Reductions)	The draft WMP appears to rely heavily on the phase-out of copper in automotive brake pads, via approved legislation SB 346, to achieve the necessary copper load reductions. Given the combination of other Cu sources identified in various LA TMDLs such as building materials, other vehicle wear, air deposition from fuel combustion and industrial facilities, and that SB 346 progressively phases out Cu content in brakes of new cars (5% by weight until 2021, 0.5% by weight until 2025), then other structural and non-structural BMPs may still be needed to reduce Cu loads sufficiently to achieve compliance deadlines for interim and/or final WQBELs.	The RAA approach of zinc being the limiting pollutant, in concert with the modeled effect of copper load reductions anticipated through SB 346, predicts that the application of the WCMs and Compliance Schedule of Chapter 3 and 5, respectively, will reduce copper loads sufficiently to achieve compliance deadlines from interim and/or final WQBELs.
Part VI.C.5.b.iv.(1)(a)(ii) (Minimum Control Measures – Industrial/Commercial	The Group proposes to alter the commercial and industrial facility inspection frequencies in Parts VI.D.6.d and VI.D.6.e of the LA County Permit. The proposed modification includes a prioritization process in which the MS4 Permittees rate applicable facilities as high, medium, or low priority. High priority	Table 3-3 has been modified to 1) clarify when facility prioritization occurs (after inspection or as information becomes available that clarifies water quality impacts), 2) ensure that prioritization be based on water quality impact, and 3) make it explicitly clear that the ratio of low priority to

WMP Comments		
Permit Provision	**Regional Water Board Staff Comment**	**Watershed Group Response**
Facilities Program)	facilities are inspected more frequently and low priority facilities are inspected less frequently. The prioritization scheme included in Figure ICF-1 prioritizes facilities by their potential water quality impact. However, the draft WMP also notes that cities "may follow an alternative prioritization method provided it results in a similar three-tiered scheme." The revised WMP should ensure that any alternative prioritization method used by a city must also be based on water quality impact. No statement to this effect was included. Furthermore, the draft WMP also notes that cities can prioritize and reprioritize facilities at any time based on their discretion. The group should revise their draft WMP to clearly stat when the initial prioritization of facilities will occur. Additionally, the group should be explicitly clear that during any reprioritization, the ratio of low priority to high priority facilities must always remain at 3:1 or lower to maintain inspection frequencies identified in the draft WMP.	high priority facilities must always remain at 3:1 or lower when reprioritizing.
Part VI.C.5.b.iv.(5)	The RAA identifies zinc as the limiting pollutant and notes that this pollutant will drive reductions of other pollutants. If the Group believes that this approach demonstrates that activities and control measures will achieve applicable receiving water limitations, it should explicitly state and justify this for each category 1, 2 and 3 pollutant.	Section 5.3.1 of the RAA justifies how Category 1, 2, and 3 pollutants are controlled through the limiting pollutant approach. This statement, along with a reference to the RAA for justification, is included in Section 4.1. The revised introduction to Section 5 provides explicit statements regarding the implementation of this approach in order to achieve applicable receiving water limitations.
Part VI.C.5.c.iii.(3) (Compliance Schedules - Bacteria)	The draft WMP proposes a final compliance date of September 2030 for bacteria in the LA River Estuary. However, the Group does not provide sufficient justification for this date. The compliance date for the lower Reach 2 and Reach 1 of the LA River is 2024 for achieving the dry-weather WQBELs. A Load Reduction Strategy must be submitted for this segment (Segment A in the TMDL) by September 2016. These dates are more appropriate to guide the schedule to address bacteria discharges during dry weather to the LA River Estuary. Additional milestones and a schedule of dates for achieving milestones should be defined for addressing bacteria discharges to the LA River Estuary.	Section 3.4.1.5 has been revised to address the final compliance date of 2030.
A.1	The Lower Los Angeles River Watershed Management Area (LLAR WMA) is subject to interim and final water quality-based effluent limitations pursuant to Attachment O, Part A "Los Angeles River Watershed Trash TMDL, Part B "Los Angeles River Nitrogen Compounds and Related Effects TMDL", Part C "Los Angeles River and Tributaries Metals TMDL", and Part D "Los Angeles River Bacteria TMDL". To the extent that the MS4 Permittees within the LLAR WMA discharge directly to the Los Angeles River Estuary and/or San Pedro Bay, those discharges are subject to WQBELs in Attachment N, Part E "Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters	The Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutant TMDL is addressed in the WMP (Section 3.4.1.6). The RAA concludes that the WQBELS of this TMDL are not "limiting", as defined by the limiting pollutant approach which is also justified and explained in the RAA. Zinc was predicted to be the limiting pollutant, and following the strategies and compliance schedules of the WMP (Chapters 3 and 5, respectively), targeting load

WMP Comments		
Permit Provision	**Regional Water Board Staff Comment**	**Watershed Group Response**
	Toxic Pollutants TMDL". To the extent that the discharges to the Los Angeles River Estuary are to be addressed by the LLAR WMP, pursuant to Part VI.C.5.a.iv(1) and VI.C.5.b.iv, pages 60 and 62-63 of the LA County MS4 Permit, the Lower Los Angeles River Group is required to conduct a reasonable assurance analysis to demonstrate that the WQBELs that are established in the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL shall be achieved through implementation of the watershed control measure proposed in the WMP. However, the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutant TMDL was appears to be completely omitted from the draft. The draft WMP did not include and analyze a strategy to implement pollutant controls necessary to achieve all applicable interim and final water quality-based effluent limitations and/or receiving water limitations with interim or final compliance deadlines within the permit term pursuant to the corresponding compliance schedules in the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL.	reductions to achieve zinc WQBELs will simultaneously result in load reduction to achieve the WQBELs of the Toxics TMDL.
A.2	The draft Lower Los Angeles River WMP identified water quality priorities for Los Angeles River (Estuary, Reaches 1 and 2), Compton Creek, and Rio Hondo), but not for San Pedro Bay. Pursuant to Section VI.C.5.a., the WMP should be revised to include an evaluation of existing water quality conditions, classify them into categories, identify potential sources, and identify strategies, control measures, and BMPs as required in the permit for San Pedro Bay unless MS4 discharges from the LLAR WMA directly into San Pedro Bay are being addressed under a separate WMP.	MS4 discharges directly to San Pedro Bay will be addressed in the WMP developed by the City of Long Beach as required by the Long Beach MS4 NPDES Permit.
A.3	The draft WMP provided corresponding implementation schedules for nonstructural BMPs, which are assumed to result in a 10% reduction in pollutant load. For structural BMPs, general implementation timeframes are given for the Proposition 84 Grant Award projects (section 5.2), implementation of the Planning and Land Development Program by Permittees (section 5.3.1), and wet weather volume reductions to meet 31% and 50% of the compliance target by 2017 and 2024, respectively. However, greater specificity should be provided with regard to these dates, and additional milestones and dates for their achievement between 2017 and 2024 should be included.	Section 5 has been modified to increase the degree of clarity and specificity regarding schedules and actions for the current and next permit terms. The Group considers this effort to be the maximum practicable considering the associated uncertainties. Greater certainty will be provided through the adaptive management process.
B.1	The model predicted stormwater runoff volume is used as a surrogate for required pollutant load reductions for wet weather conditions. Thus the predicted flow volume becomes a very important parameter for evaluating required volume reductions and BMP scenarios. Based on the results of the hydrology calibration shown in Table 4-3, the error difference between modeled flow volumes and observed data is 19% for the	It should be noted that the entire watershed was included in the model for calibration purposes, including areas upstream and outside of the area addressed by the RAA. As such, there was no absence of upstream flow contributing to the error difference. As stated in the comment, once

WMP Comments		
Permit Provision	**Regional Water Board Staff Comment**	**Watershed Group Response**
	Lower San Gabriel River. The higher error percentage could be due to the exclusion of contributions of flow volume from upstream. For calibration purposes, upstream flow volume should be included to determine whether that improves the model performance to within the "Good" or "Very Good" range, per the RAA Guidelines. Once model calibration has been completed, the upstream flow volume can then be excluded when presenting the volume reduction targets in Tables 8-3 to 8-4.	calibration was completed, upstream areas were subtracted from the model for presenting load reduction targets. The plots in Attachment E have been updated to show the daily calibration results. The Tables in Section 4.1.1 and 4.1.2 have been updated to show the modeled versus observed volume error for the daily calibration results (versus the monthly that were shown previously).
B.2	While we understand that there is significant reliance on a volume-based approach, the predicted baseline concentrations and loads for all modeled pollutants of concern, including TSS, should be presented in summary tables for wet weather conditions. This model output should be available, since it is the basis for the percent reductions in pollutant load presented in Table 5-6. (See Table 5. Model Output for Both Process-based BMP Models and Empirically-based BMP models, pages 20-21 of the RAA Guidelines)	Additional table added to report to reflect the baseline loads. Found on page 39 as Table 5-6.
B.3	Further, the differences between baseline concentrations/loads and allowable concentration/loads should be presented in time series for each pollutant under long-term continuous simulation and as a summary of the differences between pollutant concentrations/loads and allowable concentrations/loads for the critical wet weather period. (See Table 5. Model Output for Both Process-based BMP Models and Empirically-based BMP Models, pages 20-21 of the RAA Guidelines)	Time series plots were added as a new attachment (Attachment F). Text was added to the report in Section 5.3.1 to refer the reader to the attachment for the plots.
B.4	We note that modeling was not conducted for organics (DDT, PCBs, and PAHs). It is not clear why these pollutants were not modeled or why previous modeling of these pollutants could not be used, such as that conducted during the development of the Dominguez Channel and Greater LA and Long Beach Harbor Waters Toxic Pollutants TMDL. An explanation for the lack of modeling is needed.	It should be noted that the original watershed modeling (based on LSPC) supporting the Dominguez Channel and Greater LA and Long Beach Harbor Waters Toxic Pollutants TMDL did not include simulation of DDT, PCBs, and PAHs. Rather, modeled sediment was used as a surrogate to estimate watershed loadings. Therefore, 90th percentile of observed concentrations were assigned, meeting requirements set forth by RAA guidance provided by the Regional Water Quality Control Board.
B.5	The report presents the existing runoff volumes, required volume reductions, and proposed volume reductions from BMP scenarios to achieve the 85th percentile, 24-hour volume retention standard for each major watershed area (e.g., LLAR, LCC and LSGR) and by jurisdiction. The same information on the runoff volume associated with the 85th percentile, 24-hour event and the proposed runoff volume reduction from each BMP scenario also needs to be presented for each modeled subbasin (e.g. a series of tables similar to 8-1 through 8-4 and 9-4 through 9-7). See Table 5 of the RAA	Attachment B was updated to include the requested tables. Sentence of text was added to provide some clarification in Section 9.2.1 – Third paragraph.

WMP Comments		
Permit Provision	**Regional Water Board Staff Comment**	**Watershed Group Response**
	Guidelines. Additionally, more explanation is needed as to what constitutes the "incremental" and "cumulative" critical year storm volumes in tables 9-4 through 9-7 and how these values were derived from previous tables.	
B.6	The report needs to present the same information, if available, for non-stormwater runoff. Alternatively, the report should include a commitment to collect the necessary data in each watershed area, through the non-stormwater outfall screening and monitoring program, so that the model can be re-calibrated during the adaptive management process to better characterize non-stormwater flow volumes and to demonstrate that proposed volume retention BMPs will capture 100 percent of non-stormwater that would otherwise be discharged through the MS4 in each watershed area.	A commitment to recalibration has been included in WMP Section 4.2.
B.7	The ID number for each of the subwatersheds from the model input file should be provided and be shown in the simulation domain to present the geographic relationship of subwatersheds, within each watershed area, that are simulated in the LSPC model.	The maps were added to Attachment C of the RAA with the other supporting figures.

Watershed Management Program Appendix 8

A-8-1 Coordinated Integrated Monitoring Program

INCLUDED AS A SEPARATE SUBMITTAL

COORDINATED INTEGRATED MONITORING PROGRAM FOR THE LOWER LOS ANGELES RIVER WATERSHED MONITORING GROUP

Participants

Downey	Pico Rivera
Lakewood	Signal Hill
Long Beach	South Gate
Lynwood	Paramount

Los Angeles County Flood Control District



Prepared by:

KINNETIC LABORATORIES INCORPORATED

Revised
February 2015

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ACRONYMS

ALERT	Automatic Local Evaluation in Real Time
AMEL	Average Monthly Effluent Limitation
Basin Plan	*Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand 5-day @ 20 °C
CASQA	California Stormwater Quality Association
CD	Compact Disc
CFR	Code of Federal Regulations
CIMP	Coordinated Integrated Monitoring Program
CL	Control Limit
COD	Chemical Oxygen Demand
CTR	California Toxics Rule
CV	Coefficient of Variation
CWA	Clean Water Act
CWC	California Water Code
CWP	Center for Watershed Protection
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
Discharger	Los Angeles County MS4 Permittees
DNQ	Detected But Not Quantified
EFA	Effective Filtration Area
EIA	Effective Impervious Area
ELAP	California Department of Public Health Environmental Laboratory Accreditation Program
Facility	Los Angeles County MS4s
FIB	Fecal Indicator Bacteria
GIS	Geographical Information System
gpd	gallons per day
HUC	Hydrologic Unit Code
IC50	Concentration at which the organism is 50% inhibited
IC/ID	Illicit Connection and Illicit Discharge Elimination
LA	Load Allocations
LACFCD	Los Angeles County Flood Control District
LARWQCB	Regional Water Quality Control Board, Los Angeles
LCC	Los Cerritos Channel
LID	Low Impact Development
LOEC	Lowest Observed Effect Concentration
MAL	Municipal Action Limits
MBAS	Methylene Blue Active Substances
MCM	Minimum Control Measure
ME	Mass Emission
mg/L	milligrams per Liter
MDEL	Maximum Daily Effluent Limitation
MDL	Method Detection Limit
µg/L	micrograms per Liter
MGD	Million Gallons Per Day
ML	Minimum Level
MRP	Monitoring and Reporting Program

MS4	Municipal Separate Storm Sewer System
MTBE	Methyl tertiary-butyl ether
ND	Not Detected
NOEC	No Observable Effect Concentration
NPDES	National Pollutant Discharge Elimination System
NSW	Non-Stormwater
NTR	National Toxics Rule
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
Ocean Plan	Water Quality Control Plan for Ocean Waters of California
ORI	Outfall Reconnaissance Inventory
PCB	Polychlorinated Biphenyls
PES	Polyester-reinforced polysulfone
RAP	Reasonable Assurance Program
Regional Water Board	California Regional Water Quality Control Board, Los Angeles Region
RPA	Reasonable Potential Analysis
RWL	Receiving Water Limitations
SIP	State Implementation Policy (Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California)
SMC	Stormwater Monitoring Coalition
SQO	Sediment Quality Objective
SSC	Suspended Sediment Concentration
State Water Board	California State Water Resources Control Board
SVOC	Semivolatile Organic Compounds
SWAMP	State's Water Ambient Monitoring Program
TAC	Test Acceptability Criteria
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRE	Toxicity Reduction Evaluation
TSS	Total Suspended Solid
TU_c	Chronic Toxicity Unit
USEPA	United States Environmental Protection Agency
USGS	U.S. Geological Survey
WDR	Waste Discharge Requirements
WET	Whole Effluent Toxicity
WLA	Waste Load Allocations
WMA	Watershed Management Area
WMG	Waste Management Group
WMMS	Watershed Management Modeling System
WMP	Watershed Management Program
WQBELs	Water Quality-Based Effluent Limitations
WQS	Water Quality Standards
%	Percent

COORDINATED INTEGRATED MONITORING PROGRAM (CIMP)

FOR THE

LOWER LOS ANGELES RIVER WATERSHED GROUP

1 INTRODUCTION

The Los Angeles Regional Water Quality Control Board (Regional Board) adopted a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. R4-2012-0175 (Permit) on November 8, 2012 that became effective on December 28, 2012. The purpose of the Permit is to ensure the MS4s in Los Angeles County are not causing or contributing to exceedances of water quality objectives established to protect the beneficial uses in the receiving waters. The Permit included guidance for development of a Monitoring and Reporting Program (MRP- Attachment E) to demonstrate that water quality within the permitted area is compliant with established receiving water limitations (RWLs).

The Permit allows development of a Coordinated Integrated Monitoring Program (CIMP) to specify approaches for addressing the objectives of the MRP. The Lower Los Angeles River (LLAR) Watershed Management Area (WMA) chose to develop and implement a CIMP to address the unique conditions of this region.

The entire Los Angeles River Watershed drains a watershed of 824 square miles. The Los Angeles River WMA is one of the largest in the region and is also one of the most diverse in terms of land use patterns. Approximately 324 square miles of the watershed are covered by forest or open space land including the area near the headwaters, which originate in the Santa Monica, Santa Susana, and San Gabriel Mountains. The remainder of the watershed is highly developed. The river flows through the San Fernando Valley past heavily developed residential and commercial areas. From the confluence with the Arroyo Seco, north of downtown Los Angeles, to the confluence with the Rio Hondo, the river flows through industrial and commercial areas and is bordered by rail yards, freeways, and major commercial and government buildings.

The LLAR Watershed (Figure 1-1) extends from Pico Rivera on the Rio Hondo to the Pacific Ocean. The LLAR Watershed Group encompasses approximately 43.7 square miles (27,981 acres) within Los Angeles County and comprises 5.3% of the drainage area of the Los Angeles River Watershed From the Rio Hondo to the Pacific Ocean, the river flows through industrial, residential, and commercial areas, including major refineries and petroleum products storage facilities, major freeways, rail lines, and rail yards serving the Ports of Los Angeles and Long Beach. The Los Angeles River tidal prism/estuary begins in Long Beach at Willow Street and runs approximately three miles before joining with Queensway Bay. The channel has a soft bottom in this reach with concrete-lined sides.

The CIMP is required to integrate requirements of the current Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit (LARWQCB, 2012), the City of Long Beach MS4 permit and TMDL monitoring requirements. This new approach represents an expansion and reorganization of monitoring in order to allow better assessment of the effectiveness of control measures using a watershed-based approach. The CIMP is structured to support the WMP's adaptive management process. New information and data resulting from the monitoring program are intended to assist in evaluating the effectiveness of management actions and to regularly re-evaluate the monitoring plan to better identify sources of contaminants. This plan was developed to address five primary objectives which include:

- Assess the chemical, physical, and biological impacts of discharges from the MS4s on receiving waters.
- Assess compliance with receiving water limitations and water quality-based effluent limitations (WQBELs) established to implement TMDL wet and dry weather load allocations
- Characterize pollutant loads in MS4 discharges.
- Identify sources of pollutants in MS4 discharges.
- Measure and improve the effectiveness of pollutant controls implemented under the new MS4 permits.

The Monitoring and Reporting Plan (MRP; Sections I.C and I.D) provides for development of a CIMP to provide Permittees the flexibility to coordinate monitoring efforts on a watershed or subwatershed basis, leverage monitoring resources to increase cost-efficiency and effectiveness and to closely align monitoring required for TMDLs with monitoring required to support the Watershed Management Program.

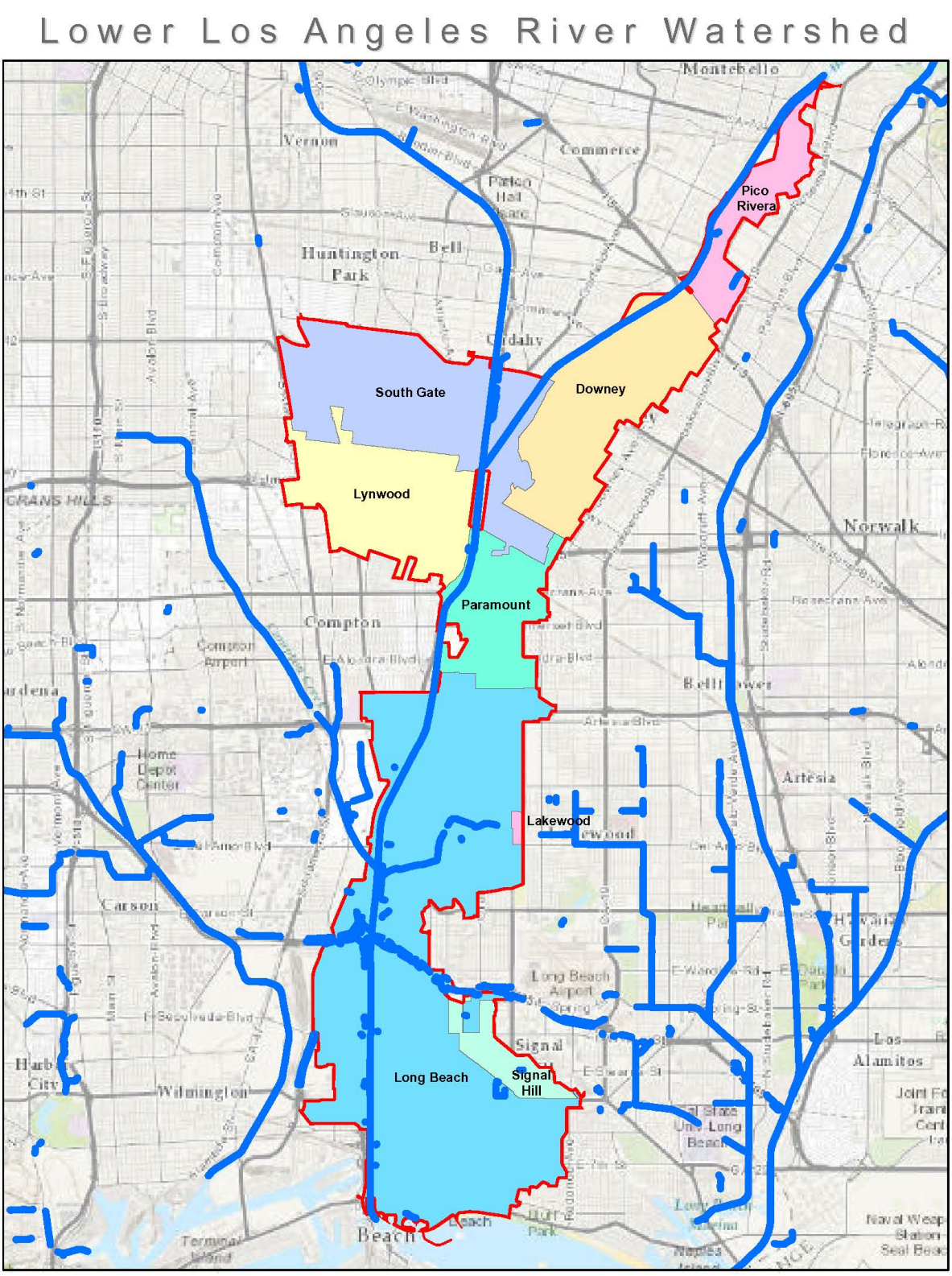


Figure 1-1. Lower Los Angeles River Watershed Group Boundaries.

2 Water Body-Pollutant Classification

Development of a Watershed Management Program (WMP) requires Permittees to develop water quality priorities within each WMA [Section C.5.a (page 58) of the Permit] that will be used assist in directing implementation of control measures and monitoring to address constituents of concern. These classifications are presented and discussed in Section 2 of the WMP.

The CIMP was developed to focus on existing water quality conditions. With more than 10 years of monitoring, data has shown that most of the constituents listed in Table E-2 of the MRP have never been detected and many more have been detected, but have not been found to exceed any RWLs. This new program is designed to target constituents that have been identified as constituents of concern in the receiving waters. Water body-pollutant combinations were used to classify segments of the LLAR WG into one of the following three categories:

- **Category 1 (Highest Priority):** Water body-pollutant combinations for which water quality-based effluent limitations and/or RWLs are established in Part VI.E and Attachments L through R of the Order.
- **Category 2 (High Priority)**: Pollutants for which data indicate water quality impairment in the receiving water according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) and for which MS4 discharges may be causing or contributing to the impairment.
- **Category 3 (Medium Priority)**: Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable RWLs contained in the Order and for which MS4 discharges may be causing or contributing to exceedances.

Five water bodies were considered for both wet and dry weather conditions while reviewing data potential impairment of the receiving waters (Table 2-1, Table 2-2). These included the Los Angeles River Estuary (LARE), Reaches 1 and 2 of the Los Angeles River (LAR1 and LAR2), Compton Creek (CC) and Reach 1 of the Rio Hondo (RH1). Each of these segments is defined in the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (Basin Plan).

Table 2-1. Wet Weather Water Body/ Pollutant Classifications for the Lower Los Angeles River WG.

CATEGORY	POLLUTANT	CLASS	WATER BODY				
			LARE	LAR1	LAR2	CC	RH1
1	Cadmium	Metal		**X**	**X**	**X**	**X**
	Copper	Metal	**X**	**X**	**X**	**X**	**X**
	Lead	Metal	**X**	**X**	**X**	**X**	**X**
	Zinc	Metal	**X**	**X**	**X**	**X**	**X**
	Trash[1]	Other		**X**	**X**	**X**	**X**
	Nitrogen Compounds[2]	Nutrient		**X**	**X**	**X**	**X**
	DDT	OC Pest	**X**				
	PCBs	OC Pest	**X**				
	PAHs	SVOC	**X**				
	E. coli	Micro		**X**	**X**	**X**	**X**
	Coliform & Enterococcus	Micro	**X**				
2	Chlordane (sediment)	OC Pest	**X**				
	Coliform Bacteria	Micro		**X**	**X**	**X**	**X**
	Aluminum	Metal		**X**			
	Diazinon	OP Pest		**X**			
	Oil	General			**X**		
	Trash	Other	**X**				
	Toxicity	Bioassay					**X**
	Sediment Toxicity	Bioassay	**X**				
	Cyanide	General		**X**			
	MBAS	General		**X**	**X**		
3	Chloride	General					**X**
	Mercury	Metal		**X**			
	Diazinon	OP Pest					**X**
	PAHs	SVOC		**X**	**X**		
	Bis(2-ethylhexylphthalate	SVOC		**X**			
	Cyanide	General					**X**
	pH	General					**X**
	Dissolved Oxygen	General		**X**	**X**		

LAR1= Los Angeles River Reach 1
LAR2= Los Angeles River Reach 2
LARE= Los Angeles River Estuary
CC= Compton Creek
RH1=Rio Hondo Reach 1

Nutrients= nitrogen and phosphorus compounds
OC Pest = organochlorine pesticides
OP Pest = organophosphorus pesticides
Micro = microbiological (fecal indicator bacteria)
SVOC = semivolatile organic compounds (acid, base & neutral

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia was listed in category 2 for LAR1 and LAR2 – included in nitrogen compounds for category 1
3. Nutrients (algae) by nitrogen compounds for category 1.

Table 2-2. Dry Weather Water Body/ Pollutant Classifications for the Lower Los Angeles River WG.

			WATER BODY				
CATEGORY	**POLLUTANT**	**CLASS**	**LARE**	**LAR1**	**LAR2**	**CC**	**RH1**
1	Copper	Metal	**X**	**X**	**X**	**X**	**X**
	Lead	Metal	**X**	**X**	**X**	**X**	**X**
	Zinc	Metal	**X**				**X**
	Trash[1]	Other		**X**	**X**	**X**	**X**
	Nitrogen Compounds[2]	Nutrients		**X**	**X**	**X**	**X**
	DDT	OC Pest	**X**				
	PAHs	SVOC	**X**				
	PCBs	OC Pest	**X**				
	E. coli	Micro		**X**	**X**	**X**	**X**
	Coliform & Enterococcus	Micro	**X**				
2	Chlordane (sediment)	OC Pest	**X**				
	Coliform Bacteria	Micro		**X**	**X**	**X**	**X**
	Aluminum	Metal		**X**			
	Selenium	Metal		**X**	**X**		
	Cyanide	General		**X**			
	Oil	General			**X**		
	Trash	Other	**X**				
	Toxicity	Bioassay					**X**
	Sediment Toxicity	Bioassay	**X**				
3	Chloride	General		**X**	**X**		
	Cyanide	General					**X**
	pH	General					**X**
	Mercury	Metal		**X**			
	Nickel	Metal		**X**			
	Thallium	Metal		**X**	**X**		
	Chlorpyrifos	OP Pest				**X**	
	PAHs	SVOA		**X**	**X**		
	Bis(2-ethylhexylphthalate	SVOA		**X**			

LAR1= Los Angeles River Reach 1
LAR2= Los Angeles River Reach 2
LARE= Los Angeles River Estuary
CC= Compton Creek
RH1=Rio Hondo Reach 1

Nutrients= nitrogen and phosphorus compounds
OC Pest = organochlorine pesticides
OP Pest = organophosphorus pesticides
Micro = microbiological (fecal indicator bacteria)
SVOC = semivolatile organic compounds (acid, base & neutral

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia was listed in category 2 for LAR1 and LAR2 – included in nitrogen compounds for category 1
3. Nutrients (algae) by nitrogen compounds for category 1.

3 Monitoring Sites and Approach

This CIMP addresses monitoring activities required by the Monitoring and Reporting Program (MRP) - No. CI-6948 for Order R4-2012-0175, NPDES Permit No. CAS004001 for the Lower Los Angeles River (LLAR) Watershed Management Group (WMG). Development of this CIMP focused on improving the overall effectiveness of the monitoring program by coordination of sampling efforts.

Final approval of the CIMP is expected in early 2015. Existing monitoring will continue to be conducted and beginning summer of 2014, the dry weather screening of major outfalls will commence. For planning purposes, the monitoring described in this CIMP is intended to commence on July 1, 2015 or 90 days after the approval of the CIMP, whichever is later. Majority of the elements will start in the summer of 2015 and the following wet weather season, and the program will be phased in over a three-year period. Non-stormwater (NSW) outfall monitoring efforts are currently underway in order to complete an inventory of all outfalls and allow the program to meet the first major deadline established by the Permit. The Permit requires that source identification surveys be completed for at least 25% of all major outfalls found to convey significant non-stormwater discharges by December 28, 2015.

The approach presented in this CIMP is designed to address objectives of the MRP by incorporating TMDL monitoring requirements and aligning field efforts to increase cost effectiveness. Information on sampling methods, cleaning protocol and QAQC are provided in Appendices B, C and D. The following sections provide a broad overview of the monitoring program. A comprehensive list of monitoring sites (Table 3-1) and the locations of these sites within the LLAR WMG (Figure 3-1) are provided to illustrate the coverage provided for each major element. Later sections will provide detailed monitoring requirements for individual elements of the CIMP.

3.1 Receiving Water Monitoring

The MRP (Part II.E.1) specifies that receiving water monitoring is to be performed at previously designated mass emission stations as well as TMDL receiving water compliance points, as designated in approved TMDL Monitoring Plans. The objectives of the receiving water monitoring include the following:

- Determine whether the receiving water limitations are being achieved,
- Assess trends in pollutant concentrations over time, or during specified conditions,
- Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring.

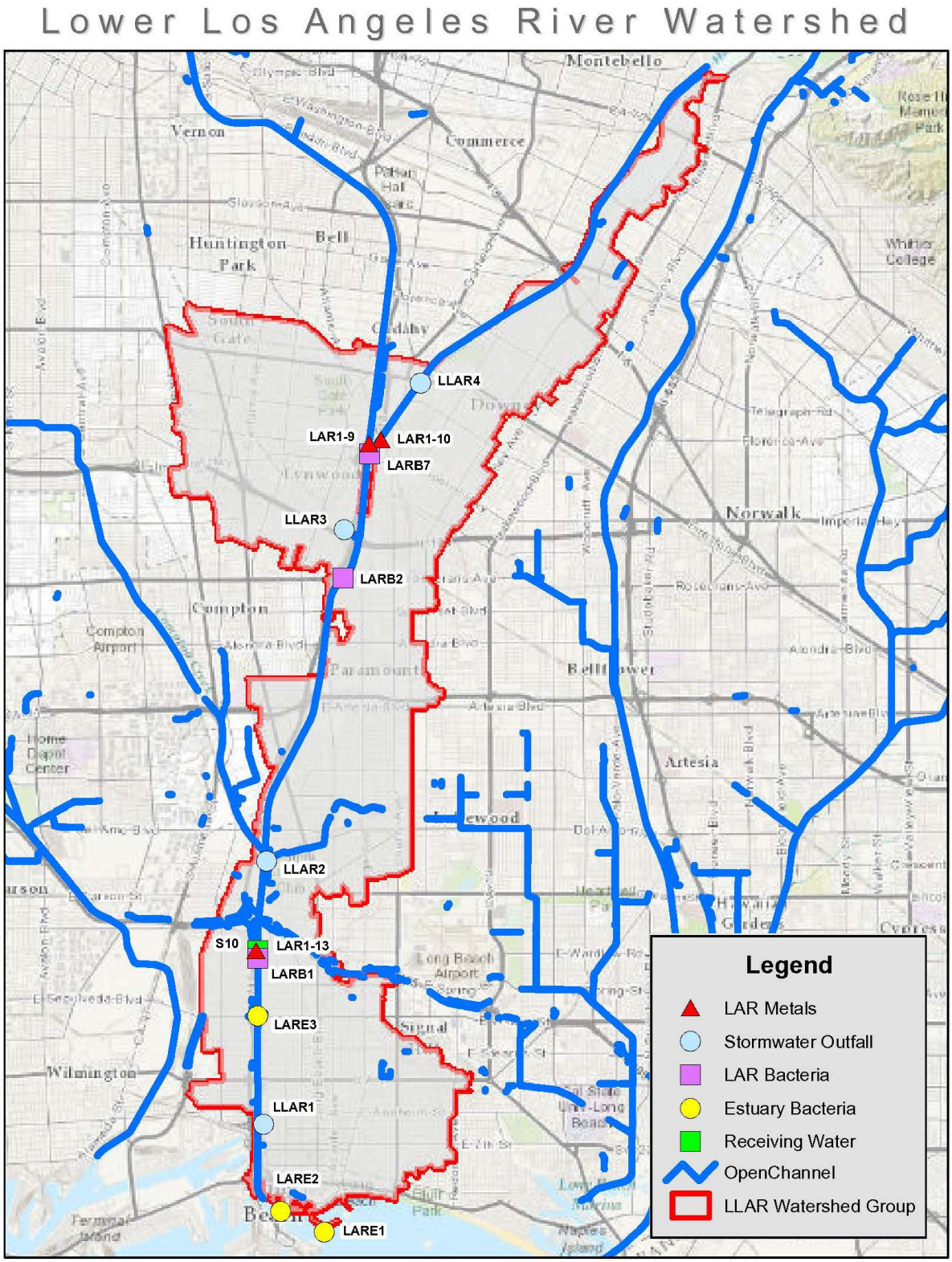


Figure 3-1. Monitoring Locations in the Lower Los Angeles River Watershed

Table 3-1. Consolidated List of Monitoring Sites in the Lower Los Angeles River WMG.

SITE CODE	SITE TYPE/PURPOSE	NAME	PRIMARY SAMPLING[2]	LATITUDE[3] (°N)	LONGITUDE (°W)
S10[1]	Receiving Water/TMDL	Wardlow Street	Auto	33.81900	118.20556
LLAR1	Stormwater Outfall	Cerritos Pump Station	Auto	33.77951	118.20380
LLAR2	Stormwater Outfall	Dominguez Gap Pump Station	Auto	33.83945	118.20320
LLAR3	Stormwater Outfall	Lynwood	Auto	33.91469	118.18214
LLAR4	Stormwater Outfall	Firestone	Auto	33.94812	118.16146
LARB1[1]	LAR Bacteria TMDL	Segment A (Wardlow)	Grab	33.81735	118.20551
LARB2	LAR Bacteria TMDL	Segment B (Rosecrans)	Grab	33.90374	118.18240
LARB7	LAR Bacteria TMDL	Rio Hondo	Grab	33.93202	118.17523
LARE1	Estuary Bacteria TMDL	LARE Mouth of Estuary	Grab	33.75506	118.18727
LARE2	Estuary Bacteria TMDL	LARE Queensway	Grab	33.75976	118.19910
LARE3	Estuary Bacteria TMDL	LARE Willow	Grab	33.80416	118.20547
LAR1-13[1]	LAR Metals TMDL	Wardlow - Main Channel	Auto/Grab	33.81900	118.20556
LAR1-10	LAR Metals TMDL	Rio Hondo - Trib	Grab	33.93510	118.17218
LAR1-9	LAR Metals TMDL	I710 - Main Channel	Grab	33.93421	118.17548

- S10, LARB1, and LAR1-13 are all located at the same location in the Los Angeles River near Wardlow Ave. This site is the final compliance location for the Metals TMDL
- Auto=Primarily sampled with automated stormwater monitoring equipment, Grab= Samples primarily taken as grab samples.
- All site locations are based upon the NAD 83 datum.

In order to achieve these requirements, two types of receiving water monitoring sites are included in the CIMP. These include:

- Mass Emission (ME) Receiving Water Monitoring - The mass emission station will serve to provide a long-term measure of compliance with receiving water quality criteria and allow for assessment of trends in pollutant concentrations.
- TMDL Receiving Water Monitoring Sites – These sites are intended to evaluate compliance or progress towards attainment of Waste Load Allocation (WLAs) for TMDLs and ultimately provide data to evaluate when objectives are met and determine when sufficient data exist to reevaluate the 303(d) listing.

3.1.1 Mass Emission (ME) Monitoring Site

The Los Angeles River monitoring station (S10) will continue to serve as the ME monitoring station for the LLAR. This site is located in the Los Angeles River at the existing stream gauge station (i.e., Stream Gauge F319-R) between Willow Street and Wardlow Road. This site is located near the bottom of Reach 1 in the City of Long Beach and was originally selected to avoid tidal influences. This site has been monitored by the Los Angeles County Flood Control District (LACFCD) since 1998 and this site will continue to be monitored by LACFCD.

Although S10 serves as the only mass emission monitoring site within the LLAR WMG, it also serves (and has previously served) as a TMDL monitoring site since it is at the base of the watershed and is the last monitoring location for most contaminants of concern before water is discharged to the Estuary (Figure 3-1, Table 3-1).

3.1.2 Total Maximum Daily Load (TMDL) Monitoring Sites

Permittees within the LLAR WMG are required to conduct monitoring required under the Los Angeles County NPDES MS4 permit and comply with any monitoring requirements associated with six separate TMDLs (Table 3-2). TMDL monitoring sites were selected by reviewing requirements of each TMDL applicable to the LLAR and monitoring sites previously selected or recommended in two previous TMDL compliance plans:

- *Los Angeles River Metals TMDL Coordinated Monitoring Plan* (Metals CMP) – March 25, 2008
- *Coordinated Monitoring Plan for Los Angeles River Watershed Bacteria TMDL – Compliance Monitoring – Draft* (Bacteria CMP). - March 23, 2013

The Metals CMP included monitoring of four sites within the LLAR but, based upon the results of initial monitoring and the minimal distances between sites (about 2 miles), monitoring at one site (referred to as the Del Amo site, LAR1-11) will be discontinued. Further discussion is found in section 8.2. Monitoring will continue as per the initial Metals CMP at the remaining three sites within the LLAR watershed.

The Bacteria CMP was not implemented due to the fact the CIMP was anticipated to address monitoring of ambient bacteria within each WMG. Nevertheless, this document provided a comprehensive approach that addressed ambient bacteria monitoring throughout the watershed

and monitoring approaches for ambient monitoring at 16 sites. The CMP provides the framework for bacteria monitoring at the four sites located within the LLAR.

Table 3-2. Summary of TMDLs applicable to the Lower Los Angeles River Watershed (LLAR) Management Group.

TMDL	REGIONAL BOARD RESOLUTION #	REGIONAL BOARD APPROVAL EFFECTIVE DATE
Nitrogen Compounds and Related Effects TMDL (Nutrient TMDL)	2003-009 2012-010	March 23, 2004 August 7, 2014
Los Angeles River and Tributaries Metals TMDL (Metals TMDL)	2007-014 2010-003	October 29, 2008 November 3, 2011
Los Angeles River Watershed Bacteria TMDL (LAR Bacteria TMDL)	2010-007 Monitoring Plan: March 23, 2013	March 23, 2012
Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL)	2011-008 Monitoring Plan: November 23, 2013 or the CIMP.	March 23, 2012
Los Angeles River Watershed Trash TMDL (Trash TMDL)	2007-012 Monitoring Plan not required.	September 23, 2008
Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL (Beaches/Estuary TMDL)	USEPA Established TMDL	March 26, 2012

Additional TMDL monitoring is required for the Long Beach City Beaches and Los Angeles River Estuary TMDLs for Indicator Bacteria (Estuary Bacteria TMDL). The LAR Estuary is the only portion of this TMDL addressed by this CIMP. The Long Beach City Beaches will be addressed as part of a separate WMP and IMP being developed to address portions of the City of Long Beach not addressed by the three plans being developed the Lower Los Angeles River, the freshwater portion of the Los Cerritos Channel and the Lower San Gabriel River watersheds.

Protection of the recreational beneficial uses of the City of Long Beach open beaches includes both the open waters used by wind surfers and boaters but emphasizes the shoreline and swash-zone where bathers are directly impacted by exposure to potentially contaminated water. In the Los Angeles River Estuary, swimmers do not typically access waters directly from the shoreline and therefore concerns are more directed towards assessment of bacterial concentrations in open waters of the Estuary and the potential for bacteria in this wind-driven surface plume to impinge upon the recreational beaches of the City of Long Beach after leaving the Estuary. Interim monitoring points were selected to allow determination of whether bacteria are subject to simple dilution by mixing as the water passes through the estuary or if areas within the Estuary serve as sources or sinks for indicator bacteria.

The Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL) also requires that monitoring be conducted to quantify the loads of pollutants from the Los Angeles River. This program will require additional monitoring at the S10 site to quantify metals, DDT, PCBs, and PAHs associated with suspended particulates. This program

will complement monitoring within the Harbor waters and the Los Angeles River Estuary that is already funded by members of the LLAR group that are included in the Greater Harbor Waters Regional Monitoring Coalition. Four of the LLAR group are active participants (including funding thereof) in the Harbor RMC effort. These members ensure close coordination between the Harbor RMC's TMDL monitoring and the LLAR. In addition, the LLAR has actively been offered the opportunity for voluntary cooperation of all Los Angeles River cities and agencies in establishing a toxics monitoring station at the River/estuary interface. In accordance with Table C of Attachment E of the Permit, this CIMP fulfills the requirement for the submission of a Monitoring and Reporting Plan and Quality Assurance Project Plan.

3.2 Stormwater Outfall Monitoring

Stormwater outfall monitoring is the one element of the program that will be phased in over the course of two years. Stormwater outfall sampling sites (Table 3-3 and Figure 3-2) will be initiated at two sites during the first year of the program. Additional sites will be added in the following year to bring the total number of stormwater outfall monitoring sites up to four. A detailed implementation schedule is provided in the following Section 4.

The stormwater outfall monitoring program was designed to ensure that selected monitoring locations provided representative data by:

- Monitoring at least one major outfall per subwatershed (HUC 12) drainage area, and
- The drainage area of the selected outfalls shall be representative of the land uses within the Permitee's jurisdiction, and
- Selected outfalls must be configured to facilitate accurate flow measurements and safety of monitoring personnel.

Table 3-3. Stormwater Outfall Monitoring Sites

Stormwater Outfall Monitoring Sites	Jurisdiction Area								Land Use				HUC Equivalent		
	Long Beach	Signal Hill	Lakewood	Paramount	Lynwood	Downey	South Gate	Pico Rivera	Residential	Industrial	Commercial	Other	Cmpt Crk/LAR	Alhm/RioHondo	C R/ LAR
LLAR1 - Cerritos Pump Station	x	x							x				x		By others*
LLAR2 - Dominguez Gap	x		x						x				x		
LLAR3 - Lynwood				x	x		x		x	x			x		
LLAR4 - Firestone						x		x	x	x	x			x	
LAR1-11 Del Amo site (discontinued)															

* The Los Angeles River Upper Reach 2 Subwatershed Group.

A significant portion of Pico Rivera drains to areas with existing significant infiltration and outfall sampling would not provide representative samples. The outfall monitoring locations account for

all significant land uses in the watershed. The land uses for the individual outfall sampling are shown on Figure 3-2 and described in Table 3-4. Monitoring site designations and monitoring functions are shown in Table 3-5.

Table 3-4. Land Use for the outfall monitoring sites for the Lower Los Angeles River Watershed

Drainage Area	Land Use %						
	Residential	Commercial	Industrial	Mixed Use	Open Space	Other	Area occupied by LA River
LLAR 1	75.30%	2.94%	0.65%	14.72%	1.95%	4.43%	-
LLAR 2	75.49%	3.68%	0.00%	2.78%	10.88%	7.17%	-
LLAR 3	73.36%	7.59%	3.62%	9.35%	0.00%	6.08%	-
LLAR 4	66.50%	5.37%	5.51%	5.65%	11.95%	5.02%	-
Total LLAR Watershed provided for comparison	63.18%	2.86%	3.03%	20.94%	4.81%	4.87%	0.31%
Average of 4 outfalls	72.66%	4.89%	2.44%	8.13%	6.20%	5.68%	

HUC units are shown in Figure 3-3. There are three HUC 12 equivalents within the LLAR. The Compton Creek-Los Angeles River is by far the largest of the three HUC units. Three of the proposed outfalls monitoring sites are within this HUC. The second largest HUC within the LLAR is the Alhambra Wash-Rio Hondo. One outfall monitoring site, LLAR 4, will be established within the Alhambra Wash-Rio Hondo HUC in the first year of monitoring so that monitoring data will be collected from both principal HUC-12 areas in the first year. The third HUC is the Chavez Ravine-Los Angeles River HUC of which the LLAR only occupies a minimal portion. It is the LLAR's understanding that the adjoining WMP group, the LA River Reach 2 Group, will be placing a monitoring station within that area, therefore the LLAR will not duplicate that effort.

3.3 Non-Stormwater Outfall Monitoring

NSW outfall based monitoring will be conducted for outfalls discharging to receiving waters of the LLAR Watershed. Initially, all pipes exceeding 12 inches and discharging directly into the LLAR receiving waters will be identified. During the first cycle of the permit, the database will be refined to determine which of the 12-inch to 36-inch pipes include discharges from areas with industrial land uses. Regardless of land use, all outfalls, including those between 12 and 36 inches, will be screened. A screening program will be implemented to initially document sites with persistent and

significant non-stormwater flows. The screening program will utilize a combination of field tests and may incorporate limited laboratory testing to assist in determining whether flows are the result of illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows or unknown.

3.4 New Development/Redevelopment Effectiveness Tracking

Participating agencies have developed mechanisms for tracking information related to new and redevelopment projects that are subject to post-construction best management practice requirements in Part VI.D.7 of the MS4 Permit.

The MRP requires that Permittees develop a New Development/Re-Development Effectiveness tracking program. Participating agencies have developed mechanisms for tracking information related to new and redevelopment projects that are subject to post-construction best management practice requirements in Part VI.D.7 of the MS4 Permit.

3.5 Regional Studies

On behalf of the participating agencies, the LACFCD will continue to provide financial and/or monitoring resources to the Southern California Stormwater Monitoring Coalition Regional Watershed Monitoring Program, also known as the Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program (Bioassessment Program). The Bioassessment Program was initiated in 2009 and is structured to occur in cycles of five years. Sampling under the first cycle concluded in 2013. The next five-year cycle is scheduled to begin in 2015, with additional special study monitoring scheduled to occur in 2014.

Permittee representatives will also participate in the Southern California Stormwater Monitoring Coalition (SMC) meetings and assist in development and implementation of selected and appropriate regional studies designed to improve stormwater characterization and impact assessment.

Table 3-5. Monitoring Site Designation and Monitoring Function.

Site Name	Site Description	Datum NAD83		Type of Site					
		Latitude (N)	Longitude (W)	Receiving Water	Stormwater Outfall	Harbor Toxics TMDL	Metals TMDL	Bacteria TMDL	
								River	Estuary
S10	Wardlow Street	33.81900	118.20556	**X**		**X**			
LLAR1	Cerritos Pump Station	33.77951	118.20380		**X**				
LLAR2	Dominguez Gap Pump Station	33.83945	118.20320		**X**				
LLAR3	Lynwood	33.91469	118.18214		**X**				
LLAR4	Firestone	33.94812	118.16146		**X**				
LARB1	Segment A (Wardlow)	33.81900	118.20556					**X**	
LARB2	Segment B (Rosecrans)	33.90374	118.18240					**X**	
LARB7	Rio Hondo	33.93202	118.17523					**X**	
LARE1	LARE Mouth of Estuary	33.75506	118.18727						**X**
LARE2	LARE Queensway	33.75976	118.19910						**X**
LARE3	LARE Willow	33.80416	118.20547						**X**
LAR1-13	Wardlow - Main Channel	33.81900	118.20556				**X**		
LAR1-10	Rio Hondo - Trib	33.93510	118.17218				**X**		
LAR1-9	I710 - Main Channel	33.93421	118.17548				**X**		

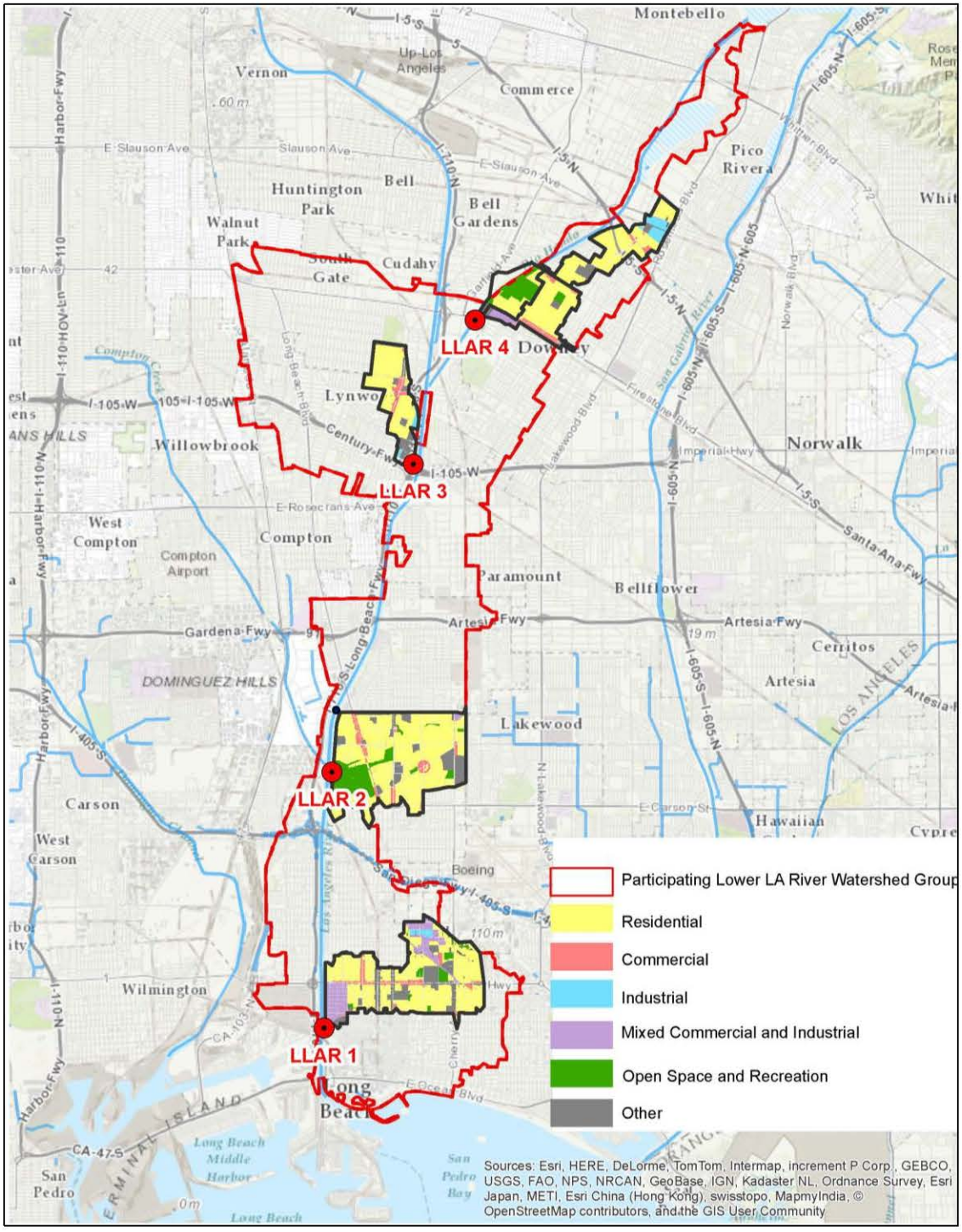


Figure 3-2. Lower Los Angeles River Land Use

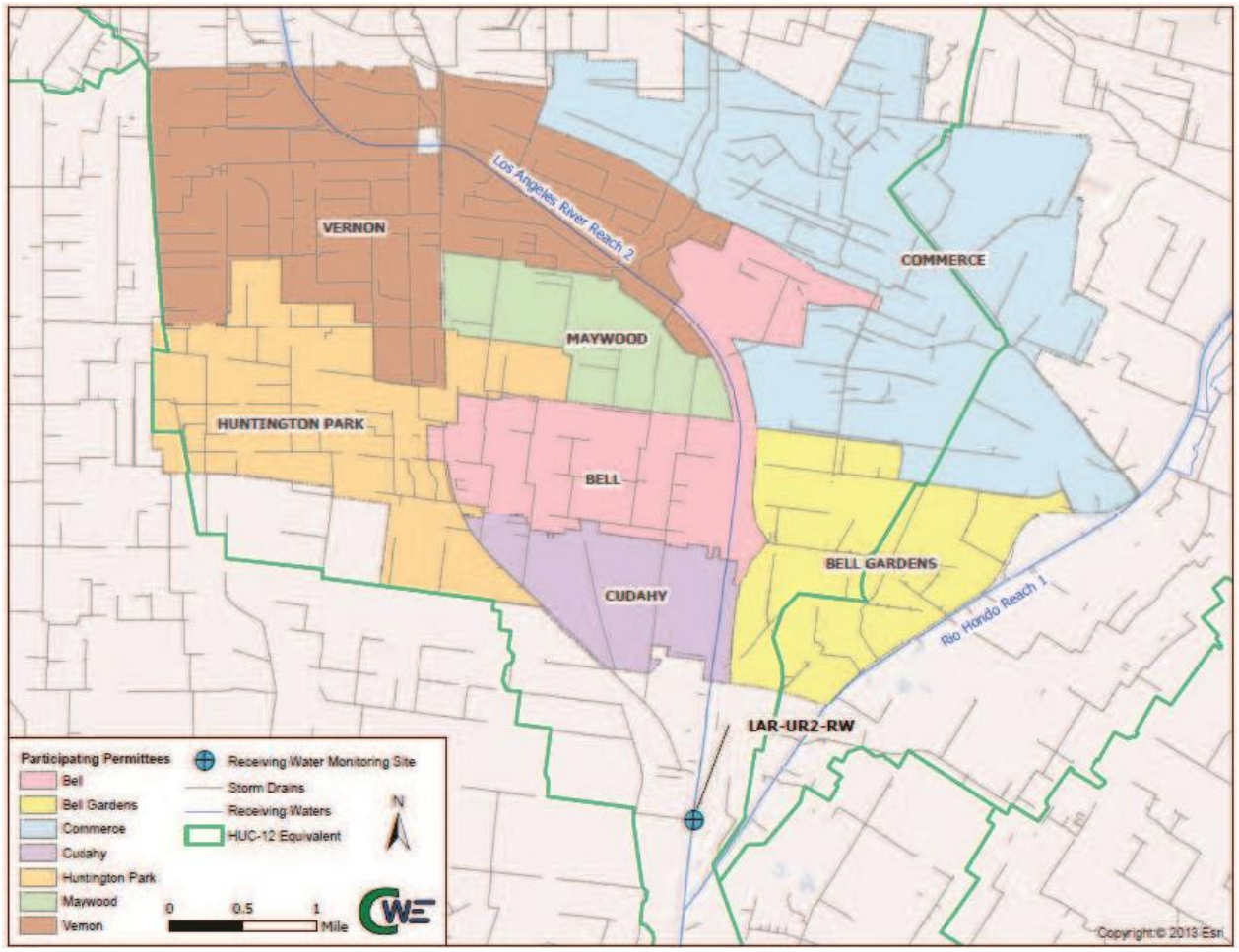


Figure 3-3. HUC 12 equivalents within the LLAR

4 Summary of Sampling Frequencies for each CIMP Element

It is anticipated that the CIMP will be implemented in a phased process (Table 4-1). The Receiving Water Quality Monitoring program will start at S10 (Wardlow) during the 2015 dry season. This site will continue to be monitored by the LACFD. This site will be sampled during two dry weather events and three stormwater events each year. During two surveys, water quality testing will incorporate the comprehensive list of water quality parameters listed in Table E-2 of the Attachment E of Regional Board Orders No. R4-2012-0175 (NPDES NO. CAS004001) and R-4-2014-0024 (NPDES No. CAS004003). This full set of analytes will be analyzed in water collected during the first major storm event of the year and during a critical, low flow dry season survey. July is considered to have the lowest historical flows based upon long-term flow monitoring. If these parameters are not detected at the specified Method Detection Limit (MDL) for their respective test method or if the result is below the lowest applicable water quality objective, and is not otherwise identified as being 303(d)-listed or part of an ongoing TMDL, the analyte will not be further analyzed. Parameters exceeding the lowest applicable water quality objective (Appendix G) will continue to be analyzed for the remainder of the Order during at the receiving water monitoring station where it was detected. Acceleration of the Receiving Water Quality Monitoring Program will also include the Aquatic Toxicity Monitoring.

Two Stormwater Outfall Monitoring sites will also start sampling during the 2015/16 wet season. These will include LLAR2 (Dominguez Gap) and a new station, LLAR4 (Firestone). The remaining Stormwater Outfall Monitoring sites will be installed in the following year. LLAR3 (Lynwood) and LLAR1 (Cerritos Pump Station) will be installed and operable for the 2016/17 season. Once the Stormwater Outfall Monitoring sites are installed they will each be monitoring during three storm events each year. If running average concentrations of pollutants exceed the Municipal Action Limits (MALs – Attachment G of the MRP) by more than 20%, expanded monitoring will be required to identify the sources of the increased loads.

Monitoring in the main stem of the Los Angeles River and the Rio Hondo tributary for the Los Angeles River Bacteria TMDL, Los Angeles River Metals TMDL and the Los Angeles River Estuary Bacteria TMDL all start in the summer of 2015. Monitoring data will be collected from both principal HUC-12 areas in the first year. Sampling for these three programs is based upon collection of grab samples.

Monitoring of non-stormwater discharges to the receiving waters of the Lower Los Angeles River started in the summer of 2014 in order to meet the first target of completion of 25% of the source investigations by December 2015.

Table 4-1. Schedule for Implementation of Monitoring Activities in the Lower Los Angeles River Watershed.

Task	Dry 2014	Wet 2014-15	Dry 2015	Wet 2015-16	Dry 2016	Wet 2016-17	Dry 2017	Wet 2017-18	Dry 2018
Receiving Water/TMDL									
S10 –Wardlow									
Harbor Toxics			1	2	1	2	1	2	1
Chemistry[1]			2	3	2	3	2	3	2
Aquatic Toxicity			1	2	1	2	1	2	1
Outfall Monitoring Site									
LLAR1 (Cerritos Pump)						3		3	
LLAR2 (Dominguez Gap)				3		3		3	
LLAR3 (Lynwood)						3		3	
LLAR4 (Firestone)				3		3		3	
Los Angeles River Metals[5]									
LAR1-13 (Wardlow)			4	4	4	4	4	4	4
LAR1-10 (Rio Hondo)			4		4		4		4
LAR1-9 (I710-LA River)			4		4		4		4
Los Angeles River Bacteria									
Pre-LRS – all Segment A outfalls			6						
LARB1 (Wardlow)			4		4		4		4
LARB2 (Rosecrans)			4		4		4		4
LARB7 (Rio Hondo)			4		4		4		4
Los Angeles River Estuary (bacteria only)									
LARE1 (Mouth of Estuary)			4		4		4		4
LARE2 (Queensway Br.)			4		4		4		4
LARE3 (Willow)			4		4		4		4
Non-Stormwater Outfall									
Inventory & Screen[2]	3								
Source ID[3]		Ongoing	Ongoing		Ongoing		Ongoing		Ongoing
Monitoring[4]					2		2		2

1. Table E-2 chemical analyses will be performed once during the first wet weather event and once during the first critical dry weather monitoring event. Constituents that exceed MDLs and available water quality objectives will continue to be monitored along with all constituents with TMDLs or 303(d) listing. Wet and dry weather chemical constituents will be separately assessed for purposes of continued monitoring.
2. Initial Inventory and Screening will be completed in three surveys before the end of 2014. One re-assessment of the Non-Stormwater Outfall Monitoring Program will be conducted prior to December 2017.
3. Investigations designed to track and classify discharges will start during the 2015 dry season. Source tracking and classification work depend upon the number of sites categorized as Suspect outfalls with evidence of significant flow.
4. Monitoring will be implemented if significant dry weather flows are identified at discharge points that are cannot be identified, are non-essential exempt flows, or identified as illicit flows that are not yet controlled. These sites will be initially monitored twice a year in conjunction with dry weather monitoring of the receiving water site.
5. Currently serviced by the City of Los Angeles, but transition to the LLAR watershed Group is expected prior to June 30, 2016

5 Chemical/Physical Parameters

This section provides a summary of chemical parameters required to be analyzed at the receiving water mass emission monitoring station a minimum of two times during the first year of the monitoring program and once during the critical dry weather period. Results of this screening process will be used to initially determine constituents that will continue to be analyzed at the mass emission site and those that will be further considered for inclusion as part of ongoing monitoring at stormwater outfall sites (Table 5-1). The full set of analytical requirements discussed below is based upon Table E-2 of the Monitoring and Reporting Program and summarized in Table 5-2 through Table 5-8 below.

Analytical requirements for the program are broken out by analytical test requirements since many are associated with an analytical test suite. This is most evident with the semivolatile organic compounds analyzed by EPA Method 625. Although this section identifies recommended methods for each analyte, many of the target constituents can be addressed by alternative methods. Selection of analytical methods is intended to be performance-based to allow laboratories flexibility to utilize methods that meet or exceed MLs listed in the MRP.

The lists of Table E-2 constituents only show minimum levels required for each analyte under the monitoring program since Method Detection Limits (MDLs) will vary among laboratories. Reporting limits are required to meet the established MLs unless matrix or other interferences are encountered that cannot be eliminated by additional cleanup procedures.

The critical dry weather event is defined as the period when historical in-stream flow records are lowest or during the historically driest month. The Reasonable Assurance Analysis (RAA)[1] conducted an assessment of long-term rainfall records and found that the least amount of rainfall occurs in August yet very little difference exists between May and September.

Initial monitoring of Table E-2 constituents during one wet and one dry weather event is intended to serve as a cross-check and/or verification that these pollutants have not become an issue in the receiving waters since the last time they were measured. This screening process is intended to be conducted one time at the receiving water mass emission site during each five-year permit cycle. If a parameter is not detected at the Method Detection Limit (MDL) for its respective test method or the result is below the lowest applicable water quality objective, and is not otherwise identified as a basic monitoring requirement, a TMDL analyte or a 303(d) listing, it is not required to be analyzed again during the current five-year permit cycle. If, during either the wet or dry weather screening, a parameter is detected exceeding the lowest applicable water quality objective then the parameter is to be analyzed for the remainder of the five-year cycle at the receiving water monitoring station where it was detected during the respective conditions (wet or dry).

[1] Draft Reasonable Assurance Analysis for Lower Los Angeles River, Los Cerritos Channel, and Lower San Gabriel River. May 2014.

In addition, any additional constituents found to commonly exceed receiving water limitations at the ME site will also be incorporated into stormwater outfall monitoring program in order to help identify watershed sources of the pollutants.

Justification for adding and deleting constituents from the stormwater outfall monitoring program will follow the process established in the Los Angeles River Metals CMP. Any Table E-2 constituents incorporated into ongoing monitoring program at the ME receiving water monitoring site will be added to the stormwater outfall monitoring requirements after two consecutive exceedances of wet weather receiving water quality limitations. Similarly, it is not intended that constituents continue to be monitored at stormwater outfall sites if they are not detected on a regular basis and/or are not found at concentrations that would contribute to exceedances of water quality criteria in the receiving waters. Constituents will be removed from the list if they are not detected at levels of concern for two consecutive stormwater monitoring events.

Comprehensive monitoring of priority pollutants in the receiving waters at the ME site is intended to assure that all constituents with potential to impact water quality are incorporated into the monitoring program. In addition, any Table E-2 constituents incorporated into the ongoing monitoring program at the ME receiving water monitoring site, will also be added to the stormwater outfall monitoring requirements if they exceed RWLs at the ME site after two consecutive wet weather monitoring events.

Table 5-1. Summary of Constituents to be Monitored on a Regular Basis at the S10 Mass Emission Monitoring Site.

CLASS OF MEASUREMENTS	MASS EMISSION SITE (S10)	
	Wet[2]	Dry
Flow	4	2
Field Measurements Dissolved oxygen, pH, temperature, and specific conductivity	4	2
MRP Table E-2 Constituents[1] (other than those specifically listed below)	1	1
Aquatic Toxicity	2	1
General and Conventional Pollutants (Table 5-2) All <u>except</u> total phenols, turbidity, BOD_5, MTBE, and perchlorate, and fluoride.	4	2
Microbiological Constituents[3] (Table 5-3) *E. coli*	4	8
Nutrients (Table 5-4) Nitrogen compounds only	3	2
Metals (Table 5-6) Al, Cd, Cu, Pb, Ni, Sb, Zn, Total Se & Hg	4	2
Organophosphate Pesticides (Table 5-7) Diazinon	3	2
Semivolatile Organic Compounds (Table 5-8) Bis(2-ethlyhexylyphthalate	3	2

1. All Table E-2 constituents will be measured during the first major storm event of the season and the critical, low flow dry weather event during the first year of the CIMP. The Los Angeles County Flood Control District owns and operates S10. Upon concurrence of the Executive Office of the Regional Board, the Flood Control District may reduce testing for pollutants listed on E2 if past monitoring has shown a history of non-detects or detection well below applicable WQO.
2. The fourth storm event is only for the purpose of fulfilling the TMDL requirements. Only metals, TSS, SSC, and hardness will be analyzed.
3. The wet and dry weather sampling frequency may change so long as one sample per month is collected in freshwater.

5.1 General and Conventional Pollutants

Many of the general and conventional pollutants listed in Table 5-2 will continue to be analyzed as part of the base monitoring requirements. Total phenols, turbidity, BOD_5, fluoride, perchlorate, and MTBE will not be part of the base monitoring requirements unless these constituents are identified as constituents of concern during the first monitored storm event of the season and/or in association with monitoring conducted during the critical low flow event.

Table 5-2. Conventional constituents, analytical methods and quantitation limits.

CONSTITUENTS CONVENTIONAL POLLUTANTS	METHOD	Target Reporting Limits mg/L
Oil and Grease	EPA1664	5
Total Petroleum Hydrocarbon	EPA 418.1	5
Total Phenols	EPA 420.1	0.1
Cyanide	EPA 335.2,SM 4500-CNE	0.003
Turbidity	EPA 180.1, SM2130B	1
Total Suspended Solids	EPA 160.2, SM2540D	1
Total Dissolved Solids	EPA 160.1, SM2540C	1
Volatile Suspended Solids	EPA 160.4, SM2540E	1
Total Organic Carbon	EPA 415.1, SM 5310B	1
Biochemical Oxygen Demand	EPA 405.1, SM 5210B	3
Chemical Oxygen Demand	EPA 410.1, SM5220D	4
Alkalinity	EPA 310.1, SM2320B	5
Specific Conductance	EPA 120.1, SM2510 B	1
Total Hardness	EPA 130.2, SM2340C	1
MBAS	EPA 425.1, SM5540-C	0.02
Chloride	EPA300.0, SM4110B	2
Fluoride	EPA300.0, SM4110B	0.1
Perchlorate	EPA314.0	4 ug/L
Volatile Organics	**METHOD**	**mg/L**
Methyl tertiary butyl ether (MTBE)	EPA624	1
Field Measurements[1]	**METHOD**	**mg/L**
pH-field instrumentation	*In-situ*, EPA 150.1	0 – 14
Temperature-field	*In-situ*	N/A
Dissolved Oxygen- field [1]	*In-situ*, SM4500 (OG)	Sensitivity to 5 mg/L

[1]Field measurements will be taken *In-situ* during dry weather surveys and in grab samples during wet weather monitoring.

[2]Dissolved Oxygen will only be measured during dry weather surveys.

5.2 Microbiological Constituents

All four microbiological constituents used as fecal indicator bacteria (FIB) will continue to be monitored at the S10 (Wardlow) Receiving Water monitoring site. Bacteria used as fecal indicators in marine waters will continue to be analyzed during wet and dry weather surveys due to being situated just above the Los Angeles River Estuary.

All four FIBs will also be analyzed during stormwater outfall monitoring at the only site (LAR1) that discharges to the Estuary. Only *E. coli* will be monitored at the remaining three stormwater outfall sites (LAR2, LAR3, and LAR4) since each located in freshwater portion of the watershed.

Escherichia coli will also be analyzed at the three Bacteria TMDL monitoring sites in the LLAR WG and will be measured as part of the bacteria load assessment required for in all dry discharges to Segment A of the Los Angeles River. Table 5-3 provides both upper and lower quantification limits for each FIB established to assure that quantifiable results are obtained. Upper quantification limits are only identified to assure that measurements result in quantitative values.

Table 5-3. Microbiological Constituents, Analytical Methods and Quantitation Limits.

BACTERIA[1]	Method	Lower Limits MPN/100ml	Upper Limits MPN/100ml
Total coliform (marine waters)	SM 9221B	<20	>2,400,000
Fecal coliform (marine waters)	SM 9221B	<20	>2,400,000
Enterococcus (marine waters)	SM 9230C	<20	>2,400,000
E. coli (fresh waters)	SM 9223 COLt	<10	>2,400,000

[1]Microbiological constituents will vary based upon sampling point. Total and fecal coliform and enterococcus will be measured only in marine waters or at locations where either the discharge point or receiving water body will impact marine waters. These includes the mass emission site, S10, and LLAR1, the only stormwater outfall site discharging to the Estuary. *E. coli* will be analyzed at sites within the freshwater portion of the watershed.

5.3 Nutrients

Nitrogen compounds (Table 5-1 and Table 5-4) are required as part of the base requirements for both the ME (S10) and stormwater outfall monitoring sites (LAR1 through LAR4). Analysis of nitrogen compounds is required due to the Nitrogen TMDL. Phosphorus compounds have not been identified as constituents of concern in the watershed and will therefore only be analyzed during the two events where all Table E-2 constituents are analyzed.

Table 5-4. Nutrients, analytical methods, and quantitation limits

CONSTITUENT	METHOD	REPORTING LIMIT (mg/L)
Total Kjeldahl Nitrogen (TKN)[1]	EPA 351.1	0.50
Nitrate as Nitrogen (NO3-N)[1,2]	EPA 300.0	0.10
Nitrite as Nitrogen (NO2-N)[1,2]	EPA 300.0	0.05
Total Nitrogen[1]	calculation	NA
Ammonia as Nitrogen (NH3-N)	EPA 350.1	0.10
Total Phosphorus	SM 4500-P E or F	0.1
Dissolved Phosphorus	SM 4500-P E or F	0.1

1. Total Nitrogen is the sum of TKN, nitrate, and nitrite.
2. Nitrate –N and Nitrite-N may be analyzed together using EPA 300

5.4 Organochlorine Pesticides and PCBs

Organochlorine pesticides (OC pesticides) and PCBs have been analyzed in both stormwater and dry weather water samples collected at S10 between 2006 and 2013. None of these compounds were detected in any samples taken during this time period. In recognition of this issue, the Harbor Toxics TMDL required testing to be conducted by analyzing these compounds on suspended sediment transported during storm events. A special monitoring program has been proposed to allow better assessment of these compounds while also providing data to support the Harbor Toxics TMDL. Monitoring for these constituents will be conducted at S10 using the same frequency as sampling being conducted in the Harbor waters and in the Los Angeles River Estuary.

The Harbor Toxics TMDL requires monitoring during two storm events and one dry weather event. Monitoring during the two storm events will use methods detailed in Section 8.5. Monitoring during dry weather will utilize conventional methods (Table 5-5) being used in the Harbor receiving waters and the estuary. During dry weather flows, suspended sediment concentrations will be too low to allow for direct assessment of chlorinated pesticides and PCBs in the suspended particulate fraction. Sampling will be coordinated with the "*Coordinated Compliance Monitoring, and Reporting Plan Incorporating Quality Assurance Project Plan Components: Greater Los Angeles and Long Beach Harbor Waters*", (Anchor QEA, 2013).

Monitoring for PCBs will be reported as the summation of aroclors and a minimum of 50 congeners, using EPA Method 8270 without the use of High Resolution Mass Spectrometry for routine monitoring, due to the extreme high cost involved.

Table 5-5. Chlorinated Pesticides and PCB Analytical Methods, and Quantitation Limits

CHLORINATED PESTICIDES	METHOD	Reporting Limit ug/*L*
Aldrin	EPA 608	0.005
alpha-BHC	EPA 608	0.01
beta-BHC	EPA 608	0.005
delta-BHC	EPA 608	0.005
gamma-BHC (lindane)	EPA 608	0.02
alpha-chlordane	EPA 608	0.1
gamma-chlordane	EPA 608	0.1
4,4'-DDD	EPA 608	0.05
4,4'-DDE	EPA 608	0.05
4,4'-DDT	EPA 608	0.01
Dieldrin	EPA 608	0.01
alpha-Endosulfan	EPA 608	0.02
beta-Endosulfan	EPA 608	0.01
Endosulfan sulfate	EPA 608	0.05
Endrin	EPA 608	0.01
Endrin aldehyde	EPA 608	0.01
Heptachlor	EPA 608	0.01
Heptachlor Epoxide	EPA 608	0.01
Toxaphene	EPA 608	0.5
POLYCHLORINATED BIPHENYLS[1]	**EPA 8270**	**0.005**
Aroclor-1016	EPA 608	0.5
Aroclor-1221	EPA 608	0.5
Aroclor-1232	EPA 608	0.5
Aroclor-1242	EPA 608	0.5
Aroclor-1248	EPA 608	0.5
Aroclor-1254	EPA 608	0.5
Aroclor-1260	EPA 608	0.5

1. Monitoring for PCBs will be reported as the summation of aroclors and a minimum of 50 congeners, without the use of High Resolution Mass Spectrometry for routine monitoring.. 54 PCB congeners include: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209. These include all 41 congeners analyzed in the SCCWRP Bight Program and dominant congeners used to identify the aroclors.

5.5 Total and Dissolved Trace Metals

A total of 16 trace metals are listed in Table E-2 of the MRP. Analytical methods and reporting limits for these elements are summarized in Table 5-6. Most metals will be analyzed by EPA Method 200.8 using ICP-MS to provide appropriate detection limits. Hexavalent chromium and mercury both require alternative methods. Hexavalent chromium has been analyzed at TMDL compliance monitoring sites in both the Los Angeles River (S10) and the San Gabriel River (S14) for the past eight to ten years. Analytical methods and detection limits used for the monitoring have been consistent with those required in Table E-2 of the MRP. Hexavalent chromium will be analyzed with all Table E-2 constituents but this trace metal has never been detected a levels greater than the reporting limit so it will not likely be monitored on a regular basis.

Dissolved mercury has not been detected in any wet or dry weather sampling conducted at the Los Angeles River Mass Emission Site (S10) since 2006 and total mercury has only been detected on two occasions. Total mercury will be analyzed as part of the base program since it was detected during two wet weather events approximately 10 years ago and it remains one of the municipal action limits (MALs) included in the MRP. Automated stormwater samplers are not suitable for sampling stormwater at the low mercury detection limits (0.5 nanograms/liter). Grab samples will be taken for analysis of mercury in order to augment composite samples, which will be analyzed by EPA method 245.1. These grab samples will be analyzed by Method 1631E since this method is less subject to interferences and will be collected at the same time that monitoring crews pull the other grab samples required by the monitoring program. Additional QA/QC will be specified to support the extremely low detection limits required by the program.

Table 5-6. Metals Analytical Methods, and Quantitation Limits.

METALS (Dissolved & Total)	METHOD	Reporting Limit *ug/L*
Aluminum	EPA200.8	100
Antimony	EPA200.8	0.5
Arsenic	EPA200.8	0.5
Beryllium	EPA200.8	0.5
Cadmium	EPA200.8	0.25
Chromium (total)	EPA200.8	0.5
Chromium (Hexavalent)[1]	EPA218.6	5
Copper	EPA200.8	0.5
Iron	EPA200.8	25
Lead	EPA200.8	0.5
Mercury[1]	EPA245.1	0.2
Mercury (Low level)	1631E	0.0005
Nickel	EPA200.8	1
Selenium	EPA200.8	1
Silver	EPA200.8	0.25
Thallium	EPA200.8	0.5
Zinc	EPA200.8	1

1. Only total hexavalent chromium and mercury will be analyzed during the initial wet and dry weather screening of Table E-2 constituents.

5.6 Organophosphate Pesticides and Herbicides

Organophosphate pesticides, triamine pesticides and herbicides list in Table E-2 of the MRP are summarized in Table 5-7. Due to the fact that diazinon and chlorpyrifos are no longer available for residential use, these constituents are now rarely detected and none of the organophosphate pesticides/herbicides have been detected at the Los Angeles River Mass Emission monitoring site in the past 10 years.

Two compounds in this list, atrazine and simazine, are not organophosphate pesticides, they can be analyzed by EPA Method 8141a. Both are triazine herbicides which are used for control of broadleaf weeds. Based upon historical data, herbicides such as these and the three additional separately listed compounds are unlikely to require continued analysis after completion of initial screening of Table E-2 constituents. Alternative analytical methods may be used as long as the established reporting limits can be met.

Diazinon remains on the 303(d) list but has detected at much lower frequencies and concentrations. Although this analyte remains on the list to be analyzed at the ME station, we recommend reevaluation after the first year of monitoring. If concentrations remain below the updated California Department of Fish and Game criteria, this analyte should be removed from the list for the ME site.

Table 5-7. Organophosphate pesticides and herbicides analytical methods, and quantitation limits

ORGANOPHOSPHATE PESTICIDES	METHOD	Reporting Limit ug/L
Atrazine	EPA507,8141A	1
Chlorpyrifos	EPA8141A	0.05
Cyanazine	EPA8141A	1
Diazinon	EPA8141A	0.01
Malathion	EPA8141A	1
Prometryn	EPA8141A	1
Simazine	EPA8141A	1
HERBICIDES		
Glyphosate	EPA547	5
2,4-D	EPA515.3	0.02
2,4,5-TP-SILVEX	EPA515.3	0.2

5.7 Semivolatile Organic Compounds (Acid, Base/Neutral)

Semivolatile organic compounds from Table E-2 of the MRP are listed in Table 5-8 below. Acids consist mostly of phenolic compounds which are uncommon in stormwater samples. Base/neutrals include polynuclear aromatic hydrocarbons (PAHs) which are the only semivolatile organic compounds considered to be constituents of concern. PAHs are included as part of the Harbor Toxics TMDL and will be part of the base program at S10.

Table 5-8. Semivolatile organic compounds analytical methods, and quantitation limits.

SEMIVOLATILE ORGANIC COMPOUNDS	METHOD	Reporting Limit
ACIDS		**ug/L**
2-Chlorophenol	EPA625	2
4-Chloro-3-methylphenol	EPA625	1
2,4-Dichlorophenol	EPA625	1
2,4-Dimethylphenol	EPA625	2
2,4-Dinitrophenol	EPA625	5
2-Nitrophenol	EPA625	10
4-Nitrophenol	EPA625	5
Pentachlorophenol	EPA625	2
Phenol	EPA625	1
2,4,6-Trichlorophenol	EPA625	10
BASE/NEUTRAL		**ug/L**
Acenaphthene	EPA625	1
Acenaphthylene	EPA625	2
Anthracene	EPA625	2
Benzidine	EPA625	5
1,2 Benzanthracene	EPA625	5
Benzo(a)pyrene	EPA625	2
Benzo(g,h,i)perylene	EPA625	5
3,4 Benzofluoranthene	EPA625	10
Benzo(k)fluoranthene	EPA625	2
Bis(2-Chloroethoxy) methane	EPA625	5
Bis(2-Chloroisopropyl) ether	EPA625	2
Bis(2-Chloroethyl) ether	EPA625	1
Bis(2-Ethylhexl) phthalate	EPA625	5
4-Bromophenyl phenyl ether	EPA625	5
Butyl benzyl phthalate	EPA625	10
2-Chloroethyl vinyl ether	EPA625	1
2-Chloronaphthalene	EPA625	10
4-Chlorophenyl phenyl ether	EPA625	5
Chrysene	EPA625	5
Dibenzo(a,h)anthracene	EPA625	0.1
1,3-Dichlorobenzene	EPA625	1
1,4-Dichlorobenzene	EPA625	1
1,2-Dichlorobenzene	EPA625	1
3,3-Dichlorobenzidine	EPA625	5
Diethyl phthalate	EPA625	2
Dimethyl phthalate	EPA625	2
di-n-Butyl phthalate	EPA625	10
2,4-Dinitrotoluene	EPA625	5
2,6-Dinitrotoluene	EPA625	5
4,6 Dinitro-2-methylphenol	EPA625	5
1,2-Diphenylhydrazine	EPA625	1
di-n-Octyl phthalate	EPA625	10

SEMIVOLATILE ORGANIC COMPOUNDS	METHOD	Reporting Limit
Fluoranthene	EPA625	0.05
Fluorene	EPA625	0.1
Hexachlorobenzene	EPA625	1
Hexachlorobutadiene	EPA625	1
Hexachloro-cyclopentadiene	EPA625	5
Hexachloroethane	EPA625	1
Indeno(1,2,3-cd)pyrene	EPA625	0.05
Isophorone	EPA625	1
Naphthalene	EPA625	0.2
Nitrobenzene	EPA625	1
N-Nitroso-dimethyl amine	EPA625	5
N-Nitroso-diphenyl amine	EPA625	1
N-Nitroso-di-n-propyl amine	EPA625	5
Phenanthrene	EPA625	0.05
Pyrene	EPA625	0.05
1,2,4-Trichlorobenzene	EPA625	1

6 Aquatic Toxicity Testing and Toxicity Identification Evaluations

Aquatic toxicity testing supports the identification of best management practices (BMPs) to address sources of toxicity in urban runoff. Monitoring begins in the receiving water and the information gained is used to identify constituents for monitoring at outfalls to support the identification of pollutants that need to be addressed in the WMP. The sub-sections below describe the detailed process for conducting aquatic toxicity monitoring, evaluating results, and the technical and logistical rationale. Control measures and management actions to address confirmed toxicity caused by urban runoff are addressed by the WMP, either via currently identified management actions or those that are identified via adaptive management of the WMP.

6.1 Sensitive Species Selection

The Permit Monitoring and Reporting Program (MRP) (page E-32) states that sensitivity screening to select the most sensitive test species should be conducted unless "a sensitive test species has already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s), then monitoring shall be conducted using only that test species." Previous relevant studies conducted in the watershed should be considered. Such studies may have been completed via previous MS4 sampling, wastewater NPDES sampling, or special studies conducted within the watershed.

As described in the MRP (page E-31), if samples are collected in receiving waters with salinity less than 1 part per thousand (ppt), or from outfalls discharging to receiving waters with salinity less than 1 ppt, toxicity tests should be conducted on the most sensitive test species in accordance with species and short-term test methods in *Short-term Methods for Estimating the Chronic Toxicity of*

Effluents and Receiving Waters to Freshwater Organisms (EPA/821/R-02/013, 2002; Table IA, 40 CFR Part 136). Salinities of both dry and wet weather discharges from the Lower Los Angeles River are considered to meet the freshwater criteria. The freshwater test species identified in the MRP are:

- A static renewal toxicity test with the fathead minnow, *Pimephales promelas* (Larval Survival and Growth Test Method 1000.04).
- A static renewal toxicity test with the daphnid, *Ceriodaphnia dubia* (Survival and Reproduction Test Method 1002.05).
- A static renewal toxicity test with the green alga, *Selenastrum capricornutum* (also named *Raphidocelis subcapitata*) (Growth Test Method 1003.0).

The three test species were evaluated to determine if either a sensitive test species had already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s). In reviewing the available data in the Los Angeles River, Los Cerritos Channel, and the San Gabriel River watersheds, organophosphate pesticides and/or metals have been identified as problematic and are generally considered the primary aquatic life toxicants of concern found in urban runoff. Pyrethroid pesticides are known to be present in urban runoff and potentially contribute to toxicity in these waters. Tests specific to pyrethroid pesticides are simply less common. Given the knowledge of the presence of these potential toxicants in the watershed, the sensitivities of each of the three species were considered to evaluate which is the most sensitive to the potential toxicants in the watersheds.

Ceriodaphnia dubia has been reported as a sensitive test species for historical and current use of pesticides and metals, and studies indicate that it is more sensitive to the toxicants of concern than *P. promelas* or *S. capricornutum*. In its aquatic life copper criteria document, the USEPA reports greater sensitivity of *C. dubia* to copper (species mean acute value of 5.93 µg/l) compared to *Pimephales promelas* (species mean acute value of 69.93 µg/l; EPA, 2007). *C. dubia's* relatively higher sensitive to metals is common across multiple metals. Researchers at the University of California, Davis also reviewed available species sensitivity values in developing pesticide criteria for the Central Valley Regional Water Quality Control Board. The UC Davis researchers reported higher sensitivity of *C. dubia* to diazinon and bifenthrin (species mean acute value of 0.34 µg/l and 0.105 µg/l) compared to *P. promelas* (species mean acute value of 7804 µg/l and 0.405 µg/l; Palumbo et al., 2010a, b). Additionally, a study of the City of Stockton urban stormwater runoff found acute and chronic toxicity to *C. dubia*, with no toxicity to *S. capricornutum* or *P. promelas* (Lee and Lee, 2001). The toxicity was attributed to organophosphate pesticides, indicating a higher sensitivity of *C. dubia* compared to *S. capricornutum* or *P. promelas*. *P. promelas* is generally less sensitive to metals and pesticides but has been found to be more sensitive to ammonia than *C. dubia*. However, as ammonia is not typically a constituent of concern for urban runoff and ammonia is not consistently observed above the toxic thresholds in the watershed, *P. promelas* is not considered a particularly sensitive species for evaluating the impacts of urban runoff in receiving waters in the watershed.

Selenastrum capricornutum is a species that is sensitive to herbicides; however, while sometimes present in urban runoff, measured concentrations are typically very low. Herbicides have not been identified as a potential toxicant in the watershed. *S. capricornutum* is also not considered the most sensitive species as it is not sensitive to either pyrethroids or organophosphate pesticides and is not as sensitive to metals as *C. dubia*. The *S. capricornutum* growth test can also be affected by high concentrations of suspended and dissolved solids, color and pH extremes, which can interfere with the determination of sample toxicity. As a result, it is common to manipulate the sample by centrifugation and filtration to remove solids in order to conduct the test. This process may affect the toxicity of the sample. In a study of urban highway stormwater runoff (Kayhanian et. al, 2008), the green alga response to the stormwater samples was more variable than both the *C. dubia* and the *P. promelas* and in some cases the alga growth was considered to be potentially enhanced due to the presence of stimulatory nutrients.

As *C. dubia* is identified as the most sensitive to known potential toxicant(s) typically found in receiving waters and urban runoff in the freshwater potions of the watershed and has demonstrated toxicity in programs within the watershed (CWH and ABC Laboratories, 2013), *C. dubia* is selected as the most sensitive species. The species also has the advantage of being easily maintained in in-house mass cultures. The simplicity of the test, the ease of interpreting results, and the smaller volume necessary to run the test, make the test a valuable screening tool. The ease of sample collection and higher sensitivity will support assessing the presence of ambient receiving water toxicity or long term effects of toxic stormwater over time. As such, toxicity testing will be conducted using *C. dubia*.

An alternative species of water fleas, *Daphnia magna*, may be used if the water being tested has elevated hardness. *C. dubia* test organisms are typically cultured in moderately hard waters (80-100 mg/L CaCO3) and can have increased sensitivity to elevated water hardness greater than 400 mg/L CaCO3), which is beyond their typical habitat range. Because of this, *Daphnia magna* may be substituted in instances where hardness in site waters exceeds 400 mg/L ($CaCO_3$). *Daphnia magna* is more tolerant to high hardness levels and is a suitable substitution for *C. dubia* in these instances (Cowgill and Milazzo, 1990).

6.2 Testing Period

The following describes the testing periods to assess toxicity in samples collected in the LCC WMP area during dry and wet weather conditions. Short-term chronic tests will be used to assess both survival and reproductive/growth endpoints for *C. dubia* for both wet and dry weather sampling efforts. Although wet weather conditions in the region generally persist for less than the chronic testing periods (7 days), the *C. dubia* chronic test will be used for wet weather toxicity testing in accordance with *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (EPA, 2002a). Utilization of standard chronic tests on wet weather samples are not expected to generate results representative of the typical conditions found in the receiving water intended to be simulated by toxicity testing.

6.3 Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

Per the MRP, toxicity test endpoints will be analyzed using the Test of Significant Toxicity (TST) t-test approach specified by the USEPA (USEPA, 2010). The Permit specifies that the chronic in-stream waste concentration (IWC) is set at 100% receiving water for receiving water samples and 100% effluent for outfall samples. Using the TST approach, a t-value is calculated for a test result and compared with a critical t-value from USEPA's TST Implementation Document (USEPA, 2010). Follow-up triggers are generally based on the Permit specified statistical assessment as described below.

For chronic *C. dubia* toxicity testing, if a ≥50% reduction in survival or reproduction is observed between the sample and laboratory control that is statistically significant, a toxicity identification evaluation (TIE) will be performed.

TIE procedures will be initiated as soon as possible after the toxicity trigger threshold is observed to reduce the potential for loss of toxicity due to extended sample storage. If the cause of toxicity is readily apparent or is caused by pathogen related mortality or epibiont interference with the test, the result will be rejected, if necessary, a modified testing procedure will be developed for future testing.

In cases where significant endpoint toxicity effects greater than 50% are observed in the original sample, but the follow-up TIE positive control "signal" is found to not be statistically significant, the cause of toxicity will be considered non-persistent. No immediate follow-up testing is required on the sample. However, future test results will be evaluated to determine if implementation of concurrent TIE treatments are needed to provide an opportunity to identify the cause of toxicity.

6.4 Toxicity Identification Evaluation Approach

The results of toxicity testing will be used to trigger further investigations to determine the cause of observed laboratory toxicity. The primary purpose of conducting TIEs is to support the identification of management actions that will result in the removal of pollutants causing toxicity in receiving waters. Successful TIEs will direct monitoring at outfall sampling sites to inform management actions. As such, the goal of conducting TIEs is to identify pollutant(s) that should be sampled during outfall monitoring so that management actions can be identified to address the pollutant(s).

The TIE approach as described in USEPA's 1991 Methods for Aquatic Toxicity Identification is divided into three phases although some elements of the first two phases are often combined. Each of the three phases is briefly summarized below:

- Phase I utilizes methods to characterize the physical/chemical nature of the constituents which cause toxicity. Such characteristics as solubility, volatility and filterability are determined without specifically identifying the toxicants. Phase I results

are intended as a first step in specifically identifying the toxicants but the data generated can also be used to develop treatment methods to remove toxicity without specific identification of the toxicants.

- Phase II utilizes methods to specifically identify toxicants.
- Phase III utilizes methods to confirm the suspected toxicants.

A Phase I TIE will be conducted on samples that exceed a TIE trigger described in Section6.4. Water quality data will be reviewed to future support evaluation of potential toxicants. A range of sample manipulations may be conducted as part of the TIE process. The most common manipulations are described in Table 6-1. Information from previous chemical testing and/or TIE efforts will be used to determine which of these (or other) sample manipulations are most likely to provide useful information for identification of primary toxicants. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b).

Table 6-1. Phase I and II Toxicity Identification Evaluation Sample Manipulations

TIE Sample Manipulation	Expected Response
pH Adjustment (pH 7 and 8.5)	Alters toxicity in pH sensitive compounds (i.e., ammonia and some trace metals)
Filtration or centrifugation*	Removes particulates and associated toxicants
Ethylenediamine-Tetraacetic Acid (EDTA) or Cation Exchange Column*	Chelates trace metals, particularly divalent cationic metals
Sodium thiosulfate (STS) addition	Reduces toxicants attributable to oxidants (i.e., chlorine) and some trace metals
Piperonyl Butoxide (PBO)*	Reduces toxicity from organophosphate pesticides such as diazinon, chlorpyrifos and malathion, and enhances pyrethroid toxicity
Carboxylesterase addition(1)	Hydrolyzes pyrethroids
Temperature adjustments(2)	Pyrethroids become more toxic when test temperatures are decreased
Solid Phase Extraction (SPE) with C18 column*	Removes non-polar organics (including pesticides) and some relatively non-polar metal chelates
Sequential Solvent Extraction of C18 column	Further resolution of SPE-extracted compounds for chemical analyses
No Manipulation*	Baseline test for comparing the relative effectiveness of other manipulations

* Denotes treatments that will be conducted during the initiation of toxicity monitoring, but may be revised as the program is implemented. These treatments were recommended for initial stormwater testing in Appendix E (Toxicity Testing Tool for Stormwater Discharges) of the State Water Resources Control Board's June 2012 Public Review Draft "Policy for Toxicity Assessment and Control".

1 Carboxylesterase addition has been used in recent studies to help identify pyrethroid-associated toxicity (Wheelock et al., 2004; Weston and Amweg, 2007). However, this treatment is experimental in nature and should be used along with other pyrethroid-targeted TIE treatments (e.g., PBO addition).

2 Temperature adjustments are another recent manipulation used to evaluate pyrethroid-associated toxicity. Lower temperatures increase the lethality of pyrethroid pesticides. (Harwood, You and Lydy, 2009)

The Watershed Group will identify the cause(s) of toxicity using a selection of treatments in Table 6-1 and, if possible, using the results of water column chemistry analyses. After any initial assessments of the cause of toxicity, the information may be used during future events to modify the targeted treatments to more closely target the expected toxicant or class of toxicants.

Moreover, if the toxicant or toxicant class is not initially identified, toxicity monitoring during subsequent events will confirm if the toxicant is persistent or a short-term episodic occurrence.

As the primary goals of conducting TIEs is to identify pollutants for incorporation into outfall monitoring, narrowing the list of toxicants following Phase I TIEs via Phase II/III TIEs is not necessary if the toxicant class determined during the Phase I TIE is sufficient for 1) identifying additional pollutants for outfall monitoring and/or 2) identifying control measures. Thus, if the specific pollutant(s) or classes of pollutants (e.g., metals that are analyzed via EPA Method 200.8) are identified then sufficient information is available to incorporate the additional pollutants into outfall monitoring and to start implementation of control measures to target the additional pollutants.

Phase II TIEs may be utilized to identify specific constituents causing toxicity in a given sample if the results of Phase I TIE testing and a review of available chemistry data fails to provide information necessary to identify constituents that warrant additional monitoring activities or management actions to identify likely sources of the toxicants and lead to elimination of the sources of these contaminants. Phase III TIEs will be conducted following any Phase II TIEs.

For the purposes of determining whether a TIE is inconclusive, TIEs will be considered inconclusive if:

- The toxicity is persistent (i.e., observed in the baseline), and
- The cause of toxicity cannot be attributed to a class of constituents (e.g., insecticides, metals, etc.) that can be targeted for monitoring.

If (1) a combination of causes that act in a synergistic or additive manner are identified; (2) the toxicity can be removed with a treatment or via a combination of the TIE treatments; or (3) the analysis of water quality data collected during the same event identify the pollutant or analytical class of pollutants, the result of a TIE is considered conclusive.

Note that the MRP (page E-33) allows a TIE Prioritization Metric (as described in Appendix E of the Stormwater Monitoring Coalition's Model Monitoring Program) for use in ranking sites for TIEs. However, as the extent to which TIEs will be conducted is unknown, prioritization cannot be conducted at this time. However, prioritization may be utilized in the future based on the results of toxicity monitoring and an approach to prioritization will be developed through the CIMP adaptive management process and will be described in future versions of the CIMP.

6.5 Follow Up on Toxicity Testing Results

Per Parts VIII.B.c.vi and XI.G.1.d of the MRP, if the results of two TIEs on separate receiving samples collected during the same conditions (i.e., wet or dry weather) are inconclusive, a toxicity test conducted during the same conditions (i.e., wet or dry weather), using the same test species, will be conducted at applicable upstream outfalls as soon as feasible (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of an inconclusive

TIE). The same TIE evaluation triggers and TIE approach presented in Section 6.3 and 6.4, respectively will be followed based on the results of the outfall sample.

The MRP (page E-33) indicates the following actions should be taken when a toxicant or class of toxicants is identified through a TIE:

1. Group Members shall analyze for the toxicant(s) during the next scheduled sampling event in the discharge from the outfall(s) upstream of the receiving water location.
2. If the toxicant is present in the discharge from the outfall at levels above the applicable receiving water limitation, a toxicity reduction evaluation (TRE) will be performed for that toxicant.

The list of constituents monitored at outfalls identified in the CIMP will be modified based on the results of the TIEs. Similarly, upon completion of a successful dry weather TIE, additional constituents identified in the TIE will be added to monitoring requirements at outfalls with significant non-stormwater flows. Monitoring for those constituents will occur as soon as feasible following the completion of a successful TIE (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of a successful TIE).

The requirements of the TREs will be met as part of the adaptive management process in the WMPs rather than the CIMP. The identification and implementation of control measures to address the causes of toxicity are tied to management of the stormwater program, not the CIMP. It is expected that the requirements of TREs will only be conducted for toxicants that are not already addressed by an existing Permit requirement (i.e., TMDLs) or existing or planned management actions.

The Water Boards' TMDL Roundtable is currently evaluating options to streamline and consistently respond to urban-use pesticide impairment listings throughout the State including a statewide urban-use pesticide TMDL modeled after the San Francisco Bay Area Urban Creeks Pesticides TMDL. In Addition to toxicity testing, statewide efforts will be monitored to study these pesticides being discussed by the California Stormwater Quality Association (CASQA) Pesticides sub-committee and other Regional Water Boards.

6.6 Summary of Aquatic Toxicity Monitoring

The approach to conducting aquatic toxicity monitoring as described in the previous sections is summarized in detail in Figure 6-1. The intent of the approach is to identify the cause of toxicity observed in receiving water to the extent possible with the toxicity testing tools available, thereby directing outfall monitoring for the pollutants causing toxicity with the ultimate goal of supporting the development and implementation of management actions. The toxicity approach is subject to modifications based on discussions with the Regional Board.

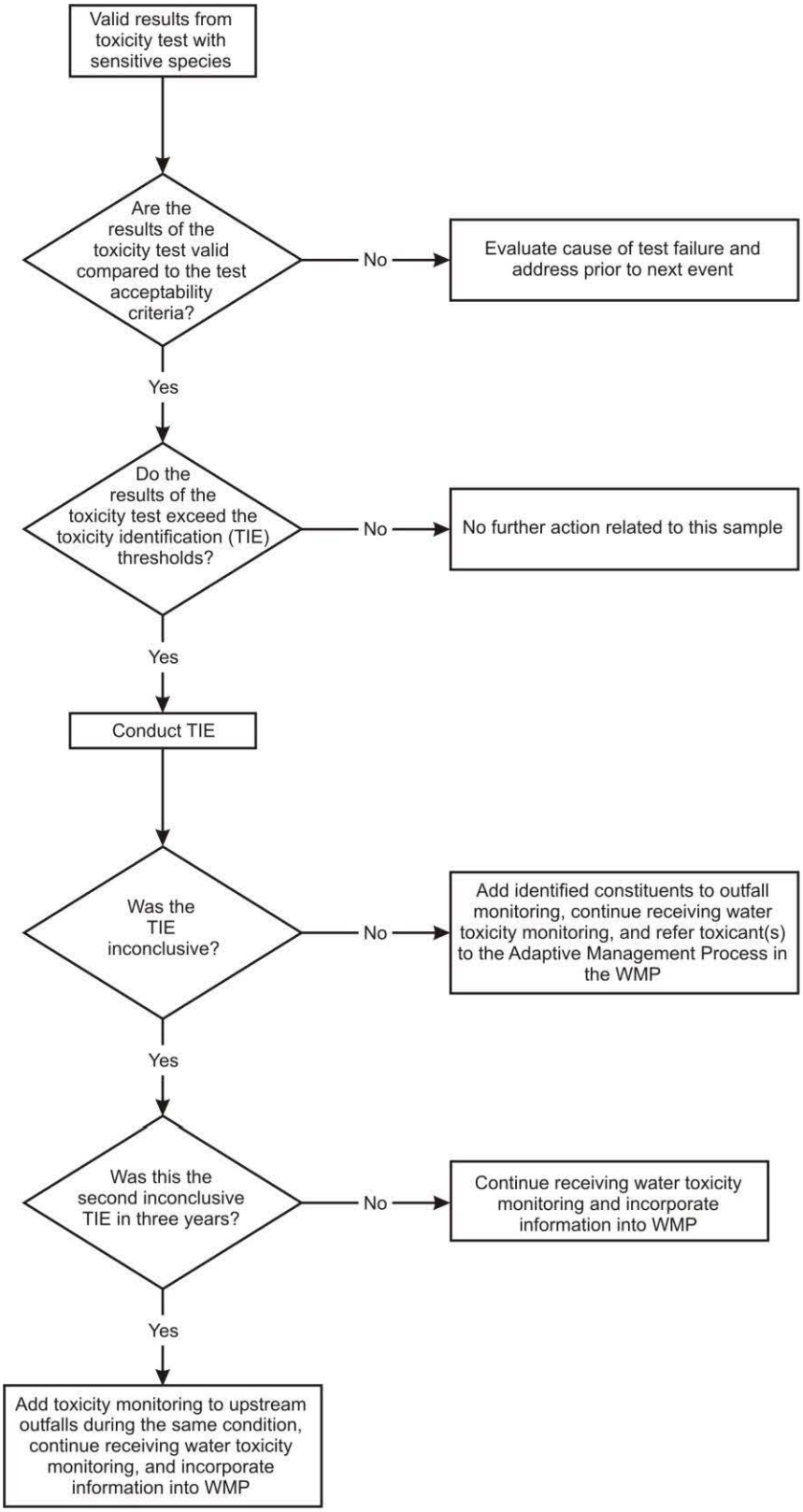


Figure 6-1. Detailed Aquatic Toxicity Assessment Process

7 Receiving Water Monitoring Mass Emission Monitoring

All receiving water quality monitoring at the Los Angeles River mass emission monitoring site, S10 (Figure 7-1), will continue to be conducted by the Los Angeles County Flood Control District (LACFCD). Flow-weighted composite samples will be collected during each monitoring event and will be analyzed for analytes in Table 5-1.

7.1 Sampling Frequency and Mobilization Requirements

Monitoring of receiving water quality at S10 will be performed three times a year during the wet season and two times a year during dry weather conditions. Screening for Table E-2 constituents listed in the MRP will be conducted during the first significant storm of the year and during a critically dry weather period. Larger sampling volumes are required to incorporate all analytical tests and associated QA/QC needed for Table E-2 constituents, bioassay tests and to provide sufficient volumes should TIEs be required.

Wet weather conditions are defined in the MRP as when the receiving waterbody has flow that is at least 20 percent greater than its base flow or, in the case of an estuary, during a storm event of greater than or equal to 0.1 inch of precipitation.

These include:

- Wet Season defined as October 1 through April 15
- Events preceded by less than 0.1 inches of rainfall within the watershed over a three day period.
- Rainfall of at least 0.25 inches and
- Maximum flow rates greater than 500 cfs measured at the Wardlow Road gaging station associated with the S10 mass emission monitoring site.

The MRP provides defines dry weather as (for rivers, streams or creeks) as periods when flow is no more than 20% greater than base flow conditions. In the case of the Estuary, dry weather conditions are further defined by rainfall being less than 0.1 inches of rain on the day of the sampling and having experienced no less than three days of dry weather after a rain event of 0.1 inches or greater within the watershed, as measured from at least 50 percent of Los Angeles County controlled rain gauges within the watershed.

7.2 Sampling Constituents

Chemical analysis are scheduled to be conducted for all analytes listed in Table 5-2 through Table 5-8 during the first significant rainfall of the season and again during a period of critical low flow. Chemical constituents not detected in excess of their respective Method Detection Limits (MDLs) or that do not exceed available water quality standards will be considered for removal during subsequent surveys. Adjustments to the list of analytical tests will be assessed separately for wet and dry weather sampling requirements.

Constituents to be sampled at the ME site during all other sampling events are listed in Table 5-1. Sampling requires focus on constituents that are currently part of a TMDL, are 303(d) listed or that have exceeded RWL but data are not sufficient for listing. This approach is designed to target constituents of concern in the watershed. In addition, an extensive sampling of all constituents is scheduled for two time periods during the first year of the permit when contaminants are expected to have the greatest potential for being detected. Additional constituents from the Table E-2 list that are detected at levels of concern during those two time periods will be added to the monitoring list at the ME site.

As noted in the previous section, it has been determined that adequate data exist to determine which of the three freshwater species are considered to be most sensitive during both storm events and dry weather periods. Available literature and local data indicate that the most sensitive bioassay test species is *Ceriodaphnia dubia*. The prior section on Aquatic Toxicity Testing and TIEs goes into detail as to species selection and the overall approach recommended for measuring toxicity in the receiving waters and strategies to eliminate any sources of toxicity. During wet weather conditions, bioassay tests will be performed based upon exposure to 100 percent test waters over a 48-hour time period since this time exposure is deemed to be more consistent with the duration of typical storm events. Since exposure times during the dry season are much long, dry weather testing will utilize 7-day chronic toxicity tests that assess both survival and reproductive endpoints for *C. dubia*. Chronic testing will also be conducted on 100 percent undiluted samples. Table 7-1 provides sample volumes necessary for toxicity tests (both wet and dry weather) as well as minimum volumes necessary to fulfill Phase I TIE testing if necessary. As detailed in the previous section, the sublethal endpoints will be assessed using EPA's TST procedure to determine if there is a statistically significant 50% difference between sample controls and the test waters and ultimately determine if further testing should be is necessary.

Table 7-1. Toxicity Test Volume Requirements for Aquatic Toxicity Testing as part of the Lower Los Angeles River Coordinated Integrated Monitoring Program.

Test Organism	Toxicity Test Type	Test Concentration	Volume Required for Initial Screen (L)	Minimum Volume Required for TIE (L)[1]
Freshwater Tests for Samples with Salinity < 1.0 ppt				
Daphnid Water Flea *(Ceriodaphnia dubia*)	48-Hour Acute Survival 7-day Chronic Survival and Reproduction	100% only	1.5	10
Sample Receipt Water Quality	--	--	1.0	--
Total volume required per event for samples with salinity < 1.0 ppt;			2.5	a

[1] Minimum volumes for TIE are for Phase 1 characterization testing only. The additional volume collected for potential TIE testing can be held in refrigeration (4°C in the dark, no head space) and shipped to the laboratory at a later date if needed.

Note: The NPDES permit targets a 36-hr holding time for initiation of testing but allows a maximum holding time of 72-hr if necessary.

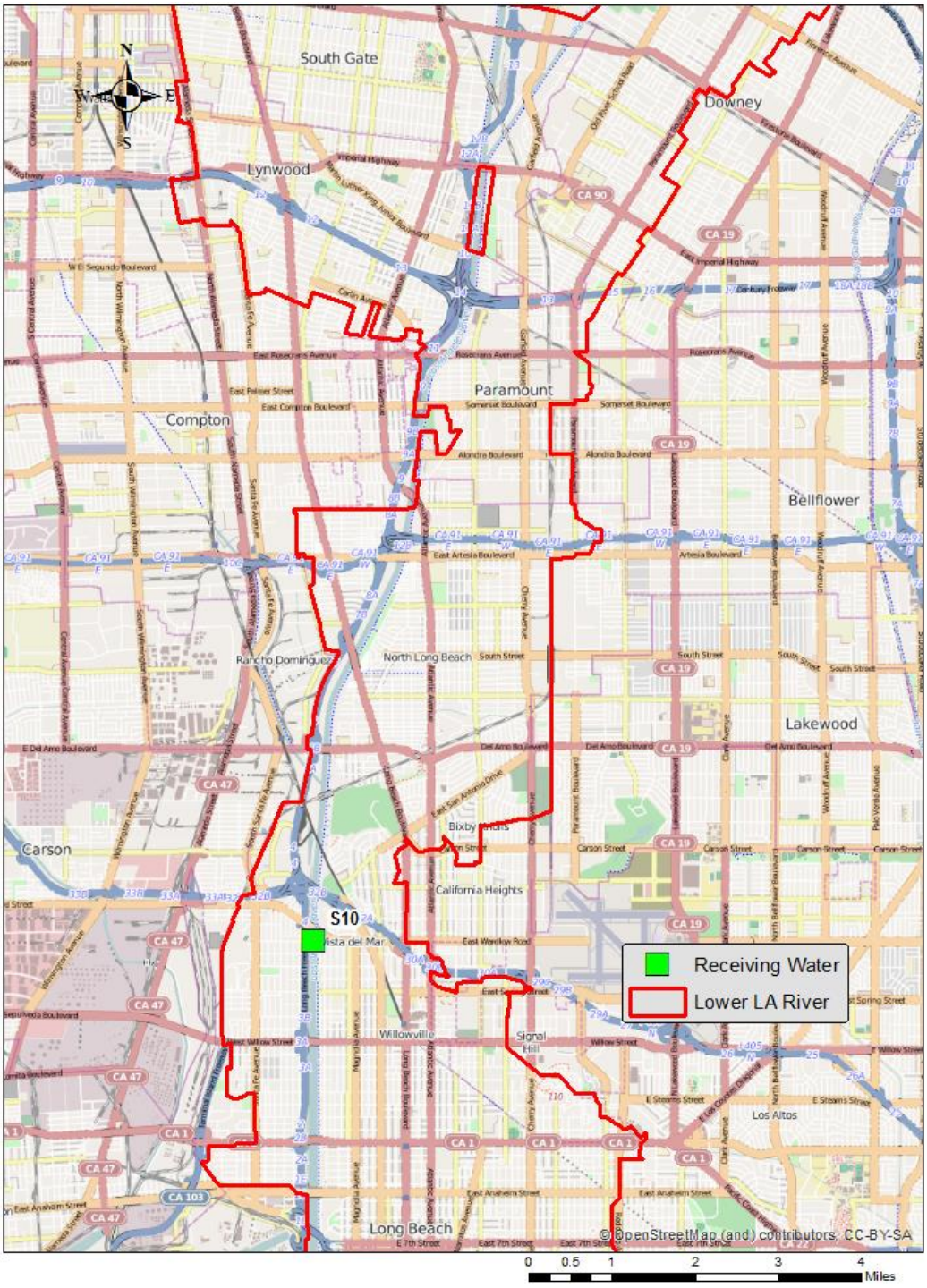


Figure 7-1. Lower Los Angeles River Receiving Water Monitoring and TMDL Compliance Site.

8 Receiving Water TMDL Monitoring

The following sections provide a summary of TMDLs applicable to the LLAR, any interim or final Waste Load Allocations applicable to each TMDL, and monitoring requirements required to evaluate compliance.

8.1 Nitrogen Compounds and Related Effects TMDL

Attachment A to Resolution No. R12-010

This TMDL identifies Water Reclamation Plants (WRP) as the major sources of nitrogen compounds to the Los Angeles River. These facilities include the Donald C. Tillman Water Reclamation Plant, the Los Angeles-Glendale WRP, and the Burbank WRP. All are located upstream of the LLAR WMG. During dry weather periods, these major POTWs contribute 84.1% of the total dry weather nitrogen load. Urban runoff, stormwater, and groundwater discharges also contribute nitrogen loads. The TMDL classifies discharges from MS4s as minor point sources of nitrogen compounds.

Waste Load Allocations (WLAs) are established for segments of the Lower LAR watershed (Table 8-1). A review of water quality measurements taken at the Wardlow (S10) Mass Emission monitoring site between 2006 and 2013 indicated that individual nitrate and nitrite-nitrogen concentrations never exceeded the 30-day WLAs. In addition, three single sample ammonia-nitrogen measurements taken in late 2006 and 2007 were found to exceed the 30-day geometric mean standard of 2.4 mg/L for ammonia-nitrogen.

Low concentrations of nitrogen compounds have been consistently reported in both wet and dry weather discharges monitored at the City of Long Beach Dominguez Gap Mass Emission Monitoring Site between 2008 and 2013 (Kinnetic Laboratories, Inc., 2013). Concentrations of ammonia-nitrogen are reported to be less than 0.7 mg/L during both dry and wet weather monitoring. Concentrations of nitrate-N in dry weather discharges have never exceeded 1.9 mg/L and all wet weather discharges have had concentrations of less than 1.4 mg/L.

Based upon the low concentrations of nitrogen reported in receiving waters of the Los Angeles River and recognition that POTWs are the major contributors of nitrogen to the River during dry weather, the existing mass emission monitoring site located at Wardlow Road (S10) will be used to assess compliance with the Nitrogen Compounds and Related Effects TMDL for the LLAR WMG. Monitoring of nitrogen compounds will be included with each of the three wet weather events and for two dry weather events.

Table 8-1. Summary of 30-day WLAs for Nitrogen Compounds in the Lower Los Angeles River Watershed Management Group.

Segment	Ammonia-N (mg/L)	Nitrate-N (mg/L)	Nitrite-N (mg/L)	Nitrate+Nitrite-N (mg/L)
Los Angeles River Reach 1	2.4	8.0	1.0	8.0
Los Angeles River Reach 2	2.4	8.0	1.0	8.0
Los Angeles River Tributaries excluding the Whittier Narrows	2.3	8.0	1.0	8.0

In addition, the highest four-day average within the 30-day period shall not exceed 2.5 times the 30-day average waste load allocation.

8.2 Los Angeles River and Tributaries Metals TMDL

Attachment A to Resolution No. R2007-014

The Los Angeles River Metals TMDL became effective on October 29, 2008. In order to address compliance with this TMDL (Table 8-3), a Coordinated Monitoring Plan (CMP) was developed and implemented jointly by the responsible Los Angeles River Watershed MS4 permittees in October 2008. Wet and dry weather monitoring began at 13 locations in the LA River and major tributaries. Four of the monitoring sites were located within the LLAR WMG area. Grab sampling was conducted at all four monitoring sites on a monthly basis during dry weather conditions. Two sites were equipped with autosamplers which were used to collect stormwater runoff samples. A summary of the results of this monitoring effort is presented in Section 2 of the WMP.

Automated sampling equipment was used at LAR 1-13[2] near Wardlow Rd. and at LAR 1-11 located just north of Del Amo Blvd. The LAR 1-13 site is located at the same site as the Los Angeles River mass emission monitoring site S10. Both are associated with at Los Angeles County gaging station F319-R. This location has been used as the final compliance point for the Metals TMDL and is also effectively the lower end of Reach 1 of the Los Angeles River. LAR 1-11 is located just 3300 meters (just over two miles) to the north. This site is also north of the location where Compton Creek discharges to the Los Angeles River and marks the lower end of Reach 2. Monitoring results from these two closely spaced sites were typically difficult to differentiate. The location of LAR 1-11 is an artifact of the prior Reach 1/Reach 2 segmenting under the TMDL, which is now being superseded by the watershed approach. The location of site LAR 1-11 was well suited for differentiating Reach 2 and Reach 1, but does not provide significant information for watershed implementation activities.

[2] LAR1-13 is located at the same site as S-10.

The river segment between stations LAR1-11 and LAR1-13 is nearly an order of magnitude less than any of the other stations.

Table 8-2. Approximate percentage of River Length Served by Automated Sampling Stations

Monitoring Site	Percent* (%)
LLAR1-1	16.4
LLAR1-4	16.0
LARB1-7	21.4
LAR1-11	35.3
LAR1-13	02.6

* Percentage does not add to 100 due to the length of the estuary not being included

Historical monitoring at LAR1-11 and LAR1-13 do not show significant differences in pollutant trends (When a pollutant increases or decreases at one station, it also increases or decreases at the other stations) as is shown in in Figures 8-1 and 8-2 using copper and zinc levels for the 2013-14 CMP sampling results. The zinc levels parallel each other, the copper level are almost indistinguishable at the two monitoring stations.

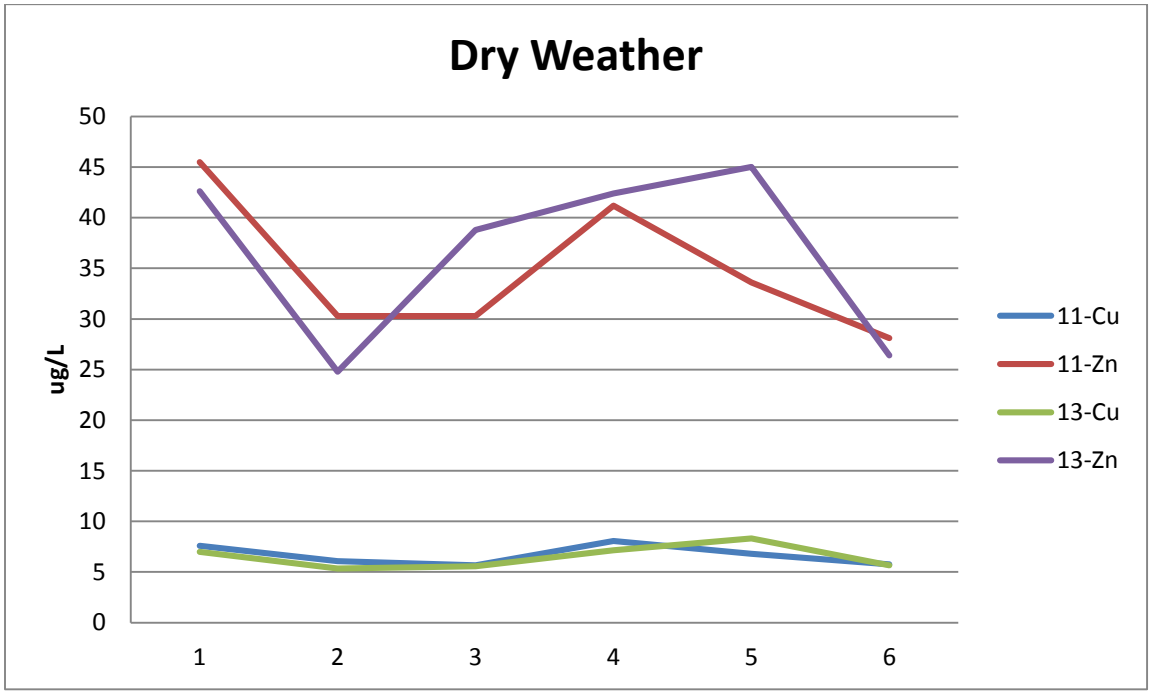


Figure 8-1. Comparison of copper and zinc levels for Monitoring Stations LAR1-11 and LAR1-13 in dry weather

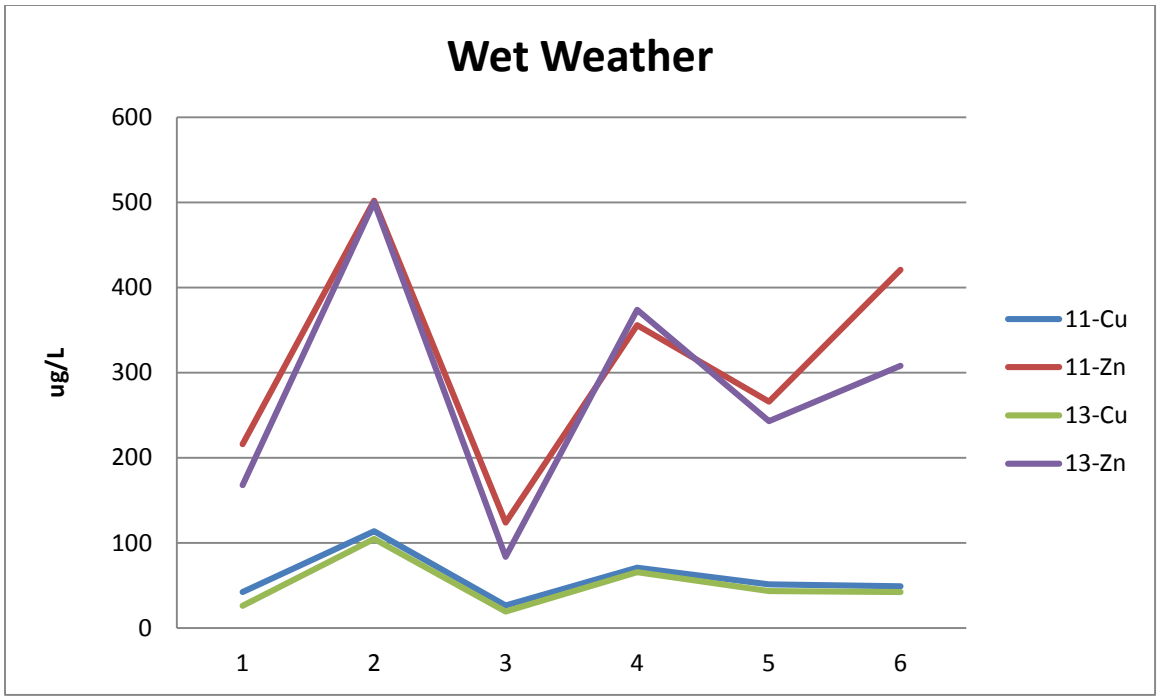


Figure 8-2. Comparison of copper and zinc levels for Monitoring Stations LAR1-11 and LAR1-13 in wet weather

For the past several years, the CMP Metals TMDL monitoring programs and the mass emission station have represented the only structural monitoring stations in the Los Angeles River. With the advent of the CIMP and IMPs, the number of sampling locations for the Los Angeles River and its tributaries, including Compton Creek is markedly increasing.

As a result, continued monitoring at LAR1-11 was redundant and not providing useful information for wet and dry weather monitoring. Thus three sites (Figure 8-3) will continue to be monitored for the LAR metals TMDL.

The LAR1-13 monitoring site will continue to be used for collection of flow-weighted stormwater composite samples since (1) this site also serves as the final compliance point for the metals TMDL, (2) is the furthest downstream and is near the interface of the river/estuary interface and (3) the LLAR groups has already indicated the Harbor Toxics TMDL would be situated at this site. Three storm events will be monitored at this location to be consistent with receiving water quality monitoring requirements at this site.

Dry weather monitoring data from the Los Angeles River Metals CMP has shown metals to be in compliance during dry weather. As a result of the high level of compliance, dry weather monitoring at each of the three sites (Figure 8-3) is scheduled be conducted on a quarterly basis. No dry weather sampling will be conducted during months when a storm event is sampled at LAR1-13. Scheduling of monitoring activities will be coordinated with the Upper Los Angeles River Watershed Management Group (ULARWMG).

Table 8-3. Numeric Targets for Trace Metal in the Lower Los Angeles River WG.

TMDL Target	Waterbody	Metal (µg/L)			
		Cadmium	Copper [3,5,6]	Lead [3,5,6]	Zinc [4,5]
Dry Weather Total Recoverable Metals Targets[1,2]	Reach 1	-	23	12	-
	Tributary - Compton Cr.		19	8.9	
	Reach 2	-	22	11	-
	Arroyo Seco	-	22	11	-
	Tributary - Rio Hondo Reach 1	-	13	5	131
Wet Weather Total Recoverable Metals Target [7,8]	Reach 1 and 2, Compton Creek, Arroyo Seco, Rio Hondo Reach 1	3.1	17	62	159

Notes:

1. Dry weather targets apply to days when maximum daily flow in the river is less than 500 cfs at Wardlow gage.
2. Dry weather conversion factors used to convert total recoverable to dissolved fraction: copper = 0.96; lead = 0.79; zinc = 0.61
3. Dry weather targets for copper and lead are based on chronic California Toxic Rule (CTR) criteria.
4. Dry weather targets for zinc are based on acute CTR criteria using the 10 percentile hardness value.
5. Copper, lead and zinc targets dependent on water hardness.
6. Copper and lead targets based on 50th percentile hardness values.
7. CF Wet weather conversion factors for copper, lead, and zinc to convert total recoverable to dissolved based on regression of data collected at Wardlow gage: copper = 0.65; lead = 0.82; zinc = 0.61. Conversion factor for cadmium taken from CTR = 0.94.
8. Wet weather targets for cadmium, copper, lead and zinc based on acute CTR criteria and the 50th percentile hardness values for stormwater collected at Wardlow gage station.

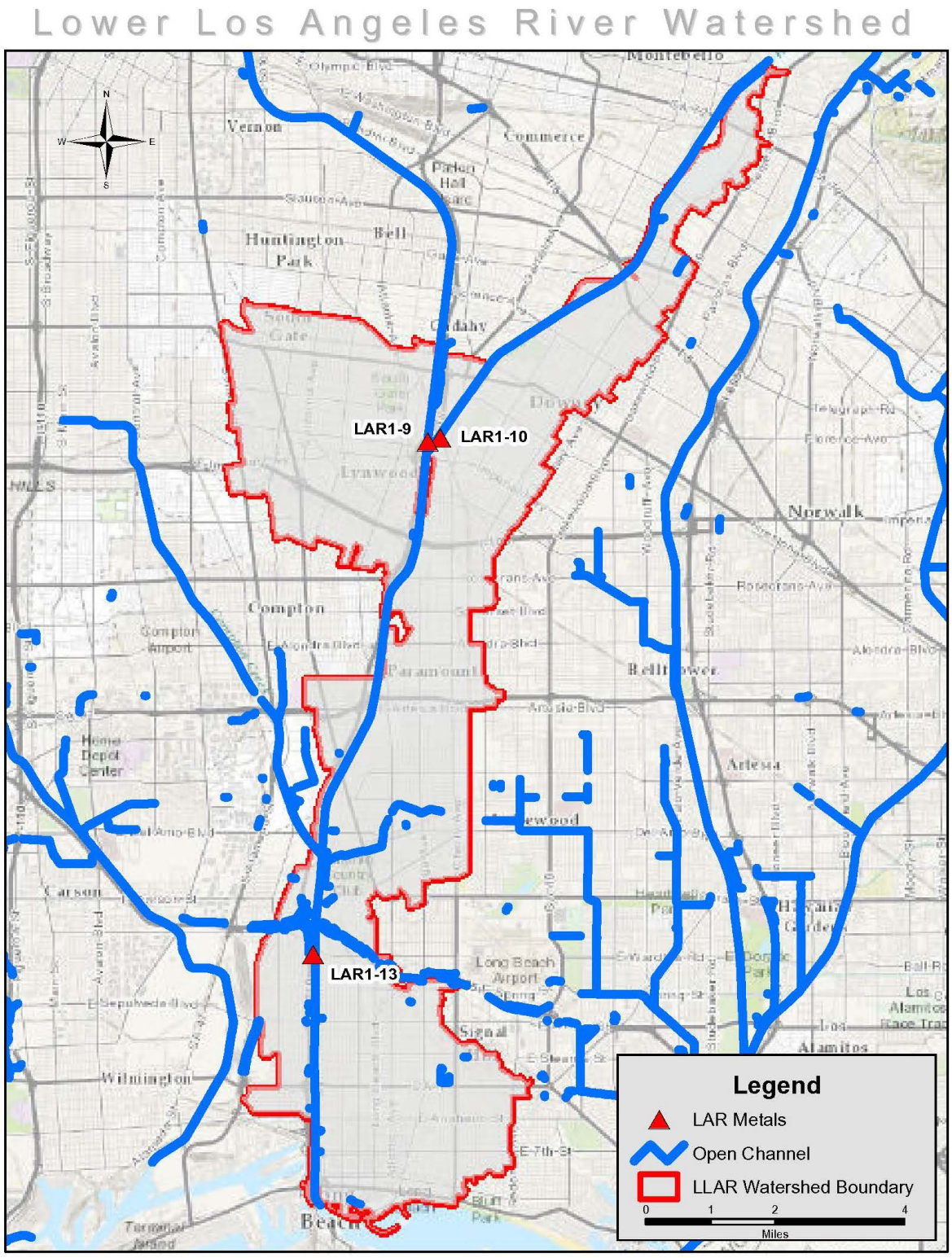


Figure 8-3. Monitoring Sites for the Los Angeles River Metals TMDL

8.3 Los Angeles River Watershed Bacteria TMDL

Attachment A to Resolution No. R10-007

The Basin Plan Amendment (Resolution No. R10-007) describes three categories of compliance monitoring:

> 1) ***Ambient (River) Monitoring*** is to occur on a monthly basis in each river segment and tributary addressed under the TMDL, until the subject river segment or tributary is at the end of the execution part of its first implementation phase, at which time, it will transition to weekly monitoring.
>
> 2) ***Load Reduction Strategy*** (LRS) Monitoring is required for parties pursing an LRS, in which intensive outfall monitoring will be conducted before and after implementation of the LRS. Pre-LRS monitoring will be used to estimate bacteria loading from MS4 Outfalls and to identify appropriate implementation actions to meet Waste Load Allocation (WLAs). Post-LRS monitoring will be used to evaluate compliance with interim WLAs and to plan for additional implementation actions to meet final WLAs during a second implementation phase, if necessary.
>
> 3) Wet Weather monitoring is to be addressed by Wet Weather Implementation Plans due in 2022.

This Coordinated Integrated Monitoring Plan (CIMP) is limited to 1) quarterly surveys necessary for the Ambient Monitoring program and 2) LRS surveys needed to first develop LRS Plans and later evaluate effectiveness of BMP implementation actions in meeting WLAs within defined reaches and tributaries within the LLAR WMG. Weekly Ambient Monitoring of receiving waters is not scheduled to occur until 7 years after a given reach or tributary has begun the first implementation phase. Given that timeline, it is expected that weekly ambient monitoring will be addressed by a future addendum to the CIMP.

River monitoring will be conducted quarterly at each of the three monitoring sites located within the LLAR WMG (Figure 8-4). Monitoring will be conducted during dry weather conditions and will consist of collection of water samples for analysis of *E. coli* and concurrent flow measurements to allow for calculation of loads. The timing of each survey will be coordinated with the upper Los Angeles River WMGs. Sampling methods are detailed in Appendix C.

LRS Monitoring will be conducted to support development of the Phase 1 LRS Plans and evaluate compliance with interim dry weather WLAs (Table 8-4). LRS monitoring for the first phase will require six synoptic surveys of all MS4 storm drains within a targeted River Segment or Tributary. Water samples will be collected from all flowing storm drains and analyzed for *Escherichia coli* (*E. coli*). Concurrent flow measurements will be necessary to allow for load calculations. The LLAR WMG includes all of Los Angeles River Segment A but only portions of River Segment B, Compton Creek and Rio Hondo. In cases where a segment or defined tributary is not fully encompassed within the LLAR WMG, the group plans to work cooperatively with adjoining WMGs to develop both the initial bacterial loading data and to later evaulate compliance with interim dry weather

WLAs after implementation. LRS monitoring will not be conducted for the initial LRS planning effort for Segment B since data were previously collected as part of the CREST program. The first LRS surveys will be conducted for River Segment A and Rio Hondo Reach 1 since the LRS plan is due by September 30, 2016 and March 23, 2016 (Table 8-6).

The LRS process is outlined in Figure 8-5. LRS monitoring is required as part of **Step 1** to provide the data necessary to develop the LRS plan and again in **Step 6** when it is necessary to evaluate effectiveness of the strategy.

8.3.1 Interim Dry Weather Limits for Bacteria

The Basin Plan Amendment (Resolution No. R10-007) established Interim Dry Weather WLAs for all segments of the Los Angeles River and the major tributaries. Table 8-4 summarizes WLAs for segments and tributaries located within the LLAR WMG.

Table 8-4. Interim Dry Weather Waste Load Allocations for LLAR Segments and Tributaries (Expressed as Load, 10^9 MPN/day).

River Segment or Tributary	*E. coli* Load (10^9 MPN/day)
Los Angeles River Segment A	301
Los Angeles River Segment B	518
Compton Creek	7
Rio Hondo	2

Source: Resolution No. R10-007, Amendment to the *Water Quality Control Plan for the Los Angeles* Region

8.3.2 Final In-stream Targets and Allowable Exceedances

The final in-stream numeric targets for this TMDL are as follows:

- Geometric Mean Target: *E. coli* density shall not exceed 126 MPN/100 mL.
- Single Sample Target: *E. coli* density shall not exceed 235 MPN/100 mL.

It is important to note that these Final In-stream Targets *do not* apply to monthly ambient monitoring results. They are included here for reference only. These targets only apply to weekly monitoring results, which will be initiated after a given river segment or tributary has completed the first phase of implementation of its Load Reduction Strategy. The single sample targets are assigned an allowable number of exceedance days for dry weather and wet weather. If the Regional Board adopts new bacterial standards, the CIMP, including any monitoring reports, shall be updated to incorporate the changes.

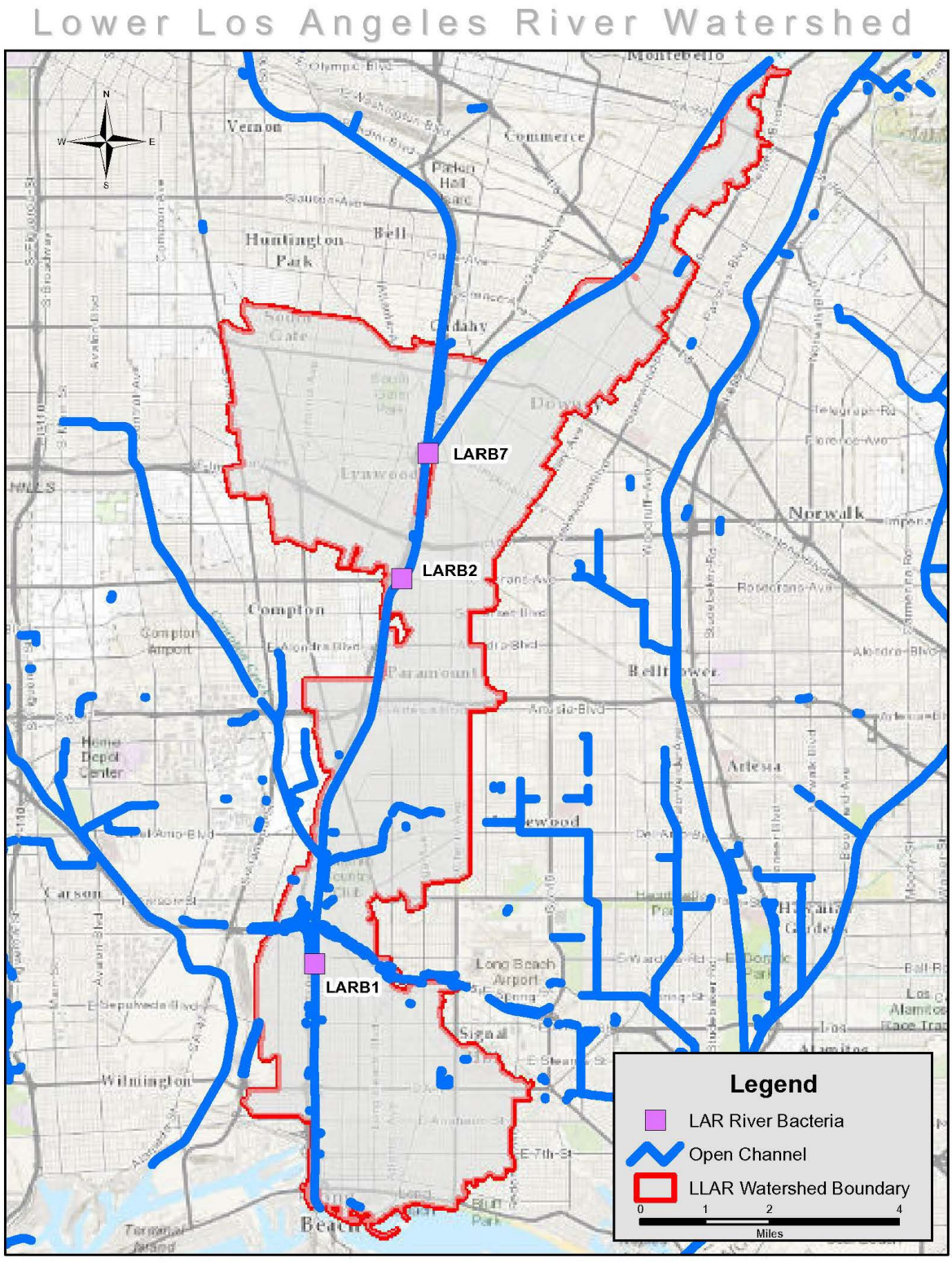
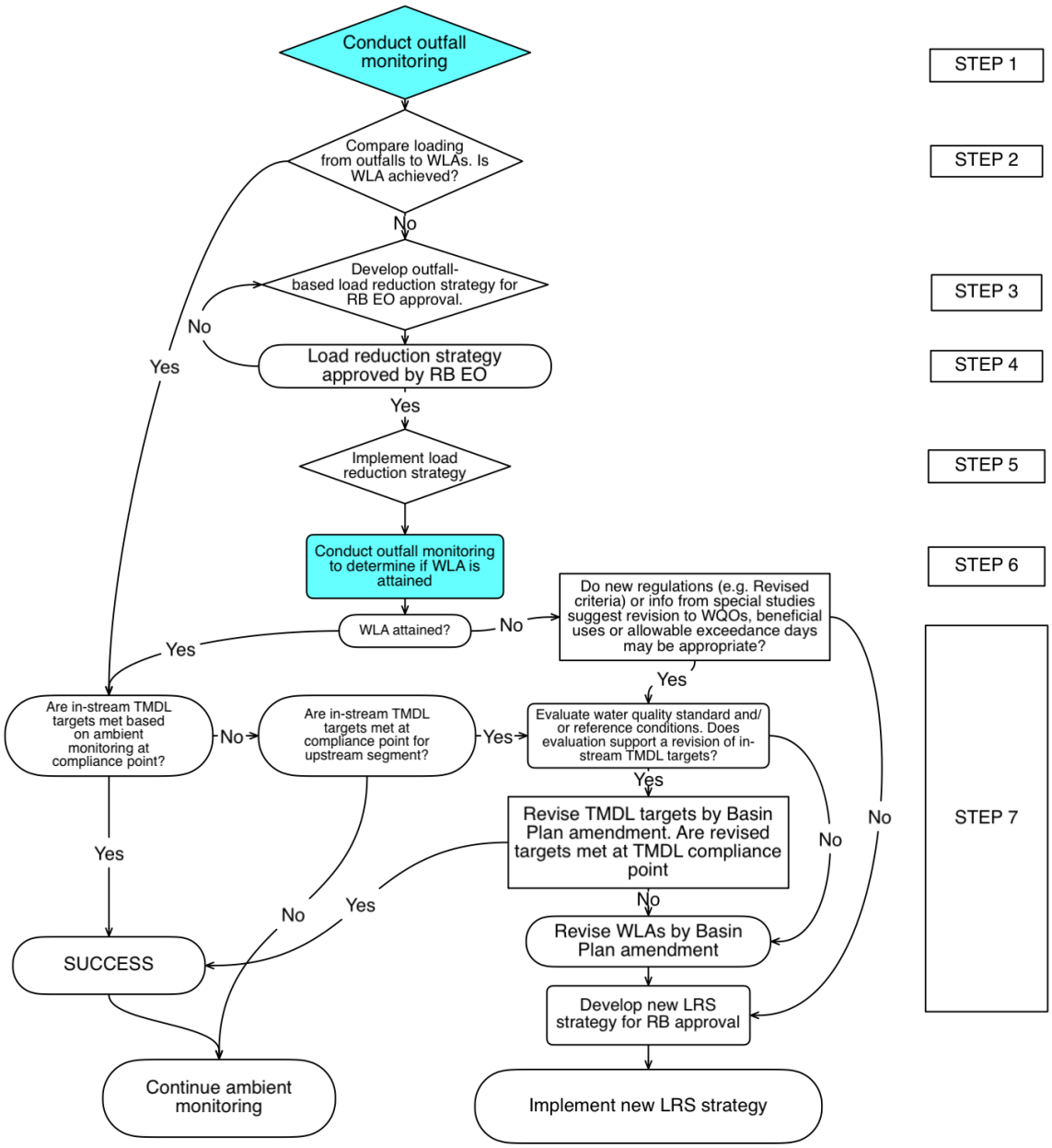


Figure 8-4. River Monitoring Sites for the Los Angeles River Bacteria TMDL.



Based Upon the Los Angeles River Bacteria TMDL Staff Report.

Figure 8-5. Outline of LRS Sampling and Assessment Process

8.3.3 High Flow Suspension

Certain reaches and tributaries of the Los Angeles River are subject to a High Flow Suspension (HFS) of the recreational beneficial uses. All segments and tributaries located within the LLAR WMG would be subject to suspension of recreational beneficial uses for time periods when rainfall is greater than or equal to 0.5 inches over a 24-hour time period and a 24-hour time period following the event (Board Resolution No. 2003-010). Since this CIMP only includes sampling scheduled to be conducted during dry weather, HFS days are not likely to apply to the results obtained through this monitoring program and are included here for reference purposes only. Table 8-5 shows the final dry and wet weather allowable exceedances based on daily and weekly sampling.

Table 8-5. Allowable Number of Exceedances of Final In-stream Numeric Targets in Dry and Wet Weather Conditions.

Allowable Number of Exceedance Days	Daily Sampling	Weekly Sampling
Dry Weather	5	1
Wet Weather(Non-HFS[1] Water bodies)	15	2
Wet Weather (HFS Water bodies)	10 (not including HFS days)	2 (not including HFS days)

1. HFS= High Flow Suspension

The River Bacteria sampling program will be based upon the March 2013 *Coordinated Monitoring Plan for Los Angeles River Watershed Bacteria TMDL – Compliance Monitoring* developed by the LA River Watershed Bacteria TMDL Technical Committee with the exception that monitoring in the estuary will be conducted quarterly rather than monthly and freshwater bacteria monitoring will be conducted monthly. The frequency of sampling will be reevaluated by Regional Board staff after the end of the permit term. In the 2016-17 Annual Report, the LLAR Group will evaluate estuary bacteria monitoring frequency and provide reasoning why the monitoring frequency is (or is not) adequate. Regional Board staff will then review this information. As final compliance dates approach, it is expected that this frequency will become weekly. This plan established 16 sites throughout the Los Angeles River Watershed to characterize ambient water quality conditions. Four of these sites are located in the LLAR WMG. Quarterly water samples will be collected at each site for analysis of the fecal indicator, *Escherichia coli (E. coli).* Quarterly monitoring is considered to initially be sufficient to determine a segment or tributary is in compliance with interim WLAs. Since interim WLAs are expressed as a load, flow measurements will be taken at or near the time of each sample collection so that the *E. coli* MPN/day can be calculated. Quarterly monitoring will only be conducted during dry weather conditions. Sampling must be preceded by a minimum of 72 hours without rainfall within the watershed.

LRS sampling is initially required to evaluate bacterial loads associated with each defined River Segment or Tributary in the LAR Bacteria TMDL. Sampling conducted to support development of

bacteria reduction plan requires six sampling events where water samples and flow measurements are taken in all outfalls discharging to the defined area. Effectiveness monitoring is scheduled to be conducted after all actions have been taken to control bacterial loads to levels below established Waste Load Allocations (WLAs). Effectiveness monitoring is expected to require three additional synoptic surveys of the target segment. If this monitoring does not demonstrate that WLAs are being met, a second phase of testing is required to evaluate further actions necessary to meet the dry weather WLAs. Initial LRS monitoring was completed for Segment B of the Los Angeles River as part of the CREST studies (CREST 2010a, b). Appendix 1 of the CREST report provided example calculations and recommendations for reducing dry weather loads. A final LRS plan is required to be submitted by September 30, 2014. This plan may utilize recommendations provided in the CREST report or recommend alternative strategies for reducing bacterial loads.

Table 8-6 provides a schedule for the first two cycles of the Permit for development of initial LRS plans and completing effectiveness monitoring River Segments A and B and tributaries that discharge to these River Segments. It is currently intended that an LRS plan be completed for outfalls discharging to the Los Angeles Estuary (LAR). In order to provide consistency with the Los Angeles River Bacteria TMDL, an LRS plan for the LAR is scheduled to be completed by September 2021 when LRS plans are due for River Segments C and D.

Table 8-6. Schedule for Completion of LRS Outfall Monitoring for Bacterial Loads under the Los Angeles River Bacterial TMDL.

	Segment B	**Segment A**	**Segment B Tributaries Rio Hondo**	**Segment A Tributaries Compton Creek**
First Phase				
Monitoring for Development of LRS – 6 outfall surveys	***Sept 23, 2014***, 2.5 years after effective date of the TMDL	***Sept 23, 2016,*** 4.5 years after effective date of the TMDL	***March 23, 2016,*** , 4 years after effective date of the TMDL	***March 23, 2018***, 6 years after effective date of the TMDL
Monitoring for Effectiveness of LRS – 3 outfall surveys	***March 23, 2022***, 10 years after effective date of the TMDL	***March 23, 2024***, 12 years after effective date of the TMDL	***September 23, 2023***, 11.5 years after effective date of the TMDL	***Sept 23, 2025,*** 13.5 years after effective date of the TMDL
Second Phase				
Submit a new LRS -6 new outfall surveys	***March 23, 2023***, 11 years after effective date of the TMDL	***March 23, 2025***, 13 years after effective date of the TMDL	***March 23, 2024***, 12.5 years after effective date of the TMDL	***September 23, 2026,***, 14.5 years after effective date of the TMDL

1. This schedule is limited to activities during the first two permit cycles (10 years) that require data collection efforts.

8.4 Long Beach City Beaches and Los Angeles River Estuary TMDLs for Indicator Bacteria

The Lower LAR Watershed Group includes drainages to the Los Angeles River Estuary, but not Long Beach City Beaches. A robust monitoring program was to be developed for the LAR Estuary. Existing data includes bi-weekly monitoring from May through September of 2009, and 2010. Monitoring was to be expanded to include year round monitoring requirements, and at least three monitoring locations within the Estuary. It was recognized that adequate data to establish a reference estuary approach was not available at the time when TMDLs were developed for indicator bacteria along the City beaches and in the Los Angeles River Estuary. It was also recognized that, as adequate data from reference estuary studies becomes available, it may be appropriate to consider a reference estuary approach to evaluate compliance with these TMDLs.

The Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL was developed by USEPA and therefore did not incorporate an Implementation Plan. The Regional Board developed a separate TMDL for bacteria in the Los Angeles River that has been incorporated into the Basin Plan Amendment with a schedule to meet compliance in 25 years (Resolution Number R10-007, approved by the State Board on November 1, 2011). The USEPA recognized that waste load allocations and load allocations (expressed as allowable exceedance days) were appropriate to implement in a timeline consistent with the lower segments of the Los Angeles River Bacteria TMDL, and that the Regional Board should consider options that provide time to comply, absent a state-adopted implementation schedule, and consistent with the State Water Board's compliance schedule policy. Interim milestones were recommended to be linked to localized efforts to reduce bacteria loading in the direct drainage areas included in these TMDLs, and should consider the influence of upstream bacteria sources to the LAR Estuary and the LBC Beaches.

The LLAR WMG only includes the LAR Estuary portion of this TMDL but the salinities can be expected to range from a freshwater to a marine environment. Receiving water quality objectives for the LAR Estuary for REC-1[3] beneficial uses are summarized in Table 8-7. The TMDL estimated direct loads to the Estuary during dry weather solely on the basis of *E. coli.* While they recognized that the different indicator bacteria were not directly comparable, it was assumed that sources were similar for indicator bacteria applicable to the marine environment. Due to the transition from a freshwater to a marine environment, all four indicator bacteria will be considered.

[3] uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing or use of natural hot springs.

Table 8-7. Marine and Freshwater Receiving Water Quality Objectives applicable to the Los Angeles River Estuary.

Water Quality Objectives	Marine REC-1	Freshwater REC-1
SINGLE SAMPLE		
E. coli	NA	235 CFU/100 mL
Fecal coliform	400 CFU/100 mL	
Enterococcus	104 CFU/100 mL	
Total Coliform[1]	10,000 CFU/100 mL	
30-DAY GEOMETRIC MEAN		
E. coli	NA	126 CFU/100 mL
Fecal coliform	200 CFU/100 mL	
Enterococcus	35 CFU/100 mL	
Total Coliform	1,000 CFU/100 mL	

1. Total coliform shall not exceed 1,000/100 mL, if the ratio of fecal to total coliform exceeds 0.1 (this is an additional single sample limit for REC-1 marine waters; presented in the Basin Plan).

The purpose of conducting a monitoring program in the Los Angeles River Estuary is to:

- develop an understanding of bacterial loading rates to the estuary and
- determine if bacteria undergo simple dilution as the freshwater passes through the estuary mixing with marine waters or if areas of the estuary serve as either sources or sinks for bacteria that can ultimately be transported to Long Beach City Beaches.

Three monitoring sites (Figure 8-6) will be monitored within the estuary. Sampling locations are located at the upstream and downstream limits of the estuary, and near the Queensway Bridge. During each survey, samples will be taken for each of the marine and freshwater bacteria indicators in due to the range of conditions within the estuary. In addition, *in-situ* measurements will be taken for salinity, temperature and turbidity using field instrumentation. Sampling points will be selected at the center of the brackish surface plume (lowest salinity) resulting from freshwater flows from the Los Angeles River. This will assure that conditions reflect the center of surface flows passing through the estuary. Sampling is intended to be completed in the morning within a 2-hour interval in order to assure that sampling represents a synoptic view of conditions within the estuary that is unimpacted by differential exposure to sunlight.

Table 8-8. Ambient Monitoring Sites within the LLAR WMG for the Los Angeles River Watershed Bacterial TMDL.

Site ID	Site Name	Water Body	GPS Coordinates		Description
			Latitude (N)	Longitude (W)	
LARB1	Segment A (Wardlow)	Los Angeles River(Reach 1)	33.81735	118.20551	Located at Wardlow Rd Mass Emission station (S10)
LARB2	Segment B (Rosecrans)	Los Angeles River (Reach 2)	33.90374	118.18240	Located at Rosecrans Ave
LARB7	Rio Hondo	Tributary: Rio Hondo	33.93202	118.17523	Located above with Confluence with the LA River

Based upon a simple estuarine mixing model, a linear change in bacteria concentrations in response to changes in salinity would indicate that the Los Angeles River is either the only bacterial source or at least the dominant source of bacteria to the Estuary. Increasing concentrations of bacteria relative to a linear dilution line will be indicative of a source along the Estuary. If measured concentrations of bacteria decrease faster than expected based upon simple dilution of the River water would indicate that the estuary serves as a sink. The latter case would occur if estuarine mixing creates conditions where bacteria would tend to be removed by coagulation and settling of particulate matter.

This monitoring is expected to provide information to assess the major sources of bacteria to the estuary and assist in determining where efforts would be best directed to reduce bacteria within recreational waters of the Los Angeles River Estuary and at beaches impacted by the freshwater plume as it leaves the mouth of the Estuary.

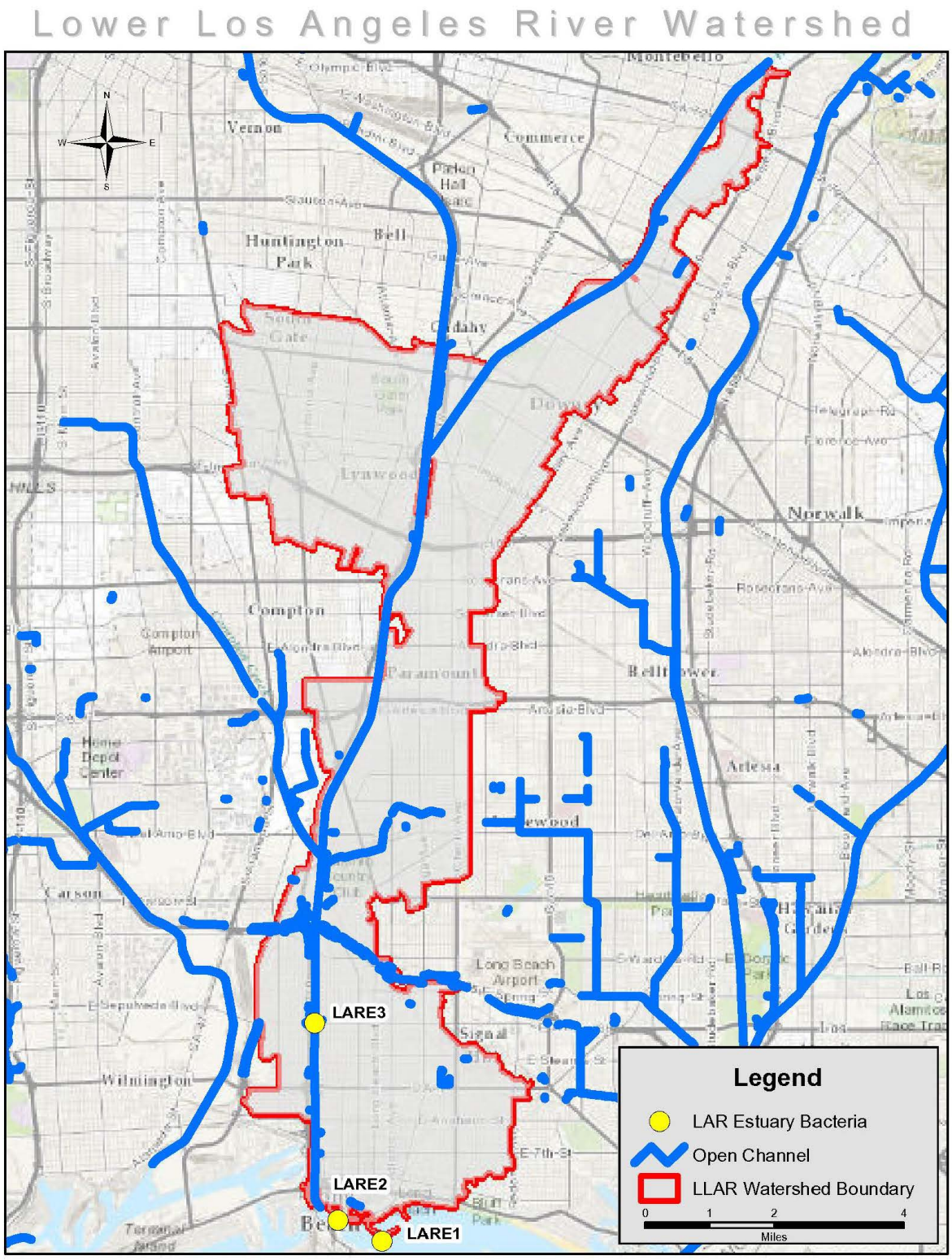


Figure 8-6. Monitoring Sites for Bacteria in the Los Angeles River Estuary.

8.5 Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL)

Attachment A to Resolution No. R11-008

The Basin Plan Amendment (Resolution No. R11-008) indicates that responsible parties identified in the existing metals TMDLs for Los Angeles River Watershed are responsible for conducting water and sediment monitoring above the Los Angeles River Estuary to determine the Rivers' contribution to the impairments in the Greater Harbor waters.

- **Water Column Monitoring**

The Basin Plan Amendment indicates that water samples and total suspended solids samples are to be collected from at least one site during two wet weather events and one dry weather event each year. The first large storm event of the season is to be included as one of the wet weather monitoring events. Water samples and total suspended solid samples are to be analyzed for metals, DDT, PCBs, and PAHs. Sampling is intended to collect sufficient volumes of water to allow for filtration of suspended solids for analysis of the listed pollutants in the bulk sediment. General water chemistry (temperature, dissolved oxygen, pH, and electrical conductivity) and a flow measurement are also required at each sampling event. General chemistry measurements may be taken in the laboratory immediately following sample collection if auto samplers are used for sample collection or if weather conditions are unsuitable for field measurements.

- **Sediment Monitoring**

The Basin Plan Amendment also requires collection of sediment samples from at least one site every two years for analysis of general sediment quality constituents and the full chemical suite as specified in SQO Part 1. Sediment monitoring has been incorporated into the Coordinated Compliance, Monitoring, and Reporting Plan for the Greater Los Angeles and Long Beach Harbor Waters (Anchor QEA, 2013) and therefore will not be addressed in this CIMP.

The Harbor Toxics Monitoring Program includes two monitoring sites within the Queensway Bay portion of the Los Angeles River Estuary that will be monitored every two years for both general sediment quality and all chemical constituents specified for SQO Part 1 testing. Permittees located in the nearshore areas as defined by the Harbor Toxics TMDL are contributing to Harbor Toxics monitoring performed in both receiving waters and sediments of the Los Angeles River Estuary, San Pedro Bay and the Port of Long Beach.

8.5.1 Sampling Approach

A number of different approaches have been attempted to enable collection of stormwater samples based upon flow-weighted composites and then extract the suspended sediments for analysis. The various approaches have met with varied level of success and typically require extensive labor to extract the sediment for analysis. Regardless of the approach used, none are based upon standard methods.

We are recommending an alternative approach for assessing the loads of toxic contaminants being discharged to the Harbor environment that will substantially reduce the amount of sample handling and potential for introduction of error. This approach will utilize High Resolution Mass Spectrometry (HRMS) to analyze for organochlorine pesticides (EPA1699), PCBs (EPA 1668) and PAHs (CARB429m). Test methods for these organic toxic compounds target the required analytes, but also enable assessment of each compound included in the Part 1 Sediment Quality Objectives (SQOs). These compounds include chlordane which is 303(d) listed in both the Los Angeles River Estuary sediments and in San Pedro Bay sediments.

The frequency of monitoring for the Harbor Toxics TMDL (Table 8-9) will be consistent for dry and wet weather monitoring requirements specified in the TMDL however, the HRMS method will be used for the two wet weather monitoring events and conventional analytical methods will be used for the dry weather monitoring event.

During the first three years of Harbor Toxics monitoring, analyses will be conducted on whole water samples. These test methods provide detection limits that are roughly 100 times more sensitive than conventional low resolution tests. In addition, these extremely low detection limits can be achieved with as little as 3-6 liters of stormwater from each monitoring location.

Use of this approach is expected to greatly enhance the ability to consistently obtain appropriate samples for measuring and comparing loads of toxic pollutants associated with each major stormwater discharge. This will assure that all key toxics can be quantified at levels suitable for estimation of mass loads to the Harbor waters. For purposes of load calculations, it would be assumed that 100% of these toxics were associated with suspended solids. Separate analyses of TSS/SSC would be used to normalize the data. After three years (six storm events) the data will be reevaluated to assess whether direct analysis of the filtered suspended sediments are necessary to improve load assessments. If deemed necessary, a modified approach will be evaluated based upon use of HRMS methods for analysis of filtered suspended sediments. Use of HRMS for analysis of the filtered sediment will reduce sediment mass requirements down to one gram per analytical method, but this still requires collection and transport of large volumes of water for laboratory filtration. It is currently not clear whether the process of filtering large samples and direct analyzing target toxics in suspended sediments will result in any significant improvements in our ability to assess loads of the toxics being addressed in the Harbor TMDL. In fact, collecting, transporting and processing the high volumes of stormwater necessary for this approach may result in a decrease in our ability to obtain useful data and will likely result in a decrease in our ability to assess pollutant loads from all watersheds.

Similar approaches have been used by the San Francisco Estuary Institute (SFEI) staff (Gilbreath, Pearce and McKee, 2012) to measure the performance of a rain garden. Autosamplers were used to collect stormwater influent and treated effluent to assess removal efficiency for pesticides, PCBs, mercury, and copper subject to TMDLs. HRMS was used to quantify PCB removal. HRMS methods are also being used in Virginia to assist in identification of sources of PCBs in MS4 and industrial stormwater discharges (Gilinsky, 2009).

Table 8-9. Summary of Constituents to be Monitored at the S10 Mass Emission for the Harbor Toxics Monitoring Program.

CLASS OF MEASUREMENTS	MASS EMISSION SITE (S10)	
	Wet[5]	Dry
Flow	4	2
Field Measurements Dissolved oxygen, pH, temperature, and specific conductivity	4	2
Organochlorine Pesticides and PCBs (Table 5-5) Chlordane[1], DDTs[2], PCBs[3]	2	1
Metals (Table 5-6) Al**,** Cd, Cu, Pb, Ni, Sb, Zn, Total Se & Hg	4	1
Semivolatile Organic Compounds (Table 5-8) PAHs[4]	2	1

1. Chlordane components are based upon sum of chlordane-alpha, chlordane-gamma, nonachlor-alpha, nonachlor-gamma, and oxychlordane consistent with the Harbor Toxics TMDL.
2. DDT compounds include: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT. Only the 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT are included in routine monitor as part of Table E-2 constituents.
3. PCBs includes the seven aroclors listed in Table 5-5 or the following 54 PCB congeners: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209.
4. PAHs include the 18 compounds used to evaluate sediment quality ERLs and ERMs: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene. PAHs will be quantified as part of the Harbor Toxics Monitoring requirements –two wet season and one dry season event. Methods in the referenced table will only be used for dry weather testing.
5. The fourth storm event is only for the purpose of fulfilling the TMDL requirements. Only metals, TSS, SSC, and hardness will be analyzed.

8.5.2 Sampling and Analytical Procedures-Wet Weather

Stormwater samples for the Harbor Toxics Monitoring Program will be collected using automated stormwater sampling methods specified in Appendix B. A separate autosampler and intake hose will be installed at each site. Existing flow metering equipment at each site will be used to pace the sampler to obtain a flow-weighted composite sample.

Based on TSS measurements at four mass emission sites in LA County (Table 8-10 and 8-11), use of a TSS concentration of 100 mg/L is expected to provide a conservative basis for estimating reporting limits for OC pesticides, PCBs, and PAHs in suspended sediments based upon 2-liter samples. However, an additional liter of stormwater will be provided for each organic analytical suite for a total of nine liters. An accurate measure of suspended sediments is critical to this sampling approach. TSS will be analyzed; however, SSC will be used as the standard for calculating the concentrations of target constituents in suspended sediments and total contaminant loads associated with those sediments. Each of the measures of suspended solids will require 1-liter samples. Any additional water (up to another six liters) will be provided to the laboratory in 2.5-L amber glass bottles.

This approach requires a maximum of 17 liters of stormwater for analysis of organic constituents and sediment tests required for the Harbor Toxics TMDL. Analyses could be performed on a minimum of eight liters of water but field duplicates would need to be provided from another site. The following configuration of sample containers and sample volumes will provide the laboratory with the maximum degree of flexibility to assure that detection limits are met and suitable water volumes are available to complete analysis of field duplicates for each analytical suite.

- Six 2.5-L amber glass containers (filled to two liters)
- Three 1-L amber glass containers
- Two 1-L HDPE containers for suspended sediment

Since detection limits will depend upon the concentration of suspended sediment in the sample, the laboratory analyzing the suspended sediment concentrations will be asked to provide a rush analysis to provide information that can be used to direct processing of the samples for the organic compounds. Processing of sample waters provided to the laboratory will depend upon the results of the SSC analysis.

- If Suspended Sediment Concentrations (SSC) are less than 150 mg/L, an additional liter of water will be extracted for each subsequent HRMS analysis. If TSS concentrations are between 150 and 200 mg/L, one of the additional liter samples may be used to increase the volume of sample water for just PAHs or the two additional liters may be used as a field duplicate for one of the analyses.

- If SSC concentrations are greater than 200 mg/L, two of the three additional liters may be used as a field duplicate for one analysis. If available, the additional water provided in 2.5 L containers will also be considered for use as field replicates.

- If the initial SSC sample indicates that sediment content is less than 50 mg/L, additional measures will be taken to improve PAH reporting limits with respect to suspended sediment loads. This would include use of extra sample water to bring up the total sample volume (up to a maximum of 4 liters) or reduction the final extract volume.

- Given adequate sample volumes and normal levels of suspended sediment, a field duplicate will be analyzed for each analysis. Field duplicates for the three HRMS analyses may come from different monitoring sites in the Los Angeles and San Gabriel River watersheds depending on available volumes. Parties conducting the testing at each site will coordinate testing to enhance the opportunity to incorporate at least one field duplicate sample for each test.

Target reporting limits (Table 8-12 and Table 8-13) were established based upon bed sediment reporting limits listed in the *Coordinated Compliance and Reporting Plan for the Greater Los Angeles and Long Beach Harbor Waters* (Anchor QEA, 2013). Table 8-12 and Table 8-13 provide a summary of the detection limits attainable in water samples using HRMS analytical methods. Estimated detection limits are provided for concentrations of the target constituents in suspended sediments given the assumption that 2-liter sample volumes will be used

for each test, suspended sediment content is 100 mg/L and that 100 percent of the target constituents are associated with the suspended sediment. This provides a conservative assumption with respect to evaluating the potential impacts of concentrations of OC pesticides, PCBs, and PAHs in suspended sediment on concentrations in bed sediment. Additionally, Table 8-12 and Table 8-13. present relevant TMDL targets and reporting limits suggested in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009). The following is a comparison between the estimated detection limits for OC pesticides, PCBs, and PAHs in the suspended sediments. The approach used to assess concentrations of trace metals in suspended sediments is based upon use of the routine monitoring information. Table 8-14 examines the possible limitations of this approach if trace metal concentrations are extremely low, approaching detection limits.

- For OC pesticides (Table 8-12), estimated detection limits in the suspended sediment are comparable or lower than Harbor Toxics TMDL targets limits for bed sediments

- For PCBs (Table 8-12), estimated detection limits in the suspended sediment are below TMDL targets limits for bed sediments. Additionally, estimated detection limits in the suspended sediment are at or below target bed sediment reporting limits for the Harbor Toxics sediment monitoring program and below target reporting limits presented in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009).

- Most PAH compounds (Table 8-13), are expected to be detectable in the suspended sediment at concentrations similar to target bed sediment reporting limits for the Harbor Toxics monitoring program, target reporting limits presented in the SWAMP QAPP (SWRCB, 2008), and maximum reporting limits cited in the SQO technical Support Manual (SCCWRP, 2009). Only two compounds, naphthalene and phenanthrene, are expected to have detection limits roughly three times the target bed sediment reporting limits for the Harbor Toxics TMDL. Both of these analytes are light weight PAHs that are not considered to be major analytes of concern in stormwater.

- Table 8-14 summarizes the reporting limits applicable to total recoverable metals. Estimated equivalent concentrations in suspended solids are very conservatively estimated based upon 100 percent of the metals being associated with suspended particulates as measured values approach project detection limits. In reality, this is not a likely condition. When concentrations of total recoverable metals approach the very low detection limits used in this program, sediment loads will also be extremely low and the concentrations of metals in the dissolved phase will become a more significant fraction of the total metals concentrations. If concentrations of total cadmium and mercury are extremely low, comparison with TMDL targets in bed sediments could be limited

Initial monitoring results will be compared against interim sediment Waste Load Allocations (WLAs) established for the respective receiving waters (Table 8-15). For the Los Angeles River, interim WLAs for the Los Angeles River Estuary would apply and for the San Gabriel River watershed, interim allocations for the Nearshore Waters of San Pedro Bay will apply.

8.5.3 Sampling and Analytical Procedures-Dry Weather

Suspended sediment concentrations during periods of dry weather are extremely low and not suitable for use of methods intended to quantify the concentrations of toxics associated with particulates. Dry weather samples will be collected as surface grab samples. Each sample will be collected directly into the laboratory sample containers using clean sampling techniques outlined in the section of grab sampling. Dry weather sampling will be scheduled to be conducted during a time period when flows are historically at the minimum levels.

Water samples will be collected and submitted for the following parameters:

- Total Suspended Solids (TSS) and Suspended Sediment Concentrations (SSC)
- Dissolved and total metals
- Organochlorine pesticides (including DDT and its derivatives, chlordane compounds, dieldrin, and toxaphene)
- Polychlorinated biphenyl (PCB) congeners

Analytical methods for each of these constituents will be consistent with methods listed in Section 5 for Table E-2 constituents. Analytical methods will also be consistent with methods used in the Harbor waters with the exception of metals which require chelation/extraction methods in saline waters.

In situ measurements will include temperature, dissolved oxygen, pH and salinity. *In situ* measurements will be taken with a calibrated water quality sonde (Hach Quanta or equivalent).

8.5.4 Quality Control Measures

Quality control measures for all HRMS analyses will include field equipment blanks to assess background contamination due to the field equipment and sample handling. One field equipment blank will be analyzed from one set of field equipment prior each monitoring event during the first year. Data will be evaluated at the end of the year to determine if field equipment blanks should be reduced to one per season. For the field blank, two liters of HPLC grade water provided by the laboratory will be pumped through the entire autosampler and intake hose for each analytical test (OC pesticides, PCBs and PAHs). The blank water will be pumped into precleaned sample containers and refrigerated until the stormwater sampling is completed. If the storm does not occur immediately after blanking, the equipment blank will be transmitted under Chain of Custody to the laboratory in order the meet the requirement for extraction of aqueous samples within 7 days of collection. Extracts will be held until stormwater samples are received unless storm does not develop within a period of 30 days after extraction (samples are required to be analyzed within 40 days of extraction). If a successful storm event is monitored immediately after the equipment blank is taken, the equipment blank and stormwater samples will be submitted to the laboratory together. Given adequate sample volumes, field duplicates will also be analyzed to assess variability associated with the sampling and subsampling processes.

Laboratory quality control measures will include analysis of method blanks, initial calibrations, analysis of Ongoing Precision and Recovery (OPR) samples and use of labeled compounds to assess

recoveries and matrix interferences. Method blanks will be based upon processing of laboratory water volumes identical to those used for the field samples. Initial calibrations are run periodically but daily calibration checks are conducted to verify stability of the calibration. OPR tests will be conducted with each batch of samples. OPR samples are blanks spiked with labelled isotopes that are used to monitoring continued performance of the test. Labelled isotopes are added to each field sample and analyzed to measure recovery in the sample matrix. Estimated Detection Limits (EDLs) will be calculated for each analyte associated with each field sample. For each analyte 'x', the EDL is calculated by the following formula:

$$EDL_x = 2.5 * \frac{(Na)*(Qis)*(Rah)}{(Ais)*(RRF)*(wv)}$$

Where:
- Na = Analyte peak to peak noise height.
- Qis = Concentration of internal standard.
- Rah = Area of Height Ratio
- Ais = Area of internal standard
- RRF = initial calibration average relative response factor for the congener of interest.
- wv = sample weight/volume.
- 2.5 = Minimum signal to noise ratio.

Quality control measures for water samples taken during dry weather periods will be consistent with all measures applied for sampling suspended sediment, trace metals, organochlorine pesticides and PCBs as part of the Receiving Water Monitoring Program.

8.5.5 Summary

In summary, target reporting limits for all but one of the organic compounds of interest are below or comparable to relevant TMDL targets and the overwhelming majority are below bed sediment reporting limits identified in the Harbor Toxics Monitoring Program (Anchor, 2013), the SWAMP QAPP (SWRCB, 2008), the SQO Technical Support Manual (SCCWRP, 2009) and available Effects Range Low (ERL) values used to assess direct effects on Harbor sediments. In the case of metals, some limitations may exist for two elements, cadmium and mercury, in extreme conditions. However, neither sediments in both eastern San Pedro Bay nor the Los Angeles River Estuary are cited as being impaired by these two metals.

The sampling approach is based upon collection and analysis of whole water samples to estimate concentrations of target pollutants associated with suspended sediments in flow-rated composite samples of stormwater. Use of this approach is expected to result in very low detection limits that will allow for quantification of total contaminant loads for each constituent of concern. It will also allow for reasonable estimates of the concentrations of target compounds in the suspended sediment and provide for direct comparisons with targets established in the receiving waters for bed sediments. This approach meets the overall objectives of the program while also enhancing the chances of successfully monitoring multiple storm events in the targeted watersheds and providing data necessary to evaluate relative loads from each watershed during multiple storms each year. The proposed methods are also expected to allow incorporation of quality control measures

necessary to evaluate potential sources of contamination and evaluate variability associated with both field sampling and analytical processes.

Sampling of dry weather discharges from the Los Angeles River and at the mouth of the Lower San Gabriel River Estuary will be based upon surface grab samples. Samples will be analyzed for suspended sediment, trace metals, organochlorine pesticides and PCBs as part of the Receiving Water Monitoring Program

Table 8-10. Measurements of Suspended Sediments for Calculation of Harbor Toxics Pollutant Loads.

SAMPLE MEDIUM	CONSTITUENT	METHOD	TARGET REPORTING LIMIT
Water	Total Suspended Solids (TSS)	SM 2540D	1.0 mg/L
	Suspended Sediment Concentration (SSC)	ASTMD 3977, Method B	1.0 mg/L

Table 8-11. Summary of TSS Measurements (mg/L) at Four Mass Emission Monitoring Sites in Los Angeles County.

Site	Site ID	2nd Quartile	Median	3rd Quartile
Los Angeles River - Wardlow	S10	65	143	291
Coyote Creek	S14	33	55	117
Ballona Creek	S01	NA	158	NA
Los Cerritos Channel	LCC1	96	155	260

NA = not available

Table 8-12. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Organochlorine Pesticides and Total PCBs

Constituent and Analytical Method	Water Detection Limit [1]	Equivalent Suspended Sediment Detection Limit [2]	Harbor Toxics Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009) Reporting Limit	Harbors Toxics TMDL Sediment Target (Indirect Effects)	Harbors Toxics TMDL Sediment Target (Direct Effects)
	pg/L	ng/g – dry wt					
Chlordane Compounds (EPA 1699)							
alpha-Chlordane	40	0.2	2	1	0.5	1.3 (Total Chlordane)	0.5 (Total Chlordane)
gamma-Chlordane	40	0.2	2	1	0.54		
Oxychlordane	40	0.2	1	1	NA		
trans-Nonachlor	40	0.2	2	1	4.6		
cis-Nonachlor	40	0.2	1	2	NA		
Other OC Pesticides (EPA 1699)							
2,4'-DDD	40	0.2	2	2	0.5	1.3 (Total DDT)	1.58 Total DDT)
2,4'-DDE	80	0.4	2	2	0.5		
2,4'-DDT	80	0.4	3	3	0.5		
4,4'-DDD	40	0.2	2	2	0.5		
4,4'-DDE	80	0.4	2	2	0.5		
4,4'-DDT	80	0.4	5	5	0.5		
Total DDT	80	0.4	---	---	0.5		
Total PCBs (EPA 1668)	5-20	0.025-0.1	0.2[3]	0.2	3.0	3.2	22.7

1. Water EDLs based upon 2 liters of water.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.
3. Harbor Toxics high resolution analytical methods include a target of 0.2 ng/g for all congeners except PCB-189 which has a target of 10 ng/g.

Table 8-13. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for PAHs

Constituent	Water Detection Limit [1]	Equivalent Suspended Sediment Detection Limit [2]	Harbor Toxics Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009)Reporting Limit	Harbors Toxics TMDL Sediment Target (Direct Effects)
	pg/L	ng/g – dry wt				
Low Molecular Weight PAHs						
1-Methylnaphthalene	5	25	20	20	20	
1-Methylphenanthrene	5	25	20	20	20	
2-Methylnaphthalene	5	25	20	20	20	201
2,6-Dimethylnaphthalene	5	25	20	20	20	
Acenaphthene	5	25	20	20	20	
Anthracene	5	25	20	20	20	
Biphenyl	5	25	20	20	20	
Fluorene	5	25	20	20	20	
Phenanthrene	12.5	62.5	20	20	20	240
Naphthalene	12.5	62.5	20	20	20	
				LOW MOLECULAR WT PAHS		**552**
High Molecular Weight PAHs						
Benzo(a)anthracene	5	25	20	20	80	261
Benzo(a)pyrene	5	25	20	20	80	430
Benzo(e)pyrene	5	25	20	20	NA	
Chrysene	5	25	20	20	80	384
Dibenz(a,h)anthracene	5	25	20	20	80	260
Fluoranthene	5	25	20	20	80	
Perylene	5	25	20	20	80	
Pyrene	5	25	20	20	80	665
				HIGH MOLECULAR WT PAHS		**1700**
					TOTAL PAHs	**4700**

1. Water EDLs based upon 2 liter of water and CARB 429m. Detection limits are based upon a final extract of 500 µL. If the SSC is low, either an additional liter of water can be extracted to decrease the detection limit by 1/3 or the final extract volume can be reduced. Depending on sample characteristics, the extract volume can be reduced to as little as 50-100 µL which would drop EDLs by a factor of 0.1 to 0.2 times the listed EDLs.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.

Table 8-14. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Metals.

Constituent and Analytical Method	Water Detection Limit (ML)	Equivalent Suspended Sediment Detection Limit [1]	Harbor Toxics Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009) Reporting Limit	Harbors Toxics TMDL Sediment Target (Direct Effects)
	ug/L	µg/g – dry wt				
Total Metals						
Cadmium	0.25	2.5	0.01	0.01	0.09	1.2
Copper	0.50	5.0	0.01	0.01	52.8	34
Lead	0.50	5.0	0.01	0.01	25.0	46.7
Mercury	0.20	2.0	0.03	0.03	0.09	0.15
Zinc	1	10	0.1	0.1	60	150

1. Suspended Sediment EDLs based upon estimate of 100 mg/L suspended solids.

Table 8-15. Interim Concentration-Based Sediment Waste Load Allocations

Waterbody	Pollutant (µg/g – dry wt)					
	Copper	Lead	Zinc	DDT	PAHs	PCBs
Los Angeles River Estuary	53.0	**46.7**	183.5	0.254	4.36	0.683
San Pedro Bay Near/Off Shore Zones	76.9	66.6	263.1	0.057	**4.022**	0.193

BOLDED values indicate cases where the interim allocations are equal to the final allocations

9 Stormwater Outfall Monitoring

Four outfall monitoring sites (Figure 9-1) have been assessed and selected for monitoring within the LLAR Watershed Management Group in order to meet the requirements of the Order for stormwater outfall monitoring. Appendix A provides a summary of the selected sites and two alternative monitoring sites. These sites were selected to provide good spatial representation of the watershed in terms of HUC12 boundaries, jurisdictional boundaries and land uses within the WMG. The Dominguez Gap Pump Station (LLAR2) and the Firestone (LLAR4) stormwater outfall monitoring sites will be the first sites to be monitored. These will be followed by the Lynwood (LLAR3) outfall and the Cerritos Pump Station (LLAR1) outfalls that will be installed in the following year (Table 4-1). Detailed information on the monitoring equipment, field sampling procedures, protocol for cleaning all materials that come into contact with the water samples, and quality assurance/quality control procedures are provided in Appendices B through E.

Constituents monitored at each stormwater outfall monitoring site are outlined in Table 9-1 and include water body/pollutant priorities under Categories 1, 2 and 3. These include all constituents with established TMDLs, that are 303(d) listed or that have been found to exceed receiving water limitations on at least one occasion. Constituents monitored at each stormwater outfall monitoring site will include analytes measured at S10 with the exception of Aquatic Toxicity. Any constituents detected at levels of concern from Table E-2 will be considered for addition to monitoring requirements for the stormwater outfall sites after being detected twice during storm events monitored at S10.

Monitoring data will be reviewed annually to determine if adjustments to the water body/pollutant categories. Category 3 constituents will be considered for removal from the monitoring program if no exceedances are identified over a period of two consecutive years. Constituents currently classified as category 2 priorities will be considered for removal from the monitoring requirements when sufficient data are available to support delisting under the State's listing/delisting policy. Any adjustments to the monitoring requirements will be implemented during the subsequent monitoring year.

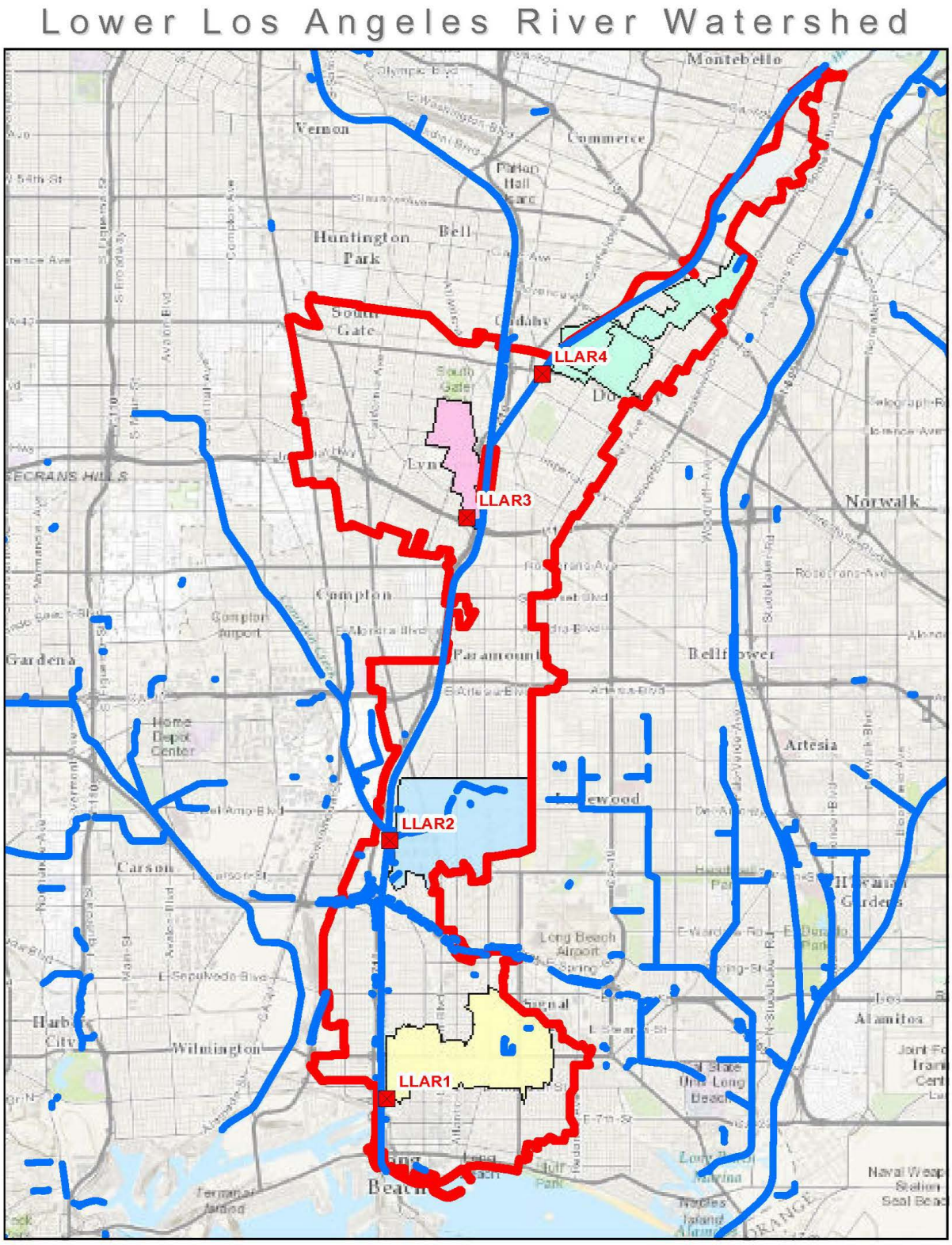


Figure 9-1. Locations of the Four Stormwater Outfall Monitoring Sites in the LLAR WMG.

Table 9-1. Summary of Constituents to be Monitored on a Regular Basis at Stormwater Outfall Monitoring Sites.

CLASS OF MEASUREMENTS	STORMWATER OUTFALL SITES Wet Only[2]			
	LAR1	LAR2	LAR3	LAR4
Flow	4	4	4	4
Field Measurements Dissolved oxygen, pH, temperature, and specific conductivity	4	4	4	4
General and Conventional Pollutants (Table 5-2) All except total phenols, turbidity, BOD_5, MTBE, and perchlorate, and fluoride.	4	4	4	4
Microbiological Constituents[3] (Table 5-3) *E. coli,* Total & Fecal Coliform, enterococcus *E. coli*	4[1] 4	4	4	4
Nutrients (Table 5-4) Nitrogen compounds only	3	3	3	3
Metals (Table 5-6) Al, Cd, Cu, Pb, Ni, Sb, Zn, Total Se & Hg	4	4	4	4
Semivolatile Organic Compounds (Table 5-8) Bis(2-ethlyhexylyphthalate	3	3	3	3

1. Analysis of all FIBs will only be included for LLAR1 that discharges directly to the Los Angeles River Estuary.
2. The fourth storm event is only for the purpose of fulfilling the TMDL requirements. Only metals, TSS, SSC, and hardness will be analyzed.
3. The wet and dry weather sampling frequency may change so long as one sample per month is collected in freshwater.

9.1 Sampling Frequency and Mobilization Requirements

The sampling frequency and mobilization requirements for Stormwater Outfall Monitoring sites will be consistent with monitoring conducted at the S10 (Wardlow) Receiving Water Monitoring Site. A total of three events will be monitored at each outfall site once they are installed. Monitoring will be concurrent with S10 monitoring in order to allow for comparison of pollutant loading rates associated with each segment relative to ultimate pollutant loads measured at the S10 site.

Stormwater monitoring at the Stormwater Outfall Monitoring Sites will be conducted by LLAR staff while monitoring at S10 will be performed by LACFCD staff. Monitoring will require coordination among both groups to increase the likelihood of sampling being conducted concurrently at both the ME site in receiving waters and at the stormwater outfalls. Although this may not always be possible due to equipment failures or other factors, concurrent sampling will enhance the ability to interpret the data.

Monitoring at the outfalls will therefore be restricted to the same wet weather definitions as used for the S10 mass emission station. These include:

- Wet Season defined as October 1 through April 15

- Events preceded by less than 0.1 inches of rainfall within the watershed over a three day period
- Rainfall of at least 0.25 inches and
- Maximum flow rates greater than 500 cfs measured at the Wardlow Road gaging station associated with the S10 mass emission monitoring site.

Because a significant storm event is based on predicted rainfall, it is recognized that this monitoring may be triggered without 0.25 inches of rainfall actually occurring. In this case, the monitoring event will still qualify as meeting this requirement provided that sufficient sample volume is collected to perform all required analyses. Documentation will be provided showing data used to determine that a storm event was expected to yield sufficient rain to be considered a significant storm event that justified mobilizing field crews and preparation of autosamplers for collection of water samples.

10 Non-Stormwater (NSW) Outfall Monitoring

Ultimately, the NSW program is intended to establish a process for identifying outfalls that serve as potential sources of contaminants. Sites where initial screening indicates the potential for discharges of a magnitude considered to have the potential to cause or contribute to exceedances of receiving water limitations will require further efforts to classify the discharges and determine appropriate actions, if any.

Detailed objectives of the screening and monitoring process (Section IX.A, page E-23 of the MRP) include the following:

1. Develop criteria or other means to ensure that all outfalls with significant non-stormwater discharges are identified and assessed during the term of this Order.
2. For outfalls determined to have significant non-stormwater flow, determine whether flows are the result of illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows, or from unknown sources.
3. Refer information related to identified IC/IDs to the IC/ID Elimination Program (Part VI.D.10 of the Order) for appropriate action.
4. Based on existing screening or monitoring data or other institutional knowledge, assess the impact of non-stormwater discharges (other than identified IC/IDs) on the receiving water.
5. Prioritize monitoring of outfalls considering the potential threat to the receiving water and applicable TMDL compliance schedules.
6. Conduct monitoring or assess existing monitoring data to determine the impact of non-stormwater discharges on the receiving water.
7. Conduct monitoring or other investigations to identify the source of pollutants in non-stormwater discharges.
8. Use results of the screening process to evaluate the conditionally exempt non-stormwater discharges identified in Parts III.A.2 and III.A.3 of the Order and take appropriate actions pursuant to Part III.A.4.d of the Order for those discharges that have been found to be a source of pollutants. Any future reclassification will occur per the conditions in Parts III.A.2 or III.A.6 of the Order.
9. Maximize the use of Permittee resources by integrating the screening and monitoring process into existing or planned CIMP efforts.

Specific methods given in the MRP will be followed. In cases where flow is determined to be significant, the program will take further action to determine if the flows are illicit, exempt, conditionally exempt, conditionally exempt but non-essential, or if the source(s) of the discharge cannot be identified (unknown). Illicit discharges require immediate action and, if they cannot be eliminated, monitoring will be implemented until such time that the illicit discharge can be

eliminated. Discharges classified as conditionally exempt but non-essential or unknown also require ongoing monitoring.

The Lower Los Angeles River Watershed group will reassess non-stormwater outfall- based screening and monitoring once during the permit term, likely during the 2016-2017 period, and follow MRP methods for sampling of non-stormwater discharges.

The following sections summarize the elements of the program and processes to ultimately eliminate major sources of non-stormwater discharges.

10.1 Non-Stormwater Outfall Screening and Monitoring Program

The NSW Outfall Screening and Monitoring Program will begin with three screening surveys starting in the summer of 2014 to identify outfalls or other discharges that are considered to be significant and persistent sources of non-stormwater flow to either the open channels or receiving waters.

The initial survey will focus on completing an inventory of all outfalls to receiving waters. Outfalls greater than 12-inches in diameter (or equivalent) will be photographed and documented. Only major outfalls, including outfalls 12-inch-diameter or greater within industrial areas will be evaluated for significant flows. Regardless of land use, all outfalls, including those between 12 and 36 inches, will be screened. Information from all three screening surveys will be consolidated to assist in the identification and ranking of outfalls considered to have significant NSW discharges. Multiple lines of evidence will be considered when assessing the significance of a discharge. The relative magnitude of the discharges, persistence of the flow, visual and physical characteristics recorded at each site, and land uses associated with the drainage will be primary consideration for determination of significant flows.

A combination of field observations, flow measurements and field water quality measurements will be used to classify outfalls into one of the following three categories that will determine further actions (Figure 10-1):

1. **Suspect Discharge** – Outfalls with persistent high flows during at least two out of three visits and with high severity on one or more physical indicators (odors, oil deposits, etc.). Outfalls in this category require prioritization and further investigation.

2. **Potential Discharge** - Flowing or non-flowing outfalls with presence of two or more physical indicators. Outfalls in this category are considered to be low priority but will be continue to be monitored periodically to determine if the sites are subject to less frequent, discharges or determine if actions can be taken to reduce or eliminate the factors that lead to the site being considered a potential source of contaminants.

3**. Unlikely Discharge** - Non-flowing outfalls with no physical indicators of an illicit discharge. Outfalls within this classification would be not be subject to any further screening.

Subsequent source investigations conducted for discharges with significant flow may utilize field water quality instrumentation and/or simple field test kits to assist in further classifying discharges. Collection of water samples for limited laboratory testing may be incorporated into the program as requirements for more complex, accurate and scientifically supportable data become necessary to characterize non-stormwater discharges and provide scientifically supportable data to track the source of these discharges. The Center for Watershed Protection and Pitt (2004) provide an evaluation of twelve analytes for assistance in determining the source of NSW discharges (Table 10-2). Three of the analytes can be measured with *in-situ* instrumentation. Others can be analyzed relatively inexpensively by use of field test kits or can be analyzed in an ELAP-certified laboratory. In addition, three to five of the listed tests are often considered sufficient to screen for illicit discharges. Ammonia, MBAS, fluoride (assuming tap water is fluorinated), and potassium are considered to confidently differentiate between sewage, wash water, tap water and industrial wastes. Incorporation of *in-situ* measurement of temperature, pH, TDS/salinity, turbidity and dissolved oxygen can further assist in characterizing and tracking the source(s) of an NSW discharge.

Table 10-1. Outline of the NSW Outfall Screening and Monitoring Program.

Element	Description	Timing of Completion
1. Outfall Screening	The Permittees will implement a screening process to determine which outfalls exhibit significant NSW discharges and those that do not require further investigation. Data will be recorded on Outfall Reconnaissance Investigation (ORI) forms and in the associated database (Appendix F).	Commencing in the summer of 2014 and completing by 2015.
2. Identification of outfalls with significant NSW discharge (Part IX.C of the MRP)	Data from the Outfall Screening process will be used to categorize MS4 outfalls on the basis of discharge flow rates, field water quality and physical observations.	Concurrent with Outfall Screening December 28, 2014 with Annual CIMP Report
3. Inventory of Outfalls with NSW discharge (Part IX.D of the MRP)	Develop an inventory of all major MS4 outfalls, identify outfalls with known NSW discharges and identify outfalls with no flow requiring no further assessment.	Concurrent with Outfall Screening December 28, 2014 with Annual CIMP Report
4. Prioritized source investigation (Part IX.E of the MRP)	Use the data collected during the Outfall Screening process to further prioritize outfalls for source investigations.	Prioritization for Source Investigation will be occur after completion of Outfall Screening
5. Identify sources of significant NSW discharges (Part IX.F of the MRP)	For outfalls exhibiting significant NSW discharges, Permittees will perform source investigations per the established prioritization.	Complete source investigations for 25% of the outfalls with significant NSW discharges by December 28, 2015 and 100% by December 28, 2017..
6. Monitoring NSW discharges exceeding criteria (Part IX.G of the MRP)	Monitor outfalls determined to convey significant NSW discharges comprised of either unknown or conditionally exempt non-essential discharges, or illicit discharges that cannot be abated.	Monitoring will commence within 90 days of completing the source investigations or after the Executive Officer approves this CIMP, whichever is later

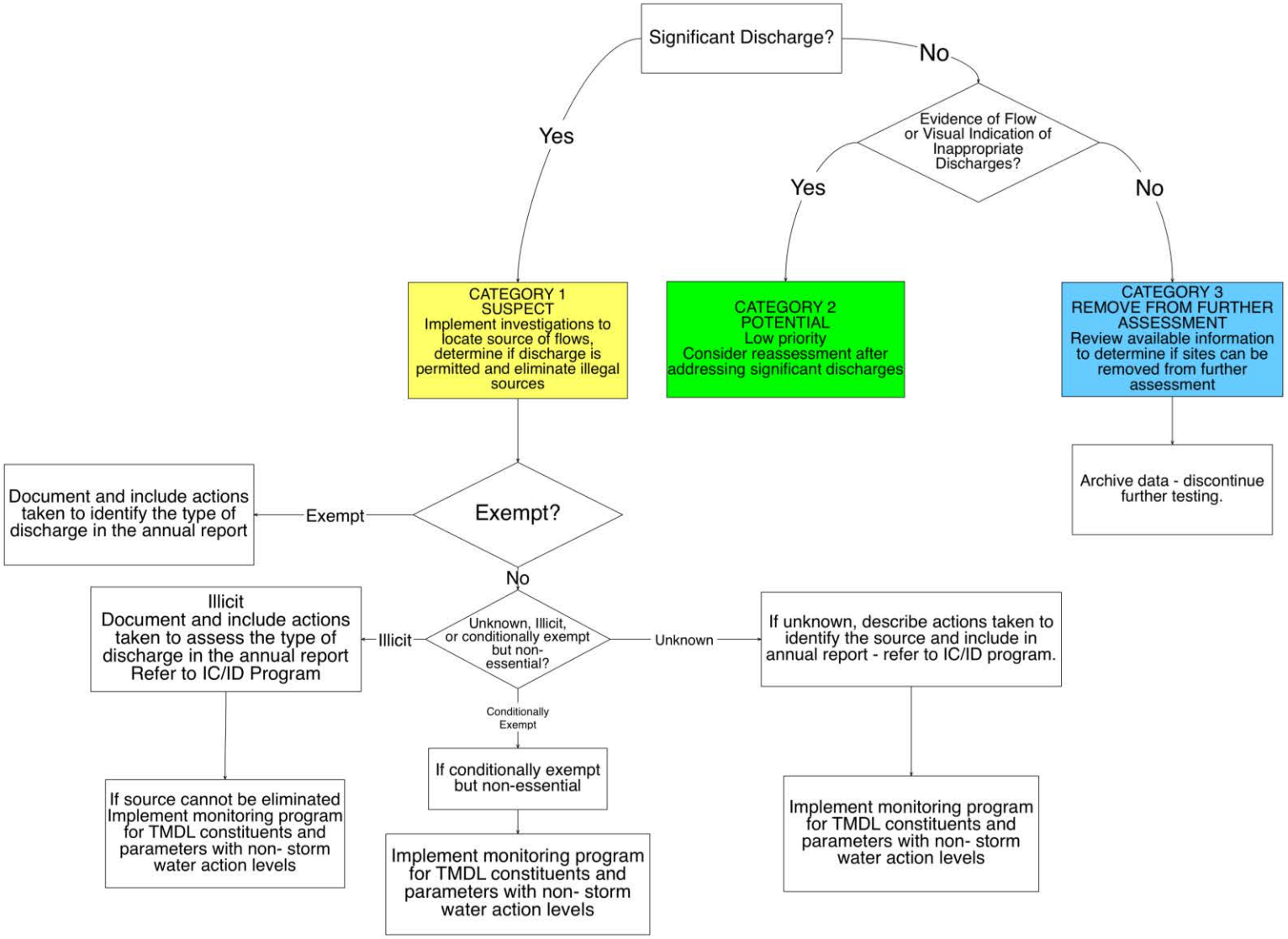


Figure 10-1. Flow Diagram of NSW Outfall Program after Classifying Outfalls during Initial Screening.

Table 10-2. Potential Indicator Parameters for Identification of Sources of NSW Discharges.

Indicator Parameters	
Ammonia	*E. coli*
Boron	Fluoride
Chlorine	Hardness
Color	pH - Field
Conductivity-Field	Potassium
Detergents – Surfactants (MBAS or fluorescence)	Turbidity

Based upon CWP and Pitt 2004. *Illicit Discharge Detection and Elimination A Guidance Manual for Program Development and Technical Assessments*

10.2 Identification of Outfalls with Significant Non-Stormwater Discharges

The screening program is necessary to collect information necessary to identify outfalls with potentially significant NSW discharges. The outfall screening includes collection of information necessary to provide an accurate inventory of the major outfalls, assess flow from each outfall and in the receiving waters, determine the general characteristics of the receiving waters (e.g. is flow present, does the flow from the outfall represent a large proportion of the flow, is it an earthen or lined channel), and record general observations indicative of possible illicit discharges. The initial screening survey(s) will also be used to refine the inventory information required in Section 10.3.

The outfall screening process has already been initiated in order to meet the established schedule for completion of 25% of the source identification work. Once the screening process is completed Permittees are required to identify MS4 outfalls with "significant" NSW discharges. The MRP (Section IX.C.1) indicates that significant NSW discharges may be determined based upon one or more of the following characteristics:

a. Discharges from major outfalls subject to dry weather TMDLs.

b. Discharges for which existing monitoring data exceeds Non-Stormwater Action Levels (NALs) identified in Attachment G of the Order.

c. Non-stormwater discharges that have caused or have the potential to cause overtopping of downstream diversions.

d. Discharges exceeding a proposed threshold discharge rate as determined by the Permittee.

The relative magnitude of the discharges, persistence of the flow, visual and physical characteristics recorded at each site, and land uses associated with the drainage will be the primary factors used to determine if flows are significant. Characteristics of the receiving waters (flow, channel characteristics –hard or soft-bottom, etc.) at the discharge location will also be considered when determining the relative significance of NSW discharges. The most important consideration is whether the discharge has the potential to cause or contribute to exceedance of receiving water quality limitations. Factors that provide the best insight with respect to these impacts will receive the greatest weight when establishing the list of "significant" NSW discharges.

10.3 Inventory of MS4 Outfalls with Non-Stormwater Discharges

Part VII.A of the MRP requires that the CIMP plan(s) include a map(s) and/or database of the MS4 that includes the elements listed in Table 10-3. Most required elements are complete and being submitted with this CIMP. Elements requiring further development include the Effective Impervious Area, information on the length of open channels and underground pipes equal to or greater than 18 inches, and the drainage areas associated with each outfall. Subbasins used for the WMMS model are currently associated with each outfall within that subbasin. If an outfall is identified as a significant source of NSW discharges, drainage areas for each targeted outfall will be refined and updated in the database. Additional information such as documenting presence of significant NSW discharges, links to a database documenting water quality measurements at sites with significant NSW discharges will be updated annually and submitted with the CIMP annual report. The agencies of LLAR are committed to updating the inventory of outfalls with significant non-storm water discharges. Maps of existing stormwater outfalls are attached as Appendix H.

Table 10-3. Basic Database and Mapping Information for the Watershed.

Database Element	Status	
	Complete	Schedule
1. Surface water bodies within the Permittee(s) jurisdiction	**X**	
2. Sub-watershed (HUC 12) boundaries	**X**	
3. Land use overlay	**X**	
4. Effective Impervious Area (EIA) overlay (if available)		Will provide if available
5. Jurisdictional boundaries	**X**	
6. The location and length of all open channel and underground pipes 18 inches in diameter or greater (with the exception of catch basin connector pipes)	**X**[1]	
7. The location of all dry weather diversions	**X**	
8. The location of all major MS4 outfalls within the Permittee's jurisdictional boundary. Each major outfall shall be assigned an alphanumeric identifier, which must be noted on the map	**X**[2]	
9. Notation of outfalls with significant non-stormwater discharges (to be updated annually)	**X**	ongoing
10. Storm drain outfall catchment areas for each major outfall within the Permittee(s) jurisdiction	**X**[3]	ongoing
11. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:[4]		
a. Ownership	**X**	
b. Coordinates	**X**	
c. Physical description	**X**	
d. Photographs of the outfall, where possible to provide baseline information to track operation and maintenance needs over time	**X**	
e. Determination of whether the outfall conveys significant non-stormwater discharges		ongoing
f. Stormwater and non-stormwater monitoring data		ongoing

1. Locations are identified but the length of all open channel and underground pipes are not fully documented.
2. Attributes in the shapefile contain a Unique ID for all outfalls greater than 12" in diameter.
3. Catchments for each outfall are included as the area of the subbasins associated with each outfall. Several outfalls may drain these subbasins. Data will be developed as needed to resolve the drainage areas specific to each outfall.
4. Efforts are ongoing to define ownership and maintenance responsibility. As data become available, information regarding the conveyance of NSW and associated water quality data will be added to the database. Information will be updated based upon the three screening surveys.

As a component of the inventory and screening process, Permittees are required to document the physical attributes of MS4 outfalls determined to have significant non-stormwater discharges. Table 10-4 summarizes the minimum physical attributes required to be recorded and linked to the outfall database. These data will be maintained using the Outfall Reconnaissance Inventory (ORI) field form and associated database (Appendix F) developed by CWP and Pitt (2004). Data entry can be accomplished by completing the ORI form while conducting the screening survey. Current forms are shown in the Appendix F but may be modified as the parameters and database are modified to provide different information more relevant to the NSW program. Maps of existing stormwater outfalls are attached in Appendix H.

Table 10-4. Minimum Physical Attributes Recorded during the Outfall Screening Process.

Database Element	
a.	Date and time of last visual observation or inspection
b.	Outfall alpha-numeric identifier
c.	Description of outfall structure including size (e.g., diameter and shape)
d.	Description of receiving water at the point of discharge (e.g., natural, soft-bottom with armored sides, trapezoidal, concrete channel)
e.	Latitude/longitude coordinates
f.	Nearest street address
g.	Parking, access, and safety considerations
h.	Photographs of outfall condition
i.	Photographs of significant non-stormwater discharge (or indicators of discharge) unless safety considerations preclude obtaining photographs
j.	Estimation of discharge rate
k.	All diversions either upstream or downstream of the outfall
l.	Observations regarding discharge characteristics such as turbidity, odor, color, presence of debris, floatables, or characteristics that could aid in pollutant source identification
m.	Observations regarding the receiving water such as flow, channel type, hard/soft bottom. (added minimum attribute.

10.4 Prioritized Source Identification

After completion of the initial reconnaissance survey and the two additional screening surveys, sites will be ranked based upon both initial flow observations from the reconnaissance inventory and the classifications assigned during each of the screening surveys. Source investigations will be scheduled to be conducted at sites categorized as Potential Illicit discharges.

The MRP (IX.E.1) states that prioritization of source investigations should be based upon the following items in order of importance.

a. Outfalls discharging directly to receiving waters with WQBELs or receiving water limitations in the TMDL provisions for which final compliance deadlines have passed.

b. All major outfalls and other outfalls that discharge to a receiving water subject to a TMDL shall be prioritized according to TMDL compliance schedules.

c. Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the Action Levels identified in Attachment G of this Order.

d. All other major outfalls identified to have significant non-stormwater discharges.

Additional information from the screening process will be used to refine priorities. Sites with evidence of higher, more frequent flow, presence of odors or stains will be assigned higher priorities for source investigations.

10.5 Identify Source(s) of Significant Non-Stormwater Discharges

The screening and source identification component of the program is intended to identify the source or sources of contaminants contributing to an NSW discharge. The prioritized list of major outfalls with significant NSW discharges will be used to direct investigations starting with outfalls deemed to present the greatest risk to the receiving water body.

The Order requires the WMG to develop a source identification schedule based on the prioritized list of outfalls exhibiting significant NSW discharges. Source investigations will be conducted for no less than 25% of the outfalls in the inventory by December 2015 and 100% of the outfalls in the inventory by December 2017.

Part IX.A.2 of the MRP requires Permittees to classify the source investigation results into one of four endpoints: illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows, or from unknown sources. If source investigations indicate the source is illicit or unknown, the Permittee will document actions to eliminate the discharge and implement monitoring if the discharge cannot be eliminated.

If the source of a discharge is found to be attributable to natural flows or authorized conditionally exempt NSW discharge, the Permittee must identify the basis for the determination (natural flows) and identify the NPDES permitted discharger. If the source is found to be a conditionally exempt but non-essential discharge, monitoring is required to determine whether the discharge should remain conditionally exempt or be prohibited.

Source investigations will be conducted using a variety of different approaches depending upon the initial screening results, land use within the area drained by the discharge point, and the availability of drainage maps. Any additional water quality sampling may be conducted as necessary.

- Tracking of dry weather flows from the location where they are first observed in an upstream direction along the conveyance system.
- Collection of additional water samples for analysis of NWS indicators for assistance in differentiating major categories of discharges such as tap water, groundwater, wash waters and industrial wastewaters.
- Compiling and reviewing available resources including past monitoring and investigation data, land use/MS4 maps, aerial photography, existing NPDES discharge permits and property ownership information.

If source tracking efforts indicate that the discharge originates from a jurisdiction upstream of the boundaries of the LCC WMP, the appropriate jurisdiction and the Regional Board will be notified in writing of the discharge within 30 days of the determination. All existing information regarding documentation and characterization of the data, contribution determination efforts, and efforts taken to identify its source will be included.

Investigations will be concluded if authorized, natural, or essential conditionally exempt flows are found to be the source of the discharge. If the discharge is determined to be due to non-essential conditionally exempt, illicit, or unknown discharges, further investigations will be considered to assess whether the discharge can be eliminated. Alternatively, if the discharges are either non-essential conditionally exempt or of an unknown source, additional investigations may be conducted to demonstrate that it is not causing or contributing to receiving water impairments.

10.6 Monitor Non-Stormwater Discharges Exceeding Criteria

As required in the MRP (Part II.3.3), outfalls with significant NSW discharges that remain unaddressed after source identification will be monitored. The objectives of the non-stormwater outfall based monitoring program include the following:

a. Determine whether a Permittee's discharge is in compliance with applicable NSW WQBELs derived from TMDL WLAs,

b. Determine whether a Permittee's discharge exceeds NSW action levels, as described in Attachment G of the Order,

c. Determine whether a Permittee's discharge contributes to or causes an exceedance of receiving water limitations

d. Assist a Permittee in identifying illicit discharges as described in Part VI.D.10 of the Order.

After completion of source investigations, outfalls found to convey NSW discharges that could not be abated and were identified as illicit, conditionally exempt, but non-essential or unknown will be monitored. Monitoring will be initiated within 90 days of completing the source investigations or as soon as the first scheduled dry weather survey. Conducting NSW monitoring at the same time as receiving water dry weather monitoring will be more cost effective and allow evaluation of whether the NSW discharges are causing or contributing to any observed exceedances of water quality objectives in the receiving water.

Monitoring of NSW discharges is expected to undergo substantial changes from year to year as the result of ongoing actions taken to control or eliminate these discharges. As NSW discharges are addressed, monitoring of the discharges will no longer be required. In addition, if monitoring demonstrates that discharges do not exceed any WQBELs, non-stormwater action levels, or water quality standards for pollutants identified on the 303(d) list after the first year, monitoring of the pollutants meeting all receiving water limitations will be no longer be necessary. Due to potential frequent adjustments in the number and location of outfalls requiring monitoring and pollutants requiring monitoring, the annual CIMP report is expected to communicate adjustments in the

number and locations of monitored discharges, pollutants being monitored and justifications for any adjustments.

10.7 Monitoring Parameters and Frequency

The MRP (Section IX.G.1) specifies the minimum parameters for monitoring of NSW discharges. Determination of monitoring parameters at each site requires consideration of a number of factors applicable to each site. Monitoring parameters will include:

a. Flow,

b. Pollutants assigned a WQBEL or receiving water limitation to implement TMDL Provisions for the respective receiving water, as identified in Attachments L - R of the Order,

c. Other pollutants identified on the CWA section 303(d) List for the receiving water or downstream receiving waters,

d. Pollutants identified in a TIE conducted in response to observed aquatic toxicity during dry weather at the nearest downstream receiving water monitoring station (LCC1) during the last sample event or, where the TIE conducted on the receiving water sample was inconclusive, aquatic toxicity. If the discharge exhibits aquatic toxicity, then a TIE shall be conducted.

e. Other parameters in Table E-2 identified as exceeding the lowest applicable water quality objective at LCC1 (the nearest downstream receiving water station) per Part VI.D.1.d.

The MRP (Part IX.G.2-4) specifies the following monitoring frequency for NSW outfall monitoring:

- For outfalls subject to a dry weather TMDL, the monitoring frequency shall be per the approved TMDL monitoring plan or as otherwise specified in the TMDL or as specified in an approved CIMP.
- For outfalls not subject to dry weather TMDLs, approximately quarterly for first year.
- Monitoring can be eliminated or reduced to twice per year, beginning in the second year of monitoring if pollutant concentrations measured during the first year do not exceed WQBELs, NALs or water quality standards for pollutants identified on the 303(d) List.

While a monitoring frequency of four times per year is specified in the Permit, it is inconsistent with the dry weather receiving water monitoring requirements. The receiving water monitoring requires two dry weather monitoring events per year. Additionally, during the term of the current Permit, outfalls are required to be screened at least once and those with significant NSW discharges will be subject to a source investigation. As a result, the LCC WMG recommends that NSW outfall monitoring events be conducted twice per year. The NSW outfall monitoring events will be coordinated with the dry weather receiving water monitoring events to provide better opportunities to determine if the NSW discharges are causing or contributing to any observed exceedances of water quality objectives in the receiving water.

Any monitoring required will be performed using grab samples (refer to Appendix A for field sampling procedures) rather than automated samplers. Bacteria, which are expected to be the limiting factor at many sites during dry weather, require collection by grab methods and delivery to the laboratory within 6 hours. Based upon the much reduced variability experienced in measurements of dry weather flows associated with ongoing monitoring programs, measured concentrations of other analytes are not expected to vary significantly over a 24-hour period.

11 New Development/Re-Development Effectiveness Tracking

Each permittee will maintain an electronic database to track qualifying new development and redevelopment projects which are subject to the Planning and Land Development Program of the Permit (Section VI.D.7.d.iv). The electronic database contains the information listed in Table 11-1, which includes details about the project and the design of onsite and offsite best management practices (BMPs). Table 11-1 also provides a description of the required information.

Table 11-1. Information Required in the New Development/Redevelopment Tracking Database.

	Required Information	Description
General Site Information	Project Name and Developer Name	Brief name of project and developer information (e.g. name, address, and phone number).
	Project Location and Map	Coordinates and map of the project location. The map should be linked to the GIS storm-drain map required in part VII.A of the Permit.
	Documentation of issuance of requirements to the developer	Date that the project developer was issued the Permit requirements for the project (e.g. conditions of approval).
	Date of Certificate of Occupancy	Date that the Certificate of Occupancy was issued.
On-site BMP Sizing Information	85th percentile storm event (inches per 24 hours)	85th percentile storm depth for the project location calculated using the *Analysis of 85th Percentile 24-hour Rainfall Depths Within the County of Los Angeles.*
	95th percentile storm event (inches per 24 hours)	95th percentile storm depth for the project location calculated using the *Analysis of 85th Percentile 24-hour Rainfall Depths Within the County of Los Angeles*. Only applies if the project drains directly to a natural drainage system[5] and is subject to hydromodification control measures.
	Project design storm (inches per 24 hours)	The design storm for each BMP as calculated using the *Analysis of 85th Percentile 24-hour Rainfall Depths Within the County of Los Angeles*.
	Projects design volume (gallons or MGD)	The design storm volume (design storm multiplied by tributary area and runoff coefficient) for each BMP.
	Percent of design storm volume to be retained on site	The percentage of the design volume which on-site BMPs will retain.
	Other design criteria required to meet hydromodification requirements for projects that directly drain to natural water bodies	Information relevant to determine if the project meets hydromodification requirements as described in the Permit e.g., peak flow and velocity in natural water body, peak flow from project area in mitigated and unmitigated condition, etc.). Only applies if the project drains directly to a natural drainage system.
	One -year, one-hour storm intensity as depicted on the most recently issued isohyetal map published by the Los Angeles County Hydrologist for flow-through BMPs	If flow-through BMPs (e.g., sand filters, media filters) for water quality are used at the project, provide the one-year, one-hour storm intensity at the project site from the most recent isohyetal map issued by LA County.
Off-site BMP Information	Location and maps of off-site mitigation, groundwater replenishment, or retrofit sites	If any off-site mitigation is used, provide locations and maps linked to the GIS storm-drain map required in part VII.A of the Permit.
	Design volume for water quality mitigation treatment BMPs	The calculated design volume, If water quality mitigation is required.
	Percent of design storm volume to be infiltrated at an off-site mitigation or groundwater replenishment project site	The percentage of the design volume which off-site mitigation or groundwater replenishment will retain.
	Percent of design storm volume to be retained or treated with biofiltration at an off-site retrofit project	The percentage of the design volume which off-site biofiltration will retain or treat.

[5] A natural drainage system is defined as a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

12 Reporting

Reporting will normally consist of Annual CIMP Reports and semi-annual data reports. Discharge Assessment Plans will be only submitted if TIEs are found to produce inconsistent results during two consecutive tests. These include the following reports:

Annual CIMP Reports

Annual CIMP monitoring reports are required to be submitted to the Regional Water Board Executive Officer by December 15th of each year in the form of three compact disks (CD) The annual reporting process is intended to meet the following objectives.

Summary information allowing the Regional Board to assess:

a. Each Permittee's participation in one or more Watershed Management Programs.
b. The impact of each Permittee(s) stormwater and non-stormwater discharges on the receiving water.
c. Each Permittee's compliance with receiving water limitations, numeric water quality-based effluent limitations, and non-stormwater action levels.
d. The effectiveness of each Permittee(s) control measures in reducing discharges of pollutants from the MS4 to receiving waters.
e. Whether the quality of MS4 discharges and the health of receiving waters is improving, staying the same, or declining as a result watershed management program efforts, and/or TMDL implementation measures, or other Minimum Control Measures.
f. Whether changes in water quality can be attributed to pollutant controls imposed on new development, re-development, or retrofit projects.

Data Submittals – CEDEN Files

Analytical data reports are required to be submitted on a semi-annual basis in formats consistent with CEDEN. These reports are required to be subject to verification and validation prior to submittal. They are to cover monitoring periods of July 1 through December 30 for the mid-year report and July 1- June 30 for the end of year report. These data reports should include verification of having be submitted and accepted through the SCWRPP Regional Data Center. These data reports should summarize:

- Exceedances of applicable WQBELs, receiving water limitations, or any available interim action levels or other aquatic toxicity thresholds.
- Basic information regarding sampling dates, locations, or other pertinent documentation.

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APPENDIX A

SITE SELECTION
STORMWATER OUTFALL MONITORING SITES
AND ALTERNATIVES

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1 Stormwater Outfall Monitoring Sites

Four outfall monitoring sites (**Error! Reference source not found.**) have been assessed and selected for monitoring within the LLAR Watershed Management Group in order to meet the requirements of the Order for stormwater outfall monitoring.

1.1 Cerritos Pump Station (LLAR1)

The Cerritos Pump Plant (Figure 1) discharges into the Los Angeles River Estuary south of Anaheim Street at 980 N. DeForest Avenue in Long Beach. This site has a large concrete forebay that receives all the water from a single 72-inch gravity storm drain. The pump station contains four pumps which discharge into the river through four culverts equipped with tide gates.



Figure 1. Concrete Forebay of Cerritos Pump Station

Instrumentation would be done by installing a monitoring station within the confines of the pump plant boundaries, with the flow measuring sensors and sample intake inserted approximately 25 feet up inside the main storm drain as it enters the forebay. Flow monitoring would be conducted using a Doppler flow sensor to measure water velocity and a water level sensor to monitor water levels within the pipe. A FEP (Fluorinated Ethylene Propylene) intake hose fitted with a stainless steel/Teflon strain would be fastened along the side of the inlet pipe so as not to interfere with flow into the station forebay. A small instrument enclosure would be placed within the confines of the station fence at street level above the storm drain discharge. This would contain the autosampler, datalogger and communications equipment. The monitoring station would powered by deep cycle batteries with a solar panel to maintain the battery power. A rain gauge will also be installed at the site in order to measure local rainfall. The monitoring equipment will be connected by use of an IP modem to allow monitoring and control of the site by the internet. This monitoring approach would not require access to the interior of the pump plant building.

Alternatively, instrumentation could be installed inside the pump station with access to AC power and hardwire telephone lines. This would require a pressure sensor to monitor water levels within the sump and head differentials for the pumps. Each pump would need to be fitted with optical tachometers to monitor pump revolutions per minute (RPM) and enable estimation of flow rates based upon pump discharge curves. Although this would provide better security, typical storm water discharges would be more accurately estimated from the recommended installation at the head of the forebay

1.2 Dominguez Gap Pump Station (LLAR2)

The Dominguez Gap Pump Station (Figure 2 and Figure 3) is located on the east bank of the Los Angeles River just south of Del Amo Blvd. The City of Long Beach first established a monitoring site at the Dominguez Gap Pump Station during the 2000/2001 wet season. This site was originally collected runoff from 3,374 acres of land that comprised the City's Drainage Basin 14. As part of the Dominguez Gap/DeForest Wetland Project, this drainage basin was modified so that runoff from north of Market Street would be directed the Market Street Pump Station and DeForest Wetlands. Runoff from the portion of Basin 14 located south of Market Street continued to drain to the Dominguez Gap Pump Station and Wetlands. The two areas were further separated by elimination of a previous connection between the two infiltration basins at Del Amo. The former detention/infiltration basin at this site underwent major modifications to establish a wetland system that now serves as a treatment system for waters diverted from the Los Angeles River and stormwater the remaining 2,082 acre urban watershed comprised of 70% residential, 12% commercial, 17% open space and 1% mixed urban land use. Much of the open space is a golf course that borders the infiltration basin.



Figure 2. Dominguez Gap Pump Station



Figure 3. Dominguez Pump Station discharge to the Los Angeles River.

The Dominguez Gap Pump Station and adjacent infiltration/detention basin started undergoing major renovations during the summer of 2006 and work extended through most of the 2007/2008 wet season. During that time period, land disturbances associated with development of the wetland system resulted in elevated levels of sediment. By late 2009 the wetland vegetation had become well established and the water quality changes observed during the construction phase were no longer evident.

Because of this infiltration basin, the actual pumped discharge to the Los Angeles River is measured and sampled from the sump within the pump station. The discharge volume is determined by use

of optical tachometers that monitor pump shaft rotation. The tachometers monitor reflective tape placed on the pump shaft to measure RPM. Discharge rates are estimated by monitoring head differentials between the sump and the discharge point and the pump curves associated with each pump. This estimate of discharge rates are used to pace the autosampler to enable collection of a flow-rated composite sample of stormwater discharges. This site has AC power but still requires use of cellular phone connections for communications. A rain gauge installed on the roof of the pump station provides a continuous record of rainfall at this site.

1.2.1 BI 0551 Line E –Lynwood at Intersection of I105 and I710 (LLAR3)

This site is located on the north side of Highway I105 at the end of Louise St.(Figure 4). The storm drain accesses a rectangular box culvert measuring 6 feet in height and 12 feet in width. This storm drain crosses under the I710 where it opens up into a 250 feet channel before entering a 54-inch RCP that runs under the I105 and discharges by gravity to the Los Angeles River. High flows are able to overflow the open channel into spreading grounds that also receive localized runoff from Caltrans drainages. This spreading ground exists on both the north and south side of the I105 freeway. A small pump station on the south side of the I105 allows overflows to be discharged to the Los Angeles River.

The monitoring site appears to be located on property owned by Caltrans and will require access through a gate located off of Wright Street. Easements will be required to install and monitor stormwater discharges at this location. Flow monitoring will be conducted using a Doppler flow sensor to measure water velocity and a water level sensor to monitor water levels within the box culvert. A small security enclosure will be placed next to the manhole to house the monitoring equipment. Equipment will include an autosampler, flow meter, datalogger and communications equipment. The monitoring station will be powered by deep cycle batteries with a solar panel to maintain the battery power. A rain gauge will also be installed at the site in order to measure local rainfall. The monitoring equipment will be connected by use of an IP modem to allow monitoring and control of the site by the internet.

RB-AR12135

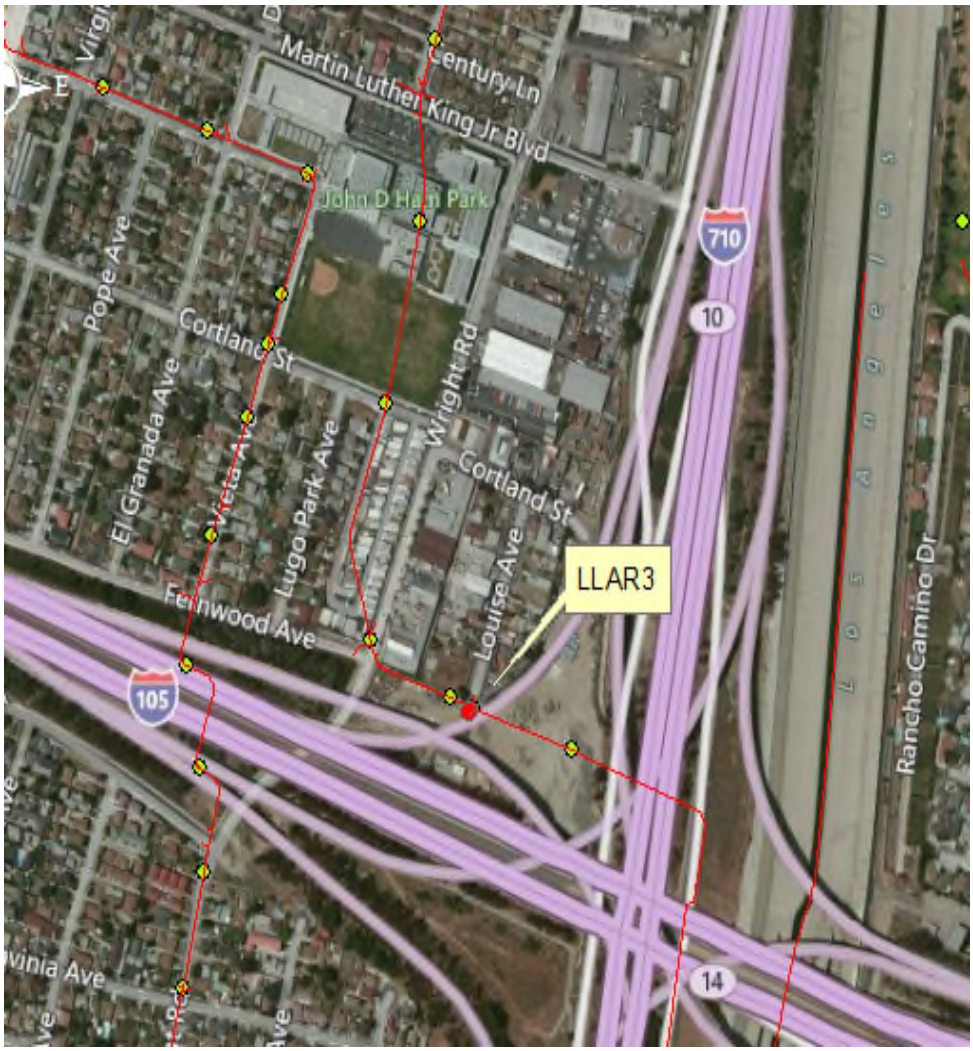


Figure 4. Location of outfall monitoring site LLAR3 at the end of Louise St. near the I710 and I105 Freeways.

1.2.2 BI 0018 Firestone - Firestone Boulevard Gravity Discharge to Rio Honda River (LLAR4)

A large gravity outfall into the Rio Honda River is located at Firestone Boulevard just downstream of the bridge that crosses the Rio Honda. Access is off of Firestone Boulevard westbound immediately after crossing the bridge via a small turnout and gate.

The outfall is a larger box culvert separated into two channels at the mouth as it passes under the levee but becomes one larger box culvert immediately upstream. This culvert discharges above the elevation of the Rio Honda Channel as it has a 5 foot ramp up to the invert of the box culvert (Figure 5).

Access for installation of instrumentation is through a small auxiliary drain located immediately above the box culvert but on the landward side of the levee road. This small local drain provides direct access to the box culvert below. Instrumentation would be housed in a small security enclosure placed at the side of the levee road. The installation would be similar to the other outfall monitoring sites. An area velocity (Doppler) flow meter would be used to monitor and record flow. The monitoring site would have a rain gauge to provide local rainfall information, a solar panel to maintain deep cycle marine batteries to power the equipment and cellular communications to allow for remote operation and monitoring of conditions at the site. The flow data will be used to pace sampling by an autosampler to enable collection of a flow-rated composite sample of stormwater discharges.







Small Drain is visible up on levee side that drops into the large stormwater channel.

Figure 5. Gravity Outfall to Rio Honda River at Firestone Boulevard

1.3 Alternative Outfall Monitoring Sites

Four alternative monitoring sites were reviewed as potential outfall monitoring locations in the case that unknown problems are encountered at one or more of the preferred locations. Of the four alternative sites, two are considered to best meet the objectives of the monitoring program if one or more of the primary sites become unsuitable. These include the Market Street and Paramount Pump Stations. The Market Street Pump Station would likely provide the most useful information due to the large drainage area, land use characteristics and the potential to provide both infiltration and settling prior to discharging stormwater to the Los Angeles River. The stormwater treatment potential for this site is addressed by other stormwater outfalls. The Paramount Pump Station is also a preferred alternative. Although this pump station collects water from a relatively small catchment, industrial land uses represent a significant portion of this area. The relative abundance of industrial land use in this catchment is higher than encountered at most other potential outfall monitoring sites.

1.1.1 Market Street Pump Station

The Market Street Pump Station is located on the east bank of the Los Angeles River at 229 Market Street in Long Beach. A large infiltration basin (DeForest Basin) extends along the inside of the levee from near Artesia Blvd to Del Amo Blvd. where it was once connected to the Dominguez Gap infiltration basin. This connection was eliminated when the wetland system was constructed in the Dominguez Gap infiltration/settling basin. Improvements to the DeForest Basin were initially planned as a second stage to work completed in the Dominguez Gap basin.

The DeForest Basin receives stormwater and dry weather discharges from several major storm drains. A 15 foot wide by 10.5 foot tall box culvert discharges from Market Street directly across from the pump station. Four additional gravity stormwater outfalls discharge to the northern end of the infiltration basin in the region of 59th Street. Low flows follow a channel towards the Market Street Pump Station. (

Installation of monitoring equipment at this site could only be installed within the Market Street Pump Station using the same approach as used at the Dominguez Gap Pump Station. Water sampling would be from the sump inside the plant, and discharge volumes to the river would be measured by optical tachometers fitted on each pump shaft to monitor the RPMs. Estimates of discharge rates would be calculated by the published pump discharge rating curve and the measured head differential between water levels in the sump and at the discharge point to the Los Angeles River. Stormwater discharge rates estimated in this manner would be used to pace autosamplers to obtain flow-rated composite sample.

RB-AR12139



Figure 6. Market Street Pump Station and Forebay.

1.1.2 LA County Flood Control District, Paramount Pump Station

The Paramount Pump Station is located at the end of East 72nd Street just south of E. Alondra Boulevard and discharges into the Los Angeles River. This pump station has no forebay.

A manhole located near the back corner of the pump station concrete apron provides access to the stormdrain that is the inlet to the pump station. Depth in this manhole to the top of the stormdrain inlet pipe is 8 feet and it is 16 feet down to the bottom of this inlet.

Flow instrumentation and sampling could be accomplished at this inlet manhole site. A Doppler velocity sensor, a water depth sensor, and a sampling tube would be fastened to the invert of this channel in a manner that could not impede flow. A small instrument enclosure could be placed near the wall of the plant site or near the wall of the building near the manhole as vehicles cannot drive through this area.







Figure 7. **Paramount Pump Station showing access point to storm drain.**

APPENDIX B

AUTOMATED STORMWATER MONITORING EQUIPMENT

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1 Automated Stormwater Monitoring Equipment

Monitoring of stormwater runoff at the stormwater outfall monitoring sites will require use of automated stormwater sampling equipment. This section addresses the equipment and sampling procedures that will be used for collection of composite sample of stormwater runoff.

Flow-weighted composite samples will be collected at most sites however, time-weighted sampling may be conducted at some locations where equipment is deployed on a short-term basis and sampling is conducted to screen for contaminants. Similar equipment will be necessary regardless of the selected sampling approach. Time-weighted composite samples simply allow for more mobile installations that do not require flow meters, rain gauges, solar panels, or communication equipment. In lieu of communications equipment, such sites require added field personnel to monitor and track performance of the equipment along with added sensors to trigger the equipment to initiate the sampling.

For purposes of this CIMP, it is assumed that all sites requiring collection of flow-weighted composite samples will be established as "permanent" or "long-term" sites with appropriate security to protect the equipment and intake structures from debris coming down the stream or vandalism. As noted, collection of time-weighted samples will be utilize the same types of autosamplers and composite containers but will not include flow meters, rain gauges and telecommunication packages. Monitoring stations designed to take time-weighted composite samples will require sensors to detect initial flows and trigger the sampler. This will allow for use of smaller security enclosures that can temporally be secured at a site or, if necessary, equipment can be deployed in a manhole.

Fixed monitoring sites will utilize automated stormwater sampling stations that incorporate an autosampler (American Sigma or Isco), a datalogger/flow module to monitor flow and pace the autosampler, a rain gauge to monitor and record local rainfall, and telecommunications to allow for remote monitoring and control of each site. Sites without access to AC power will be powered by deep-cycle marine batteries. Sites without direct access to AC power will utilize solar panels to provide the energy needed to maintain the charge on two deep cycle batteries used to power the autosampler, flow meter and datalogger. Providing reliable telecommunications for real-time access to data and to provide command and control functionality has greatly improved efficiency and contributed to improved stormwater data.

Both types of automated stormwater monitoring systems considered for this monitoring program use peristaltic pumping systems. When appropriate measures are taken, it has been demonstrated that these types of systems are capable of collecting blanks that are uncontaminated and high quality, reproducible data using detection limits appropriate to water quality criteria. In order to accomplish this, extreme care must be taken to avoid introduction of contaminants.

Requirements include:

- Assuring that all materials coming into contact with the samples are intrinsically low in trace metals and do not adsorb/absorb metals or other target.
- Materials coming into contact with the sample water are subjected to intensive cleaning using standardized protocol and subjected to systematic blanking to demonstrate and document that blanking standards are met.
- All cleaned sampling equipment and bottles are appropriately tracked so that blanking data can be associated with all component deployed in the field.
- Samples are collected, processed and transported taking care to avoid contamination from field personnel or their gear, and
- Laboratory analysis is conducted in a filtered air environment using ultrapure reagents.

Table 2-1 of the USGS National Field Manual (http://pubs.water.usgs.gov/twri9A/) provides a summary of acceptable materials for use sampling organic and inorganic constituents. The stormwater monitoring stations will primarily utilize 20-L borosilicate glass media bottles for the composite samples, FEP tubing for the sample hose and either 316 SS or Teflon-coated intake strainers. Ten (10) liter borosilicate glass media bottles will be considered for sites where required sample volumes are low and lower sample volumes are acceptable. The peristaltic hose is a silicone-base material that is necessary for operation of the autosamplers. The peristaltic hose can be as source of silica which is not a target compound.

Although the technical limitations of autosamplers are often cited, they still provide the most practical method for collecting representative samples of stormwater runoff for characterization of water quality and have been heavily utilized for this purpose for the past 20 years. The alternative, manual sampling, is generally not practical for collection of flow-weighted composite samples from a large number of sites or for sampling events that occur over an extended period of time. Despite the known drawbacks, autosamplers combined with accurate flow metering remain the most common and appropriate tool for monitoring stormwater runoff.

1.1 Sampler Intake Strainer, Intake Tubing and Flexible Pump Tubing

Intake strainers will be used to prevent small rocks and debris from being drawn into the intake tubing and causing blockages or damage to the pump and peristaltic pump tubing. Strainers will be constructed of a combination of Teflon and 316 stainless or simply stainless steel. The low profile version is typically preferred to provide greater ability to sample shallow flows. Although high grade stainless steel intake strainers are not likely to impact trace metal measurements, it is preferable to use strainers coated with a fluoropolymer coating. If the stainless steel intake is not coated, the strainer will not be subjected to cleaning with acids. Cleaning will be limited to warm tap water, laboratory detergents and MilliQ water rinses.

Tubing comprised of 100% FEP (Fluorinated Ethylene Propylene) will be used for the intake tubing. Several alternative fluoropolymer products are available but 3/8" ID solid FEP tubing has the chemical characteristics suitable for sampling metals and organics at low levels and appropriate physical characteristics. The rigidity of FEP tubing provides resistance to collapse at high head differentials but still is manageable for tight configurations.

The peristaltic hose used in autosamplers is a medical-grade silicon product. The specifications for the peristaltic pump hoses used in these samplers are unique to the samplers. It is very important that hose specified and provided by the manufacturers of the autosamplers be used. Minor differences in the peristaltic hose can cause major deterioration in performance of the samplers. Use of generic peristaltic pump hose from other sources can lead to problems with the ability to calibrate the samplers and maintain intake velocities of greater than 2.5 feet per second with higher lift requirements.

The peristaltic hose is connected to the FEP tubing and fed through the pump head leaving the minimum amount necessary to feed the peristaltic pump hose into the top of the composite bottle. The composite container will always have a lid to prevent dust from settling in the container.

1.2 Composite Containers

The composite containers used for monitoring must be demonstrated to be free of contaminants of interest at the desired levels (USEPA 1996). Containers constructed of fluoropolymers (FEP, PTFE), conventional or linear polyethylene, polycarbonate, polysulfone, polypropylene, or ultrapure quartz are considered optimal for metals but borosilicate glass has been shown to be suitable for both trace metals and organics at limits appropriate to EPA water quality criteria. High capacity borosilicate media bottles (20-liters or ~5-gallons) are preferred for storm monitoring since they can be cleaned and suitably blanked for analysis of both metals and organic compounds. The transparency of the bottles is also a useful feature when subsampling and cleaning the containers for reuse.



Figure 1. Composite Bottle with Label and installed Tubing inside Brute® Container.

These large media bottles are designed for stoppers and thus do not come with lids. Suitable closure mechanisms must be fabricated for use during sampling, transport and storage of clean bottles. The preferred closure mechanism is a Teflon® stopper fitted with a Viton® O-ring (2 3/8" - I.D. x 23/4"- O.D.) that seals the lid against the media bottle. A polypropylene clamp (Figure 2) is used to seal the Teflon® stopper and O-ring to the rim of the composite sample bottle. Two polypropylene bolts with wing-nuts are used to maintain pressure on the seal or to assist in removal of the lid.

Every composite bottle requires one solid lid for use in protecting the bottle during storage and transport. A minimum of one Teflon® stopper should be available for each monitoring site during storm events. Each field sampling crew should have additional stoppers with holes ("sampling stopper") that would be available if a sampling stopper is accidentally contaminated during bottle changes or original installations.



Figure 2. Composite bottle showing bottle bag used for transport and lifting.

The holes in the sampling stoppers should be minimally larger than the external diameter of the peristaltic hose. If a tight fit exists, the pressure created when water is pumped into the bottle will cause the hose to be ejected and the sampling event will to be abandoned.

Transporting composite bottles is best accomplished by use of 10-gallon Brute® containers to both protect them from breakage and simplify handling. They also provide additional capacity for ice while transporting full bottles to the laboratory or subsampling site.

Bottle bags (Figure 2) are also useful in allowing full bottles to be handled easier and reduce the need to contact the bottles near the neck. They are important for both minimizing the need to handle the neck of the bottle and are also an important Health and Safety issue. The empty bottles weigh 15 pounds and they hold another 40 pounds of water when full. These can be very slippery and difficult to handle when removing them from the autosamplers. Bags can be easily fabricated out of square-mesh nylon netting with nylon straps for handles. Use of bottle bags allows two people to lift a full bottle out of the ice in the autosampler and place it in a Brute® container. Whether empty or full, suitable restraints should be provided whenever the 20-L composite bottles and Brute® containers are being transported.

1.3 Flow Monitoring

Retrieval of flow-weighted stormwater samplers requires the ability to accurately measure flow over the full range of conditions that occur at the monitoring site. The ability to accurately measure flow at an outfall site should be carefully considered during the initial site selection process. Hydraulic characteristics necessary to allow for accurate flow measurement include a relatively straight and uniform length of pipe or channel without major confluences or other features that would disrupt establishment of uniform flow conditions. The actual measurement site should be located sufficiently downstream from inflows to the drainage system to achieve well-mixed conditions across the channel. Ideally, the flow sensor and sample collection inlet should be placed a minimum of five pipe diameters upstream and ten pipe diameters downstream of any confluence to minimize turbulence and ensure well-mixed flow. The latest edition of the *Isco Open Channel Flow Measurement Handbook* (Walkowiak 2008) is an invaluable resource to assist in selection of the most appropriate approach for flow measurements and information on the constraints of each method.

The existing mass emission site has an established flow rating curve (Stage-Flow relationships) that only requires measurement of water level to estimate flow. Additional sites requiring flow monitoring are expected to utilize area-velocity sensors that use Doppler-based sensors to measure

the velocity of water in the conveyance, a pressure sensor to measure water depth, and information regarding channel dimensions to allow for real-time flow measurements to pace the autosamplers.

1.4 Rainfall Gauges

Electronic tipping bucket rain gauges will be installed at each fixed monitoring location to provide improved assessment of rainfall in the smaller drainages. Use of a localized rain gauge provides better representation of conditions at the site. A variety of quality instruments are available but all require substantial maintenance to ensure maintenance of high data quality.

Tipping bucket rain gauges with standard 8-inch diameter cones will be used at each site. These provide 1 tip per 0.01" of rain and have an accuracy of ± 2% up to 2"/hr. The accuracy of tipping bucket rain gauges can be impacted by very intense rainfall events but errors are more commonly due to poor installation.

Continuous data records will be maintained throughout the wet season with data being output and recorded for each tip of the bucket. The rainfall data is downloaded at the same rate as the flow and stormwater monitoring events.

1.5 Power

Stormwater monitoring equipment can generally be powered by battery or standard 120VAC. If 120VAC power is unavailable, external, sealed deep-cycle marine batteries will be used to power the monitoring site. Even systems with access to 120VAC will be equipped with batteries that can provide backup power in case of power outages during an event. All batteries will be placed in plastic marine battery cases to isolate the terminals and wiring. A second battery will be provided at each site to support the telecommunication packages. Sites relying on battery power will also be equipped with a solar panel to assure that a full charge is available when needed for a storm event.

1.6 Telecommunication for System Command/Control and Data Access

The ability to remotely communicate with the monitoring equipment has been shown to provide efficient and representative sampling of stormwater runoff. Remote communication facilitates preparation of stations for storm events and making last minute adjustments to sampling criteria based upon the most recent forecasts. Communication with the sites also reduces the number of field visits by monitoring personnel. Remote two-way communication with monitoring sites allows the project manager (storm control) to make informed decisions during the storm as to the best allocations of human resources among sampling sites. By remotely monitoring the status of each monitoring site, the manager can more accurately estimate when composite bottles will fill and direct field crews to the site to avoid disruptions in the sampling. Real time access to flow, sampling and rainfall data also provides important information for determining when sampling should be terminated and crews directed to collect and process the samples. Increases in both efficiency and sample quality make two-way communication with monitoring stations a necessity for most monitoring programs.

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APPENDIX C

GENERAL FIELD SAMPLING PROCEDURES FOR COMPOSITE AND GRAB SAMPLES

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GENERAL FIELD SAMPLING PROCEDURE FOR:

Composite Samples

1.0 SCOPE

This Standard Operating Procedure (SOP) describes the procedures for the compositing and sub-sampling of non-point source (NPS) "composite" sample bottles. The purpose of these procedures is to ensure that the sub-samples taken are representative of the entire water sample in the "composite" bottle (or bottles). In order to prevent confusion, it should be noted that the bottles are referred to as "composite" bottles because they are a composite of many small samples taken over the course of a storm; in this SOP the use of "compositing" generally refers to the calculated combining of more than one of these "composite" bottles.

2.0 APPLICATION

This SOP applies to all laboratory activities that comprise the compositing and sub-sampling of NPS composite sample bottles.

3.0 HEALTH AND SAFETY CONSIDERATIONS

The compositing and sub-sampling of composite sample bottles may involve contact with contaminated water. Skin contact with sampled water should be minimized by wearing appropriate protective gloves, clothing, and safety glasses. Avoid hand-face contact during the compositing and sub-sampling procedures. Wash hands with soap and warm water after work is completed.

4.0 DEFINITIONS

4.1 "Composite" sample bottle: A borosilicate glass bottle that is used to collect multiple samples over the course of a storm (a composite sample).

4.2 Large-capacity stirrer: Electric motorized "plate" that supports composite bottle and facilitates the mixing of sample water within the bottle by means of spinning a pre-cleaned magnetic stir-bar which is introduced into the bottle.

4.3 Stir-bar: Pre-cleaned teflon-coated magnetic "bar" approximately 2-3 inches in length which is introduced into a composite bottle and is spun by the stirrer, thereby creating a vortex in the bottle and mixing the sample.

4.4 Sub-sampling hose: Two pre-cleaned ~3-foot lengths of Teflon tubing connected by a ~2-foot length of silicon tubing. Used with a peristaltic pump to transfer sample water from the composite sample bottle to sample analyte containers.

4.5 Volume-to-Sample Ratio (VSR): A number that represents the volume of water that will flow past the flow-meter before a sample is taken (usually in liters but can also be in kilo-cubic feet for river deployments). For example, if the VSR is 1000 it means that every time 1000 liters passes the flow-meter the sampler collects a

sample (1000 liters of flow per 1 sample taken). Note: The VSR indicates when a sample should be taken and is NOT an indication of the sample size.

5.0 EQUIPMENT

5.1 Instrumentation: Not applicable

5.2 Reagents: Not applicable.

5.3 Apparatus:

1) Large capacity stirrer.

2) Stir bar.

3) Sub-sampling hose.

4) Peristaltic pump.

5.4 Documentation: Information from the field logbook should include the volume-to-sample ratio for each composite sample bottle, each bottle's ID number, and the time of the last sample taken at a particular sampling site (for purposes of holding times). Previous documentation should exist for the cleaning batch numbers for the 20-L bottles and the sub-sampling hoses.

6.0 COMPOSITING AND SUB-SAMPLING PROCEDURES

Compositing sample water prior to sub-sampling may be necessary if more than one composite sample bottle was filled (or partially filled) during the course of a storm at a particular sampling site. Care must be taken to ensure that no contaminants are introduced at any point during this procedure. If the compositing is not performed with this in mind, the possibility for the introduction of contaminants (i.e., from dust, dirty sub-sampling hose tips, dirty fingers/gloves, engine emissions, etc.) is increased significantly.

6.1 Determining the Fraction of Each Sample Bottle to be Composited: This is essential to producing a composite that is representative of the entire storm sampled and is not biased/weighted toward the first part of the storm (Bottle 1) or the last part of the storm (last bottle). In general, either the bottles have been sampled using the same volume-to-sample ratio (VSR), OR the VSR has been increased for the Bottle 2 in order to prevent over-filling of another bottle; this happens when the amount of rainfall and resulting runoff volume was underestimated.

6.1.1 Consult the field logbook and confirm that the bottles are from the same sampling station. Inspect the bottles' "ID" tags and confirm that the volume-to-sample ratio (VSR) numbers are the same as in the logbook.

6.1.2 If both bottles have the same VSR then equal parts of each sample should be mixed.

6.1.3 If the VSR of Bottle 2 is double that of Bottle 1 then 2-parts from Bottle 2 should be mixed with 1-part from Bottle 1. This is because Bottle 1 is, in a sense, twice as concentrated as Bottle 2, having sampled half as much flow per sample aliquot.

6.1.4 If there are more than two bottles to composite simply follow the rules above but apply it to all three bottles. For example, if Bottles 1, 2, and 3 had VSRs of 100, 200, and 400, respectively, then the composite would be composed of 4-parts from Bottle 3, 2-parts from Bottle 2, and 1-part from Bottle 1.

6.1.5 Volume-to-Sample Ratios are typically multiples of each other and are rarely fractions of each other. This is simply to make compositing bottles with different VSRs easier.

6.1.6 Rarely does an instance occur in which the VSR of Bottle 1 is HIGHER than that of Bottle 2. The only reason for this would be if the runoff was grossly overestimated and "Sample Control" instructed a field crew to pull Bottle 1 early and lower the VSR for Bottle 2.

6.2 Determining Water Volume Needed and the Fate of Any Excess Water: Compositing multiple composite bottles can often be done using only those bottles, or may require "dirtying" or "sacrificing" a clean composite bottle. The different reasons are described below.

6.2.1 Determine sample volume needed: The minimum volume of sample water needed for filling the numerous sample analyte containers must be known, or calculated on the spot. This is done by simply adding up the volumes of all sample containers to be filled. If there is not enough sample water (after compositing) to fill all the containers then consult with the project manager to determine what the order of priority is for the analyses (i.e., in what order to fill the containers). It is also useful to know the absolute minimum sample volumes needed by the laboratory to perform each analysis; some sample containers may not need to be filled completely.

6.2.2 Determine if excess water is to be saved: If the composite bottles are mostly full then it is likely that much of the sample water will be left over from the sub-sampling process. In this case it is sometimes prudent to save the left over sample water (on ice) for several days in case problems occur with the laboratory and more water is needed. Always check with the project manager on this point because it <u>may</u> require dirtying (sacrificing) a clean composite bottle to make the composite in. If any excess water is not to be saved then compositing can always be done in the existing composite

sample bottles: while being homogenized on a stir plate the excess sample water is simply discarded (pumped out in a calculated fashion), making room for the final composite.

6.2.3 **Plan on making as large a composite as possible:** If, for example, only 8 liters of sample water are needed but there is enough water to make a higher volume composite then it is prudent to do so. This is to account for any accidental spills and, if required, to the save enough excess water for possible re-analysis. There generally will never be a need to make a composite greater than a single 20-L composite bottle.

6.2.4 **If only one composite bottle exists from a station:** Simply follow the procedures for sub-sampling into numerous sample containers described in Section 6.5.

6.3 **Compositing Without Saving Excess Water:** This procedure also applies to instances in which there may not be excess water. For the sake of clarity an example will be used to explain the following steps. In this example three 20-L composite bottles are involved in creating a composite: Bottle 1 has 20 liters of sample water and was filled at a Volume to Sample Ratio (VSR) of 100; Bottle 2 has 20 liters and a VSR of 200; Bottle 3 has 20 liters and a VSR of 400. Sample water will be composited in Bottle 3. Most bottles have 1 liter graduations; if some don't then sample depth must be used to figure the fraction of water to be transferred.

6.3.1 Carefully place Bottle 3 on a large spin plate and gently drop a pre-cleaned stir-bar into the bottle and adjust the speed of the spin plate to optimize the mixing of the sample water throughout the bottle. The speed at which the stir-bar is spun should be adjusted so that even mixing is achieved. Speeds that are too fast will create a large vortex within the composite bottle that can actually concentrate heavier particles and should be avoided. Settling on a particular speed is based on a subjective visual assessment of what speed produces the most even, random mixing throughout the composite bottle.

6.3.2 Install a pre-cleaned sub-sampling hose into a peristaltic pump. Carefully remove the plastic cover which protects the approximately 18 inches of its exterior surface which has been cleaned. Insert this end into Bottle 3. Uncap the other end of the sub-sampling hose and ready it over a waste bucket.

6.3.3 While being mixed on the stir plate pump 10 liters into the waste bucket, leaving 10 liters in Bottle 3. This is best performed by two people. One person is responsible for filling the waste bucket and one person is responsible for moving the intake tubing up and down in the water column of the composite sample and controlling the pump. Based on experimental

evidence, this up and down movement of the intake helps obtain (or, in this case discard) a more representative sample. This is because there can still be some stratification of heavier particles in the sample bottle despite the mixing created by the stirrer. The up and down movement of the intake tubing should be limited to 80-90 percent of the water depth and should never touch the bottom of the sample bottle.

6.3.4 Remove Bottle 3 from the stir plate and replace with Bottle 2 and insert a new stir-bar and mix as described in Section 6.3.1. Keeping the sub-sampling hose clean (avoid setting it down or bumping it into objects), insert the intake end into Bottle 2. Using the methods described in Section 6.3.3 pump only 5 liters from Bottle 2 into Bottle 3, making a total of 15 liters. **NEVER INSERT THE "DIRTY" EFFLUENT END OF THE HOSE INTO ANY BOTTLE.**

6.3.5 Repeat the actions in Section 6.3.4 with Bottle 1, pumping only 2.5 liters of Bottle 1 into Bottle 3, making a total of 17.5 liters of composited water.

6.3.6 Note that this process cannot generate any excess composite water because there is none left from Bottle 3 that has not been contaminated in the waste bucket.

6.4 Compositing While Also Saving Excess Water: This is identical to the procedures described in Section 6.3 with one difference: the first 10 liters of Bottle 3 is pumped into a clean 20-L bottle instead of into a waste bucket. This "dirties" a fourth bottle but ensures that excess sample water can be kept and composited again, if desired.

6.5 Sub-sampling Composited Water into Sample Containers: This is the final stage in successfully filling a suite of sample analyte containers with composited water that is representative of an entire sampling event.

6.5.1 Place the composite bottle containing the composited water on the stir plate and achieve proper mixing.

6.5.2 Uncap and arrange all the sample containers to be filled in such a way that they can be easily filled. Due to the vibration of the peristaltic pump on the sub-sampling hose it takes a very steady hand to efficiently guide the stream of sample water into the containers. **NEVER INSERT THE "DIRTY" EFFLUENT END OF THE HOSE INTO THE SAMPLE CONTAINERS.** It is often necessary to steady the sample containers with a second hand so they do not fall over.

7.0 PERSONNEL

Only personnel that have been trained in the use of the proper safety equipment, as per the are allowed to complete this task. . The Laboratory Supervisor is responsible for training

personnel in the proper procedures in composite sample bottle, teflon sample hose and silicon peristaltic tubing, and stir bar cleaning.

8.0 QUALITY ASSURANCE REQUIREMENTS

The composite sample bottles and sub-sampling hoses must have been evaluated ("blanked") for contaminants after their initial decontamination procedure.

GENERAL FIELD SAMPLING PROCEDURE FOR:

Grab Samples

1.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes the procedures involved in the discrete manual sampling (grab sampling) of storm water for a nonpoint source (NPS) monitoring program. The purpose of these procedures is to ensure contaminant free samples, and to ensure the safety of the personnel involved.

2.0 DEFINITIONS

2.1 **Sample Containers** – any EPA or laboratory specified clean container that is used to collect sample water.

2.2 **Grab Pole** – used to obtain grabs from locations where it is impossible or too dangerous (fast current, storm drain pipe, etc.) to manually obtain a sample.

3.0 PERSONNEL

Only personnel that have been trained in the use of the proper safety equipment are allowed to complete this task. Training needs to include the proper sampling techniques and station hazards that will be encountered while performing this task. The Project Manager is responsible for training personnel in these procedures.

4.0 EQUIPMENT

4.1 **Instrumentation** – see section 12.0 Physical Parameters

4.2 **Reagents** – preservatives will be supplied by the laboratory that supplies the sample bottles. Usually, the preservative is a concentrated acid (HNO_3, H_2SO_4, HCl or other).

4.3 **Apparatus** – a telescoping grab pole with a bottle holding device secured to one end. The bottle holding device is made of plastic and Velcro. It is designed to hold in place sample bottles of various sizes and types.

4.4 **Documentation** – time, date, location, number of containers and type of grab (whether for chemical analysis or physical parameters) must be noted in the station log book for that station.

5.0 PROCEDURES

Grab sampling methods will be discussed for the following analytes:

Metals and Total Cyanide

Oil and Grease

Fecal Coliform and Fecal Streptococci

Volatile Organic and Aromatic Compounds (VOA's)

Organic Compounds (Pesticides, PAHs, PCBs, SVOCs, etc.)

Physical Parameters

6.0 GRAB SAMPLING TECHNIQUES

6.1 Grab sampling may be conducted at any time during the storm event, depending upon the specific project requirements. The type of grab study might vary as the storm season progresses and the scope requirements deem necessary. These might include:

6.1.1 **Discrete Grabs** – Taken once during the storm event at a predetermined time, usually at peak flow.

6.1.2 **Persistent Grabs** – A schedule of discrete grabs which continue through the end of the storm to show a rate of change over time.

6.1.3 **First Flush** – A type of discrete grab to be taken within the first thirty minutes of the storm event.

For the majority of grab sample studies, discrete grabs will be required. Grabs will be taken on the rising hydrocurve of the storm event and as close to peak stage as is feasible. The times of these grabs will be decided by the Storm Control and/or Shift Leader and will be relayed to the field crews.

6.2 Depending upon then type of analyte being sampled, the technique may vary but all sampling **MUST** follow these general rules to minimize contamination:

6.2.1 Grab bottles are to be filled as near to the intake as is safely possible.

6.2.2 When unable to obtain a sample near the intake, take one as near to the center of flow as possible or in an area of sufficient velocity to ensure good mixing

6.2.3 The field personnel taking grab samples must be standing downstream from the sample bottle when filling.

6.2.4 The mouth of the bottle must be facing into the current.

6.2.5 Raise and lower the bottle through the water column so the sample is not biased with only one level sampled.

6.2.6 Manhole sites and inaccessible stream sites are best sampled with a grab pole.

7.0 METALS AND TOTAL CYANIDE

Samples to be analyzed for metals and cyanide are grabbed in a plastic or Teflon® container. Metals and total cyanide will require a preservative in the container (see Section 4.2). These grabs require extra care so as to not overfill the container and spill out any of the preservative, or allow the preservative to come into contact with the skin.

Metals sample bottles contain an acid preservative (HNO_3) and total cyanide sample bottles contain a base (NaOH) for a preservative. When the grab container is being filled manually, the level of water can be watched so the container is not overfilled. When the sample cannot be taken by hand and must be taken with a grab pole, the filling becomes a bit more difficult. Lower the container with the grab pole and watch for escaping air bubbles when submerged. Pull the sample bottle out frequently to check the water level accumulated and quit filling when that level has reached the "shoulder" of the bottle. Be sure **NOT TO OVERFILL THE SAMPLE BOTTLE**; this would spill the preservative compromising the sample and possibly endangering the person sampling.

8.0 OIL AND GREASE

Oil and grease samples are very similar to metals in that the bottles contain preservative and **MUST NOT BE OVERFILLED**. Oil and grease analysis requires that the sample be taken in glass containers, usually amber and usually in duplicate (in case of breakage). Fill these containers in the same exact way as mentioned above for metals analysis.

9.0 FECAL COLIFORM AND FECAL STREPTOCOCCI

Fecal coliform and fecal streptococci are usually grabbed in bacteria bottles or urine analysis cups. They contain a residual chlorine removal preservative tablet and should be filled to the sample container fill line when sampling. Wear protective gloves so that there is no skin contact with the interior of the container. The main precaution is not to contaminate the sample when opening the cup. Fill each cup completely and secure the cap.

10.0 VOLATILE ORGANIC AND AROMATIC COMPOUNDS (VOA'S)

Collecting water for Volatile Organic Compounds (VOA) requires extreme care. VOA's volatilize (enter the gaseous phase very quickly), thus, sample vials are designed to prevent this. These vials will leave no headspace (air bubbles) in a properly filled container because they have a septa cap , thereby minimizing loss of analyte to the atmosphere.

To fill a VOA vial, lower it into the water column and allow it to **FILL UP COMPLETELY** (until a water dome is formed over the top of the vial). VOA's must be preserved with HCl so take extra care not to spill any of this preservative. Very carefully place the septa cap onto the vial so no air is introduced, start with the cap tilted to one side and gently lower it until it is seated onto the threads of the vial and secure. Make sure there is no air in the vial by inverting the sample. If air bubbles show, a new sample must be taken using a new vial and the bad container and sample must be returned to the lab for proper disposal. **See Section 13.0 for additional precautions to be taken with VOA vials.**

11.0 ORGANIC COMPOUNDS (PESTICIDES, PAHs, PCBs, SVOCS, etc.)

Organic compound samples are collected in glass containers, usually amber. These samples generally do not require preservatives but should be filled in the same way as those collected for metals, and oil and grease analyses.

12.0 PHYSICAL PARAMETERS

Each time a station is visited during a storm event, certain physical parameters must be measured. Generally, at a minimum, pH and temperature are measured. Follow the instructions that are included with the field instrumentation used for the best results. There are many different brands of meters that require different techniques.

Take the measurements as close to the grab sampling point as possible while keeping safety a priority. A grab sample may be taken and analyzed somewhere more convenient and safe than the stream edge. Remember that the analysis on a grab sample should be performed "as soon as possible" to ensure as accurate measurements (pH, temperature, etc.) as possible. Record all results in the log book for that station and be sure to write in the units of measurement.

13.0 QUALITY CONTROL LIMITS

Grab sample containers must come from a reputable distributor and be certified clean for the analyte to be sampled. They must also be properly preserved and labeled prior to sampling. Transport the bottles in clean coolers accompanied with any required paperwork or instructions.

Immediately upon completion of sampling, return the sample bottles to a clean cooler and ice them down to 4°C. Recheck to be certain that all the information on the label is correct (date, time, location, analysis, preservative, etc.). Fill out the required paperwork and station log book sheets and transfer the samples to a predetermined pick-up location for the Analytical Laboratory.

13.1 For some storm sampling events, different Quality Assurance and Quality Controls (QA/QC) will be implemented. These will include:

13.1.1 Field Duplicates – Additional set of sample bottles grabbed at the same location and time as the actual sample. This sample may be given its own mock station identification and be submitted to the Analytical Laboratory blind.

13.1.2 Field Blanks – This is a full set of sample bottles (usually minus TSS and turbidity) containing reagent grade analyte free water provided by the Analytical Laboratory that will be doing the analysis. These samples are poured by hand from clean bottles containing the blank water into a labeled sample container. These sample bottles may be given a mock station identification and submitted blind as well.

13.1.3 Trip Blanks – Usually required for very sensitive samples (VOA's). The Analytical Laboratory will provide sample bottles already filled with reagent

grade analyte free water that will make the full "trip" from the lab, out into the field and back into the lab. **THESE CONTAINERS ARE NOT TO BE OPENED**.

Trip blanks are only analyzed if contamination is suspected. If analyzed and contamination is found, they usually warrant further investigation and subsequent sampling.

13.1.4 Matrix Spiking and Lab Replicates – These analyses can usually be taken from a sample bottle already sent into the field and do not require extra bottles, however, extra volume may be required at these stations.

13.2 While performing or preparing for grab sampling, be sure that no "outside" contamination will occur:

13.2.1 No engines are running in the general vicinity of sampling.

13.2.2 Sample containers are clean and intact.

13.2.3 Sample containers are properly labeled and meet bottle requirements for that analyte (size, type, preservative, type of cap liners, etc.).

13.2.4 Sample techniques are proper and safe.

13.3 Volatile Organic and Aromatic Compounds (VOA's) – require very special handling.

13.3.1 VOA vials are very fragile. Protect with adequate foam packing material.

13.3.2 VOA bottles should have no headspace (see Section 10.0). This means that they are subject to freezing. **Prevent direct contact of VOA vial with ice by using additional packaging.**

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APPENDIX D

CLEANING AND BLANKING PROTOCOL

FOR

EQUIPMENT AND SUPPLIES USED IN COLLECTION OF FLOW OR TIME-WEIGHTED COMPOSITES

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CLEANING PROTOCOL FOR:

20-L Borosilicate Glass Composite Bottles (Media Bottles) and Closures

1.0 SCOPE

This Standard Operating Procedure (SOP) describes the procedures for the cleaning of 20-liter composite sample bottles and the related equipment necessary to complete the task. The purpose of these procedures is to ensure that the sample bottles are contaminant-free and to ensure the safety of the personnel performing this procedure.

2.0 APPLICATION

This SOP applies to all laboratory activities that comprise the cleaning of 20-liter composite sample bottles and stoppers.

3.0 HEALTH AND SAFETY CONSIDERATIONS

The cleaning of 20-liter composite-sample bottles and associated equipment involves hazardous materials. Skin contact with all materials and solutions should be minimized by wearing appropriate personal protective equipment (PPE) including: chemical-resistant gloves, laboratory coats, chemical-resistant aprons, and goggles. To ensure that you are aware of the hazards involved, the material safety data sheets (MSDSs) for nitric acid and laboratory detergents should be reviewed before beginning any of these procedures.

Note: Preparations should be made to contain and neutralize any spillage of acid. Be aware of the location of absorbent, neutralizing, and containment materials in the bottle cleaning area.

4.0 DEFINITIONS

4.1 **Composite sample bottle** - 20 liter borosilicate glass bottle that is used with autosamplers to collect a stormwater composite sample.

4.2 **Stopper** - a Teflon® cap used to seal the composite sample bottle (either solid, or drilled with holes for the silicon inlet tubing).

4.3 **O-Ring** - Viton O-ring 23/8"- I.D. x 23/4"- O.D. that is located around the base of stopper.

4.4 **Clamp** - Polypropylene clamp, 2 bolts, and wing nuts specifically designed to fasten the stopper and the O-ring to the rim of the composite sample bottle.

4.5 **De-ionized (DI) water** - commercial de-ionized water (12-13 Megohm/cm)

4.6 **Laboratory Detergent** - 2% solution of Contrad 70® or Micro-90® detergent

5.0 EQUIPMENT

5.1 Instrumentation:

1) Peristaltic pump with a protocol-cleaned sub-sampling hose setup

5.2 Reagents:

1) ACS Reagent Grade nitric acid in a 2 Normal solution (2N HNO_3)

2) Contrad 70® non-phosphate laboratory detergent

3) Contrad 70® anti-foaming agent

4) Micro-90® non-phosphate laboratory detergent

5) Baking soda or equivalent to neutralize acid

6) pH paper

5.3 Apparatus:

1) Bottle Rolling Rack

2) DI Rinse Rack

3) Yellow Neutralization Drip Bucket

4) Neutralization Tank

5.4 Documentation:

The status of each composite sample bottle must be tracked. Bottles should be washed in batches of 10, 20, or 30 and the status of each batch must be made apparent to all personnel by posting a large status label (including the start date) with each batch. This will ensure that all required soak times have been attained and that each bottle was subjected to the proper cleaning procedures. Information on each batch of bottles cleaned (including bottle number, QA batch, date cleaning started, date finished, date blanked, and cleaning technicians) should be entered in the **Bottle Cleaning Log Sheet**.

6.0 CLEANING PROCEDURES

Care must be taken to ensure that no contaminants are introduced at any point during this procedure. If the wash is not performed with this in mind, the possibility for the introduction of contaminants (i.e., from dust, dirty sub-sampling tubing tips, dirty fingers/gloves, automobile emissions, etc.) is increased significantly.

6.1 Teflon® Bottle Stoppers with Holes and Field Extras:

To be performed whenever required for field use.

1) Wash with laboratory detergent using a clean all-plastic brush.

2) Rinse thoroughly (minimum of three times) with tap water.

3) Rinse thoroughly (minimum of three times) with DI water.

4) Wash three times with 2N nitric acid squirt bottle.

5) Rinse thoroughly (minimum of three times) with DI water.

6) Allow to dry in a dust-free environment.

7) Store in two sealed clean Ziploc® bags.

6.2 NPS 20 liter composite sample bottle Cleaning:

6.2.1 Preliminary Bottle Cleaning:

Bottles should undergo a preliminary rinse with tap water as soon as possible after they are available. This includes dumping any remaining stormwater into a sanitary drain and rinsing the bottles and stoppers. This prevents material from adhering to the interior surface of the bottle.

6.2.2 **48 Hour Soak:** Place the bottle to be cleaned into a secondary containment bucket. Prepare a 2% solution of laboratory detergent with tap water directly in the bottle. Note: Since laboratory detergent is a foaming solution, add 3/4 of the tap water first, add the detergent, then add the rest of the water. Should excessive foam be generated, a few drops of Contrad 70® anti-foaming agent may be added. **Make sure that the bottle is filled to the rim and scrub the rim with an all-plastic scrub brush.** Scrub a Teflon® stopper with 2% solution of laboratory detergent and place stopper over the full bottle so overflowing happens. This will allow both the stopper and the bottle to soak for 48 hours. After the 48 hour soak, this solution may be may be retained for reuse (i.e., siphoned into other dirty bottles) or it can be poured off into a sanitary drain.

6.2.3 Teflon® Bottle Stopper and O-ring Cleaning:

This procedure should be performed prior to the bottle washing process so that the stopper can follow the bottle through the acid wash.

1) Rinse thoroughly (minimum of three times) with tap water.

2) Rinse thoroughly (minimum of three times) with DI water.

3) Store temporarily in a similarly cleaned

6.2.4 **Tap Water Rinse:** Tap water rinses detergent better than DI water. Flush upside down bottle with tap water for 20 sec. Rinse each bottle 3 times with tap water being careful not to contaminate the clean surfaces.

6.2.5 **DI Rinse:** Rinse the top and neck of the bottles with DI water using a squirt bottle and then rinse upside down for three minutes on the DI rinse rack for bottles. Make sure to tip bottles from side to side for a more thorough rinsing. Allow 1-2 minutes for the bottles

to drain as much as possible. Rinse each stopper with DI water squirt bottle 3 times (being careful not to touch the clean surfaces).

6.2.6 **Acid Wash:** Note that it is important to Wash the bottle with 2N nitric acid according to the following procedure:

1) Place the empty bottle near the 2N nitric acid carboy and peristaltic pump. The location should be able to safely contain a spill if the 20L bottle breaks.

2) Pump acid into the bottle using the peristaltic pump fitted with a protocol-cleaned sub-sampling hose setup

3) Fill the bottle slightly more than half full.

4) Place a protocol-cleaned solid Teflon® stopper (with a properly seated O-ring) (Refer to Section 6.2.3 above) on the bottle and clamp it securely.

5) **Carefully** lift and place the bottle on the roller rack and check for leakage from the stopper. Neutralize any spillage. Often small leaks can be corrected by a slight tightening of the clamp. Roll the bottles for twenty minutes.

6) Pump the acid into another bottle for rolling or back into the 2N nitric acid carboy.

6.2.7 **DI Rinse for Sub-sampling Hose**: After use, the sub-sampling hose setup should be rinsed by pumping 1-2 gallons of DI water through the hoses and into a neutralization tank. Carefully rinse the outside of the hose to remove any acid that may be on the exterior of the hose. pH paper should be used to insure that the fluid in and on the hose is 6.8 or higher. Continue rinsing until your reach neutral pH. Store hose in a clean, large plastic bag between uses. Dispose of rinsate in accordance with all federal, state, and local regulations

6.2.8 **DI Rinse for Bottles**: Allow the bottles to drain into a yellow neutralization bucket for at least 1 minute. Place four bottles at a time on the DI rinse rack and rinse for 5 minutes. Move bottles around to ensure complete and thorough rinsing. Rinse the outside of the bottle with tap water. Allow bottles to drain for 2 minutes.

6.2.9 **DI Rinse for Stoppers**: Rinse caps thoroughly 3 times over neutralization tank. Place on a clean surface where the clean side of the stopper will not be contaminated.

6.3 **Storage:** Clamp a stopper (one that went through the entire cleaning procedure) on the bottle. Properly label the bottle as to the date cleaned and by whom and place on the bottle storage rack or in a secondary containment bucket in a safe area. Also, fill out the **Bottle Cleaning Log Sheet**.

7.0 QUALITY ASSURANCE REQUIREMENTS

7.1 The NPS 20 liter sample bottles must be evaluated ("blanked") for contaminants after they have completed the decontamination procedure. The analytical laboratory performing

the evaluation should supply Milli-Q® water that is used as a blanking rinsate, and sample bottles for the appropriate constituents of concern. This evaluation will be accomplished by randomly blanking 10% of the washed bottles, or 1 bottle per batch (whichever is greater) and having the blanking rinsate analyzed by the laboratory for the appropriate constituents.

7.2 If any of the bottles fail the analyses (concentration of any analytes are at or above the limit of detection), all of the bottles from that batch must be decontaminated. Again, 10% of these bottles must be subjected to the blanking process as described-above.

7.3 If results of the evaluation process show that the bottles are not contaminant-free, the cleaning procedure must be re-evaluated. Consult with the Quality Assurance/Quality Control Officer to determine the source of contamination.

CLEANING PROTOCOL FOR:

Miscellaneous Laboratory Equipment used for Cleaning and Blanking

1.0 SCOPE

This Standard Operating Procedure describes the procedures for cleaning the miscellaneous items necessary to complete the tasks of cleaning 20- liter composite sample bottles and hoses. The purpose of these procedures is to ensure that the items are contaminant-free and to ensure the safety of the personnel performing this procedure.

2.0 APPLICATION

This SOP applies to all laboratory activities that comprise the cleaning of ancillary items necessary to complete the tasks of cleaning 20 liter composite sample bottles and NPS hoses.

3.0 HEALTH AND SAFETY CONSIDERATIONS

The cleaning of the following items may involve contact with hazardous materials. Skin contact with all materials and solutions should be minimized by wearing appropriate personal protective equipment (PPE) including: chemically-resistant protective gloves, laboratory coats, chemically-resistant aprons, and goggles. In addition, to ensure that you are aware of the hazards involved and of any new revisions to the procedure, the material safety data sheets (MSDSs) for nitric acid and the laboratory detergent should be reviewed before beginning any of these procedures.

4.0 DEFINITIONS

4.1 Polyethylene Squirt Bottles - ½ and 1 liter squirt bottles for washing and/or rinsing with DI water or nitric acid.

4.2 Polycarbonate and Polyethylene De-ionized Water Jugs - For holding DI water.

4.3 Polyethylene Bucket - For holding tap water, DI water or detergent solutions during hose washing procedures.

4.4 Four-inch Teflon® Connector - For connecting two lengths of silicon peristaltic tubing together.

4.5 Four-inch Silicon Connector - For connecting two lengths of Teflon® hose together.

4.6 Orange Polypropylene Hose Caps - For placing over the ends of clean Teflon® hose to prevent contamination.

4.7 De-ionized (DI) water - Commercial de-ionized water

4.8 Laboratory Detergent - 2% solution of Contrad 70® or Micro-90® detergent.

5.0 EQUIPMENT

5.1 Instrumentation: Not applicable.

5.2 Reagents:

1) ACS Reagent Grade nitric acid as a 2 Normal solution (2N HNO_3)

2) Micro-90® non-phosphate laboratory detergent

3) Contrad 70® non-phosphate laboratory detergent

4) Contrad 70® anti-foaming agent.

5) pH paper or pH meter

6) Baking soda ($NaHCO_3$) or equivalent to neutralize acid

5.3 Apparatus:

1) Clean polyethylene squirt bottles.

2) Clean polyethylene trays or 2000 ml glass beakers.

3) Neutralization Tank

5.4 Documentation:

Label each squirt bottle, DI jug, storage container holding clean items, etc. as to the date each was cleaned and the initials of the cleaning technician.

6.0 CLEANING PROCEDURES

Care must be taken to ensure that no contaminants are introduced at any point during these procedures. If the wash is not performed with this in mind, the possibility for the introduction of contaminants (i.e., from dirty sinks, dirty counter tops, dirty fingers/gloves, dirty hose ends, etc.) is increased significantly.

Rinsing properly is essential to ensure proper cleaning. This is done by squirting the liquid over the item to be cleaned in a top-down fashion, letting the water flow off completely **before** applying the next rinse. Rinse the item in this fashion **a minimum** of three times. **Numerous rinses of relatively small volumes are much better than one or two rinses of higher volume.** Be aware of handling: use clean gloves (it is best if they have gone through the same prior wash as the item to be rinsed) and rinse off the fingers prior to grasping the item to be cleaned. Try to grasp the item in a slightly different place between rinses so ones fingers do not cover a portion of the item throughout the rinses.

6.1 Polyethylene Squirt Bottles:

1) Soak in a 2% solution of laboratory detergent in a protocol-cleaned bucket for 48 hours.

2) Rinse thoroughly (minimum of three times) with tap water.

3) Rinse thoroughly (minimum of three times) with DI water.

4) Wash three times with 2N (10%) nitric acid.

5) Rinse thoroughly (minimum of three times) with DI water. Neutralize and dispose of rinsate in accordance with all federal, state, and local regulations.

6.2 Polycarbonate and Polyethylene DI Water Jugs:

1) Fill to the rim with a 2% solution of laboratory detergent, cap the jug, and let soak for 48 hours. Wash cap with an all-plastic scrub brush after soak.

2) Rinse thoroughly (minimum of three times) with tap water.

3) Rinse thoroughly (minimum of three times) with DI water.

4) Wash three times with 2N (10%) nitric acid.

5) Rinse thoroughly (minimum of three times) with DI water. Neutralize and dispose of rinsate in accordance with all federal, state, and local regulations.

6.3 Polyethylene Bucket:

1) Fill to the rim with a 2% solution of laboratory detergent and let soak for 48 hours.

2) Rinse thoroughly (minimum of three times) with tap water.

3) Rinse thoroughly (minimum of three times) with DI water.

4) Wash three times with 2N (10%) nitric acid squirt bottle.

5) Rinse thoroughly (minimum of three times) with DI water. Neutralize and dispose of rinsate in accordance with all federal, state, and local regulations. **Label as to the date cleaned and initial**.

6.4 Four-inch Teflon® and Silicon Hose Connectors and Orange Polypropylene Hose Caps. The purpose of the four-inch sections of Teflon® and silicon hose is to connect longer lengths of each type of hose together during the hose cleaning procedures. The orange polypropylene hose caps are for the ends of cleaned FEP hoses to prevent contamination prior to use in the field or laboratory.

1) Using a 2% solution of laboratory detergent, soak the four-inch sections of FEP hose, silicon tubing, and orange caps for 48 hours.

2) Rinse thoroughly with tap water (minimum of three rinses).

3) Rinse thoroughly with DI water (minimum of three rinses).

4) Using a squirt bottle filled with 2N (10%) HNO_3, thoroughly rinse the interior and exterior of the connectors and caps thoroughly OR, roll/agitate them in a shallow layer of 2N (10%) HNO_3

in a laboratory detergent cleaned glass beaker or other appropriate, clean container for a more thorough washing.

5) Thoroughly rinse connectors and caps with DI water (minimum of three rinses). Neutralize and dispose of rinsate in accordance with all federal, state, and local regulations. Keep clean connectors and caps in a similarly cleaned (or certified clean) widemouth glass jar or detergent-cleaned resealable bag and **label as clean, date cleaned, and initial**.

NPS 20-Liter Bottle Subsampling Procedure

1.0 Scope

This Standard Operating Procedure (SOP) describes the procedures for the compositing and sub-sampling of non-point source (NPS) 20 liter sample bottles. The purpose of these procedures is to ensure that the sub-samples taken are representative of the entire water sample in the 20-L bottle (or bottles). In order to prevent confusion, it should be noted that in other KLI SOPs relating to 20-L bottles they are referred to as "composite" bottles because they are a composite of many small samples taken over the course of a storm; in this SOP the use of "compositing" generally refers to the calculated combining of more than one of these 20-L "composite" bottles.

2.0 Application

This SOP applies to all laboratory activities that comprise the compositing and sub-sampling of NPS 20 liter sample bottles.

3.0 Health and Safety Considerations

The compositing and sub-sampling of NPS 20 liter sample bottles may involve contact with contaminated water. Skin contact with sampled water should be minimized by wearing appropriate protective gloves, clothing, and safety glasses. Avoid hand-face contact during the compositing and sub-sampling procedures. Wash hands with soap and warm water after work is completed.

4.0 Definitions

4.1 **20 liter sample bottle:** 20 liter borosilicate glass bottle that is used to collect multiple samples over the course of a storm (a composite sample).

4.2 **Large-capacity stirrer**: Electric motorized "plate" that supports a 20 liter bottle and facilitates the mixing of sample water within the bottle by means of spinning a pre-cleaned magnetic stir-bar which is introduced into the bottle.

4.3 **Stir-bar**: Teflon-coated magnetic "bar" approximately 2-3 inches in length which is introduced into a 20 liter bottle and is spun by the stirrer, thereby creating a vortex in the bottle and mixing the sample. Pre-cleaned using cleaning protocols provided in KLI SOP for *Cleaning Procedures for Miscellaneous Items Related to NPS Sampling*.

4.4 **Sub-sampling hose**: Two ~3-foot lengths of Teflon tubing connected by a ~2-foot length of silicon tubing. Pre-cleaned using cleaning protocols provided in SOP for *Teflon Sample Hose and Silicon Peristaltic Tubing Cleaning Procedures*. Used with a peristaltic pump to transfer sample water from the 20-L sample bottle to sample analyte containers.

4.6 **Volume-to-Sample Ratio (VSR):** A number that represents the volume of water that will flow past the flow-meter before a sample is taken (usually in liters but can also be in kilo-cubic feet for river deployments). For example, if the VSR is 1000 it means that every time 1000 liters passes

the flow-meter the sampler collects a sample (1000 liters of flow per 1 sample taken). Note: The VSR indicates when a sample should be taken and is NOT an indication of the sample size.

5.0 EQUIPMENT

5.1 Instrumentation: Not applicable

5.2 Reagents: Not applicable.

5.3 Apparatus

1) Large capacity stirrer.

2) Stir bar.

3) Sub-sampling hose.

4) Peristaltic pump.

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APPENDIX E

QUALITY ASSURANCE/QUALITY CONTROL

1. Quality Assurance/Quality Control

Elements of a Quality Assurance and Quality Control (QA/QC) Plan have been incorporated into the CIMP in order to detail critical activities conducted to assure that both chemical and physical measurements meet the standard of quality needed to evaluate measurements at levels relevant to applicable water quality criteria. With many different monitoring programs being implemented within the region, comparability should remain of the primary goals of the QA/QC monitoring program. The Intergovernmental Task Force on Monitoring Water Quality (ITFM, 1995) defines comparability as the "characteristics that allow information from many sources to be of definable or equivalent quality so that it can be used to address program objectives not necessarily related to those for which the data were collected."

One important aspect of comparability is the use of analytical laboratories that are accredited under a program such as the National Environmental Laboratory Accreditation Program (NELAP), California's Environmental Laboratory Accreditation Program (ELAP) or a well-qualified research laboratory. In addition, the laboratory should be a participant in a laboratory proficiency and intercalibration program. Laboratories have not been selected for this program but participation in the Stormwater Monitoring Coalition's (SMC) intercalibration program will be a primary consideration. Unfortunately, the SMC has not fully completed implementation of a program the full range of analyses included in the MRP Table E-2 list.

Evaluation of data quality will be based upon protocols provided in the *National Functional Guidelines for Inorganic Superfund Data Review (USEPA540-R-10-011)* (USEPA 2010), *National Functional Guidelines for Superfund Organic Methods Data Review (EPA540/R-08-01),* and the *Guidance on the Documentation and Evaluation of Trace Metals Data Collected for Clean Water Act Compliance Monitoring (EPA/821/B/95/002)* (USEPA 1996).

The sections that follow address activities associated with both field sampling and laboratory analyses. Quality assurance activities start with procedures designed to assure that errors introduced in the field sampling and subsampling processes are minimized. Field QA/QC samples are collected and used to evaluate potential contamination and sampling error introduced into a sample prior to its submittal to the analytical laboratory. Laboratory QA/QC activities are used to provide information needed to assess potential laboratory contamination, analytical precision and accuracy, and representativeness.

1.1.1 Sample Handling, Containers and Holding Times.

Table **1** provides a summary of the types of sample volumes, container types, preservation and holding times for each analytical method. Analytical methods requiring the same preservation and container types may be transferred to the laboratory in one container in order to minimize handling prior to transfer to the laboratory.

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Table 1. Constituents, Sample Container, Preservation and Holding Times.

Analyte	EPA Method Number	Holding Time	Container Size	Container Type	Preservation	Minimum Level/ Resolution	Units
Conventionals							
pH	150.1	15 minutes		glass or PE	none	+/- 0.1	std. units
Oil and Grease	1664A	28 days	1 L	Glass	HCl	5	mg/L
TPH	418.1	28 days	1 L	Glass	HCl	5	mg/L
Total Phenols	420.1	28 days	500mL-1 L	Glass	H_sSO_4	5	mg/L
Cyanide	SM4500-CN-E	14 days	500 mL	HDPE	NaOH	0.003	mg/L
Turbidity	SM2130B	48 hours	100-250mL	Glass	4-6°C	1	NTU
TSS	160.2	7 days	1 L	HDPE	4-6°C	4	mg/L
SSC[1]	ASTMD3977B	7 days	1 L	HDPE	4-6°C	4	mg/L
TDS	160.1	7 days	1 L	HDPE	4-6°C	1	mg/L
VSS	160.4	7 days	1 L	HDPE	4-6°C	1	mg/L
TOC; DOC	415.1	28 days	250 mL	glass	4°C and HCl or H_2SO_4 to pH<2	1	mg/L
BOD_5	SM5210B	48 hours	600mL-1L	HDPE	4-6°C	3	mg/L
COD	410.1	28 days	20-250 mL	Glass	H_sSO_4	4	mg/L
Alkalinity	SM 2320B	Filter ASAP, 14 days	100-250 mL	HDPE	4-6°C	1	mg/L
Conductivity	SM 2510	28 days	100-250 mL	HDPE	4°C; filter if hold time >24 hours	1	µmho/cm
Hardness	130.2	6 months	100-250 mL	HDPE	and HNO_3 or H_2SO_4 to pH<2	1	mg/L
MBAS	425.1	48 hours	250-500 mL	HDPE	4-6°C	0.02	mg/L
Chloride	300	28 days	250-500 mL	HDPE	4-6°C	2	mg/L
Fluoride	300	28 days	250-500 mL	HDPE	4-6°C	0.1	mg/L
Perchlorate	314.0	28 days	100-250 mL	HDPE	4-6°C	4	µg/L
Volatile Organics							
MTBE	624	14 days	3 40mL VOA	Glass	HCl	1	µg/L

Analyte	EPA Method Number	Holding Time	Container Size	Container Type	Preservation	Minimum Level/ Resolution	Units
Bacteria							
Total Coliform	SM9221B	6 hr-8 hr	100 mL	Sterile HDPE	4-6°C	20-2,400,000	MPN/100mL
Fecal Coliform	SM9221B	6 hr-8 hr	100 mL	Sterile HDPE	4-6°C	20-2,400,000	MPN/100mL
Enterococcus	SM9230B or C	6 hr-8 hr	100 mL	Sterile HDPE	4-6°C	20-2,400,000	MPN/100mL
E. coli	SM 9223 COLt	6 hr-8 hr	100 mL	Sterile HDPE	4-6°C	20-2,400,000	MPN/100mL
Nutrients							
TKN	351.1	28 days	500mL-1L	Amber glass	H_sSO_4	0.5	mg/L
Nitrate-N	300	48 hours	50-125mL	HDPE	4-6°C	0.1	mg/L
Nitrite-N	300	48 hours	50-125mL	HDPE	4-6°C	0.05	mg/L
Total Nitrogen	Calculation					NA	mg/L
Ammonia-N	350.1	28 days	500mL-1L	Amber glass	H_sSO_4	0.1	mg/L
Total Phosphorus	SM4500-P,EorF	28 days	100-250 mL	glass	H_sSO_4	0.1	mg/L
Dissolved Phosphorus	SM4500-P,EorF	28 days	100-250 mL	glass	4-6°C	0.1	mg/L
Organic Compounds (pesticides and herbicides)							
Organochlorine Pesticides & PCBs	608	7days:40days	1L	Amber glass	4-6°C	0.005-0.5	µg/L
Organophosphate Pesticides	507	14days	1L	Amber glass	$Na_sS_2O_3$ 4-6°C	0.01-1	µg/L
Glyphosate	547	14days	250mL	Amber glass	$Na_sS_2O_3$ 4-6°C	5	µg/L
Chlorinated Acids	515.3	14days	250mL	Amber glass	$Na_sS_2O_3$ 4-6°C		
2,4-D						0.02	µg/L
2,4,5-TP-Silvex						0.2	µg/L
Semivolatile Organic Compounds	625;8270D	7days;40days	1L	Amber glass	4-6°C	0.05-10	µg/L

Metals (Total and Dissolved)

Analyte	EPA Method Number	Holding Time	Container Size	Container Type	Preservation	Minimum Level/ Resolution	Units
Aluminum	200.8	If practical, filter immediately after subsampling. Otherwise filter in laboratory for dissolved fraction and preserve not more than 24 hours after subsampling; 6 months to analysis	250 to500 mL	HDPE	4°C and HNO_3 to pH<2	100	µg/L
Antimony	200.8					0.5	µg/L
Arsenic	200.8					0.5	µg/L
Beryllium	200.8					0.5	µg/L
Cadmium	200.8					0.25	µg/L
Chromium (Total)	200.8					0.5	µg/L
Copper	200.8					0.5	µg/L
Iron	200.8					25	µg/L
Lead	200.8					0.5	µg/L
Nickel	200.8					1	µg/L
Selenium	200.8					1	µg/L
Silver	200.8					0.25	µg/L
Thallium	200.8					0.5	µg/L
Zinc	200.8					1	µg/L
Chromium (Hexavalent)	218.6	Filter as above 24 hours	250 ml	HDPE	4°C	5	µg/L
Mercury	245.1	Filter as above 28 days	250 ml	Glass or Teflon	4°C and HNO_3 to pH<2	0.2	µg/L

Abbreviations

TSS=Total Suspended Solids
SSC=Suspended Sediment Concentration
TDS=Total Dissolved Solids
TPH=Total Petroleum Hydrocarbons
VSS=Volatile Suspended Solids
TOC=Total Organic Carbon
BOD_5=Five-day Biochemical Oxygen Demand
COD=Chemical Oxygen Demand
MBAS=Methylene Blue Active Substances
MTBE= Methyl Tertiary Butyl Ether
TKN=Total Kjeldahl Nitrogen
PCBs=Polychlorinated Biphenyls

1.1.2 Precision, Bias, Accuracy, Representativeness, Completeness, and Comparability

The overall quality of analytical measurements is assessed through evaluation of precision, accuracy/bias, representativeness, comparability and completeness. Precision and accuracy/bias are measured quantitatively. Representativeness and comparability are both assessed qualitatively. Completeness is assessed in both quantitative and qualitative terms. The following sections examine how these measures are typically applied.

1.1.2.1 Precision

Precision provides an assessment of mutual agreement between repeated measurements. These measurements apply to field duplicates, laboratory duplicates, matrix spike duplicates, and laboratory control sample duplicates. Monitoring of precision through the process allows for the evaluation of the consistency of field sampling and laboratory analyses.

The Relative Percent Difference (RPD) will be used to evaluate precision based upon duplicate samples. The RPD is calculated for each pair of data is calculated as:

$$RPD=[(x_1-x_2)*100]/[(x_1+x_2)/2)$$

Where:

x_1=concentration or value of sample 1 of the pair

x_2=concentration or value of sample 2 of the pair

In the case of matrix spike/spike duplicate, RPDs are compared with measurement quality objectives (MQOs) established for the program. MQOs will be established to be consistent with the most current SWAMP objectives in the SWAMP Quality Assurance Project Plan (2008) including the most recent updates as well as consultations with the laboratories performing the analyses. In the case of laboratory or field duplicates, values can often be near or below the established reporting limits. The most current SWAMP guidelines rely upon matrix spike/spike duplicate analyses for organic compounds instead of using laboratory duplicates since one or both values are often below detection limits or are near the detection limits. In such cases, RPDs do not provide useful information.

1.1.2.2 Bias

Bias is the systematic inherent in a method or caused by some artifact or idiosyncrasy of the measurement system. Bias may be either positive or negative and can emanate from a number of different points in the process. Although both positive and negative biases may exist concurrently in the same sample, the net bias is all that can be reasonably addressed in this project. Bias is preferably measured through analysis of spiked samples so that matrix effects are incorporated.

1.1.2.3 Accuracy

Accuracy is a measure of the closeness of a measurement or the average of a number of measurements to the true value. Accuracy includes of a combination of random error as measured by precision and systematic error as measured by bias. An assessment of the accuracy of measurements is based on determining the percent difference between measured values and known or "true" values applied to surrogates, Matrix Spikes (MS), Laboratory Control Samples (LCS) and Standard Reference Materials (SRM). Surrogates and matrix spikes evaluate matrix interferences on analytical performance, while laboratory control samples, standard reference materials and blank spikes (BS) evaluate analytical performance in the absence of matrix effects.

Assessment of the accuracy of measurements is based upon determining the difference between measured values and the true value. This is assessed primarily through analysis of spike recoveries or certified value ranges for SRMs. Spike recoveries are calculated as Percent Recovery according to the following formula:

$$\text{Percent Recovery} = [(t-x)/\alpha]*100\%$$

Where:

t=total concentration found in the spiked sample

x=original concentration in sample prior to spiking, and

α=actual spike concentration added to the sample

1.1.2.4 Representativeness, Comparability and Completeness

Representativeness is the degree to which data accurately and precisely represents the natural environment. For stormwater runoff, representativeness is first evaluated based upon the automated flow-composite sample and the associated hydrograph. To be considered as representative, the autosampler must have effectively triggered to capture initial runoff from the pavement and the composite sample should:

- be comprised of a minimum number of aliquots over the course of the storm event,
- effectively represent the period of peak flow,
- contain flow-weighted aliquots from over 80% of the total runoff volume, and
- demonstrate little or no evidence of "stacking".

Stacking occurs when the sampling volume is set too low and commands back up in the memory of an autosampler causing it to continuously cycle until it catches up with the accumulation of total flow measured by the stormwater monitoring station.

Representativeness is also assessed through the process of splitting or subsampling 20 L composite bottles into individual sample containers being sent to the laboratory. The first subsamples removed from the composite bottle should have the same composition as the last. Subsampling should be conducted in accordance with guidance in the subsampling SOP. This SOP is based upon use of large laboratory magnetic stir plate, an autosampler, and precleaned subsampling hoses to

minimize variability. Sample splitting can introduce a substantial amount of error especially if significant quantities of coarse sediments (greater than 250 µm) represent as significant fraction of the suspended sediments. Use of a USGS Teflon churns or Decaport cone splitter may also be used but would require development of a separate SOP.

Comparability is the measure of confidence with which one dataset can be compared to another. The use of standardized methods of chemical analysis and field sampling and processing are ways of insuring comparability. Application of consistent sampling and processing procedures is necessary for assuring comparability among data sets. Thorough documentation of these procedures, quality assurance activities and a written assessment of data validation and quality are necessary to provide others with the basic elements to evaluate comparability.

Completeness is a measure of the percentage of the data judged valid after comparison with specific validation criteria. This includes data lost through accidental breakage of sample containers or other activities that result in irreparable loss of samples. Implementation of standardized Chain-of-Custody procedures which track samples as they are transferred between custodians is one method of maintaining a high level of completeness.

A high level of completeness is essential to all phases of this study due to the limited number of samples. Of course, the overall goal is to obtain completeness of 100%, however, a realistic data quality indicator of 95% insures an adequate level of data return.

1.1.3 Laboratory Quality Assurance/Quality Control

The quality of analytical data is dependent on the ways in which samples are collected, handled and analyzed. Data Quality Objectives provide the standards against which the data are compared to determine if they meet the quality necessary to be used to address program objectives. Data will be subjected to a thorough verification and validation process designed to evaluate project data quality and determine whether data require qualification.

The three major categories of QA/QC checks are accuracy, precision, and contamination were discussed in the previous section. As a minimum, the laboratory will incorporate analysis of method blanks, and matrix spike/spike duplicates with each analytical batch. Laboratory duplicates will be analyzed for analytical tests where matrix spike/spike duplicate are not analyzed. Use of Certified Reference Materials (CRM) or Standard Reference Materials (SRM) is also recommended as these allow assessment of long term performance of the analytical methods so that representativeness can be assessed. Laboratories often use an internal CRM that is analyzed with each batch to evaluate any potential long-term shift in performance of the analytical procedures. Recommended minimum quality control samples will be based upon SWAMP QAPP (2008) and the associated 2013 Quality Control and Sample Handling Tables for water (http://www.swrcb.ca.gov/water_issues/programs/swamp/mqo.shtml).

1.1.4 Field QA/QC

1.1.4.1 Blanks

A thorough system of blanking is an essential element of monitoring. Much of the blanking processes are performed well in advance of the actual monitoring in order to demonstrate that all equipment expected to contact water is free of contaminants at the detection limits established for the program. Equipment components are cleaned in batches. Subsamples from each cleaning batch are rinsed with Type 1 laboratory blank water and submitted to the laboratory for analysis. If hits are encountered in any cleaning batch, the entire batch is put back through the cleaning and blanking process until satisfactory results are obtained. If contaminants are measured in the blanks, it is often prudent to reexamine the cleaning processes and equipment or materials used in the cleaning process. Equipment requiring blanks and the frequency of blanks is summarized below and in Table 2.

Table 2. Summary of Blanking Requirements for Field Equipment.

System Component	Blanking Frequency
Intake Hose	One per batch
Peristaltic Pump Hose	One per batch[1] or 10% for batches greater than 10
Composite Bottles	One per batch or 10% for batches greater than 10
Subsampling Pump Hose	One per batch or 10% for batches greater than 10
Laboratory Sample Containers	2% of the lot[2] or batch, minimum of one
Capsule Filter Blank[3]	One per batch or 10% for batches greater than 10
Churn/Cone Splitter[4]	When field cleaning is performed, process one blank per session

[1] A batch is a group of samples that are cleaned at the same time and in the same manner.

[2] If decontaminated bottles are sent directly from the manufacturer, the batch would be the lot designated by the manufacturer in their testing of the bottles.

[3] If filtration is performed in the laboratory, the capsule filter blanks would be considered part of laboratory QA/QC.

[4] This is applicable to use of a churn or cone splitter to subsample flow-weighted composite samples into individual containers. Splitting may be performed by the sampling team in a protected, clean area or by the laboratory.

1.1.4.2 Field Duplicates

Composite subsampling duplicates associated with flow-weighted composite samples are often referred to as field duplicates but, in fact, they are subsampling replicates. These replicates help assess combined variability associated with subsampling from the composite container and variability associated with the analytical process. They are evaluated against the same criteria as used for laboratory duplicates.

1.1.5 Equipment Cleaning, Blanking and Tracking

Sample collection, handling, and processing materials can contribute and/or sorb trace elements within the time scales typical for collection, processing and analysis of runoff samples. Sampling artifacts are especially important when measured concentrations that are at or near analytical detection limits (Horowitz 1997). Therefore, great care is required to collect and process samples in a manner that will minimize potential contamination and variability in the sampling process (Breault and Granato 2000).

Sampling conducted to measure dissolved metals and other trace contaminants at levels relevant to EPA water quality criteria requires documentation that all sampling equipment is free of contamination and that the processes used to obtain and handle samples do not introduce contamination. This requires documentation that methods used to collect, process and analyze the samples do not introduce contamination. Documentation for the CIMP includes written procedures provided in Appendix B for cleaning all components of the sampling system, blanking processes necessary to verify that system components and sample handling are not introducing contamination, and a system of tracking deployment of protocol-cleaned equipment in the field as described in this section.

All composite containers and equipment used for sample collection in the field and/or sample storage in the laboratory will be decontaminated and cleaned prior to use. These include the FEP tubing, Teflon® lids, strainers and hoses/fittings that are used in the subsampling process (USGS 1993). Personnel assigned to clean and handle the equipment are thoroughly trained and familiar with the cleaning, blanking, and tracking procedures. In addition, all field sampling staff will be trained to be familiar with these processes so that they have a better understanding of the importance of using clean sampling procedures and the effort required to eliminate sources of contamination.

Sample contamination has long been considered one of the most significant problems associated with measurement of dissolved metals and may be accentuated with use of High Resolution Mass Spectroscopy (HRMS) methods for trace levels of organic constituents at levels three orders of magnitude lower than conventional GCMS methods. One of the major elements of QA/QC documentation is establishing that clean sampling procedures are used throughout the process and that all equipment used to collect and process the water samples are free of contamination.

Cleaning protocols are consistent with ASTM (2008) standard D5088 – 02 that covers cleaning of sampling equipment and sample bottles. The generalized cleaning process is based upon a series of washings that typically start with tap water with a phosphate-free detergent, a tap water rinse, soaking in a 10% solution of reagent grade nitric acid, and a final series of rinses with ASTM Type 1 water. Detailed procedures for decontamination of sampling equipment are provided in Appendix A. In addition, Appendix G of the most recent Caltrans Stormwater Monitoring Guidance Manual (Caltrans, 2013) provides alternative cleaning procedure that incorporate use of methylene chloride to remove potential organic contaminants. Experience indicates that this step can be eliminated and still result in blanking data suitable for most target organic contaminants. Addition of this cleaning step or a comparable step to address organic contaminants may be necessary if satisfactory equipment blanks cannot be attained. Significant issues exist with respect to use of

methylene chloride. This chemical is highly toxic, must be handled and disposed as a hazardous waste and is difficult to fully remove from the 20-L media bottles used as composite containers.

In order to account for any contamination introduced by sampling containers, blanks must be collected for composite bottles and laboratory bottles used for sample storage for trace contaminants. A sampling container blank is prepared by filling a clean container with blank water and measuring the concentrations of selected constituents (typically metals and other trace contaminants for composite bottles and metals analysis only for metals storage bottles). Blanking of the 20-L composite bottles will be performed by using the minimum amount of blank water necessary for the selected analytical tests. This is typically requires one to two liters. The bottle is capped and then manipulated to assure that all surfaces up to the neck of the bottle are rinsed. The water is then be allowed to sit for a minimum of one hour before decanting the rinse water into sample containers. In order to provide adequate control, media bottles are labelled and tracked. All media bottles cleaned and blanked in one batch are tracked to allow for recall if laboratory analyses reveal any contamination. Further tracking is required in the field to document where bottles from each cleaning batch are used and to assist in tracking of any contamination that might be detected after bottles have been deployed since laboratory turnaround in the middle of the storm season may require use of decontaminated bottles prior to receiving the results of the blank analyses.

Selected constituents for blanking will be dependent upon the list of contaminants with reasonable potential to be present at levels that could impact sample results. Minimum parameters used for blank analyses will include total recoverable trace metals, TDS, TOC and nutrients. Analysis of total metals will allow for detection of any residual metal contamination which will be of concern for all sampling. Nutrients, particularly nitrogen compounds, will assure that residual nitrogen from acid cleaning has been fully removed. TDS and TOC are useful for accessing presence of any residual contaminants. Additional blanking may be added when sampling other constituents with ultra-low analytical methods. These blanks may be submitted "blind" to the laboratory by field personnel or prepared internally by the laboratory.

Certified pre-cleaned QC-grade laboratory containers can be used. These bottles are cleaned using acceptable protocol for the intended analysis and tracked by lots. They come with standard certification forms that document the concentration to which the bottles are considered "contaminant-free" but these concentrations are not typically suitable for program reporting limits required for measurement of dissolved metals. Manufacturers may provide an option of certification to specific limits required by a project but it is preferable to purchase the QC bottles that are tracked by lot and conduct internal blanking studies. Lots not meeting project requirements should be returned to the manufacturer and exchanged for containers from another lot. At least 2% of the bottles in any "lot" or "batch" should be blanked at the program detection limits with a minimum frequency of one bottle per batch. A batch is considered to be a group of samples that are cleaned at the same time and in the same manner; or, if decontaminated bottles are sent directly from the manufacturer, the batch would be the lot designated by the manufacturer in their testing of the bottles. Cleaned bottles are stored in a clean area with lids properly secured.

Subsampling hoses consist of a length of peristaltic hose with short lengths of FEP tubing attached to each end. These are required to be cleaned inside and out since the FEP tubing is immersed in the composite bottle during the subsampling process. Once cleaned, the ends of the subsampling hoses are bagged. All hoses associated with the batch are then stored in large zip-lock containers labeled to identify the cleaning batch. Blanking of subsampling hoses is conducted as part of the composite bottle blanking process. A clean subsampling hose is used to decant blank water from the 20-L composite bottles into clean laboratory containers. Detection of any contaminants in the bottle blanks therefore requires that the subsampling hoses also are subjected another decontamination process. After cleaning, the subsampling hoses should only be handled while wearing clean, powder-free nitrile gloves.

APPENDIX F

NON-STORMWATER IC/ID AND OUTFALL TRACKING

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Operation Procedures	
Illicit Discharge Detection & Elimination: Initial Outfall Screening	
Purpose:	This provides a basic checklist for field crews conducting initial survey of storm drainage system outfalls for use in identification of illicit discharges

Reference: Brown et al., *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments,* Center for Watershed Protection, Ellicott City, 2004.

Planning Considerations:

- ❑ Employees should have reviewed and understand the information presented in Chapter 11 of the reference manual
- ❑ Inspections are to occur during dry weather (no runoff producing precipitation in last 72 hours)
- ❑ Conduct inspections with at least two staff per crew
- ❑ Conduct inspections during low groundwater (if appropriate).
- ❑ Complete ***Site Info section on Outfall Reconnaissance Inventory Form*** before leaving the office. Additional forms should be available for undocumented outfalls

Field Methods:

- ❑ Ensure outfall is accessible.
- ❑ Inspect outfall only if safe to do so.
- ❑ Characterize the outfall by recording information on the ***LCC Outfall Reconnaissance Inventory Form.***
- ❑ Photograph the outfall with a digital camera (use dry erase board to identify outfall).
- ❑ Enter flow information on form if dry weather flow is present and ***easily*** obtained. If not, provide rough estimate of flow.
- ❑ Document clean, dry outfalls for potential elimination during future screening programs.
- ❑ Water samples will not be collected during the initial survey. In-situ measurements of temperature, conductivity, and pH should be taken if significant flow is present.
- ❑ Do not enter private property without permission.
- ❑ Photograph each site with the site identification written on the dry erase board.

Equipment List:

1. System map
2. Outfall Reconnaissance Inventory Forms
3. City identification or business cards
4. Digital camera (spare batteries)
5. Cell phone
6. GPS unit
7. Clip board and pencils
8. Dry erase board and pens
9. Hand Mirror
10. Flashlight (spare batteries)
11. Disposable gloves
12. Folding wood ruler or comparable
13. Temperature, Conductivity probe
14. pH probe/strips
15. ***Ammonia test strips***
16. ***Ten1-liter (polyethylene) sample bottles***
17. Watch with second hand
18. Calculator
19. Hand sanitizer
20. Safety vests
21. First aid kit
22. ***Cooler***
23. Permanent marker

Bolded, italicized items will only be needed for later surveys. No water quality samples will be taken for laboratory analysis during the first survey.

LOWER LA RIVER OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

Section 1: Background Data

Subbasin:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours: Last 48 hours:		
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

☐ Industrial	☐ Open Space
☐ Ultra-Urban Residential	☐ Institutional
☐ Suburban Residential	Other: _____
☐ Commercial	Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ **Closed Pipe**	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**	**(applicable when collecting samples)**				
Flow Present?	☐ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	_____' _____"	Ft, In	Tape measure
	Measured length	_____' _____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°F	Meter
pH			pH Units	Meter
Ammonia			mg/L	Test strip

Lower LA River Outfall Reconnaissance Inventory Field Sheet

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization

☐ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a severity of 3) ☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	☐ No	
2. If yes, collected from:	☐ Flow	☐ Pool	
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type: ☐ OBM ☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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APPENDIX G

MINIMUM CRITERIA FOR EVALUATION OF WATER QUALITY CONSTITUENTS IN TABLE E-2 OF THE MRP

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Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Oil and Grease	5	mg/L	Basin Plan	Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.	N/A		
Total Phenols	100	µg/L	None	None	N/A		
Cyanide (Total)	5	µg/L	CTR Freshwater (1 hr avg.)	22	µg/L		
			CTR Freshwater (4 day avg.)	5.2			
pH	0 - 14	N/A	MS4 MAL[1]	7.7	N/A		
			Basin Plan	The pH of inland surface waters shall not be depressed below 6. 5 or raised above 8. 5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0. 5 units from natural conditions as a result of waste discharge.			
				The pH of bays or estuaries shall not be depressed below 6. 5 or raised above 8. 5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0. 2 units from natural conditions as a result of waste discharge.			
Temperature	None	°F	Basin Plan	The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. Alterations that are allowed must meet the requirements below.	°F		
				For waters designated WARM, water temperature shall not be altered by more than 5 °F above the natural temperature. At no time shall these WARM designated waters be raised above 80 °F as a result of waste discharges.			
				For waters designated COLD, water temperature shall not be altered by more than 5 °F above the natural temperature.			
Dissolved Oxygen	Sensitivity to 5 mg/L	mg/L	Basin Plan	At a minimum (see specifics below), the mean annual dissolved oxygen concentration of all waters shall be greater than 7 mg/L, and no single determination shall be less than 5.0 mg/L, except when natural conditions cause lesser concentrations.	mg/L		
				The dissolved oxygen content of all surface waters designated as WARM shall not be depressed below 5 mg/L as a result of waste discharges.			
				The dissolved oxygen content of all surface waters designated as COLD shall not be depressed below 6 mg/L as a result of waste discharges.			
				The dissolved oxygen content of all surface waters designated as both COLD and SPWN shall not be depressed below 7 mg/L as a result of waste discharges.			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Fecal coliform (fresh waters)	20	MPN/100 ml	Basin Plan (REC-1, log mean, >= 4 samples for any 30-day period)	200	MPN/100 ml	Daily Maximum	
			Basin Plan (REC-1, <10% samples during any 30-day period)	400			
			LAR Estuary Bacteria TMDL	Total Coliform: 10,000/100 mL			
				Fecal Coliform: 400/100 mL			
				Enterococcus: 104/100 mL			
E. coli (fresh waters)	1	MPN/100 ml	LAR Bacteria TMDL	235/100 ML	MPN/100 ml	Daily Maximum	
Dissolved Phosphorus	0.05	mg/L	Basin Plan	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.	mg/L		
Total Phosphorus	0.05	mg/L	MS4 MAL	0.8	mg/L		
Turbidity	0.1	NTU	Basin Plan	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in natural turbidity attributable to controllable water quality factors shall not exceed the following limits: (1) Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20%; (2) Where natural turbidity is greater than 50 NTU, increases shall not exceed 10%; (3) Allowable zones of dilution within which higher concentrations may be tolerated may be defined for each discharge in specific Waste Discharge Requirements.	NTU		
Total Suspended Solids (TSS)	2	mg/L	Basin Plan	Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.			
			MS4 MAL	264.1	mg/L		
Suspended Sediment Concentration (SSC)	0.5	mg/L	Basin Plan	Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.	mg/L		
Total Dissolved Solids (TDS)	2	mg/L	USEPA Secondary MCL	500	mg/L		
			CA Dept. Public Health Recommended Upper Level	1,000			
			CA Dept. Public Health Recommended Short-term Level	1,500			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Volatile Suspended Solids (VSS)	2	mg/L	Basin Plan	Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.	mg/L		
Total Organic Carbon (TOC)	1	mg/L	None	None	N/A		
Total Petroleum Hydrocarbons (extractable fraction, i.e., diesel and motor oil range hydrocarbons)	5	mg/L	None	None	none		
Biochemical Oxygen Demand	2	mg/L	Basin Plan	Waters shall be free of substances that result in increases in the BOD which adversely affect beneficial uses.			
Chemical Oxygen Demand	20-900	mg/L	MAL	247.5	mg/L		
Total Ammonia-Nitrogen (NH_3-N)	0.1	mg/L	LAR Nitrogen Compounds TMDL	1 hour Average: Los Angeles River below Los Angeles-Glendale WRP 8.7	mg/L		
				30 Day Average: Los Angeles River below Los Angeles-Glendale WRP 2.4			
				1 Hour Average: Los Angeles Tributaries 10.1			
				30 Day Average: Los Angeles Tributaries 2.3			
			Basin Plan	Varies based on pH and temperature for Cold waters and Warm Waters (Table 3-1 to 3-4 of Basin Plan)			
Total Kjeldahl Nitrogen (TKN)	0.1	mg/L	MS4 MAL	4.59	mg/L		
Nitrate+Nitrite (NO_2+NO_3 as N)	0.1	mg/L	LAR Nitrogen Compounds TMDL	30 Day Average: All 8.0	mg/L		
			MS4 MAL	1.85			
			Basin Plan	10 as NO3-N + NO2-N			
Alkalinity	2	mg/L	USEPA National Recommended Water Quality Criteria (Freshwater)	20,000	ug/L		
Specific Conductance	1	umho/cm	CA Dept. Public Health Secondary MCL	900	µmhos/cm		
Total Hardness (as CaCO3)	2	mg/L	None	None	N/A		
Methylene Blue Active Substances (MBAS)	500	µg/L	CA Dept. Public Health Secondary MCL	500	µg/L		
			Basin Plan Federal MCL	500			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Chloride	2	mg/L	Basin Plan	150	mg/L		
Fluoride	100	µg/L	CA Dept. Public Health MCL (drinking water)	2,000	µg/L		
Methyl tertiary butyl ether (MTBE)	1000	µg/L	USEPA National Recommended Water Quality Criteria 4-day average (freshwater)	51,000	µg/L		
			USEPA National Recommended Water Quality Criteria 1-hour average (freshwater)	151,000	µg/L		
Perchlorate	4	µg/L	CA Dept. Public Health MCL (drinking water)	6	µg/L		
Aluminum	100	µg/L	USEPA National Recommended Water Quality Criteria 4-day average (freshwater)	87	µg/L	-	
			USEPA National Recommended Water Quality Criteria 1-hour average (freshwater)	750		-	
Antimony	0.5	ug/L	USEPA National Recommended Water Quality Criteria Freshwater (acute)	9000	µg/L		
			USEPA National Recommended Water Quality Criteria Freshwater (chronic)	1600			
Arsenic	1	µg/L	CTR Freshwater (1 hr avg.) dissolved	340	µg/L		
			CTR Freshwater (4 day avg.) dissolved	150	µg/L		
Beryllium	0.5	µg/L	USEPA National Recommended Water Quality Criteria Freshwater (acute)	130	µg/L		
			USEPA National Recommended Water Quality Criteria Freshwater (chronic)	5.3			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Cadmium	0.25	µg/L	LAR Metals TMDL	Wet Weather: All WER x 2.8 x 10-9 x daily volume (L) – 1.8	kg/day	Mass based WQBEL	WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.
			MS4 MAL	2.52	µg/L		
			CTR Freshwater (1 hr avg.) dissolved	1.6	µg/L		
			CTR Freshwater (4-day avg.) dissolved	1.1			
Chromium	0.5	µg/L	MS4 MAL	20.2	µg/L		
			National Toxics Rule Freshwater (4-day avg.) dissolved	84			
			National Toxics Rule Freshwater (1-hour avg.) dissolved	260			
Chromium (Hexavalent)	5	µg/L	CTR Freshwater (1 hr avg.) dissolved	16	ug/L		
			CTR Freshwater (4 day avg.) dissolved	11			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Copper	0.5	µg/L	LAR Metals TMDL	Dry Weather: LA River Reach 1 WER x 23 Dry Weather: LAR Reach 2 and Arroyo Seco: WER x 22 Dry Weather: Compton Creek WER x 19 Dry Weather: Rio Hondo Reach 1 WER x 13	ug/L	Concentration based WQBELs	WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.
				Dry Weather: LA River Reach 1 WER x 0.14 Dry Weather: LA River Reach 2 WER x 0.13 Dry Weather: Arroyo Seco WER x 0.01 Dry Weather: Compton Creek WER x 0.04 Dry Weather: Rio Hondo Reach 1 WER x 0.01	kg/day	Mass based WQBELs	
				Wet Weather: All WER[1] x 1.5 x 10-8 x daily volume (L) – 9.5			
			Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 35.3	kg/yr	Annual mass based loading in sediment deposited to LAR Estuary	
			CTR Freshwater (1 hr avg.) dissolved	5.7	ug/L		
			CTR Freshwater (4 day avg.) dissolved	4.1			
Iron	100	µg/L	USEPA National Recommended Water Quality Criteria 4-day average (freshwater)	1,000	ug/L		
Lead	0.5	µg/L	LAR Metals TMDL	Dry Weather: LA River Reach 1 WER x 12 Dry Weather: LA River Reach 2 and Arroyo Seco WER x 11 Dry Weather: Compton Creek WER x 8.9 Dry Weather: Rio Hondo Reach 1 WER x 5.0	ug/L	Concentration based WQBELs	WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.
				Dry Weather: LA River Reach 1 WER x 0.07 Dry Weather: LA River Reach 2 WER x 0.07 Dry Weather: Arroyo Seco WER x 0.01 Dry Weather: Compton Creek WER x 0.02 Dry Weather: Rio Hondo Reach 1 WER x 0.006	kg/day	Mass based WQBELs	
				Wet Weather: All WER[1] x 5.6 x 10-8 x daily volume (L) – 3.85			

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 65.7	kg/yr	Annual mass based loading in sediment deposited to LAR Estuary	
			CTR Freshwater (1 hr avg.) dissolved	24	ug/L		
			CTR Freshwater (4 day avg.) dissolved	0.92			
Nickel	1	µg/L	MS4 MAL	27.43	µg/L		
			CTR Freshwater (1 hr avg.) dissolved	220			
			CTR Freshwater (4 day avg.) dissolved	24			
Selenium	1	µg/L	CTR Freshwater (1 hr avg.) dissolved	20			
			CTR Freshwater (4 day avg.) dissolved	5			
Silver	0.25	µg/L	CTR Freshwater (1 hr avg.)	0.71	ug/L		
Thallium	1	µg/L	USEPA National Recommended Water Quality Criteria chronic (freshwater)	40	ug/L		
			USEPA National Recommended Water Quality Criteria acute (freshwater)	1400			
Zinc	1	µg/L	LAR Metals TMDL	Dry Weather: Rio Hondo Reach 1 WER[1] x 131	ug/L	Concentration based WQBEL	WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.
				Dry Weather: Rio Hondo Reach 1 WER[1] x 0.16	kg/day	Mass based WQBEL	
				Wet weather: All WER[1] x 1.4 x 10-7 x daily volume (L) – 83			
			Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 2.31	kg/yr	Annual mass based loading in sediment deposited to LAR Estuary	

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			CTR Freshwater (1 hr avg.) dissolved	54	ug/L		
			CTR Freshwater (4 day avg.) dissolved	54			
Mercury	0.5	µg/L	CTR Human Health Protection (30-d avg; fish consumption only)	0.051	µg/L		
2-Chloroethylvinyl ether[4]	1	µg/L	None	None	µg/L		
2-Chlorophenol	2	µg/L	CTR Human Health Protection (Sources of Drinking water)	120	µg/L		
4-Chloro-3-methylphenol	1	µg/L	USEPA National Recommended Water Quality Criteria (Taste & Odor)	3,000	µg/L		
2,4-Dichlorophenol	1	µg/L	CTR Human Health Protection (Sources of Drinking water)	93	µg/L		
2,4-Dimethylphenol	2	µg/L	CTR Human Health Protection (Sources of Drinking water)	540	µg/L		
2,4-Dinitrophenol	5	µg/L	CTR Human Health Protection (Sources of Drinking water)	70	µg/L		
2-Nitrophenol	10	µg/L	None	None	N/A		
4-Nitrophenol	5	µg/L	None	None	N/A		
Pentachlorophenol	2	µg/L	CTR Fresh Water (4 day avg.) at pH 6.5	4	ug/L		
			CTR Freshwater (1 hr avg.) at pH 6.5	5.3			
Phenol	1	µg/L	CTR Human Health Protection (Sources of Drinking water)	21,000	µg/L		
2,4,6-Trichlorophenol	10	µg/L	CTR Human Health Protection (Sources of Drinking water)	2.1	µg/L		
Acenaphthene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	170	µg/L		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			USEPA National Recommended Water Quality Criteria toxicity to algae	520			
Acenaphthylene	2	µg/L	None	None	N/A		
Anthracene	2	µg/L	CTR Human Health Protection (other waters)	110,000	µg/L		
Benzidine	5	µg/L	CTR Human Health Protection (Sources of Drinking water)	0.00012	µg/L		
1,2 Benzanthracene	5	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Benzo(a)pyrene	2	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Benzo(g,h,i)perylene	5	µg/L	None	None	N/A		
3,4 Benzoflouranthene	10	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Benzo(k)flouranthene	2	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Bis(2-Chloroethoxy) methane	5	µg/L	None	None	N/A		
Bis(2-Chloroisopropyl) ether	2	µg/L	None	None	N/A		
Bis(2-Chloroethyl) ether	1	µg/L	None	None	N/A		
Bis(2-Ethylhexl) phthalate	5	µg/L	National Toxics Rule (other waters)	5.9	N/A		
4-Bromophenyl phenyl ether	5	µg/L	None	None	N/A		
Butyl benzyl phthalate	10	µg/L	None	None	N/A		
2-Chloronaphthalene	10	µg/L	None	None	N/A		
4-Chlorophenyl phenyl ether	5	µg/L	None	None	N/A		
Chrysene	5	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Dibenzo(a,h)anthracene	0.1	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
1,3-Dichlorobenzene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	1,120	µg/L		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			USEPA National Recommended Water Quality Criteria chronic (freshwater)	763			
1,4-Dichlorobenzene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	1,120	µg/L		
			USEPA National Recommended Water Quality Criteria chronic (freshwater)	763			
1,2-Dichlorobenzene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	1,120	µg/L		
			USEPA National Recommended Water Quality Criteria chronic (freshwater)	763			
3,3-Dichlorobenzidine	5	µg/L	None	None	N/A		
Diethyl phthalate	2	µg/L	None	None	N/A		
Dimethyl phthalate	2	µg/L	None	None	N/A		
Di-n-Butyl phthalate	10	µg/L	None	None	N/A		
2,4-Dinitrotoluene	5	µg/L	None	None	N/A		
2,6-Dinitrotoluene	5	µg/L	USEPA Toxicity LOEL	330 (acute)	µg/L		
				230 (chronic)			
4,6 Dinitro-2-methylphenol	5	µg/L	None	None	N/A		
1,2-Diphenylhydrazine	1	µg/L	None	None	N/A		
Di-n-Octyl phthalate	10	µg/L	USEPA Toxicity LOEL	940 acute	µg/L		
				3 chronic			
Fluoranthene	0.05	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	398	ug/L		
Fluorene	0.1	µg/L	CTR Human Health Protection (other waters)	14,000	ug/L		
Hexachlorobenzene	1	µg/L	None	None	N/A		
Hexachlorobutadiene	1	µg/L	None	None	N/A		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Hexachloro-cyclopentadiene	5	µg/L	None	None	N/A		
Hexachloroethane	1	µg/L	None	None	N/A		
Indeno(1,2,3-cd)pyrene	0.05	µg/L	CTR Human Health Protection (other waters)	0.049	µg/L		
Isophorone	1	µg/L	None	None	N/A		
Naphthalene	0.2	µg/L	USEPA National Recommended Water Quality Criteria chronic (freshwater)	620	ug/L		
			USEPA National Recommended Water Quality Criteria acute (freshwater)	2,300			
Nitrobenzene	1	µg/L	None	None	N/A		
N-Nitroso-dimethyl amine	5	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	585	ug/L		
N-Nitroso-diphenyl amine	1	µg/L	None	None	N/A		
N-Nitroso-di-n-propyl amine	5	µg/L	None	None	N/A		
Phenanthrene	0.05	µg/L	None	None	N/A		
Pyrene	0.05	µg/L	CTR Human Health Protection (other waters)	11,000	ug/L		
1,2,4-Trichlorobenzene	1	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	250	ug/L		
			USEPA National Recommended Water Quality Criteria chronic (freshwater)	50			
Aldrin	0.005	µg/L	CTR freshwater instantaneous max.	3	ug/L		
alpha-BHC	0.01	µg/L	CTR Human Health Protection (other waters)	0.013	ug/L		
beta-BHC	0.005	µg/L	CTR Human Health Protection (other waters)	0.046	ug/L		
delta-BHC	0.005	µg/L	None	None	N/A		
gamma-BHC (lindane)	0.02	µg/L	CTR Freshwater (1 hr avg.)	0.95	ug/L		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
alpha-chlordane[1]	0.1	µg/L	None	None	N/A		
gamma-chlordane[1]	0.1	µg/L	None	None	N/A		
4,4'-DDD	0.00004	µg/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	0.06	ug/L		
4,4'-DDE	0.00008	ug/L	USEPA National Recommended Water Quality Criteria acute (freshwater)	105	ug/L		
4,4'-DDT	0.00008	µg/L	Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 0.100	g/yr	Annual mass based loading in sediment deposited to LAR Estuary	
			CTR Freshwater (4-day avg.)	0.001	ug/L		
			CTR freshwater instantaneous max.	1.1			
Dieldrin	0.01	µg/L	CTR Freshwater (1 hr avg.)	0.24	ug/L		
			CTR Freshwater (4-day avg.)	0.056			
alpha-Endosulfan	0.02	µg/L	CTR Freshwater (1 hr avg.)	0.22	ug/L		
			CTR Freshwater (4-day avg.)	0.056			
beta-Endosulfan	0.01	µg/L	CTR Freshwater (1 hr avg.)	0.22	ug/L		
			CTR Freshwater (4-day avg.)	0.056			
Endosulfan sulfate	0.05	µg/L	USEPA 24 hr avg	0.056	µg/L		
Endrin	0.01	µg/L	CTR Freshwater (1 hr avg.)	0.086	µg/L		
			CTR Freshwater (4-day avg.)	0.036			
Endrin aldehyde	0.01	µg/L	None	None	N/A		
Heptachlor	0.01	µg/L	National Toxics Rule Freshwater (4-day avg.)	0.0038	ug/L		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
			CTR freshwater instantaneous max.	0.52			
Heptachlor epoxide	0.01	µg/L	National Toxics Rule Freshwater (4-day avg.)	0.0038	ug/L		
			CTR freshwater instantaneous max.	0.52			
Toxaphene	0.5	µg/L	CTR Freshwater (1 hr avg.)	0.73	ug/L		
			CTR Freshwater (4-day avg.)	0.0002			
Total PCBs (sum of 166 congeners)	range for all congeners: 0.000005-0.000020	µg/L	Dominguez Channel and Greater LA and LB Harbor Toxics TMDL	LAR Estuary 0.324	g/yr	Annual mass based loading in sediment deposited to LAR Estuary	
			National Toxics Rule Freshwater (4-day avg.)	0.014	ug/L		
	Total PCBs: 0.00002		California Primary MCL	0.5			
Atrazine	2	µg/L	USEPA National Recommended Water Quality Criteria Freshwater (1-hour avg)	1,500	ug/L		
Chlorpyrifos	0.05	µg/L	California Dept. of Fish and Game Freshwater (1-hour avg)	0.02	ug/L		
			California Dept. of Fish and Game Freshwater (4-day avg)	0.014			
Cyanazine	2	µg/L	None	None	N/A		
Diazinon	0.01	µg/L	California Dept. of Fish and Game Freshwater (4-day avg)	0.05	µg/L		
			California Dept. of Fish and Game Freshwater (1-hour avg)	**0.08**			
Malathion	1	µg/L	USEPA National Recommended Water Quality Criteria for Freshwater Aquatic Life (max instant.)	0.1	µg/L		
Prometryn	2	µg/L	None	None	N/A		

Constituent	Minimum Level		Water Quality Objective/Criterion			Notes	
	Value	Units	Source	Value	Units		
Simazine	2	µg/L	USEPA National Recommended Water Quality Criteria for Freshwater Aquatic Life (max instant.)	10	µg/L		
2,4-D	10	µg/L	USEPA National Recommended Water Quality Criteria (water+fish consumption)	100	ug/L		
Glyphosate	5	µg/L	None	None	N/A		
2,4,5-TP-SILVEX	0.5	µg/L	USEPA National Recommended Water Quality Criteria (water+fish consumption)	10	ug/L		

[1] MAL = Municipal Action Level as defined by Los Angeles County Permit Order No. R4-2012-0175 Attachment G.

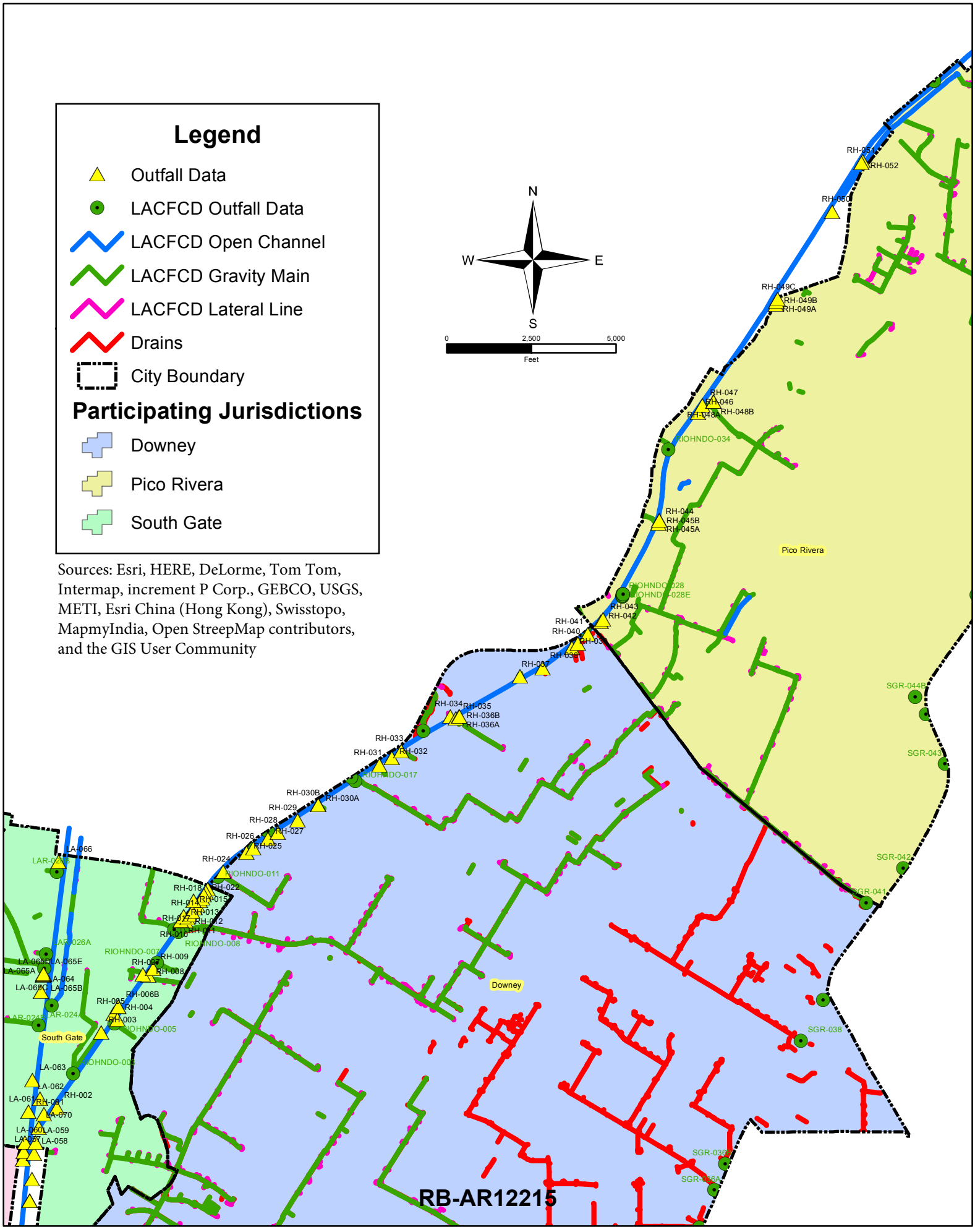
APPENDIX H

Outfall Identification

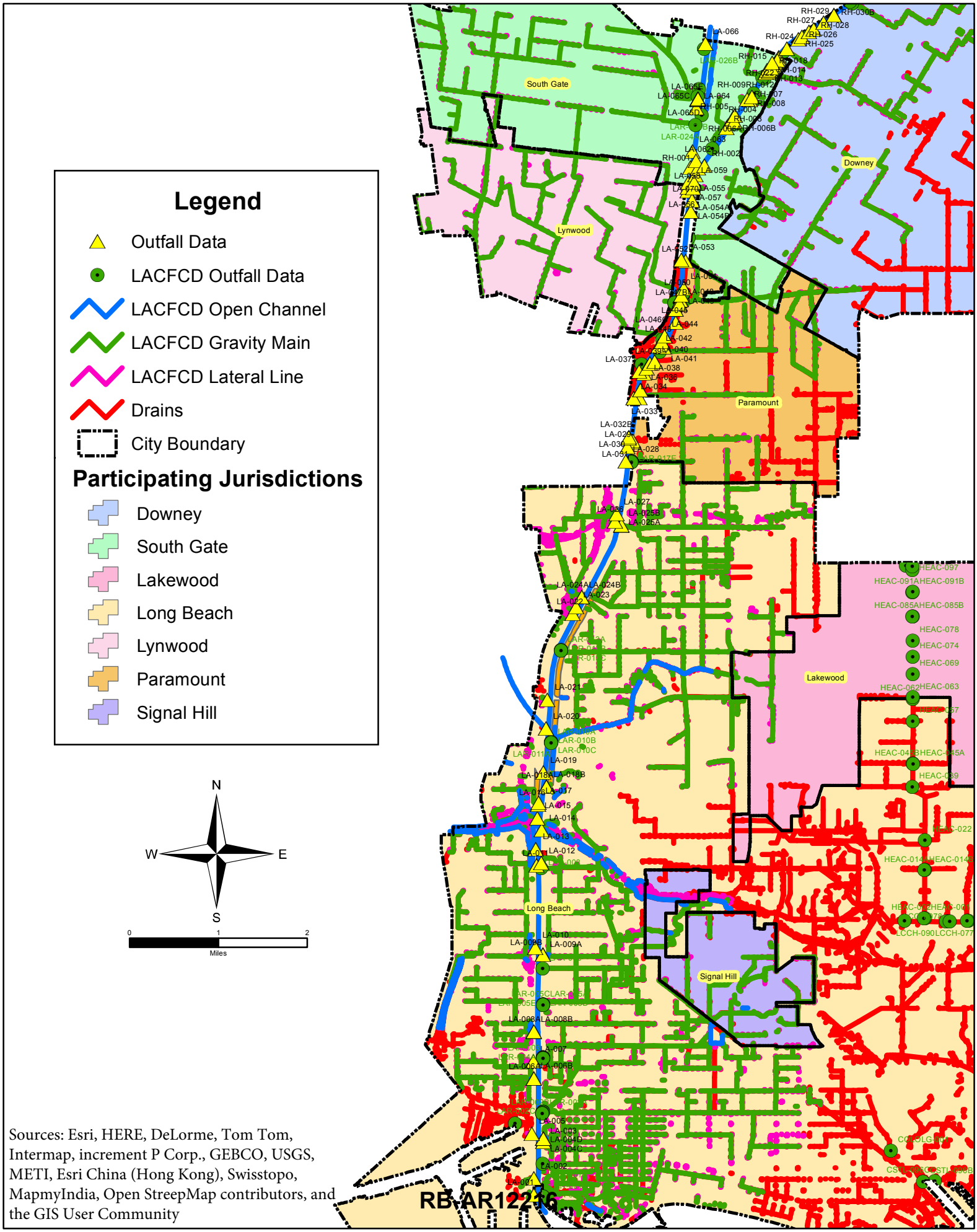
Per Section VII, Attachment E

Outfalls 12 inches and greater were surveyed. Maps showing the location of these outfalls are contained in this Appendix. Photographs collected during the survey and a database with outfall attributes is available upon request.

Rio Hondo Channel



Los Angeles River



Sources: Esri, HERE, DeLorme, Tom Tom, Intermap, increment P Corp., GEBCO, USGS, METI, Esri China (Hong Kong), Swisstopo, MapmyIndia, Open StreepMap contributors, and the GIS User Community

April 28, 2015

Permittees of the Lower Los Angeles River Watershed Management Group[1]

APPROVAL, WITH CONDITIONS, OF THE LOWER LOS ANGELES RIVER GROUP'S WATERSHED MANAGEMENT PROGRAM (WMP), PURSUANT TO THE LOS ANGELES COUNTY MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT (NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175) AND THE CITY OF LONG BEACH MS4 PERMIT (NPDES PERMIT NO. CAS004003; ORDER NO. R4-2014-0024)

Dear Permittees of the Lower Los Angeles River Watershed Management Group:

On November 8, 2012, the California Regional Water Quality Control Board, Los Angeles Region (Los Angeles Water Board or Board) adopted Order No. R4-2012-0175, *Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach* (hereafter, LA County MS4 Permit). On February 6, 2014, the Board adopted Order No. R4-2014-0024, *Waste Discharge Requirements for Municipal Separate Storm Sewer System Discharges from the City of Long Beach* (hereafter, Long Beach MS4 Permit). Part VI.C of the LA County MS4 Permit and Part VII.C of the Long Beach MS4 Permit allow Permittees the option to develop either a Watershed Management Program (WMP) or an Enhanced Watershed Management Program (EWMP) to implement permit requirements on a watershed scale through customized strategies, control measures, and best management practices (BMPs).

Development of a WMP or EWMP is voluntary and allows a Permittee to address the highest watershed priorities, including complying with the requirements of Part V.A (Receiving Water Limitations), Part VI.E and Attachments L through R (Total Maximum Daily Load Provisions), and by customizing the control measures in Parts III.A (Prohibitions – Non-Storm Water Discharges) and VI.D (Minimum Control Measures), except the Planning and Land

[1] Permittees of the Lower Los Angeles River Watershed Management Group include the Los Angeles County Flood Control District; and the cities of Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, and South Gate. See attached distribution list.

Development Program, of the LA County MS4 Permit.[2] Pursuant to Part VI.C.4.c of the LA County MS4 Permit and Part VII.C.4.c of the Long Beach MS4 Permit, the Permittees of the Lower Los Angeles River Watershed Management Group (LLAR WMG) jointly submitted a draft WMP dated June 27, 2014, to the Los Angeles Water Board for review.

Public Review and Comment

On July 3, 2014, the Board provided public notice and a 46-day period to allow for public review and comment on the LLAR WMG's draft WMP. A separate notice of availability regarding the draft WMPs, including the LLAR WMG draft WMP, was directed to State Senators and Assembly Members within the Coastal Watersheds of Los Angeles County. The Board received two comment letters that had comments on WMPs generally, which were in part applicable to the LLAR WMG draft WMP. One joint letter was from Natural Resources Defense Council (NRDC), Heal the Bay, and Los Angeles Waterkeeper, and the other letter was from the Construction Industry Coalition on Water Quality (CICWQ). On October 9, 2014, the Board held a workshop at its regularly scheduled Board meeting on the draft WMPs. The Board also held a public meeting on April 13, 2015 for permittees and interested persons to discuss the revised draft WMPs with the Executive Officer and staff. During its initial review and its review of the revised draft WMP, the Los Angeles Water Board considered those comments applicable to the LLAR WMG's proposed WMP.

Los Angeles Water Board Review

Concurrently with the public review, the Los Angeles Water Board, along with U.S. EPA Region IX staff, reviewed the draft WMPs. On October 28, 2014, the Los Angeles Water Board sent a letter to the LLAR WMG detailing the Board's comments on the draft WMP and identifying the revisions that needed to be addressed prior to the Board's approval of the LLAR WMG's WMP. The letter directed the LLAR WMG to submit a revised draft WMP addressing the Los Angeles Water Board's comments. Prior to the LLAR WMG's submittal of the revised draft WMP, Board staff had a meeting on January 23, 2015 with LLAR WMG representatives and consultants to discuss the Board's comments and the revisions to the draft WMP, including the supporting reasonable assurance analysis (RAA), which would address the Board's comments. The LLAR WMG submitted a revised draft WMP on January 28, 2015 for Los Angeles Water Board review and approval.

Approval of WMP, with Conditions

The Los Angeles Water Board hereby approves, subject to the following conditions, the LLAR WMG's January 28, 2015 revised draft WMP. The Board may rescind this approval if all of the

[2] Equivalent requirements in the Long Beach MS4 Permit are as follows: Part VI.A (Receiving Water Limitations), Part VIII (Total Maximum Daily Load Provisions), Part IV.B (Prohibitions – Non-Storm Water Discharges), and Part VII.D-VII.M (Minimum Control Measures).

following conditions are not met to the satisfaction of the Board within the timeframe provided below.

1. Revise the Load Reduction Strategy (LRS) schedule for Los Angeles River Estuary as outlined in Table 3-8 of the revised draft WMP as follows:
    a. Revise "Submit LRS to Regional Board" deadline to April 28, 2017.
    b. Revise "Complete Implementation of LRS" deadline to October 28, 2021.
    c. Revise deadlines for the achievement of interim or final dry-weather WQBELs to October 28, 2024.
    d. Revise dates included in the asterisked comment such that, if applicable, a second phase LRS is submitted by October 28, 2025; second phase LRS implementation is completed by April 28, 2029; and final WQBELs are achieved by April 28, 2031.
2. Include the revised LRS schedule for Los Angeles River Estuary (Table 3-8) in Chapter 5 of the revised draft WMP as part of the LLAR WMG's compliance schedule.
3. Correct Table 3-2 of the revised draft WMP (pg. 3-9) so that it shows that the City of Paramount will implement the new fourth term nonstructural minimum control measures. Additionally, revise any inapplicable control measures inadvertently listed for LACFCD.
4. Revise Section 5.2 of the revised draft WMP to include a table that lists definitive interim and final milestone achievement dates and the responsible Permittee(s) for each LID BMP in the Proposition 84 project. The responsible Permittees within the LLAR WMG will be responsible for meeting these milestone achievement dates. Currently, the revised WMP only provides "expected" dates for construction and completion.
5. Correct the units for the cadmium concentrations (i.e. 0.55 mg/L and 0.26 mg/L) referenced in Section 2.2.5 of the revised draft WMP (pg. 2-23).
6. Revise Table 5-1 of the revised draft WMP to state that for control measures listed as being a "jurisdictional effort," the Permittees that are responsible for completion of each milestone are identified in Table 3-11.
7. Revise Table 5-1 of the revised draft WMP to include the milestones and milestone completion dates for the following targeted control measures (TCMs) as follows:
    a. TCM-PLD-2 (LID Ordinance): Remove the phrase "when practicable" and set a milestone date for ordinance adoption to 12/28/17 (i.e., end of permit term).
    b. TCM-TSS-1 (Exposed Soil Ordinance): Remove the phrase "if practicable" from the milestone description.
    c. TCM-TSS-3 (Private Lot Sweeping Ordinance): Remove the phrase "when practicable" from the milestone description.
    d. TCM-RET-1 (Encourage downspout disconnects): Identify interim milestone(s) and date(s) for milestone achievement and include in table.
8. Remove "Statewide Trash Amendments" from Table 5-1 of the revised draft WMP, since the amendments are inapplicable to the Los Angeles River Watershed given the existing trash TMDL, and change the Chapter 3 ID for "Increased street sweeping frequency or routes" to TCM-PAA-3.

9. In Section 4.3 of the revised draft WMP, include references to Table 3-2, Table 3-11, and any other relevant tables that list BMPs contributing to the 10% pollutant reduction assumption for non-modeled BMPs.
10. Provide further detail and specificity in Section 3.4.2.2 of the revised draft WMP on what incentives are being included in TCM-NSWD-1 and whether any incentives are being offered apart from Metropolitan Water District's rebate program.
11. The City of Long Beach submitted its Statement of Legal Authority to the Los Angeles Water Board on February 26, 2015. Include this Statement of Legal Authority in the WMP appendix section containing the other Permittees' legal authority statements.

The LLAR WMG shall submit a final WMP to the Los Angeles Water Board that satisfies all of the above conditions no later than June 12, 2015.

Determination of Compliance with WMP

Pursuant to Part VI.C.6 of the LA County MS4 Permit and Part VII.C.6 of the Long Beach MS4 Permit, the Permittees of the LLAR WMG shall begin implementation of the approved WMP immediately. To continue to be afforded the opportunity to implement permit provisions within the framework of the WMP, Permittees must fully and timely implement all actions per associated schedules set forth in the approved WMP regardless of any contingencies indicated in the approved WMP (e.g., funding) unless a modification to the approved WMP, including any extension of deadlines where allowed, is approved by the Los Angeles Water Board pursuant to Part VI.C.6.a or Part VI.C.8.a.ii-iii of the LA County MS4 Permit, and/or Part VII.C.6 or Part VII.C.8.b-c of the Long Beach MS4 Permit. The Los Angeles Water Board will determine the LLAR Permittees' compliance with the WMP on the basis of the compliance actions and milestones included in the WMP, including, but not limited to, the following:

- Pollutant Reduction Plan to Attain Interim & Final Limits (Section 5.4)
- Nonstructural Best Management Practices Schedule, including Table 5-1 Nonstructural TCM Compliance Schedule (Section 5.1)
- List of Nonstructural Targeted Control Measures, including Table 3-11 Nonstructural TCMs (Section 3.4.2)
- Proposition 84 Grant Award LID BMPs (Section 5.2)
- Structural Best Management Practice Schedule (Section 5.3)
- RAA Attachment B: Detailed Jurisdictional Compliance Tables

Pursuant to Parts VI.C.3 and VI.E.2.d.i.(4)(a) of the LA County MS4 Permit[3], the LLAR Permittees' full and timely compliance with all actions and dates for their achievement in their approved WMP shall constitute compliance with permit provisions pertaining to applicable WQBELs/WLAs in Part VI.E and Attachment O of the LA County MS4 Permit.[4] Further, per Part

[3] Corresponding provisions in the Long Beach MS4 Permit are Parts VII.C.3 and VIII.E.1.d.

[4] Corresponding provisions in the Long Beach MS4 Permit are Part VIII (general TMDL provisions) and Parts VIII.K, VIII.L, VIII.M, VIII.N, and VIII.O (provisions specific to Los Angeles River Watershed TMDLs).

VI.C.2.b of the LA County MS4 Permit and Part VII.C.2.e of the Long Beach MS4 Permit, the LLAR Permittees' full compliance with all requirements and dates for their achievement in their approved WMP constitutes compliance with the receiving water limitations provisions of Part V.A of the LA County MS4 Permit and Part VI.A of the Long Beach MS4 Permit for the specific waterbody-pollutant combinations addressed by their approved WMP.

If the Permittees in the LLAR WMG fail to meet any requirement or date for its achievement in the approved WMP, which will be demonstrated through the LLAR WMG's Annual Reports and program audits (when conducted), the Permittees in the LLAR WMG shall be subject to the baseline requirements of the LA County MS4 Permit and the Long Beach MS4 Permit, including demonstrating compliance with applicable receiving water limitations and TMDL-based WQBELs/WLAs through outfall and receiving water monitoring. See Parts VI.C.2.c and VI.E.2.d.i.(4)(c) of the LA County MS4 Permit, and Parts VII.C.2.f and VIII.E.1.d.iii of the Long Beach MS4 Permit.

Annual Reporting

The LLAR WMG shall report on achievement of actions and milestones within the reporting year, as well as progress towards future milestones related to multi-year projects, through their Annual Report per Attachment E, Part XVIII of the LA County MS4 Permit and Attachment E, Parts XV to XIX of the Long Beach MS4 Permit. For multi-year efforts, the LLAR WMG shall include the status of the project, which includes the status with regard to standard project implementation steps. These steps include, but are not limited to, adopted or potential future changes to municipal ordinances to implement the project, site selection, environmental review and permitting, project design, acquisition of grant or loan funding and/or municipal approval of project funding, contractor selection, construction schedule, start-up, and effectiveness evaluation (once operational), where applicable. For all stormwater retention/infiltration projects, including LID due to new/redevelopment, green streets, and regional BMPs, the Permittees in the LLAR WMG shall report annually on the volume of stormwater retained in the area covered by the LLAR WMG WMP. The LLAR WMG shall also report annually on runoff reduction, total suspended solids (TSS) reduction, and pollutant reductions from source control.

The LLAR WMG shall also include in their Annual Report the source(s) of funds used during the reporting year, and those funds proposed for the coming year, to meet necessary expenditures related to implementation of the actions identified in its WMP per Part VI.A.3 of the LA County MS4 Permit and Part VII.A.3 of the Long Beach MS4 Permit. Further, as part of the annual certification concerning a Permittee's legal authority required by Part VI.A.2.b of the LA County MS4 Permit and Part VII.A.2.b of the Long Beach MS4 Permit, each Permittee in the LLAR WMG shall also certify in the Annual Report that each has the necessary legal authority to implement each of the actions and milestones in the approved WMP as required by Part VI.C.5.b.iv.(6) of the LA County MS4 Permit and Part VII.C.5.vi of the Long Beach MS4 Permit. If a Permittee does not have legal authority to implement an action or milestone at the time the

LLAR WMG submits their Annual Report, the Permittee shall propose a schedule to establish and maintain such legal authority.

Adaptive Management

The LLAR WMG shall conduct a comprehensive evaluation of its WMP no later than April 28, 2017, and subsequently, every two years thereafter pursuant to the adaptive management process set forth in Part VI.C.8 of the Los Angeles County MS4 Permit and Part VII.C.8 of the Long Beach MS4 Permit. As part of this process, the LLAR WMG must evaluate progress toward achieving:

- Applicable WQBELs/WLAs in Attachment O of the LA County MS4 Permit and Parts VIII.K, VIII.L, VIII.M, VIII.N, and VIII.O of the Long Beach MS4 Permit according to the milestones set forth in its WMP;
- Improved water quality in MS4 discharges and receiving waters;
- Stormwater retention milestones; and
- Multi-year efforts that were not completed in the current year and will continue into the subsequent year(s), among other requirements.

The LLAR WMG's evaluation of the above shall be based on both progress implementing actions in the WMP and an evaluation of outfall-based monitoring data and receiving water data. Per Attachment E, Part XVIII.6 of the LA County MS4 Permit and Attachment E, Part XVIII.6 of the Long Beach MS4 Permit, the LLAR WMG shall implement adaptive management strategies, including but not limited to:

- Refinement and recalibration of the Reasonable Assurance Analysis (RAA) based on data specific to the LLAR WMP area that are collected through the LLAR WMG's Coordinated Integrated Monitoring Program and other data as appropriate;
- Identifying the most effective control measures, why they are the most effective, and how other control measures can be optimized based on this understanding;
- Identify the least effective control measures, why they are ineffective, and how the control measures can be modified or replaced to be more effective;
- Identify significant changes to control measures during the prior year(s) and the rationale for the changes; and
- Describe all significant changes to control measures anticipated to be made in the next year(s) and the rationale for each change.

As part of the adaptive management process, any modifications to the WMP, including any requests for extension of deadlines not associated with TMDL provisions, must be submitted to the Los Angeles Water Board for review and approval. The Permittees of the LLAR WMG must implement any modifications to the WMP upon approval by the Los Angeles Water Board or its Executive Officer, or within 60 days of submittal of modification if the Los Angeles Water Board or its Executive Officer expresses no objections. Note that the LA County MS4 Permittees' Report(s) of Waste Discharge (ROWD) are due no later than July 1, 2017 and the City of Long Beach's ROWD is due no later than September 29, 2018. To align any modifications to the

WMP proposed through the adaptive management process with permit reissuance, results of the first adaptive management cycle should be submitted in conjunction with the Permittees' ROWD.

The Los Angeles Water Board appreciates the participation and cooperation of the LLAR WMG in the implementation of the LA County MS4 Permit. If you have any questions, please contact Chris Lopez at Chris.Lopez@waterboards.ca.gov or by phone at (213) 576-6674. Alternatively, you may also contact Ivar Ridgeway, Storm Water Permitting, at Ivar.Ridgeway@waterboards.ca.gov or by phone at (213) 620-2150.

Sincerely,

Samuel Unger

Samuel Unger, P.E.
Executive Officer

Enclosure: Mailing Distribution List

Lower Los Angeles River Watershed Management Group
Mailing Distribution List (via email)

Jason Wen
City of Downey
jwen@downeyca.org

Konya Vivanti
City of Lakewood
kvivanti@lakewoodcity.org

Anthony Arevalo
City of Long Beach
Anthony.Arevalo@longbeach.gov

Emilio Murga
City of Lynwood
emurga@lynwood.ca.us

Sarah Ho
City of Paramount
sho@paramountcity.com

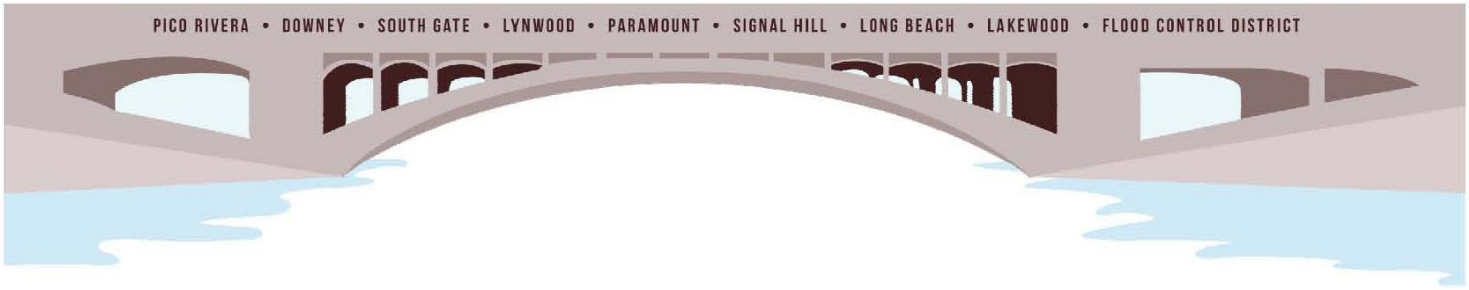
Gladis Deras
City of Pico Rivera
gderas@pico-rivera.org

Steve Myrter
City of Signal Hill
smyrter@cityofsignalhill.org

Arturo Cervantes
City of South Gate
acervantes@sogate.org

Keith Jones
Caltrans
kjones@dot.ca.gov

Terri Grant
Los Angeles County Flood Control District
tgrant@dpw.lacounty.gov



Lower Los Angeles River Watershed Management Program

June 12, 2015

Prepared For:

Lower Los Angeles River Watershed Group

Prepared By:

John L. Hunter and Associates, Inc.

RB-AR12225

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EXECUTIVE SUMMARY

This Watershed Management Program (WMP) sets forth a path to achieve pollutant reductions in the waterbodies of the Lower Los Angeles River and its tributaries. The WMP includes a discussion of existing and planned watershed control measures, a Reasonable Assurance Analysis (RAA) based upon the Watershed Management Modeling System previously developed by the Los Angeles County Flood Control District in collaboration with the USEPA and a Coordinated Integrated Monitoring Program (CIMP) to be implemented over a three year period.

The Watershed Group has been working cooperatively towards the goal of a cleaner Los Angeles River for several years. Beginning in the late 2000s, all Cities within the Group (as part of a larger Gateway cities effort) pursued and were awarded a grant to install full trash-capture inserts and partial capture retractable screens catch basins. Thus far nearly 4,800 full capture inserts have been installed in the Lower LAR drainage area. In 2009 the Lower LAR cities again worked together, forming Technical Committees and funding the development of Implementation Plans for Reach 1 and Reach 2 and tributaries for the Metals TMDL of the Los Angeles River. The Technical Committees that were formed as a result of the Metals TMDL effort continued their effort and in 2011, applicable agencies of both the Reach 1 and 2 committees merged into a single Lower LAR Watershed Committee. The funding of Committee activities has been authorized by city council and governing board Memorandums of Understanding through 2028. This cooperative effort continues and in 2014, the Watershed Group was notified of their successful multi-city grant application (as part of a larger Gateway effort) to install 23 LID BMPs along selected major thoroughfares.

These efforts are in addition to many equally successful efforts by individual agencies which have resulted in the planning, construction and installation of both regional and local stormwater treatment systems. These include:

- The Los Angeles County Flood Control District's Dominguez Gap Wetlands,
- South Gate's Azalea infiltration system,
- South Gate's Atlantic Boulevard tree box filtration systems,
- Signal Hill's and Long Beach's Hamilton Bowl trash capture systems and
- Downey's over 500 treatment systems on individual parcels.

Many additional individual treatment systems are located in cities throughout the Lower LAR Watershed. This summer, ground breaking is anticipated for the City of Long Beach's Deforest Park natural habitat.

Prior to 2012, National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) Permits required cities and agencies to implement a series of best management practices such as street sweeping and catch basins cleaning to demonstrate compliance. With the adoption of the fourth term MS4 permit by the Los Angeles Regional Water Quality Control Board on November 8, 2012, the emphasis shifted to a more watershed based effort that includes the goals of achieving specific pollutant targets as runoff leaves the storm drain system and enters the main river channels.

This WMP is a long-term planning document that takes a comprehensive look at the Lower LAR Watershed, including its land uses, MS4 system, existing and planned control measures (both structural and nonstructural), existing storm water treatment systems, historical monitoring data and the various segments of the Los Angeles River and its tributaries that have been identified as impaired by various pollutants. Using that data, the Watershed Management Modeling System – one of the three modeling system authorized by the MS4 Permit – is used to generate the RAA which predicts an optimal combination of structural treatment systems and construction timelines to achieve the goals of the MS4 Permit. The RAA distributes the responsibility for implementation of future treatment systems amongst all Lower LAR Watershed Cities.

The RAA identifies wet weather zinc as the primarily pollutant of concern[1] and that by designing treatment systems and other non-structural controls measures for zinc, the targets for other pollutants of concern will also be met. The first target for zinc occurred in 2012, when 25% of the area within the Lower LAR Watershed was to meet the wet weather zinc reduction goal. The wetlands, detention basins, extensive number of per-parcel treatment systems and non-structural control measures were designed to achieve that goal along with other pollutant reductions and multi-use factors such as groundwater recharge and recreational use.

The next wet weather target specified in the MS4 Permit occurs in 2024 when 50% of the area must achieve the zinc reduction goal. In order to maintain continued progress towards the 2024 goal, this WMP establishes an early-action milestone of 31% that is to be achieved through an effective combination of enhanced non-structural control measures and structural treatment projects that have been completed or are substantially through the planning and design phase by December 28, 2017. The RAA provides a recommended volume of wet weather runoff on a city-by-city basis to be used as the target in order to meet the early-action step of 31% by December 28, 2017, and the MS4 Permit targets of 50% by 2024 and 100% by 2028. Cumulatively, the RAA establishes a final (2028) goal of capturing and treating 803.2 acre feet. The ultimate cost will vary considerably depending on the availability and configuration of suitable treatment locations and effectiveness of nonstructural watershed control measures but is estimated to be in the range of $156 million - $293 million. The treatment volumes recommended by the RAA are estimates based on current land used data, historical monitoring and assumed treatment system efficiencies. The WMP also incorporates an adaptive management strategy to adjust and modify the various control measures as necessary.

A Coordinated Integrated Monitoring Program (CIMP) has been developed at a part of this WMP which greatly expands the monitoring of water quality in the Lower LAR watershed. The CIMP goals are in part to measure the overall effectiveness of the control measures the Watershed Group is implementing. Four new outfall monitoring sites along the Los Angeles River Channel and three new bacteria TMDL monitoring sites within the Los Angeles River Estuary are scheduled to be phased in over a 3-year period. These will be in addition continued operation of three of the four existing Metals TMDL

[1] The discharge of copper is anticipated to be reduced as copper is removed from brake pads over the next decade. Trash is on a separate compliance path with cities individually reporting greater than 90 percent of all catch basins retrofitted with full trash capture inserts or equivalent within the current Trash TMDL reporting year (ending September 30, 2014)

monitoring stations and the existing Mass Emission Station currently operated by the Los Angeles County Flood Control District near the interface of the river and estuary which measures the comingled runoff from the entire Los Angeles River Watershed.

This WMP and its components, including Chapter 3 *Selection of Watershed Control Measures*, Chapter 4 *RAA* and Chapter 8 *CIMP* outline a path to achieve significantly improved water quality in the Lower LAR Watershed. The WMP outlines a path based on the optimal placement of treatment systems determined by the RAA, but this is not the only viable path. The Watershed Group can follow the adaptive management strategy described in Chapter 9 to adjust the number, locations and sizes of future treatment systems as long as the timelines and goals of this WMP are followed. While this WMP is developed for the Watershed Group to implement the recommended volume reduction goals on a city-by-city basis, it does not preclude participating agencies from collaborating on potentially more cost effective regional and multi-city runoff treatment systems.

As part of the overall collaborative and inclusive effort, this Draft Watershed Management Program was presented at a public stakeholder meeting at the Downey City Hall on May 1, 2014. The Watershed Control Measures, Reasonable Assurance Analysis and Coordinated Integrated Monitoring Programs were discussed and comments from interested members of the public were solicited.

1 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Watershed Management Program (WMP) has been developed to implement the requirements of Los Angeles Regional Water Quality Control Board Order Nos. R4-2012-0175 and R4-2014-0024 (National Pollutant Discharge Elimination System (NPDES) Permit Nos. CA004001, CA004003 respectively) on a watershed scale. In addition, elements of this WMP relating to Total Maximum Daily Loads (TMDLs) address requirements of California State Water Resources Control Board Order No. 2012-0011-DWQ (the Caltrans Stormwater Permit) for those TMDLs within the watershed area as described in the following section. Combined, the Orders set forth waste discharge requirements for the Municipal Separate Storm Sewer (MS4) discharges by Caltrans, the Los Angeles County Flood Control District (LACFCD), the County of Los Angeles and 85 cities within the coastal watersheds of Los Angeles County (Permittees). These requirements include three fundamental elements: (i) effectively prohibit nonstormwater discharges through the MS4, (ii) implement controls to reduce the discharge of pollutants to the maximum extent practicable, and (iii) other provisions the Regional Water Board has determined appropriate for the control of such pollutants.[1] The ultimate goals of the WMP are listed in Section 1.2.3.

1.1.1 PARTICIPATING AGENCIES

This WMP is a collaborative effort of ten participating agencies with MS4 facilities within the subwatersheds[2] of Reach 1 and Reach 2 of the Los Angeles River, Compton Creek and the Rio Hondo. For the purposes of this WMP, the area defined by the boundaries of the participating agencies with these subwatersheds is referred to as the Lower Los Angeles River Watershed (Lower LAR Watershed). The participating agencies and their respective MS4 stormwater Permits addressed by this WMP are listed in Table 1-1.

Table 1-1: Participating Agencies of the Lower LAR Watershed

Agency	Permit Order No.	Permit Name
Downey	R4-2012-0175	Los Angeles County NPDES MS4 Permit (LA MS4 Permit)
LACFCD[3]		
Lakewood		
Lynwood		
Paramount		
Pico Rivera		
Signal Hill		
South Gate		
Long Beach	R4-2014-0024	Long Beach NPDES MS4 Permit (LB MS4 Permit)
Caltrans[3]	2012-0011-DWQ	Caltrans Stormwater Permit (Caltrans MS4 Permit)

[1] 2012 LA NPDES MS4 Permit Findings, pg. 20

[2] Subwatersheds within this WMP are the "HUC-12 Equivalent" drainage areas as defined in 1.E.3.

[3] LACFCD and Caltrans participation is restricted to their land and facilities in the Lower LAR Watershed.

1.1.2 MS4 PERMITS ADDRESSED

As noted in Table 1-1, Caltrans and the City of Long Beach are regulated under their own MS4 Permits, separate from the Los Angeles MS4 Permit. The extent to which this impacts the contents of this WMP is explained in this section.

LONG BEACH AND LOS ANGELES MS4 PERMITS

The Long Beach and Los Angeles MS4 Permits, adopted by the Los Angeles Regional Water Quality Control Board (Regional Board) within 15 months of each other, contain similar language and requirements. Specifically, both Permits include a WMP approach to compliance. These similarities allow for the preparation of one WMP to address the requirements of both permits. Except where otherwise noted, the term *MS4 Permit* will refer exclusively to the Los Angeles and Long Beach MS4 Permits.

CALTRANS STORMWATER PERMIT

Discharges to Caltrans' MS4 are regulated through the Caltrans MS4 Permit. Although the Caltrans Stormwater Permit does not include a WMP compliance approach like the Los Angeles and Long Beach MS4 Permits, its TMDL provisions do require cooperation with agencies subject to the same TMDLs. As such, Caltrans' participation is restricted to those sections of the WMP related to TMDL requirements. Caltrans has acknowledged their intent to participate.

1.1.3 NON-PARTICIPATING AGENCIES

All other permitted agencies within these subwatersheds that are not listed above have developed either individual or collaborative WMPs or draft EWMPs separately and are not participating in this WMP. Non-participating agencies include the County of Los Angeles (unincorporated areas), the Cities of Los Angeles, Compton and Carson and multiple cities within Reach 2 of the Los Angeles River and the Rio Hondo. Figure 1-1 shows the participating agencies within the Lower LAR.

1.1.4 THE LOWER LOS ANGELES RIVER WATERSHED GROUP

DESIGNATION

The participating agencies have a long history of working together to address TMDL issues. Prior to the adoption of the current MS4 Permits[4], the agencies were under a Memoranda of Understanding to develop Implementation Plans for the Los Angeles River Metals TMDL. After Permit adoption, the agencies decided to continue their collaborative efforts to develop a WMP. In addition, the LACFCD decided to participate in this joint effort. The agencies' intent was to focus collective resources on water quality prioritization and implementation efforts to their shared receiving waters. The ten agencies submitted a Notice of Intent to develop a WMP to the Regional Board prior to the June 28, 2013[5], deadline and each signed a Memoranda of Understanding to develop the WMP.

[4] The Los Angeles MS4 Permit adopted November 8, 2012, expires December 28, 2017 and the Long Beach MS4 Permit adopted February 6, 2014, expires March 28, 2019

[5] The Notice of Intent was approved by the Regional Board on September 25, 2013

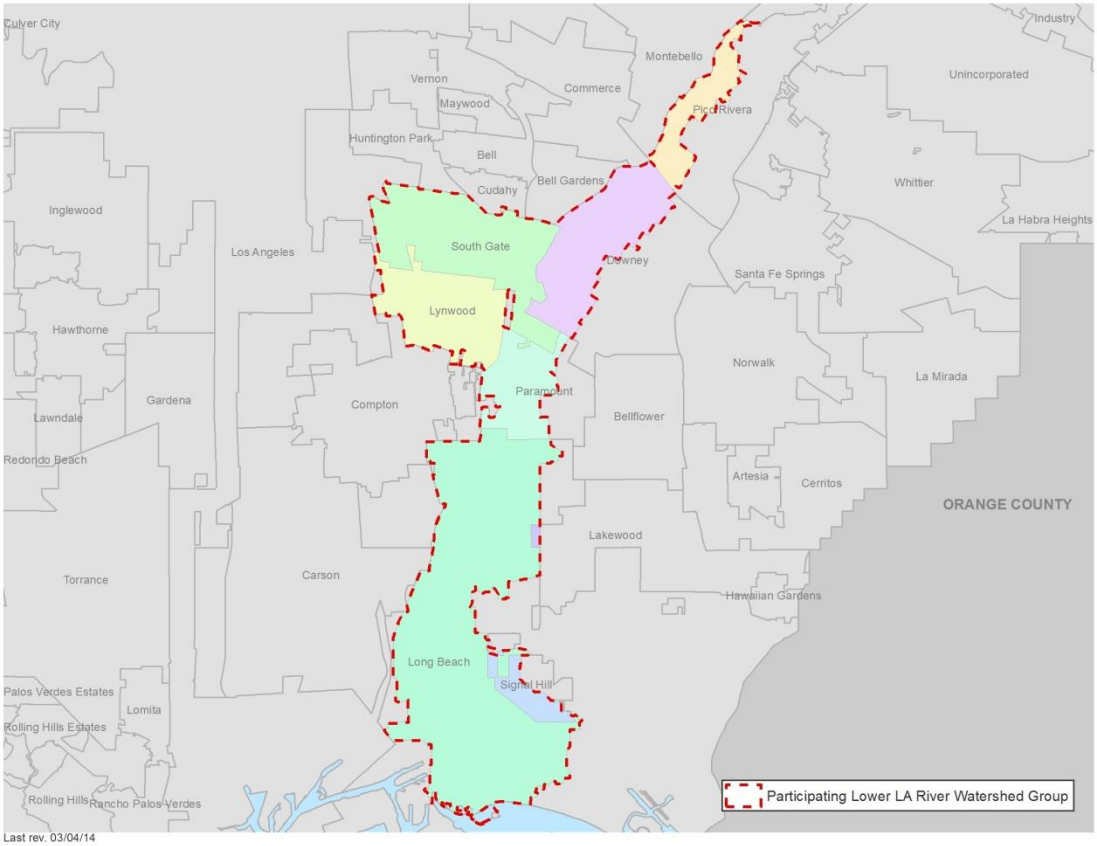


Figure 1-1: Participating Agencies Map

BOUNDARIES

The Lower LAR Watershed is located within the Los Angeles River Watershed Management Area (WMA) as designated in the Los Angeles MS4 Permit (Figure B-4). The three main water bodies located within the Lower LAR - Compton Creek, Los Angeles River (Reach 1 and 2)[6] and Rio Hondo Reach 1 - are defined by the Regional Board as inland Surface Waters of the State. As part of the main stem of the Los Angeles River, Reaches 1 and 2 and the Estuary are designated Waters of the United States (EPA, 2010). By definition its tributaries are also Waters of the United States, which includes Compton Creek and Rio Hondo.

Within the Lower LAR Watershed, the main channels of the Los Angeles River, Compton Creek and the Rio Hondo and most of their tributaries are owned by the LACFCD. The Army Corps of Engineers does not have ownership of channels, although there are privately owned and maintained drains and open channels.

[6] The LAR Estuary is not considered an inland Surface Water of the State

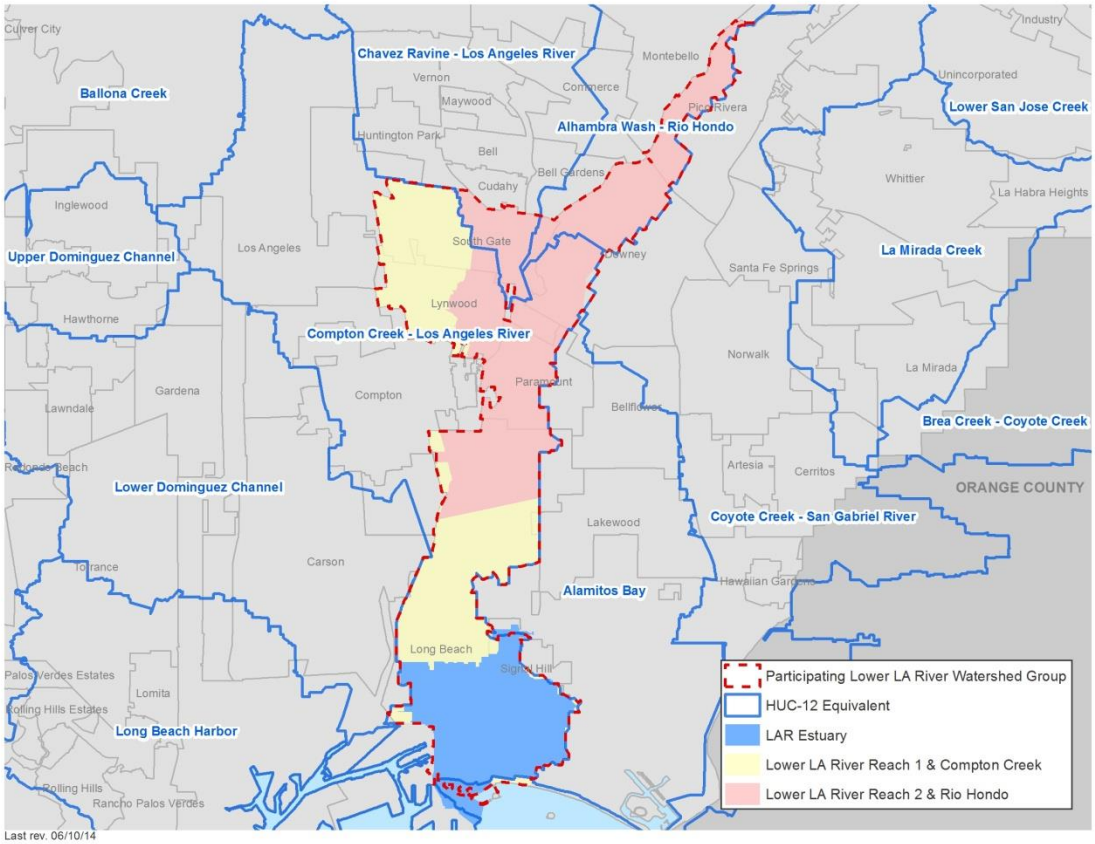


Figure 1-2: Watershed Map with HUC-12 Equivalent Subwatersheds

HYDROLOGIC UNIT CODES (HUC)

The United States Geological Survey's (USGS) Hydrologic Unit Codes (HUCs) are referenced in the MS4 Permit requirements. The HUC system divides the United States into a hierarchical classification of defined, hydrologically-based watersheds. The LACFCD found that some of the HUC boundaries within the Los Angeles Basin were incorrect and have since developed more accurate "HUC equivalents". Following the HUC equivalent system, Compton Creek and the Los Angeles River Estuary and Reach 1 are within subwatershed 180701050402, the Los Angeles River Reach 2 is within subwatersheds 180701050401 and 180701050402 and Rio Hondo Reach 1 is within subwatershed 180701050303. The subwatersheds of the Lower LAR are shown in Figure 1-2 and listed in Table 1-2.

The subwatersheds defined by these 12 digit numbers are referred to as HUC-12. Groups of subwatersheds that share a common downstream waterbody form a watershed. A watershed is designated by the first 10 digits of a HUC-12 and as such is referred to as HUC-10. In the case of the Lower LAR Watershed, Compton Creek and Los Angeles River Reach 1 and 2 are within the Lower Los Angeles River HUC-10 watershed and the Rio Hondo Reach 1 is within the neighboring Rio Hondo HUC-10 watershed. Both watersheds are within the Los Angeles HUC-08 subbasin, which shares most of its borders with the Los Angeles River WMA (Figure B-4).

Table 1-2: Subwatersheds/Water Bodies within the Lower LAR Watershed

Subwatershed/ Water Body	HUC 12 Equivalent	HUC Name	Area within Lower LAR Watershed (mi^2)
Compton Creek	180701050402	Compton Creek – Los Angeles River	6.83
LA River Reach 1	180701050402	Compton Creek – Los Angeles River	16.3
LA River Reach 2	180701050402	Compton Creek – Los Angeles River	16.18
	180701050401	Chavez Ravine – Los Angeles River	
LA River Estuary	180701050402	Compton Creek – Los Angeles River	
Rio Hondo Reach 1	180701050303	Alhambra Wash – Rio Hondo	6.04

WATERSHED AUTHORITY GROUP

Watershed Authority Groups (WAGs) as described in State Assembly Bill 2554, which in 2010 amended the Los Angeles County Flood Control District Act, are referenced in the MS4 Permits. The purpose of the WAGs is to implement collaborative water quality improvement projects and services, with the goal of improving water quality and reducing stormwater and urban runoff pollution. The creation and funding of the WAGs has not yet occurred - it is dependent upon voter approval of the LACFCD's Water Quality Funding Initiative (a countywide parcel fee). AB 2554 divides the County into nine WAGs - the Lower LAR Watershed is located within the Lower Los Angeles River WAG, which shares borders with the Lower Los Angeles River HUC-10 watershed. Figure 1-3 is a complete map of the WAG groups.

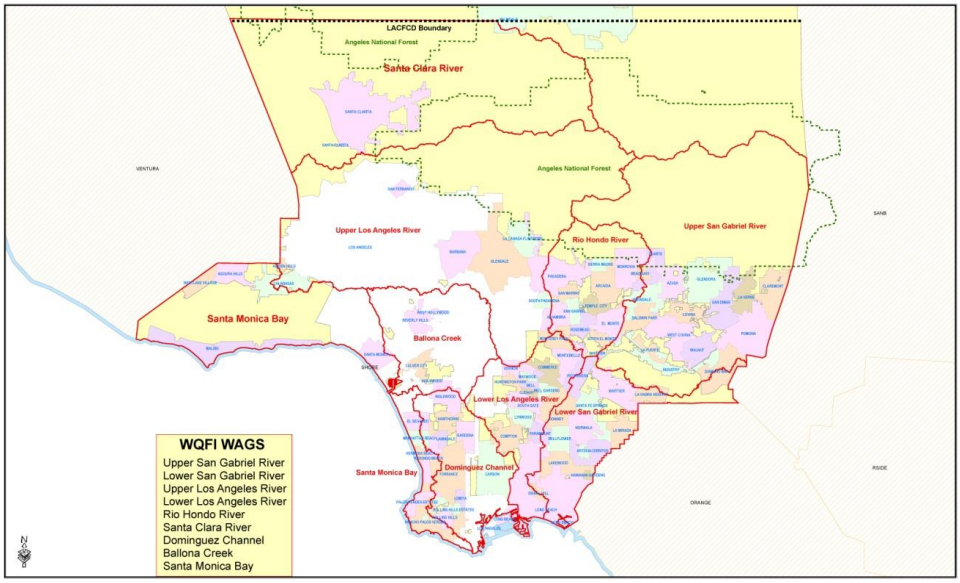


Figure 1-3: Watershed Authority Groups Map

1.2 THE WATERSHED MANAGEMENT PROGRAM

1.2.1 PURPOSE OF THE MS4 PERMIT

MS4s receive stormwater and non-stormwater discharges from various sources, including municipal MS4s and other public agencies, discharges under NPDES permits or authorized by the USEPA[7], groundwater and natural flow. As the discharges flow over the urban landscape, they may pick up pollutants generated by urban activities, such as metals, bacteria, pesticides, fertilizers and trash. Polluted stormwater and non-stormwater discharges conveyed through the MS4 ultimately reach receiving waters, resulting in adverse water quality impacts.[8]

The goal of the MS4 Permit is to reduce the discharge of these pollutants from MS4s to the maximum extent practicable.

1.2.2 WATERSHED MANAGEMENT EMPHASIS

The watershed management approach to permit implementation – described in the current MS4 Permits as a voluntary approach to compliance – is a departure from previous permit structures. The previous MS4 Permits (Order Nos. 01-182 and 99-060) addressed implementation through jurisdictional Stormwater Quality Management Programs (SQMPs). The Los Angeles countywide SQMP, prepared jointly by the Permittees and approved by the Regional Board in 2001, described the controls to be implemented in order to comply with the special provisions (now referred to as the Minimum Control Measures, or MCMs) of the MS4 Permit. These controls were identical for each Permittee and did not 1) differentiate between watersheds or agencies or 2) target or identify priority pollutants.

The emphasis of the prior SQMP approach was rote program development and implementation. In contrast, management actions under the WMP are driven by the water quality conditions of the receiving waters and outfalls within the watershed.

The Regional Board outlines several reasons for this shift in emphasis from the previous MS4 Permit. A watershed based structure for permit implementation is consistent with TMDLs developed by the Regional Board and USEPA, which are established at a watershed or subwatershed scale and are a prominent part of the MS4 Permit. The participating agencies have already begun collaborating on a watershed scale to develop monitoring and implementation plans required by TMDLs.

1.2.3 WATERSHED MANAGEMENT GOALS

Addressing MS4 discharges on a watershed scale focuses on water quality results by emphasizing the receiving waters and outfalls within the watershed[9]. The conditions of the receiving waters drive

[7] Including discharges subject to a decision document approved pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
[8] MS4 Permit Fact Sheet (pg. F7)
[9] MS4 compliance is measured at 1) Receiving water monitoring, 2) Stormwater outfall based monitoring, 3) Non-storm water outfall based monitoring, and 4) New Development/Re-development effectiveness tracking.

management actions, which in turn focus on the measures to address pollutant contributions from MS4 discharges.

The ultimate goals of the Watershed Management Programs is to ensure that discharges from the MS4:

1. Achieve applicable Water Quality Based Effluent Limitations (WQBELs) that implement TMDLs,
2. Do not cause or contribute to exceedances of receiving water limitations,
3. Nonstormwater discharges from the MS4 are not a source of pollutants to receiving waters.

1.2.4 WATERSHED MANAGEMENT APPROACH

In order to achieve the goals listed in the previous section, the approach of the WMP is to:

- Prioritize water quality issues resulting from stormwater and non-stormwater discharges from the MS4 to receiving waters,
- Identify and implement strategies, control measures, and BMPs that:
    - Achieve applicable water quality-based effluent limitations[10]
    - Do not cause or contribute to exceedances of receiving water limitation[11]
    - Do not include non-stormwater discharges that are effectively prohibited[12]
    - Ensure that controls are implemented to reduce the discharge of pollutants to the maximum extent practicable[13]
- Execute an integrated monitoring program and assessment program[14] to determine progress towards achieving applicable limitations and/or action levels
- Modify strategies, control measures, and BMPs as necessary based on analysis of monitoring data collected pursuant to the Monitoring and Reporting Program (MRP) to ensure that applicable water quality-based effluent limitations and receiving water limitations and other milestones set forth in the WMP are achieved in the targeted timeframes.
- Provide opportunity for meaningful stakeholder input. This includes participation in a permit-wide WMP technical advisory committee (TAC) that advises and participates in the development of the WMP from month six through the date of program approval.

The overall approach is adaptive, whereby BMPs will be implemented, their effectiveness monitored and modifications to this WMP will be made as needed. These modifications will maintain consistency with the assumptions and requirements of applicable TMDL Waste Load Allocations.

1.2.5 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The goals and objectives of the WMP may be achieved by development of storm water structural controls that may require discretionary approval subject to review under the California Environmental

[10] Pursuant to Part VI.E and Attachments L through R pursuant to corresponding compliance schedules
[11] Pursuant to Parts V.A and VI.E and Attachments L through R of the Permit
[12] Pursuant to Part III.A of the Permit
[13] Pursuant to Part IV.A.1 of the Permit
[14] Pursuant to Attachment E – MRP, Part IV of the Permit

Quality Act (CEQA). The participating agencies intend to comply with CEQA when implementing structural BMPs. Public agencies responsible for carrying out or approving stormwater structural controls are identified as the lead agency. The environmental review required imposes both procedural and substantive requirements. At a minimum, the lead agency must adhere to the consultation and public notice requirements set forth in the CEQA Guidelines, make determinations whether the proposed stormwater structural control is a "project", and if so, conduct an initial review of the project and its environmental effects. The lead agency must identify and document the potential environmental impacts of the proposed project in accordance with CEQA, (Public Resources Code Section 21000 et seq.), and the CEQA Guidelines (Title 14 of the California Code of Regulations, Section 15000, et seq.).

Certain classes of projects have been determined not to have significant effect on the environment and are exempt from the provisions of CEQA by statute or category. When a public agency decides that a project is exempt from CEQA, and the public agency approves or determines to carry out the project, the agency may file a Notice of Exemption. For projects deemed not exempt, the lead agency will prepare and Initial Study and decide whether a Negative Declaration will be required for the project, or depending on the potential effects, a further, and more substantial review may be conducted in the form of an Environmental Impact Report (EIR). A project may not be approved as submitted if feasible alternatives or Mitigation Measures are able to substantially lessen the significant environmental effects of the project. Moreover, environmental review must include provisions for wide public involvement, formal and informal, in order to receive and evaluate public reactions to environmental issues, and when deciding the matter, the lead agency must consider all comments it receives (Cal. Pub. Res. Code § 21091(d)(1); 14 CCR § 15074(b)). The lead agency will use the EIR in determining the environmental effects of the proposed storm water treatment control project, and whether or not to approve the proposed project. If the proposed project is approved, all conditions and mitigations made in the adopted EIR will become part of any subsequent actions taken by the lead agency. The EIR will also be used by permitting agencies, funding agencies and the public to support proposed project decisions.

The National Environmental Quality Act (NEPA) comes into play less often than CEQA, but may be included for storm water treatment control projects involving federal funding. A joint NEPA and CEQA review process is encouraged to improve coordination and avoid redundancies. Like CEQA, NEPA process provides opportunities to address issues related to proposed projects early in the planning stages. NEPA was codified under Title 42 of the United States Code sections 4331 et seq. (42 U.S.C. 4331 et seq.).

1.3 LOWER LOS ANGELES RIVER WATERSHED

1.3.1 OVERVIEW OF THE LOS ANGELES RIVER WATERSHED

The Los Angeles River Watershed drains a watershed of 824 square miles[15]. The Los Angeles River WMA is one of the largest in the region and is also one of the most diverse in terms of land use patterns. Approximately 324 square miles of the watershed are covered by forest or open space land including the area near the headwaters, which originate in the Santa Monica, Santa Susana, and San Gabriel Mountains. The remainder of the watershed is highly developed. The river flows through the San Fernando Valley past heavily developed residential and commercial areas. From the confluence with the Arroyo Seco, north of downtown Los Angeles, to the confluence with the Rio Hondo, the river flows through industrial and commercial areas and is bordered by rail yards, freeways, and major commercial and government buildings. From the Rio Hondo to the Pacific Ocean, the river flows through industrial, residential, and commercial areas, including major refineries and petroleum products storage facilities, major freeways, rail lines, and rail yards serving the Ports of Los Angeles and Long Beach. Due to major flood events at the beginning of the century, by the 1950s most of the Los Angeles River was lined with concrete. The Los Angeles River tidal prism/estuary begins in Long Beach at Willow Street and runs approximately three miles before joining with Queensway Bay. The channel has a soft bottom in this reach with concrete-lined sides.

The remaining discussion on the watershed will solely refer to the specific characteristics of the Lower Los Angeles River Watershed.

1.3.2 LOWER LOS ANGELES RIVER WATERSHED AREA

REGIONAL AND LOCAL SETTING

The Lower LAR Watershed encompasses approximately 43.7 square miles (27,981 acres) within Los Angeles County and comprises 5.3% of the drainage area of the Los Angeles River Watershed. The boundaries of the watershed are shown in Figure 1-1 and further explained in Section 1.1.

CLIMATE

Average annual precipitation for the watershed area is highly variable and terrain-dependent, averaging fifteen (15) inches annually and mainly occurring during the winter months (November through April). Due to the atmospheric dominance of the stable marine layer, significant precipitation is rare between May and October.

During the winter months Pacific storms often push cold fronts across California from northwest to southeast. These storms and frontal systems account for the vast bulk of the area's annual rainfall. Such rainy season storms are migratory, with wet and dry periods alternating during the winter and early

[15] MS4 Permit Fact Sheet (pg. F94)

spring with irregularity in timing and duration. Rainfall patterns average 3.68 inches of rainfall in February to 0.01 inches of rainfall in July[16].

With the highly developed conditions within the watershed, most stormwater flows generated by the rainfall is routed to the ocean through the curb and gutters along the streets, catch basins and storm drains into the Los Angeles River. The velocity of the storm flows within this watershed ranges up to 20 feet per second within the waterways.

RAINFALL AND FLOW CHARACTERISTICS

Historical rainfall records from two existing rain gauges located near the Lower LAR Watershed were obtained and utilized in this analysis. These meteorological stations and resulting rain gauge data are maintained by National Climatic Data Center. The gauges were chosen due to their active status and the duration of available data. Their locations are shown in Figure 1-4 with detailed location information provided in Table 1-3.

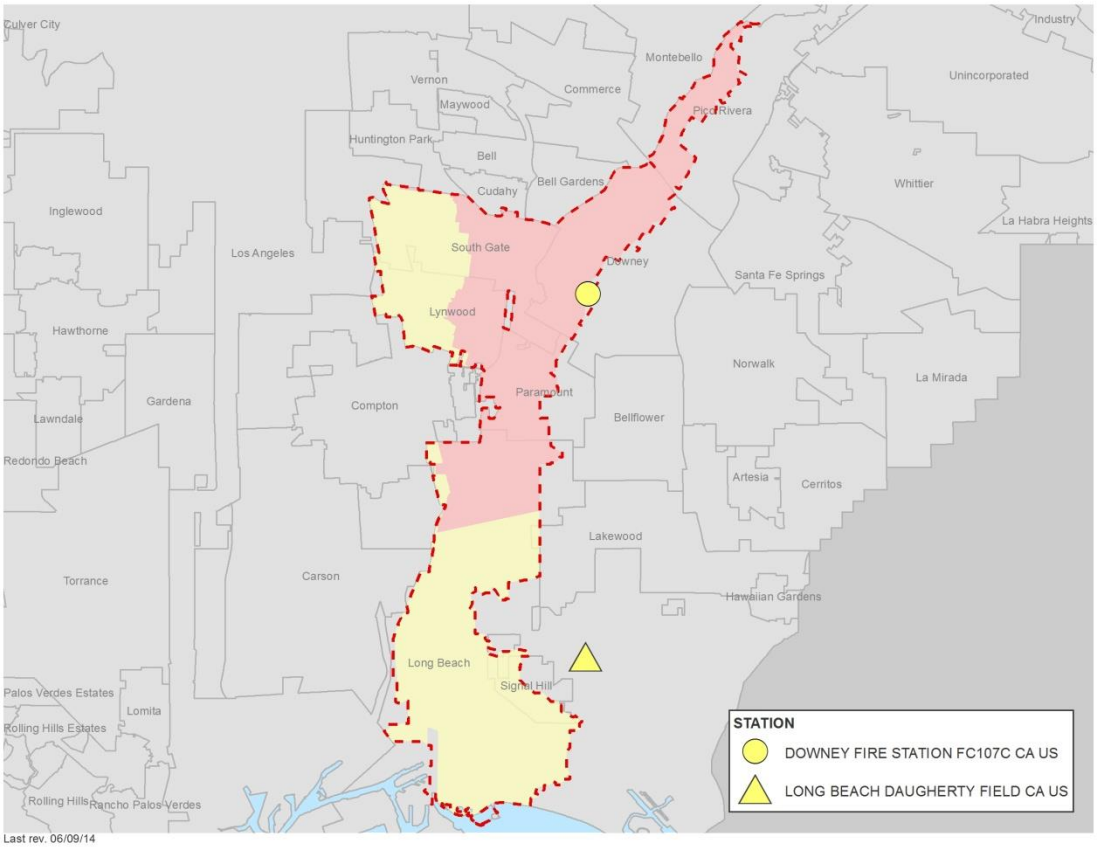


Figure 1-4: Rainfall Gauge Stations in Downey and Long Beach (Yellow Squares)

[16] National Climatic Data Center, http://lwf.ncdc.noaa.gov

Table 1-3: Rainfall Data Summary

Station ID	Station	Period	Latitude	Longitude	Elevation (ft)	Mean Annual Precipitation (in)	85th Percentile Storm (in)
USC00042494	Downey Fire Station	1949 - 2012	33.929	-118.145	110.0	12.32	0.22
USW00023129	Long Beach Daugherty Field	1949-2014	33.811	-118.146	30.84	11.20	0.18

(1) National Climatic Data Center, http://lwf.ncdc.noaa.gov

Average monthly rainfall for the historical record has been calculated for each rain gauge and is provided in Table 1-4. The monthly values are similar among the two rain gauges.

Table 1-4: Summary of Average Monthly Rainfall (in)

Month	Downey Fire Station	Long Beach Daugherty Field
January	3.0	2.6
February	3.2	2.9
March	2.4	1.8
April	1.1	0.7
May	0.2	0.2
June	0.1	0.1
July	<0.1	<0.1
August	0.1	0.1
September	0.3	0.2
October	0.4	0.4
November	1.6	1.2
December	2.5	1.8
Total Average Monthly Rainfall	**1.2**	**1.0**

(1) National Climatic Data Center, http://lwf.ncdc.noaa.gov

DRY WEATHER FLOWS TO THE LOWER LOS ANGELES RIVER

Dry weather flow in the Los Angeles River comes predominantly from effluent discharges and groundwater inflow. Sources of effluent discharges in the Lower LA River watershed include wastewater treatment plants, urban runoff such as irrigation overflows and car wash water, and various industrial discharges.

The Sanitation Districts of Los Angeles County maintain a regional, interconnected sewerage system called the Joint Outfall System. The Joint Outfall System includes six satellite water reclamation plants (WRPs), including the Whittier Narrows WRP, which discharges effluent during dry weather into the Rio Hondo above the Whittier Narrows dam. The Whittier Narrows WRP is located at 301 N. Rosemead Boulevard in the City of El Monte. The plant occupies 27 acres south of the Pomona (60) Freeway, and provides primary, secondary and tertiary treatment for 15 million gallons of wastewater per day. Most of the reclaimed water is reused as groundwater recharge into the Rio Hondo and San Gabriel Coastal

Spreading Grounds, or for irrigation at an adjacent nursery. Remaining effluent is discharged directly into the Rio Hondo and the San Gabriel River at 3 effluent discharge points.

The average monthly effluent discharge from the LA County Sanitation District's Whittier Narrows Water Reclamation Plant was 6.44 MGD in 2012, with the average monthly max being 8.05 MGD and the average monthly minimum flows measured at 4.97 MGD.

The three publicly owned treatment works (POTWs) discharge to the Los Angeles River (Tillman Water Reclamation Plant, LA-Glendale Water Reclamation Plant, and Burbank Water Reclamation Plant) and constitute the majority of the flow and metals loadings during dry weather[17]. The critical flow for the entire river (each reach and tributary) is 203 cfs, which is equal to the combined design flow of the three POTWs (169 cfs) plus the median flow from the storm drains and tributaries (34 cfs).

WET WEATHER FLOWS TO THE LOWER LOS ANGELES RIVER

In addition to stormwater flows within the Los Angeles Basin, wet weather flows from the Santa Monica Mountains, the Verdugo Mountains, the Santa Susana Mountains and the San Gabriel Mountains also contribute to flows in the Los Angeles River.

WATERSHED CATCHMENT HYDROLOGIC CONNECTIVITY

The upstream limit of the LLAR subwatershed begins at the north stem of Reach 2 Los Angeles River within the City of South Gate and the downstream limit ends at the Estuary. The main reach through the watershed is the Los Angeles River, with Compton Creek and the Rio Hondo as major tributaries. The stretch of Los Angeles River within the watershed consists of a concrete lined channel spanning 400 to 465 feet in width. Compton Creek and the Rio Hondo are primarily concrete channels within the Lower LAR Watershed. Figure 1-5 shows the LACFCD storm drain system within the Lower LAR Watershed as well as its main channels and tributaries.

The Compton Creek subwatershed drains approximately 42 square miles to its confluence with the Los Angeles River. The subwatershed is almost entirely developed.

The Rio Hondo subwatershed drains approximately 143 square miles to its confluence with the Los Angeles River.

The Lower LAR Watershed drains runoff directly from urbanized area totaling approximately 43.7 square miles. From its upstream beginning in South Gate to its downstream confluence with the Los Angeles River Estuary, the Lower LAR stretches approximately 13.3 miles.

The Los Angeles County Department of Public Works provided the delineation of the catchments within each subwatershed. Approximately 53 catchments are located within this watershed[18]. These delineations are based on a combination of contour information and existing underground storm drain systems.

[17] Los Angeles River Metals TMDL Basin Plan Amendment, 2006

[18] Los Angeles County Watershed Management Modeling System, http://dpw.lacounty.gov/wmd/wmms/

Drainage areas for individual outfalls are not readily available at this time. Defining these areas would require significant resources. The Group proposes to provide drainages areas for major outfalls with significant discharges and outfalls to be monitored as part of the CIMP. To complete this task, existing drainage maps from the LACFCD and/or cities will be obtained and converted to GIS project files. This task will be completed within one year of WMP approval

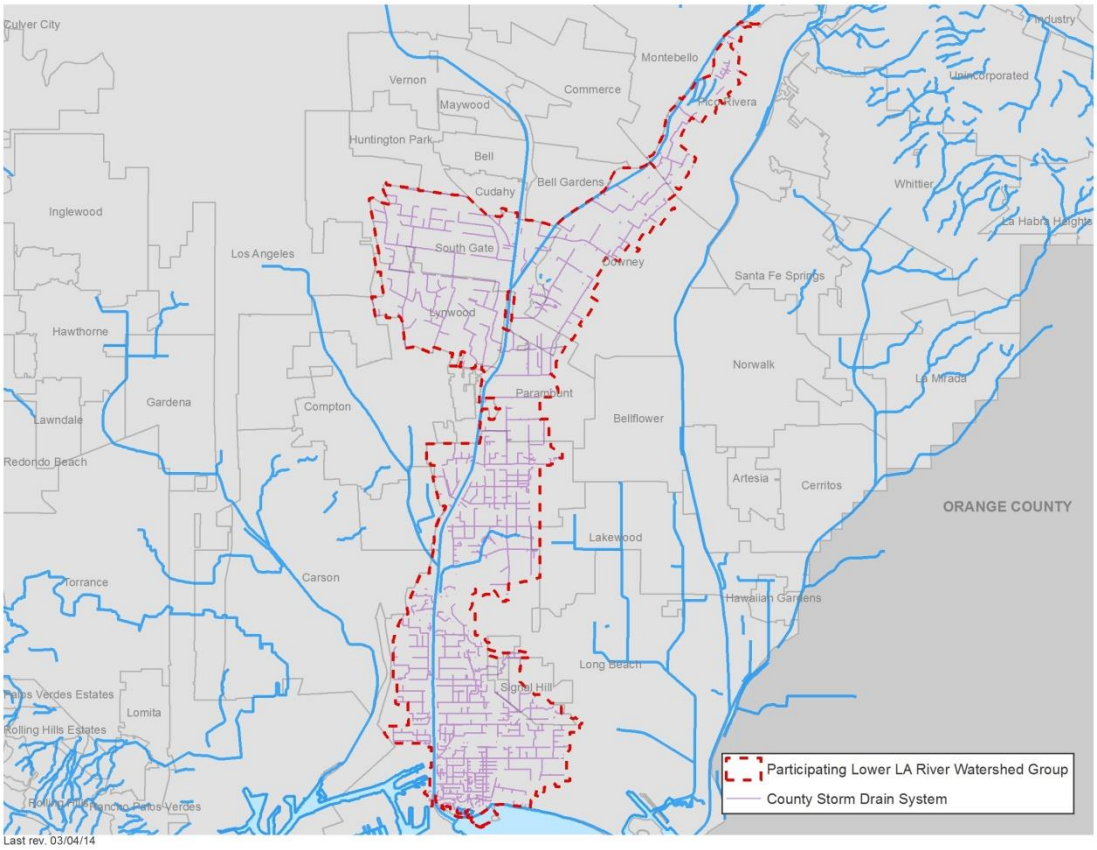


Figure 1-5: LACFCD Storm Drains

The watershed is predominantly served by storm sewer systems, across ten agency jurisdictions, connecting drainage in urbanized areas with the main tributaries. Due to the narrow shape of the watershed, the participating agencies are directly adjacent to either the Lower LAR or its main tributaries Compton Creek and the Rio Hondo.

GEOPHYSICAL SETTING

TOPOGRAPHY

Natural topography is comprised of the existing soils, ground elevation/slope, vegetation, stream network, and groundwater. These features impact each other in both the natural and built environments, and therefore should not be analyzed independently when evaluating BMP location options.

SOILS

The Lower LAR Watershed can be characterized as having seven soil types. Figure 1-6 shows the various soil types underlying the watershed. Soils range from sandy loam to clay loam, having a varying range of saturated hydraulic conductivity.

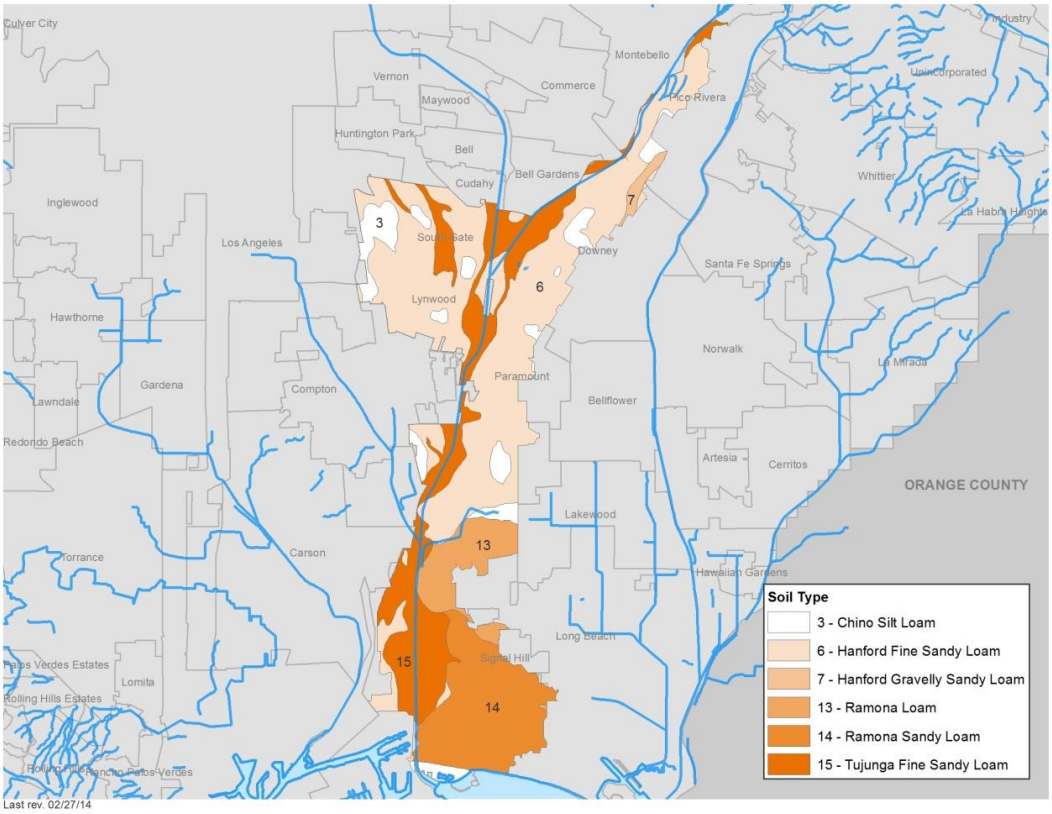


Figure 1-6: Soil Types[19]

GROUNDWATER

Groundwater flow in the Lower LAR Watershed generally mimics surface topography. Depth to the groundwater varies from 11 feet to greater than 40 feet. Figure 1-7 shows the groundwater basin for the Lower LAR Watershed.

WATERSHED LAND AREA

Table 1-5 lists the percent land area within the Lower LAR for each participant.

LAND USES

Table 1-6 lists and Figure 1-8 shows the developed and undeveloped land within the Lower LAR Watershed.

[19] Source: LA County Department of Public Works, **http://ladpw.org/wrd/publication/Engineering/hydrology/soil_types.zip**

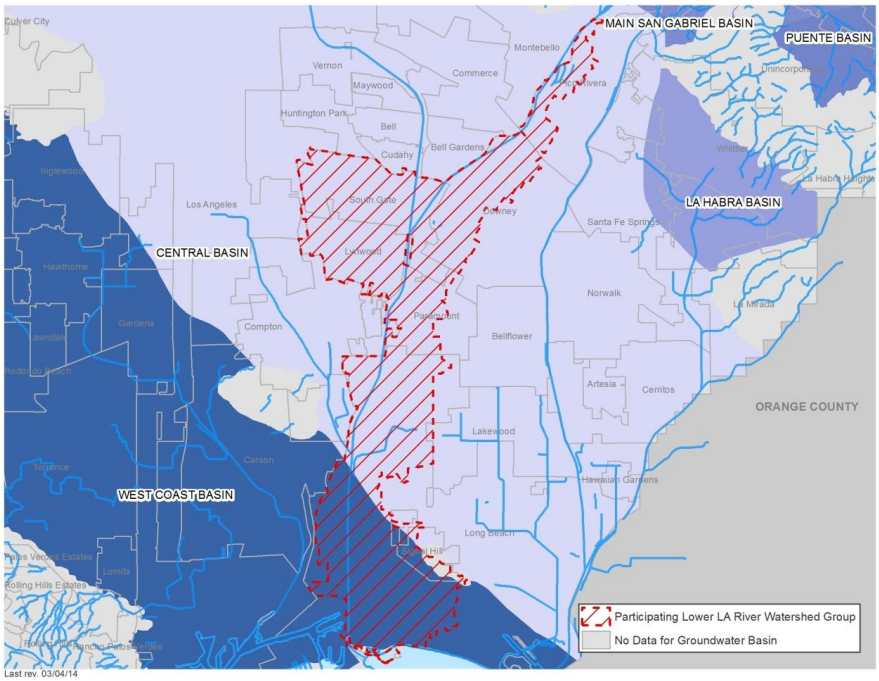


Figure 1-7: Groundwater Basins

Table 1-5: Watershed Land Area by Participant

Agency	Land area (Acres)	Percent of total area (%)
Downey	3,546	13
Lakewood	51	<1
Long Beach	12,301	42
Lynwood	3,098	11
Paramount	1,997	7
Pico Rivera	1,510	5
Signal Hill	774	3
South Gate	4,704	15
Caltrans	Caltrans owns and operates approximately 4% of the watershed	
LACFCD	N/A	N/A

Table 1-6: Developed and Undeveloped Land

Agency	Acres developed	Acres undeveloped	% Developed lands
Downey	5,074	379	93%
LACFCD	ND	ND	ND
Lakewood	47	3	94%
Long Beach	18,068	1,320	93%
Lynwood	2,180	50	98%
Paramount	3,350	26	99%
Pico Rivera	1,580	13	99%
Signal Hill	1,890	17	99%
South Gate	3,820	14	99%
Caltrans	ND	ND	ND

ND - Not delineated

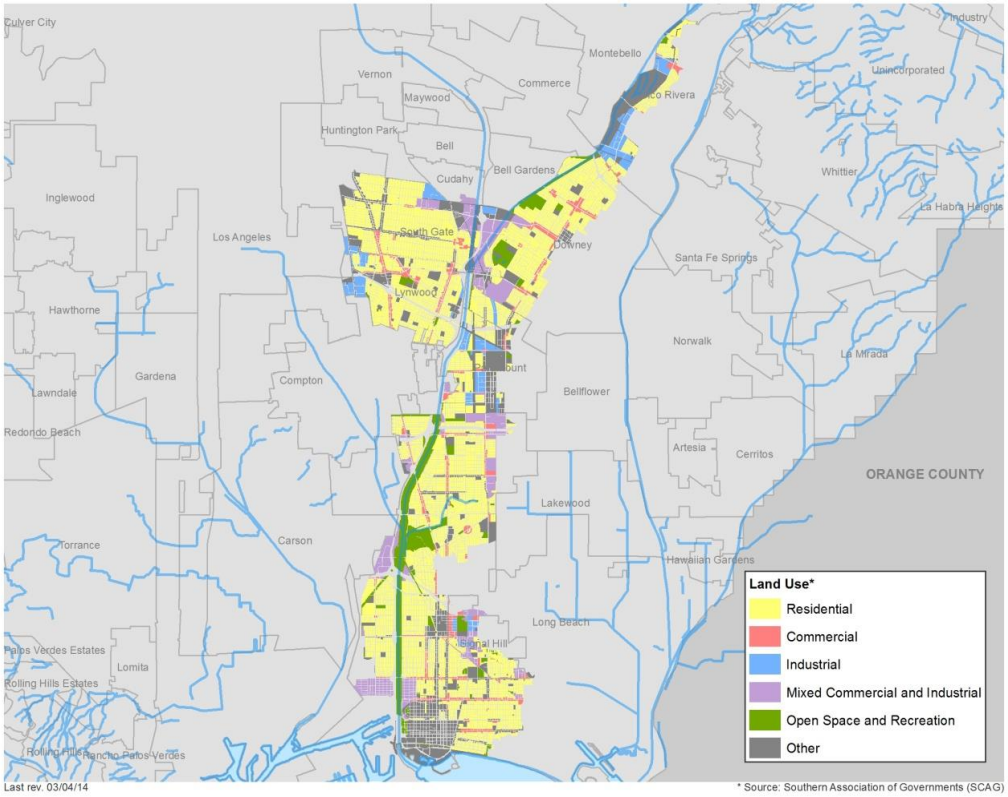


Figure 1-8: Land Use Map

DISADVANTAGED COMMUNITY

The Lower LAR Watershed is in a geographic area encompassing all or part of eight cities. This area is a high-minority and economically disadvantaged region. Of the eight cities participating in this WMP, three are categorized as disadvantaged communities as a whole, meaning that the median income levels in the city as a whole are less than 80% of the state's median household income ($48,706)[20]. All of the remaining five cities that are not disadvantaged as a whole are disadvantaged in part. Table 1-7 lists the income statistics for each city and Figure 1-9 is a map of the disadvantaged communities.

Table 1-7: DAC Percentage by City

City	DAC Percentage[1]
Downey	29%
Lakewood	3%
Long Beach	49%
Lynwood*	100%
Paramount*	100%
Pico Rivera	34%
Signal Hill	34%
South Gate*	100%

* Denotes disadvantaged community as a whole

[20] Integrated Regional Water Management, Grants, DAC Maps, *www.water.ca.gov/irwm/grants/resourceslinks.cfm*

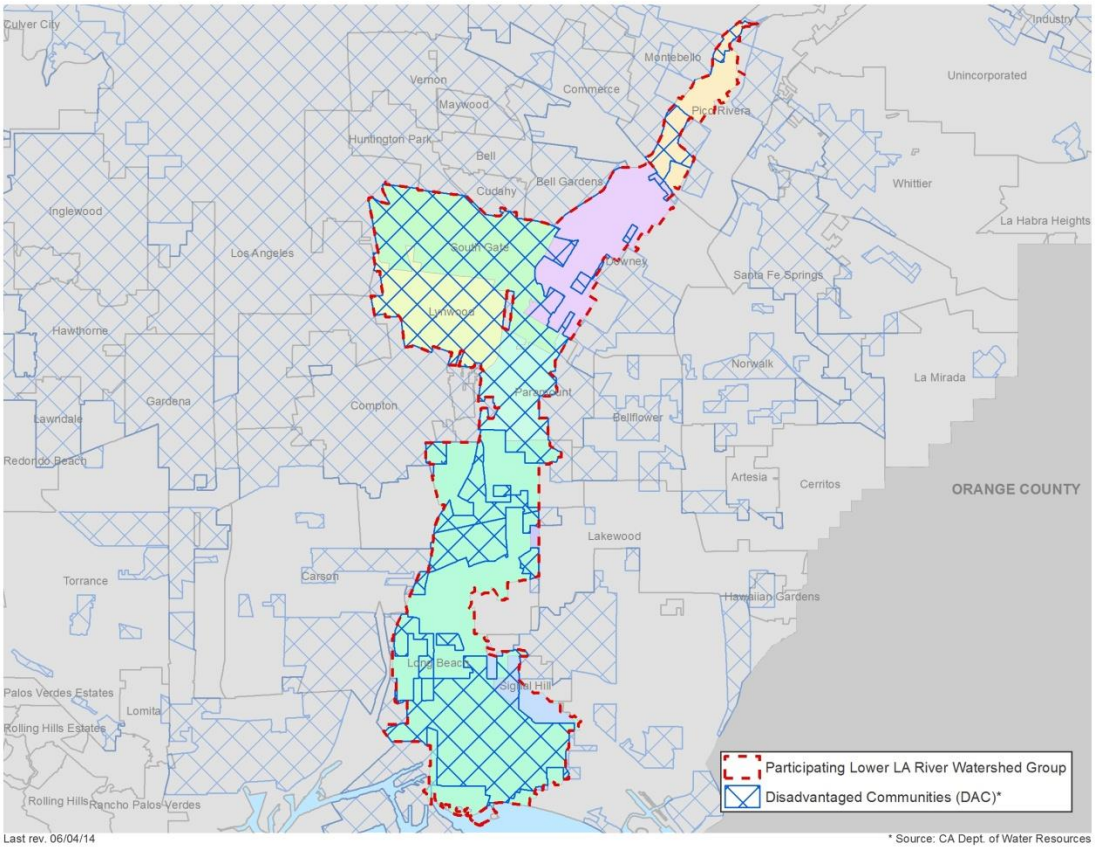


Figure 1-9 - Disadvantaged Community Map

1.4 WATER QUALITY IMPAIRMENTS

1.4.1 HISTORY OF IMPAIRMENTS IN THE LOWER LAR WATERSHED

Various reaches within the Lower LAR Watershed are on the 2010 CWA Section 303(d) List of impaired water bodies for trash, nitrogen compounds and related effects (ammonia, nitrate, nitrite, algae, pH, odor, and scum), metals (copper, cadmium, lead, zinc, aluminum and selenium), bacteria, and historic pesticides. Beneficial uses impaired by trash in the Los Angeles River are REC-1, REC-2, WARM, WILD, EST, MAR, RARE, MIGR, SPWN, COMM, WET and COLD. The excess nitrogen compounds may be causing impairments to the WARM and WILD designated beneficial uses of Los Angeles River. Excess metals may be causing impairments to the WILD, RARE, WARM, WET, and GWR designated beneficial uses of the Los Angeles River and its tributaries. Elevated indicator bacteria densities are listed impairments to the REC-1 and REC-2 designated beneficial uses of Los Angeles River.

1.4.2 ORGANIZING TO ADDRESS TMDLS

TMDLs represent large-scale efforts crossing jurisdictional boundaries and often encompassing the entire drainage of a major regional waterbody (e.g., Los Angeles River). Within the Lower LAR, these efforts have included the following:

- Beginning in 2009, the Los Angeles River working group was formed for development of the Metals TMDL implementation plan. The group eventually developed into the Lower LAR Watershed group to develop this WMP.
- All Lower LAR cities participated in and received funding as part of a grant to sixteen cities in the Gateway region whereby city-owned and LACFCD owned catch basins were retrofitted with full-capture trash inserts[21].
- The Cities of Signal Hill and Long Beach (together with the LACFCD) worked together and were awarded a grant to install full capture end-of-pipe trash nets and screens in Hamilton Bowl.
- The Cities of Downey, Lynwood, Paramount, Pico Rivera, Signal Hill and South Gate were awarded a Proposition 84 grant to install Low Impact Development (LID) BMPs along high traffic transportation corridors.

1.5 WATER QUALITY ISSUES AND THE HISTORY OF WATER QUALITY REGULATIONS

1.5.1 FEDERAL AND STATE LAW

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for all inland surface waters, estuaries, and coastal waters. The federal Environmental Protection Agency (EPA) is ultimately responsible for

[21] State Water Board Project No C-06-6439-110, December 2011

implementation of the CWA and its associated regulations. However, the CWA allowed EPA to authorize the NPDES Permit Program to state governments, enabling states to perform many of the permitting, administrative, and enforcement aspects of the NPDES Program. California, like other states, implements the CWA by promulgating its own water quality protection laws and regulations. As long as this authority provides equivalent protections as the federal CWA, EPA can delegate CWA responsibilities to the state while retaining oversight responsibilities. In some cases, California has established requirements that are more stringent than federal requirements.

The 1970 Porter-Cologne Water Quality Control Act granted the California State Water Resources Control Board (SWRCB) and nine California Regional Water Quality Control Boards (Regional Boards) broad powers to protect water quality. This Act and its governing regulations provide the basis for California's implementation of CWA responsibilities. The Los Angeles Regional Water Quality Control Board (Regional Board) is the governing regulatory agency for the Lower LAR Watershed.

Section 303(d) of the CWA requires waterbodies not meeting water quality objectives even after all required effluent limitations have been implemented (e.g. through wastewater or stormwater discharge permits) to be regularly identified. These waters are often referred to as "303(d) listed" or "impaired" waters. Waterbodies that are listed on the 303(d) list typically require development of a Total Maximum Daily Load (TMDL) for the pollutant(s) impairing the use of the water. Development and approval of the 303(d) list is a lengthy state and federal process. A list is not effective until the EPA approves the list. The current EPA-approved 303(d) list for California is the 2010 list, which can be found in Appendix A-2-2.

A TMDL establishes the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. Depending on the nature of the pollutant, TMDL implementation requires limits on the contributions of pollutants from point sources (waste load allocation), nonpoint sources (load allocation), or both. The Regional Board is responsible for TMDL development in the Lower LAR Watershed.

Adoption of a TMDL requires an amendment to the Water Quality Control Plan (known as the Basin Plan) for the Los Angeles Region. The Regional Board's Basin Plan is designed to preserve and enhance water quality and protect the beneficial uses of regional waters. Specifically, the Basin Plan (i) designates beneficial uses for surface and ground waters, (ii) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy, and (iii) describes implementation programs to protect all waters in the Region. The Basin Plan is reviewed and updated as necessary (Regional Board 1994, as amended). Following adoption by the Regional Board, the Basin Plan and subsequent amendments are subject to approval by the State Board, the State Office of Administrative Law (OAL), and the Environmental Protection Agency (EPA).

1.5.2 WATER QUALITY REQUIREMENTS

The Regional Board designates "beneficial uses" for waterbodies in the watersheds that it governs and adopts water quality objectives to protect these uses[22]. In some cases, EPA may also promulgate objectives where it makes a finding that the state's objectives are not protective enough to protect the beneficial use. The nature of the objectives is directly related to the type of beneficial use. For example, the freshwater warm habitat beneficial use protects aquatic organisms resident in warm-water streams. The associated water quality objectives are for those constituents known to affect both the growth and reproduction of aquatic life. These objectives range from physical characteristics such as temperature, dissolved oxygen, and pH to potential toxic constituents including metals and organics. In California, the objectives for metals and a number of organic compounds have been established by the federal EPA rather than the state (California Toxics Rule, 2000). The EPA promulgated numeric water quality criteria for priority toxic pollutants and other water quality standards provisions based on the determination that the numeric criteria were necessary (since the state had been without numeric water quality criteria for many priority toxic pollutants as required by the CWA) to protect human health and the environment. These Federal criteria are legally applicable in the state for inland surface waters, enclosed bays and estuaries for all purposes and programs under the CWA.

1.6 MS4 PERMIT REQUIREMENTS

The development of this WMP is a compliance option of the MS4 permits held by the Permittees[23]. The WMP includes an evaluation of existing water quality conditions, including characterization of storm water and non-storm water discharges from the MS4 and receiving water quality to support identification and prioritization/sequencing of management actions. At a minimum, water quality priorities within each Watershed Management Area must include achieving applicable water quality based effluent limitations and/or receiving water limitations established.

The MS4 permit requires that this WMP identifies strategies, control measures, and BMPs to implement through the stormwater management programs on a watershed scale, with the goal of creating an efficient program to focus collective resources on watershed priorities and effectively eliminate the source of pollutants. Customization of the BMPs to be implemented, or required to be implemented, is

[22] See Regional Board's 1994 Los Angeles Region Basin Plan, as amended.

[23] The Cities of Pico Rivera, Downey, Lynwood and Signal Hill (hereinafter "the Cities") submitted Administrative Petitions (Petitions) to the California State Water Resources Control Board (SWRCB) pursuant to section 13320(a) of the California Water Code requesting that the SWRCB review various terms and requirements set forth in the 2012 MS4 Permit, Order No. R4-2012-0175 (2012 Permit) adopted by the California Regional Water Quality Control Board, Los Angeles Region (Regional Board)." These Cities have participated in good faith in the development of this Lower Los Angeles River Watershed Management Program (WMP). Nothing in this WMP shall affect those cities' administrative petitions, nor shall anything in this WMP constitute a waiver of any positions or rights therein.

done with the goal of creating an efficient program to focus individual and collective resources on watershed priorities.

On the basis of the evaluation of existing water quality conditions, waterbody-pollutant combinations are classified into one of the following three categories:

- CATEGORY 1 (HIGHEST PRIORITY): Waterbody-pollutant combinations for which water quality based effluent limitations and/or receiving water limitations are included in the MS4 Permits to implement TMDLs.
- CATEGORY 2 (HIGH PRIORITY): Pollutants for which data indicate water quality impairment in the receiving water according to the State's Listing Policy and for which MS4 discharges may be causing or contributing to the impairment.
- CATEGORY 3 (MEDIUM PRIORITY): Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable receiving water limitations contained in the MS4 permit and for which MS4 discharges may be causing or contributing to the exceedances.

Sources for the waterbody-pollutant combinations are identified by considering the following:

- Review of available data, including historical findings from the participating agencies' Minimum Control Measure and TMDL programs, watershed model results and other pertinent information, data or studies.
- Locations of major MS4 outfalls and major structural controls for stormwater and nonstormwater that discharge to receiving waters.
- Other known and suspected sources of pollutants from the MS4 to receiving waters.

Based on the findings of the source assessment, the issues within the watershed are prioritized and sequenced. Factors considered in establishing watershed priorities include:

1. Pollutants for which there are water quality based effluent limitations and/or receiving water limitations with interim or final compliance deadlines within the permit term.
2. Pollutants for which there are water quality based effluent limitations and/or receiving water limitations with interim or final compliance deadlines between October 26, 2012 and October 25, 2017.
3. Pollutants for which data indicate impairment in the receiving water and the findings from the source assessment implicates discharges from the MS4, but no TMDL has been developed.

1.6.1 REASONABLE ASSURANCE ANALYSIS AND WATERSHED CONTROL MEASURES

As part of the WMP plan, a Reasonable Assurance Analysis (RAA) is conducted for each waterbody-pollutant combination. The RAA consists of an assessment, through quantitative analysis or modeling, to demonstrate that the activities and control measures (i.e. BMPs) identified in the Watershed Control Measures section of the WMP are performed to demonstrate that applicable water quality based

effluent limitations and/or receiving water limitations with compliance deadlines during the permit term will be achieved. Watershed Control Measures are subdivided into 1) Minimum Control Measures, 2) Non-Stormwater Discharge Measures 3) TMDL Control Measures and 4) other control measures for water-body pollutant Categories 1, 2 and 3.

Schedules are developed for strategies, control measures and BMPs to be implemented by each individual Permittee within its jurisdiction and for those that will be implemented by multiple Permittees on a watershed scale. The schedules will measure progress at least twice during the permit term and incorporate 1) Compliance deadlines occurring within the permit term for all applicable interim and/or final water quality based effluent limitations and/or receiving water limitations to implement TMDLs, 2) Interim deadlines and numeric milestones within the permit term for any applicable final water quality based effluent limitation and/or receiving water limitation to implement TMDLs, where deadlines within the permit term were not otherwise specified, and 3) For watershed priorities related to addressing exceedances of receiving water limitations.

1.6.2 ADAPTIVE MANAGEMENT

An adaptive management process will be implemented every two years from the date of program approval, adapting the WMP to become more effective, based on, but not limited to the following:

1. Progress toward achieving the outcome of improved water quality in MS4 discharges and receiving waters through implementation of the watershed control measures,
2. Progress toward achieving interim and/or final water quality based effluent limitations and/or receiving water limitations, or other numeric milestones where specified, according to established compliance schedules,
3. Re-evaluation of the highest water quality priorities identified for the Watershed Management Area based on more recent water quality data for discharges from the MS4 and the receiving water(s) and a reassessment of sources of pollutants in MS4 discharges,
4. Availability of new information and data from sources other than the Permittees' monitoring program(s) within the Watershed Management Area that informs the effectiveness of the actions implemented by the Permittees,
5. Regional Water Board recommendations; and
6. Recommendations for modifications to the WMP solicited through a public participation process

Based on the results of the iterative process, modifications necessary to improve the effectiveness of the WMP will be reported in the Annual Report, and as part of the Report of Waste Discharge (ROWD). Any necessary modifications to the WMP will be implemented upon acceptance by the Regional Water Board Executive Officer or within 60 days of submittal if the Regional Water Board Executive Officer expresses no objections.

2 IDENTIFICATION OF WATER QUALITY PRIORITIES

2.1 WATERBODY POLLUTANT CLASSIFICATION

One of the goals of this Watershed Management Program (WMP) is to identify and address water quality priorities within the Lower Los Angeles River (Lower LAR) Watershed. In order to begin prioritizing water quality issues within the Lower LAR Watershed, an evaluation of existing water quality conditions, including characterization of stormwater and nonstormwater discharges from the Municipal Separate Storm Sewer System (MS4) and receiving waters has been completed per section VI.C.5.a of the MS4 Permit.

The existing water quality conditions of the Lower LAR Watershed were used to classify pollutants into three categories each containing specific subcategories. These categories form the basis for identifying watershed priorities, which include, at a minimum, achieving applicable water quality-based effluent limitations and/or receiving water limitations established pursuant to TMDLs. The three categories and their subcategories are described below:

CATEGORY 1: Waterbody-pollutant combinations for which water quality-based effluent limitations and/or receiving water limitations are established in Part VI.E TMDL Provisions and Attachments L through R of the MS4 Permit.

- CATEGORY 1A: Final deadlines within Permit term (after approval of WMP[1] and prior to December 28, 2017)
- CATEGORY 1B: Interim deadlines within Permit term (after approval of WMP[2] and prior to December 28, 2017)
- CATEGORY 1C: Final deadlines between December 29, 2017 - December 28, 2022
- CATEGORY 1D: Interim deadlines between December 29, 2017 - December 28, 2022
- CATEGORY 1E: Interim and final deadlines after December 28, 2022
- CATEGORY 1F: Past final deadlines (final deadlines due prior to approval of WMP)
- CATEGORY 1G: USEPA established TMDLs with no implementation schedule

CATEGORY 2: Pollutants for which data indicate water quality impairment in the receiving water according to the State Board's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) and for which MS4 discharges may be causing or contributing to the impairment.

- CATEGORY 2A: Non-legacy pollutants
- CATEGORY 2B: Bacterial indicators
- CATEGORY 2C: Legacy pollutants
- CATEGORY 2D: Water quality indicators

[1] Upon approval and no later than April 28, 2015.
[2] *Ibid.*

CATEGORY 3: Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable receiving water limitations contained in this Order and for which MS4 discharges may be causing or contributing to the exceedance.

- CATEGORY 3A: Non-legacy pollutants
- CATEGORY 3B: Bacterial indicators
- CATEGORY 3C: Legacy pollutants
- CATEGORY 3D: Water quality indicators

The Lower LAR Watershed encompasses Reaches 1 and 2 of the Los Angeles River, the Los Angeles River Estuary, Reach 1 of the Rio Hondo, and Compton Creek. The pollutants for which the Lower LAR Watershed is listed as impaired for are shown on Figure 2-1.

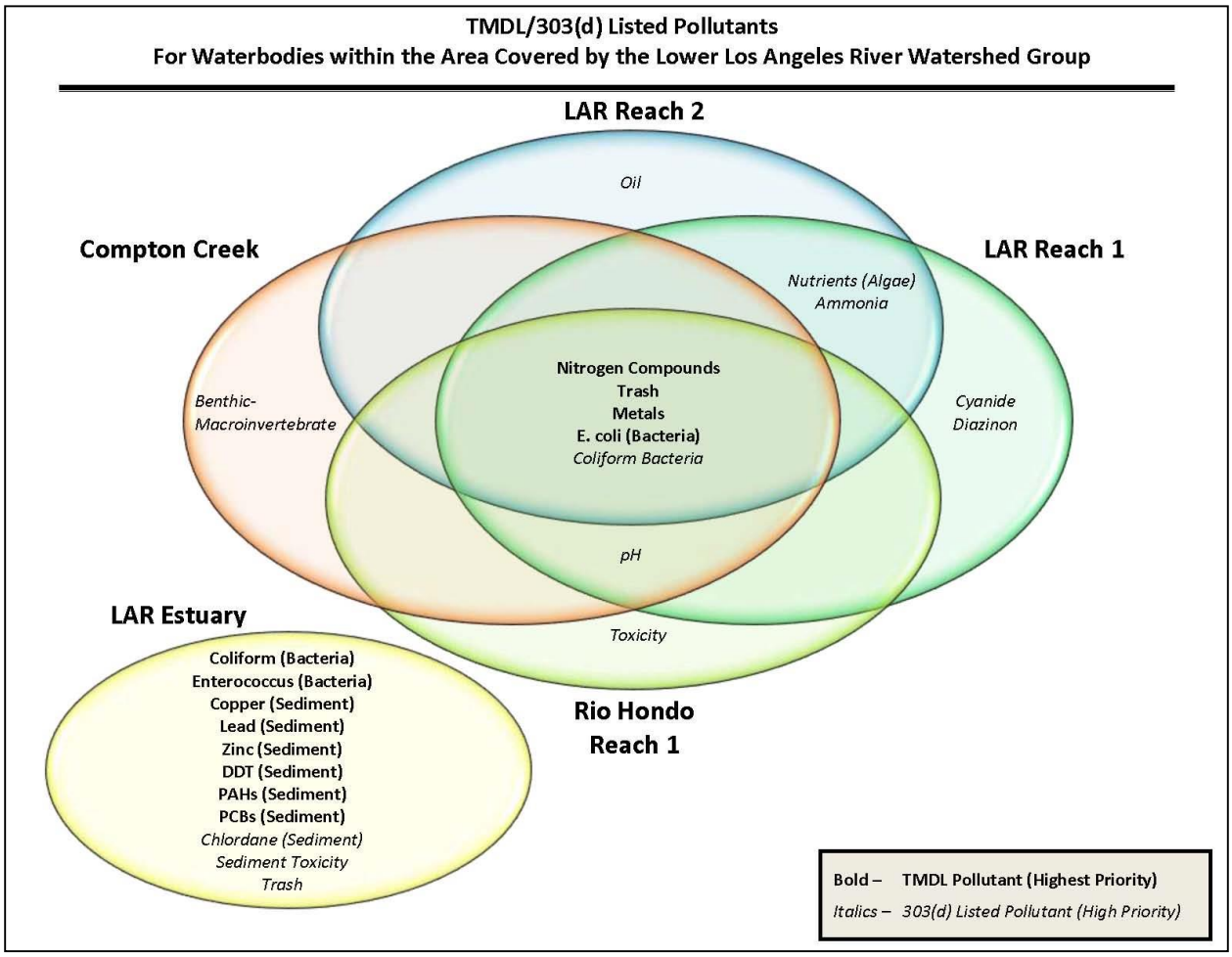


Figure 2-1: Lower Los Angeles River Watershed Pollutant Venn Diagram

The pollutant categories for the Lower LAR are summarized below including the weather condition for which impairment was determined:

CATEGORY 1A

- TRASH – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)
- NITROGEN COMPOUNDS – Los Angeles River Reach 1(Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)

CATEGORY 1B

- COPPER – Los Angeles River Estuary (Wet and Dry)
- LEAD – Los Angeles River Estuary (Wet and Dry)
- ZINC – Los Angeles River Estuary (Wet and Dry)
- DDT – Los Angeles River Estuary (Wet and Dry)
- PAHS – Los Angeles River Estuary (Wet and Dry)
- PCBS – Los Angeles River Estuary (Wet and Dry)

CATEGORY 1C

- BACTERIA (E. COLI) – Los Angeles River Reach 1 (Wet and Dry), Compton Creek (Wet and Dry)

CATEGORY 1E

- CADMIUM – Los Angeles River Reach 1 (Wet), Los Angeles River Reach 2 (Wet), Compton Creek (Wet), Rio Hondo Reach 1 (Wet)
- COPPER – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)
- LEAD – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)
- ZINC – Los Angeles River Reach 1 (Wet), Los Angeles River Reach 2 (Wet), Compton Creek (Wet), Rio Hondo Reach 1 (Wet and Dry)
- BACTERIA (E. COLI) – Los Angeles River Reach 2 (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)

CATEGORY 1G (USEPA ESTABLISHED)

- BACTERIA (COLIFORM AND ENTEROCOCCUS) – Los Angeles River Estuary (Wet and Dry)

CATEGORY 2A

- CHLORDANE (SEDIMENT) – Los Angeles River Estuary (Wet and Dry)
- CYANIDE – Los Angeles River Reach 1 (Wet and Dry)
- DIAZINON – Los Angeles River Reach 1 (Wet and Dry)
- OIL – Los Angeles River Reach 2 (Wet and Dry)
- TRASH – Los Angeles River Estuary (Wet and Dry)

CATEGORY 2B

- COLIFORM BACTERIA – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)

CATEGORY 2C

- ALUMINUM– Los Angeles River Reach 1(Wet and Dry)
- SELENIUM – Los Angeles River Reach 1 (Dry), Los Angeles River Reach 2(Dry)

CATEGORY 2D

- PH – Los Angeles River Reach 1 (Wet and Dry), Compton Creek (Wet and Dry), Rio Hondo Reach 1 (Wet and Dry)
- SEDIMENT TOXICITY[3] – Los Angeles River Estuary (Wet and Dry)
- BENTHIC-MACROINVERTEBRATE (BMI) BIOASSESSMENTS – Compton Creek (Wet and Dry)
- TOXICITY – Rio Hondo Reach 1 (Wet and Dry)
- MBAS – Los Angeles River Reach 1, Los Angeles River Reach 2 (Wet)

CATEGORY 3A

- BIS(2-ETHYLHEXYL)PHTHALATE – Los Angeles River Reach 1 (Wet and Dry)
- CHLORIDE – Los Angeles River Reach 1 (Dry), Los Angeles River Reach 2 (Dry), Rio Hondo Reach 1 (Wet)
- Chlorpyrifos – Compton Creek (Dry)
- CYANIDE – Rio Hondo Reach 1 (Wet and Dry)
- DIAZINON – Rio Hondo Reach 1 (Wet)
- PAHS – Los Angeles River Reach 1 (Wet and Dry), Los Angeles River Reach 2 (Wet and Dry)

CATEGORY 3C

- MERCURY – Los Angeles River Reach 1 (Wet and Dry)
- NICKEL – Los Angeles River Reach 1 (Dry)
- Thallium – Los Angeles River Reach 1 (Dry), Los Angeles River Reach 2 (Dry)

CATEGORY 3D

- DISSOLVED OXYGEN[4] – Los Angeles River Reach 1 (Wet), Los Angeles River Reach 2 (Wet)
- PH – Rio Hondo Reach 1 (Wet and Dry)

Tables 2-1 and 2-2 summarize the waterbody pollutant combinations for the Lower LAR Watershed Group.

[3] It is anticipated that the control measures used to address the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Toxics TMDL will address sediment toxicity in the Los Angeles River.
[4] This listing is based on an exceedance that occurred during the 03-04 storm year. There have been no exceedances since that time.

Table 2-1: Wet Weather Waterbody/Pollutant Classifications for the Lower LAR Watershed Group

Category	Pollutant	Waterbody				
		LARE[(a)]	LAR1[(b)]	LAR2[(c)]	CC[(d)]	RH1[(e)]
1	Cadmium		×	×	×	×
	Copper	×	×	×	×	×
	Lead	×	×	×	×	×
	Zinc	×	×	×	×	×
	Trash[1]		×	×	×	×
	Nitrogen Compounds[2]		×	×	×	×
	DDT	×				
	PCBs	×				
	PAHs	×				
	E. coli		×	×	×	×
	Coliform and Enterococcus	×				
2	Chlordane (sediment)	×				
	Coliform Bacteria		×	×	×	×
	Aluminum		×			
	Diazinon		×			
	Oil			×		
	Trash	×				
	Toxicity					×
	Sediment Toxicity	×				
	Cyanide		×			
	MBAS		×	×		
	Benthic Macroinvertebrate Bioassessments				×	
	pH		×		×	×
3	Chloride					×
	Mercury		×			
	Diazinon					×
	PAHs		×	×		
	Bis(2-ethylhexyl)phthalate		×			
	Cyanide					×
	pH					×
	Dissolved Oxygen		×	×		

(a) Los Angeles River Estuary
(b) Los Angeles River Reach 1
(c) Los Angeles River Reach 2
(d) Coyote Creek
(e) Rio Hondo Reach 1

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia and Nutrients (algae) included in nitrogen compounds for category 1

Table 2-2: Dry Weather Waterbody/Pollutant Classifications for the Lower LAR Watershed Group

Category	Pollutant	Waterbody				
		LARE[(a)]	LAR1[(b)]	LAR2[(c)]	CC[(d)]	RH1[(e)]
1	Copper	×	×	×	×	×
	Lead	×	×	×	×	×
	Zinc	X				×
	Trash[1]		×	×	×	×
	Nitrogen Compounds[2]		×	×	×	×
	DDT	×				
	PAHs	×				
	PCBs	×				
	E. coli		×	×	×	×
	Coliform and Enterococcus	×				
2	Chlordane (sediment)	×				
	Coliform Bacteria		×	×	×	×
	Aluminum		×			
	Selenium		×	×		
	Cyanide		×			
	Oil			×		
	Trash	×				
	Toxicity					×
	Sediment Toxicity	×				
	Benthic Macroinvertebrate Bioassessments				×	
	pH		×		×	×
3	Chloride		×	×		
	Cyanide					×
	pH					×
	Mercury		×			
	Nickel		×			
	Thallium		×	×		
	Chlorpyrifos				×	
	PAHs		×	×		
	Bis(2-ethylhexyl)phthalate		×			

(a) Los Angeles River Estuary
(b) Los Angeles River Reach 1
(c) Los Angeles River Reach 2
(d) Coyote Creek
(e) Rio Hondo Reach 1

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia and Nutrients (algae) included in nitrogen compounds for category 1

2.1.1 CATEGORY 1 POLLUTANTS

TRASH

Trash is classified as a Category 1A pollutant for the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines within the MS4 Permit term.

NITROGEN COMPOUNDS (INCLUDING AMMONIA)

Nitrogen compounds are classified as a Category 1A pollutant for the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines within the MS4 Permit term.

METALS (CADMIUM, COPPER, LEAD, AND ZINC)

Cadmium, Copper, Lead, and Zinc (herein collectively referred to as "Metals") are classified as a Category 1E pollutant for the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines after December 28, 2022.

According to the California 2010 Integrated Report, cadmium is being considered for removal from the 303(d) list for Los Angeles River Reach 1. The weight of evidence indicated that there is sufficient justification for removing this water segment pollutant combination from the 303(d) list based on the conclusion that the data used satisfies the quality requirements of the State's Listing Policy, and the amount of samples exceeding water quality objectives do not exceed the allowable frequency listed in Table 4.1 of the State's Listing Policy. It has been recommended that the decision to remove Cadmium be approved by the State Board; however, it has not yet been removed from the 303(d) list for Reach 1 of the Los Angeles River[5].

ESTUARY METALS (COPPER, LEAD, AND ZINC)

Copper, Lead, and Zinc are classified as a Category 1B pollutant for the Los Angeles River Estuary, which has an interim TMDL deadline within the MS4 Permit term[6].

BACTERIA (E. COLI)

E. Coli bacteria is classified as a Category 1C pollutant for the Los Angeles River Reach 2 which has a final TMDL deadline between December 29, 2017 to December 28, 2022 and a Category 1E for the Los Angeles River Reach 1, Compton Creek, and Rio Hondo Reach 1 which have final TMDL deadlines after December 28, 2022.

BACTERIA (COLIFORM AND ENTEROCOCCUS)

Coliform and enterococcus bacteria are classified as a Category 1G pollutant for the Los Angeles River Estuary.

[5] Based on data from the State Listing Policy lines of evidence ID #2332 and #2331 collected by the County of Los Angeles Department of Public Works.
[6] Dominguez Channel and Great Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL

2.1.2 CATEGORY 2 POLLUTANTS

The following pollutants have been categorized as Category 2 because data indicate water quality impairment according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy)[7].

ALUMINUM

LA County Flood Control District (LACFCD) mass emissions station S(10) detected 30 out of 40 wet weather and 11 out of 23 dry weather exceedances of the USEPA National Recommended Water Quality Criteria for aluminum between 2002 and 2012. Since this meets the State Listing Policy for 303(d) listing, aluminum will be classified as a Category 2C pollutant for Reach 1 of the Los Angeles River.

COLIFORM BACTERIA

Coliform bacteria are microorganisms known to be harmful in water with high concentrations. The 303(d) List has indicated that the Los Angeles River (Reaches 1 and 2), Compton Creek, and Rio Hondo Reach 1 are impaired by coliform bacteria; therefore, coliform bacteria is classified as a Category 2B pollutant for Reaches 1 and 2 of the Los Angeles River, Compton Creek, and Reach 1 of the Rio Hondo.

BENTHIC-MACROINVERTEBRATE (BMI) BIOASSESSMENTS

Benthic macroinvertebrate (BMI) communities are both bioindicators of stream condition and a food resource for fish. The 303(d) List has indicated that Compton Creek is impaired as indicated through BMI bioassessments; therefore, BMIs are classified as a Category 2D for Compton Creek.

The State Water Board staff has determined that BMI populations are impacted by a wide range of anthropogenic stressors and has recommended listing for benthic-macroinvertebrate bioassessment. It is anticipated that the BMI population will be subsequently improved by the control measures implemented for other pollutants.

CHLORDANE (SEDIMENT)

Chlordane is an organochlorine compound used as a pesticide. The 303(d) List has indicated that sediment in Los Angeles River Estuary is impaired by chlordane; therefore, chlordane is classified as a Category 2A pollutant for the Los Angeles River Estuary.

CYANIDE

Cyanide is an inorganic chemical compound. The 303(d) List has indicated that Los Angeles River Reach 1 is impaired by cyanide; therefore, cyanide is classified as a Category 2A pollutant for the Reach 1 of the Los Angeles River.

[7] An excerpt of the 2010 California 303(d) List of Water Quality Limited Segments for Region 4 is included in Appendix 2-1.

DIAZINON

Diazinon is an organophosphate insecticide. The 303(d) List has indicated that Los Angeles River Reach 1 is impaired by diazinon; therefore, diazinon is classified as a Category 2A pollutant for the Reach 1 of the Los Angeles River.

METHYLENE BLUE ACTIVE SUBSTANCE (MBAS)

An MBAS assay is used to detect the presence of detergents or foaming agents in water samples.

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by MBAS, the LACFCD Mass Emissions station S(10) in the LA River collected 11 out of 40 wet weather samples that exceeded the LA Basin Plan Water Quality Objective (WQO) for MBAS between 2002 and 2012, which meets the State Listing Criteria for 303(d) listing[8]. Therefore, MBAS will be classified as a Category 2D within this WMP. It is anticipated that the control measures used to address the pollutants of concern in this watershed will subsequently address MBAS levels; however, if exceedances are found to occur and the implemented or proposed control measures do not address MBAS, the WMP will be revised to include control measures to address the pollutant directly.

OIL

Oil is a chemical substance. The 303(d) List has indicated that the Los Angeles River Reach 2 is impaired by oil; therefore, oil is classified as a Category 2A pollutant for Reach 2 of the Los Angeles River.

PH

pH is a measure of the acidity or basicity of an aqueous solution. The 303(d) List has indicated that Los Angeles River Reach 1, Compton Creek, and Rio Hondo Reach 1 are impaired by pH; therefore, pH is classified as a Category 2D for Reach 1 of the Los Angeles River, Compton Creek, and Reach 1 of the Rio Hondo.

SEDIMENT TOXICITY

Sediment Toxicity is a measurement of toxicity within a sediment sample. The 303(d) List has indicated that the Los Angeles River Estuary contains sediment toxicity; therefore, it is classified as a Category 2D for the Los Angeles River Estuary. It is anticipated that sediment toxicity in the Los Angeles River Estuary will be addressed through the Dominguez Channel and Greater Los Angeles and Long Beach Harbors Toxics TMDL.

SELENIUM

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by selenium, the LACFCD Mass Emissions station S(10) in the LA River collected 2 out of 23 dry weather samples that exceeded the CTR Chronic WQO for selenium between 2002 and 2012, which meets the State Listing

[8] According to the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List Minimum Number of Measured Exceedances Needed to Place a Water Segment on the Section 303(d) List for Toxicants and Conventionals – Tables 3.1 and 3.2.

Criteria for 303(d) listing[9]. Selenium will be considered as a Category 2C pollutant within this WMP when determining the control measures to be implemented in the Los Angeles River Reaches 1 and 2. It is anticipated that the control measures used to address the pollutants within Los Angeles River and Tributaries Metals TMDL will subsequently address selenium levels; however, if exceedances are found to occur and the implemented or proposed control measures do not address selenium, the WMP will be revised to include control measures to address the pollutant directly.

TOXICITY

The 303(d) List has indicated that Rio Hondo Reach 1 is impaired by toxicity; therefore, toxicity is classified as a Category 2D for Reach 1 of Rio Hondo.

TRASH

Although the Los Angeles River Estuary is not included in the Los Angeles River Watershed Trash TMDL, the 303(d) List has indicated that the Los Angeles River Estuary is impaired by trash; therefore, trash is classified as a Category 2A pollutant for the Los Angeles River Estuary.

2.1.3 CATEGORY 3 POLLUTANTS

The waterbody-pollutant combinations described below have been identified as exceeding water quality objectives (WQOs) in the Lower LAR Watershed. Through the adaptive management process, water quality priorities identified in this WMP will be re-evaluated every two years, and if exceedances of Category 3 WQOs are identified through monitoring, then the WMP will be adapted to become more effective in addressing these constituents, per Section VI.C.8.a.ii of the MS4 Permit.

BIS(2-ETHYLHEXYL)PHTHALATE

LACFCD mass emission station S(10) detected 2 out of 40 wet weather and 4 out of 23 dry weather exceedances of the National Toxics Rule WQO for bis(2ethylhexyl)phthalate between 2002 and 2012. Therefore, bis(2ethylhexyl)phthalate will be classified as a Category 3A pollutant within this WMP for Reach 1 of the Los Angeles River.

CHLORIDE

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by chloride, the LACFCD Mass Emissions station S(10) in the LA River collected 1 out of 23 dry weather samples, and the tributary station TS06 (Rio Hondo) collected 1 out of 9 wet weather samples exceeding the Basin Plan WQO for this pollutant between 2002 and 2012. Chloride will be considered as a Category 3A pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures

[9] According to the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List Minimum Number of Measured Exceedances Needed to Place a Water Segment on the Section 303(d) List for Toxicants – Table 3.1.

are not expected to address chloride pollutants, the WMP will be revised to include control measures to address the pollutant directly.

CHLORPYRIFOS

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by chlorpyrifos, data from the LACFCD mass emission monitoring and the City of Los Angeles Status and Trends Monitoring program detected 3 out of 91 dry weather exceedances in Los Angeles River Reach 1 and 2 9ut of 112 dry weather exceedances in Los Angeles River Reach 2 of the CTR WQO for chlorpyrifos between 2001 and 2013. Chlorpyrifos is classified as a Category 3A pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address chlorpyrifos, the WMP will be revised to include control measures to address the pollutant directly.

CYANIDE

Cyanide is listed as a Category 2 pollutant for the LA River Reach 1; however, no other reaches are listed on the State's 303(d) list for cyanide. Although the other waterbodies are not listed as impaired by cyanide, the LACFCD Tributary station TS(06) in the Rio Hondo collected 1 out of 9 wet weather samples and 2 out of 3 dry weather samples exceeding the CTR WQO for this pollutant between 2002 and 2012. Cyanide will be considered as a Category 3A pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address cyanide, the WMP will be revised to include control measures to address the pollutant directly.

DIAZINON

Diazinon is listed as a Category 2 pollutant for the LA River Reach 1; however, no other reaches are listed on the State's 303(d) list for Diazinon. Although the other waterbodies are not listed as impaired by Diazinon, the LACFCD Tributary station TS(06) in the Rio Hondo collected 3 out of 9 wet weather samples exceeding the California Department of Fish and Game's WQO for this pollutant between 2002 and 2012. Diazinon will be considered as a Category 3A pollutant within thisWMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address diazinon, the WMP will be revised to include control measures to address the pollutant directly.

DISSOLVED OXYGEN

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by low dissolved oxygen, the LACFCD Mass Emissions station S(10) in the LA River collected 1 out of 39 wet weather samples below the dissolved oxygen water quality criteria between 2002 and 2012. This exceedance occurred during the 2003-04 storm year and there have been no exceedances since this time. Therefore, dissolved oxygen will be classified as a Category 3D within this WMP, however will not be addressed directly through this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address dissolved oxygen, the WMP will be revised to include control measures to address it directly.

MERCURY

LACFCD mass emission station S(10) detected 1 out of 40 wet weather and 1 out of 23 dry weather exceedances of the USEPA National Recommended Water Quality Criteria for mercury between 2002 and 2012. Therefore, mercury will be classified as a Category 3C pollutant within this WMP for Reach 1 of the Los Angeles River.

NICKEL

LACFCD mass emission station S(10) detected 1 out of 23 dry weather exceedances of the CTR WQO for nickel between 2002 and 2012. Therefore, nickel will be classified as a Category 3C pollutant within this WMP for Reach 1 of the Los Angeles River.

PH

pH is listed as a Category 2 pollutant for the LA River Reaches 1 and 2 and Compton Creek; however, no other reaches are listed on the State's 303(d) list for pH. Although the other waterbodies are not listed as impaired by pH, the LACFCD Tributary station TS(06) in the Rio Hondo collected 1 out of 9 wet weather samples and 1 out of 3 dry weather samples exceeding the LA Basin Plan WQO for this pollutant between 2002 and 2012. pH will be considered as a Category 3D pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address pH, the WMP will be revised to include control measures to address the pollutant directly.

POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

PAHs are chemical compounds that occur naturally in the environment and can also be man-made. PAHs are created during incomplete combustion of coal, oil, gas, and garbage. According to the Toxic Release Inventory, there are approximately twenty compounds defining this group, even though there are hundreds of PAH combinations.

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by PAHs, a five year SCCRWP study conducted partially in the watershed estimates that the LA River is a source of PAH loading to the ocean. Therefore, PAHs will be classified as Category 3A pollutants within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address PAH pollutants, the WMP will be revised to include control measures to address them directly.

THALLIUM

Although the waterbodies within the Lower LAR Watershed are not listed as impaired by thallium, the LACSD WRP effluent monitoring collected 1 out of 4 dry weather samples exceeding the USEPA National Recommended Water Quality Criteria this pollutant between 2009 and 2011. Thallium is classified as a Category 3C pollutant within this WMP. If exceedances are found to occur and the implemented or proposed control measures are not expected to address thallium, the WMP will be revised to include control measures to address the pollutant directly.

2.1.4 POLLUTANT CLASSIFICATION

In order to determine the sequence of addressing pollutants of concern, the pollutants have been placed into classification groups. Pollutants have been identified to be in the same "class" if they have a similar fate and transport, can be addressed via the same types of control measures, and can be addressed within the same timeline. The seven following classes have been identified:

- Metals
- Nutrients
- Pesticides
- Bacteria
- Semivolatile Organic Compounds (SVOC)Water Quality Indicators/General
- Trash

The specific classes and pollutants associated can be found below. Since similar control measures and timelines are to be implemented for pollutants within the same class, each class will be treated with the highest priority of any one pollutant within that class. See Section 2.4 for a table of Water Quality Priorities (WQPs). Watershed Control Measures and Implementation Schedules are discussed in Sections 3 and 5, respectively.

METALS	PESTICIDES	WATER QUALITY INDICATORS/GENERAL	TRASH
Aluminum	Chlordane	Benthic-Macroinvertebrate (BMI)	Trash
Cadmium	Chlorpyrifos	Chloride	
Copper	DDT	Cyanide	
Lead	Diazinon	Dissolved Oxygen	
Mercury	PCBs	MBAS	
Nickel		Oil	
Selenium		pH	
Thallium		Sediment Toxicity	
Zinc		Toxicity	

NUTRIENTS	BACTERIA	SVOC
Ammonia	Coliform and	Bis(2ethylhexyl)phthalate
Nitrogen Compounds	Enterococcus	PAHs
Nutrients (Algae)	e. Coli	

2.2 WATER QUALITY CHARACTERIZATION

In order characterize existing water quality conditions in the Lower LAR watershed, and to identify pollutants of concern for prioritization per section VI.C.5.a.ii of the MS4 Permit, available monitoring data collected during the previous ten years were analyzed. The following sources were utilized during the water quality characterization:

- LACFCD Mass Emission and Tributary Monitoring Programs
- LA County Sanitation Districts Monitoring
- City of Long Beach Stormwater Monitoring Program
- LAR Metals, Trash, and Bacteria TMDL Monitoring Programs
- Southern California Coastal Water Research Project (SCCWRP) Pollutant Loading Study
- Los Angeles River Watershed Monitoring Program (LARWMP)

A summary of each of these monitoring efforts and relevant findings is presented below. In addition to providing a characterization of the current conditions within the watershed, this information will be used to target watershed management efforts in the Lower LAR watershed.

2.2.1 MASS EMISSIONS HISTORICAL DATA ANALYSIS

Since 1994, the LACFCD has conducted stormwater monitoring in Los Angeles County. The LACFCD operates seven mass emission monitoring stations, which collect runoff from the major watersheds in the county with the goal of estimating the mass emissions from the MS4, assessing mass emissions trends, and determining whether the MS4 is contributing to exceedances of water quality objectives by comparing results to applicable objectives in the Water Quality Control Plan for the Los Angeles Region (Basin Plan), and the California Toxics Rule (CTR).

The LACFCD Monitoring Station, S(10), collects samples that are applicable to the Lower LAR Watershed. Station S(10) is located in the Los Angeles River at the existing stream gauge station (Stream Gauge No. F319-R) between Willow Street and Wardlow Road in the City of Long Beach and is shown in Figure 2-2. At this location, which was chosen to avoid tidal influences, the total upstream tributary drainage area for the Los Angeles River is 825 square miles. Station S(10) is equipped with automated samplers with integral flow meters, and collects flow composite samples from a minimum of three storm events, including the first storm, and two dry weather events in accordance with the 1996 MS4 Permit.

Monitoring data from stormwater collected at Station S(10) during the previous ten years of monitoring (2002-2012) were compared to the most stringent applicable water quality objectives (WQOs)to date to determine exceedances of receiving water limitations. WQOs were determined pursuant to TMDLs, the Basin Plan and the California Toxics Rule, 40 CFR Part 131.38 (CTR). Water quality objectives for chlorpyrifos and diazinon are determined using the freshwater final acute criteria set by the California Department of Fish and Game. Many of the WQOs were used as benchmarks for determining Water Quality Priorities, and should not be used for compliance purposes. Please refer to the Lower LAR

Watershed Coordinated Integrated Monitoring Plan (CIMP) for a table of monitored constituents along with their most up-to-date WQOs.

A summary of the constituents not attaining WQOs at station S(10) during the monitoring years 2002-2012 is presented in Tables 2-3 and 2-4. Complete tables of monitoring results can be found in Appendix A-2-2.

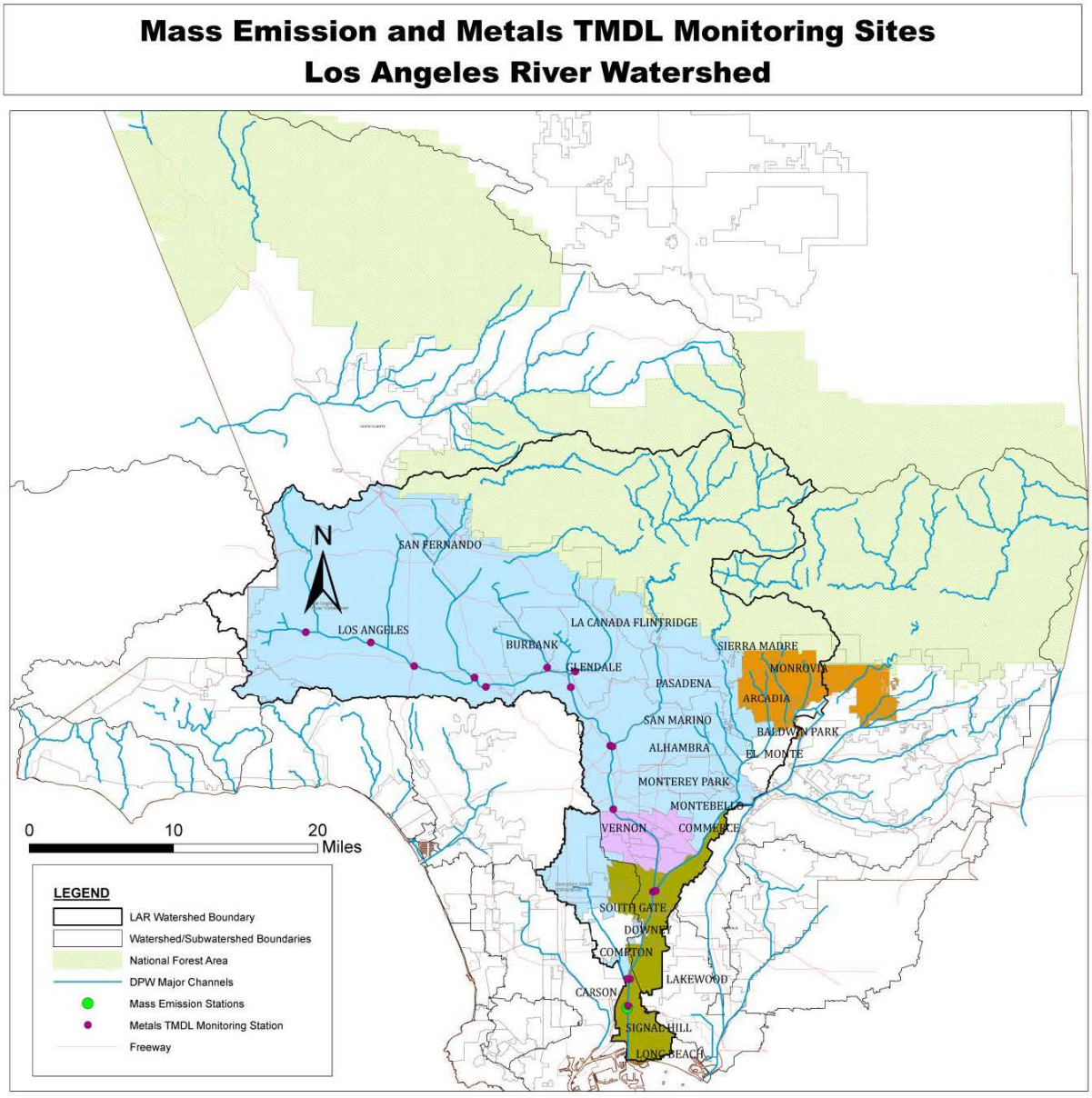


Figure 2-2: Mass emission and metals TMDL monitoring sites courtesy of LACFCD

Table 2-3: S10 Constituents exceeding WQOs during wet weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	40	9	23	0.022	CTR Freshwater Aquatic Life Protection, Acute
pH	40	5	13	6.5-8.5	LA Basin Plan
DO	39	1	3	5	LA Basin Plan
Total Coliform	40	40	100	10000	LA Basin Plan - Marine Waters
Fecal Coliform	40	39	98	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	40	40	100	104	LA Basin Plan - Marine Waters
MBAS	40	11	28	0.5	LA Basin Plan
Total Aluminum	40	30	75	750	USEPA National Recommended WQ Criteria
Total Cadmium	40	5	13	3.1	LA River Metals TMDL
Total Copper	40	33	83	17	LA River Metals TMDL
Total Lead	40	10	25	62	LA River Metals TMDL
Total Mercury	40	1	2.5	0.051	CTR Human Health
Dissolved Zinc	40	9	23	120	CTR-100mg/L CMC
Total Zinc	40	24	60	159	LA River Metals TMDL
Bis(2-ethylhexyl)phthalate	40	2	5	5.9	National Toxics Rule Human Health
Diazinon	40	2	5	0.08	CADF&G

Table 2-4: S10 Constituents exceeding WQOs during dry weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	23	20	87	0.0052	CTR Freshwater Aquatic Life Protection, Chronic
pH	23	11	48	6.5-8.5	LA Basin Plan
Total Coliform	22	6	27	10000	LA Basin Plan - Marine Waters
Fecal Coliform	23	11	48	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	23	14	61	104	LA Basin Plan - Marine Waters
Chloride	23	1	4	150	LA Basin Plan
Nitrate	8	2	25	8	LA River Nutrient TMDL
Nitrite	22	6	27	1	LA River Nutrient TMDL
Total Aluminum	23	11	48	87	USEPA National Recommended WQ Criteria
Total Copper	23	2	9	23	LA River Metals TMDL
Total Mercury	23	1	9	0.051	CTR Human Health
Total Nickel	23	1	9	24	CTR Chronic
Total Selenium	23	2	9	5	National Toxics Rule
Total Zinc	23	1	4	131	LA River Metals TMDL
Bis(2-ethylhexyl)phthalate	23	4	17	5.9	National Toxics Rule Human Health
Diazinon	23	2	9	0.05	CADF&G

2.2.2 LACFCD TRIBUTARY MONITORING

In addition to the Mass Emission Station monitoring, LACFCD conducted tributary monitoring during the 2002-03 and 2003-04 storm years. This monitoring occurred at 1 tributary station in the Lower LAR Watershed: Rio Hondo (TS06). Rio Hondo Channel monitoring station is located on Beverly Boulevard, downstream of Whitter Narrows dam, at the USGS – U.S. Army Corps of Engineers (ACOE) Stream gage No. 1102300 or E327-R. The upstream tributary watershed area is approximately 142 square miles.

Monitoring data from stormwater collected at station TS06 was compared to the most stringent applicable water quality objectives (WQOs) to determine exceedances of receiving water limitations. WQOs were determined pursuant to TMDLs, the Basin Plan and the California Toxics Rule, 40 CFR Part 131.38 (CTR). Water quality objectives for chlorpyrifos and diazinon were determined using the freshwater final acute criteria set by the California Department of Fish and Game. Many of the WQOs were used as benchmarks for determining Water Quality Priorities, and should not be used for compliance purposes. Please refer to the Lower LAR Watershed Coordinated Integrated Monitoring Plan (CIMP) for a table of monitored constituents along with their most up-to-date WQOs.

A summary of the constituents not attaining WQOs at station TS06 during the monitoring years 2002-2012 is presented in Tables 2-5 and 2-6. Complete tables of monitoring results can be found in Appendix A-2-2.

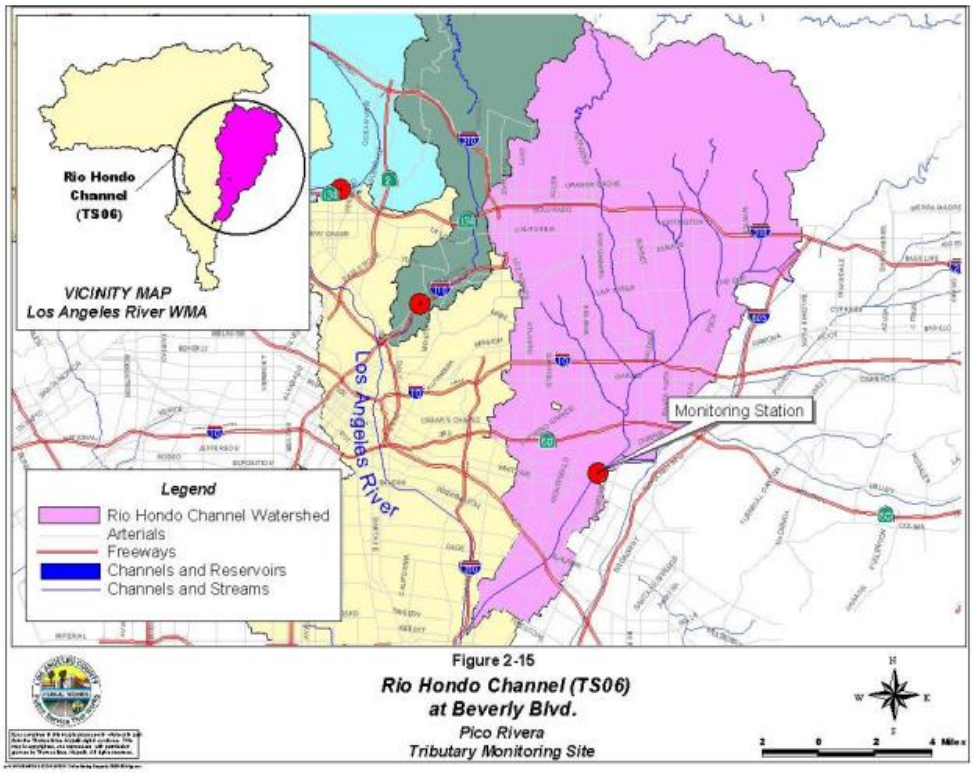


Figure 2-3: Rio Hondo tributary station

Table 2-5: TS06 constituents exceeding WQOs during wet weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	9	1	11	0.022	CTR Freshwater Aquatic Life Protection, Acute
pH	9	1	11	6.5-8.5	LA Basin Plan
Total Coliform	9	9	100	10000	LA Basin Plan - Marine Waters
Fecal Coliform	9	9	100	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	9	9	100	104	LA Basin Plan - Marine Waters
Chloride	9	1	11	150	LA Basin Plan
Total Copper	9	4	44	17	LA River Metals TMDL
Total Lead	9	1	11	62	LA River Metals TMDL
Total Zinc	9	1	11	159	LA River Metals TMDL
Diazinon	9	3	33	0.08	CADF&G

Table 2-6: TS06 constituents exceeding WQOs during dry weather

Constituent	No Samples	No. Exceeding Applicable WQOs	Percent of Samples Exceeding WQOs	Source of Lowest Applicable WQO Value	Source
Cyanide	3	2	67	0.0052	CTR Freshwater Aquatic Life Protection, Chronic
pH	3	2	67	6.5-8.5	LA Basin Plan
Total Coliform	3	1	33	10000	LA Basin Plan - Marine Waters
Fecal Coliform	3	2	67	235	LA Basin Plan Fresh- Rec 1 Standard
Fecal Enterococcus	3	2	67	104	LA Basin Plan - Marine Waters
Total Copper	3	2	67	13	LA River Metals TMDL

2.2.3 LA COUNTY SANITATION DISTRICT MONITORING

The County Sanitation Districts of Los Angeles County (LACSD) are a confederation of 23 independent special districts serving the water pollution control management needs of about 5.7 million people in Los Angeles County. The Sanitation Districts' service area covers approximately 820 square miles and encompasses 78 cities and unincorporated territory within the County. With regard to wastewater treatment, the Sanitation Districts construct, operate and maintain facilities to collect, treat and dispose of wastewater and industrial wastes.

Seventeen of the 23 districts are signatory to an agreement which provides for sewerage service to the majority of residential, commercial and industrial users (IUs) within the County, but mostly located outside of the City of Los Angeles service area. This treatment system, known as the Joint Outfall System (JOS), currently consists of the Joint Water Pollution Control Plant (JWPCP) located in the City of Carson and six upstream water reclamation plants (WRPs); the Whittier Narrows WRP near the City of South El Monte, the Los Coyotes WRP in the City of Cerritos, the San Jose Creek WRP adjacent to the City of Industry, the Long Beach WRP in the City of Long Beach, the Pomona WRP in the City of Pomona and the La Cañada WRP in La Cañada Flintridge. All JOS facilities except the La Cañada WRP are regulated under the NPDES program; all six WRPs are subject to California Waste Discharge or Water Reclamation Requirements. See Chapter 1 Introduction for more detail on the WRP discharges within the Lower LAR Watershed.

The LACSD monitors its effluent at multiple locations within the Lower LAR Watershed. Data from 2004 to 2012 was analyzed and exceedances of WQOs were added to the Lower LAR WQPs.

2.2.4 LOS ANGELES RIVER METALS TMDL MONITORING DATA ANALYSIS

The Los Angeles River Metals TMDL became effective on October 29, 2008. For compliance with the requirements of this TMDL, a Coordinated Monitoring Plan (CMP) was developed and implemented jointly by the responsible LA River Watershed MS4 Permittees in October 2008. Wet and dry weather monitoring began at 13 locations in the LA River and major tributaries (shown in Figure 2-2) in 2008 to characterize ambient water quality and measure attainment of effluent limitations set forth in the TMDL and outlined in Table 2-7.

Table 2-7: Los Angeles River Metals Water Quality Based Effluent Limitations (Total Recoverable)

	Effluent Limitations Daily Maximum (µg total recoverable metals/L)		
Waterbody	Copper	Lead	Zinc
LA River Reach 2	WER[1] x 22	WER[1] x 11	-
LA River Reach 1	WER[1] x 23	WER[1] x 12	-
Compton Creek	WER[1] x 19	WER[1] x 8.9	-
Rio Hondo Reach 1	WER[1] x 13	WER[1] x 5.0	WER[1] x 131

[1] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved via the Basin Plan Amendment process.

Five of the thirteen monitoring locations identified in the CMP are located within, and collect runoff from, the Lower LAR Watershed:

LAR I-9: The LAR I-9 sampling site is located between the 710 Freeway bridge to the north and Imperial Highway bridge to the south in the main channel, upstream of the Rio Hondo confluence. The site is located in Reach 2.

LAR I-10: LAR I-10 is currently monitored by the City of Los Angeles as part of its Status and Trends Monitoring Program. The site is located in Reach 2.

LAR I-11: LAR I-11 is located in Long Beach at Del Amo Boulevard in the main channel upstream of the Compton Creek confluence. The site is located at the bottom of Reach 2.

LAR I-12: LAR I-12 is currently monitored by the City of Los Angeles as part of its Status and Trends Monitoring Program. The site is located in Reach 1.

LAR I-13: LAR I-13 is an existing Los Angeles County mass emission sampling site located in Long Beach south of Wardlow Road and north of Willow Street in the main channel. This is the location of an existing Los Angeles County gauging station identified as F319-R. The site is located in Reach 1.

A summary of the constituents not attaining applicable WQBELs at these monitoring locations during the monitoring years 2008-2012 is shown in Tables 2-8 and 2-9. Note that while some collected samples were found to exceed WQBELs during this time, the watershed is on schedule to meet applicable interim and final WLAs as outlined in the LA River Metals TMDL and the JG1 and JG2 LA River Metals TMDL Implementation Plans.

Table 2-8: Lower LAR metal exceedances, dry weather exceedances by location (total dry samples)

	LAR I-9	LAR I-10	LAR I-11	LAR I-12	LAR I-13
Constituent	Reach 2 at 710 Freeway	Rio Hondo	Reach 2 at Rio Hondo	Compton Creek	Reach 1 at Wardlow
Total Recoverable Copper	0	7(10)	0	0	0
Total Recoverable Zinc	0	0	0	0	0
Total Recoverable Lead	0	2(10)	0	0	0

Table 2-9: Lower LAR metal exceedances, wet weather exceedances by location (total dry samples)

	LAR I-11	LAR I-13
Constituent	Reach 2 at Rio Hondo	Reach 1 at Wardlow
Total Recoverable Copper	17(17)	20(20)
Total Recoverable Zinc	3(17)	4(20)
Total Recoverable Lead	16(17)	16(20)
Total Recoverable Cadmium	0	0

*Only sampling locations LAR I-11 and LA I-13 are sampled during wet weather in the Lower LAR Watershed

2.2.5 CITY OF LONG BEACH STORMWATER MONITORING

The City of Long Beach first established a monitoring site at the Dominguez Gap Pump Station during the 2000/2001 wet season. Refer to Section 5 (the RAA) for further information on the project.

The Dominguez Gap Pump Station and adjacent infiltration/detention basin started undergoing major renovations during the summer of 2006 and work extended through most of the 2007/2008 wet season. During that time period, land disturbances associated with development of the wetland system resulted in elevated levels of sediment. By late 2009 the wetland vegetation had become well established and the water quality changes observed during the construction phase were no longer evident.

The Dominguez Gap has been determined to play a critical role in attainment of TMDL requirements for Reach 1. Discussions with the LACFCD have emphasized the benefits of operating water levels to benefit both the wetland habitat and minimize mass emissions of trace metals and other contaminants to (or back to) the Los Angeles River.

The Los Angeles River Metals TMDL established concentration-based targets at 23 µg/L for total recoverable copper and 12 µg/L for total recoverable lead at the downstream Wardlow monitoring site during dry weather. A summary of all dry weather monitoring data from the Dominguez Gap Pump Station for these metals (Tables 2-10 and 2-11 and Figure 2-4) shows consistently low concentrations of copper, lead and zinc in both the total recoverable and dissolved forms. Concentrations of these metals in Dominguez Gap Pump Stations dry weather discharges have also remained lower than measurements made within the Los Angeles River by the Coordinated Monitoring Program. This indicates that the wetland system is has very effective in removing these metals.

The Los Angeles River Metals TMDL establishes wet weather water quality targets based on the acute CTR criteria and the 50th percentile hardness values for stormwater collected at the County's Wardlow water quality monitoring site on the Los Angeles River. These targets are for total recoverable metals:

- Cadmium: 3.1 ug/l
- Copper: 17 ug/l
- Lead: 62 ug/l
- Zinc: 159 ug/l

In a total of 37 monitored storm events concentrations of total cadmium have never exceeded 0.55 µg/L and the median concentration has been 0.26 µg/L. Long-term trends for discharges of total copper, lead and zinc are illustrated in Figure 2-5. This figure examines trends in flow, concentrations of the target metals, and loads of trace metal discharges. The graphs on the left side of the figure illustrate trends both before and after implementation of the TMDL while the graphs on the right side of the figure trends without regard to the implementation date. Stormwater discharges have tended to decrease over time however this watershed was reconfigured when the treatment wetland system was created. It now has a smaller drainage area. Concentrations of total copper, total lead and total zinc were all increasing prior to both completion of the wetland treatment system and implementation of the TMDL. General trends

suggest that loads of all three metals have been decreasing in recent years but further data will be necessary to confirm this trend. Concentrations of total copper still occasionally exceed the current water quality target established for the Los Angeles River at Wardlow (17 ug/L) but measured concentrations in the past three years have never exceeded 21 ug/L. Concentrations of total lead present in wet weather discharges from the Dominguez Gap Pump Station are less than 25% of the established objective. Concentrations of total zinc are also declining and, in recent years, have remained less than 2/3 of the water quality target in Los Angeles River Reach 1.

The Los Angeles River Nitrogen TMDL established WLAs for both ammonia-N and nitrate-N that apply to minor discharges that discharge both below the Los Angeles-Glendale WRP and within Reach 1 of the Los Angeles River. Ammonia-N WLAs were established for a 1-hour average (8.7 mg/L) and a 30-day average (2.4 mg/L). WLAs for both nitrate-N and nitrate+nitrite-N were both set at 8.0 mg/L for a 30-day average. Concentrations of ammonia-N have consistently been less than 0.7 mg/L during both dry and wet weather monitoring (Figure 2-6). Median concentrations of ammonia are 0.18 mg/L during dry weather and 0.38 mg/L during wet weather discharges. Concentrations of nitrate-N in dry weather discharges have never exceeded 1.9 mg/L and all wet weather discharges have had concentrations of less than 1.4 mg/L. Thus all discharges from the Dominguez Gap Pump Station continue to achieve the WLAs established for nitrogen compounds. Furthermore, total nitrogen (TKN plus nitrate/nitrite-N) concentrations typically range between 2.0 and 3.0 mg/L with the highest measured concentration being reported at 5.02 mg/L during a wet weather discharge.

Table 2-10: Total metals in dry weather discharges from the Dominguez Gap pump station

Statistic	*Copper*	*Lead*	*Zinc*
LA River @ Wardlow TMDL objective	23	12	
No. of Events	7	7	7
Mean	4.2	3.5	23.8
Standard Deviation	2.2	1.5	12.0
Minimum	1.7	2.2	8.8
Median	3.9	3.1	21
Maximum	8.8	6.5	47

Table 2-11: Dissolved metals in dry weather discharges from the Dominguez Gap pump station

Statistic	*Copper*	*Lead*	*Zinc*
CTR Objective (median hardness 282 mg/L, 10^{th} percentile hardness 219 mg/L)	22	7.6	230
No. of Events	7	7	7
Mean	1.88	0.6	12.8
Standard Deviation	1.04	0.22	6.68
Minimum	0.54	0.39	6.3
Median	2.1	0.62	11
Maximum	3.6	1.0	24

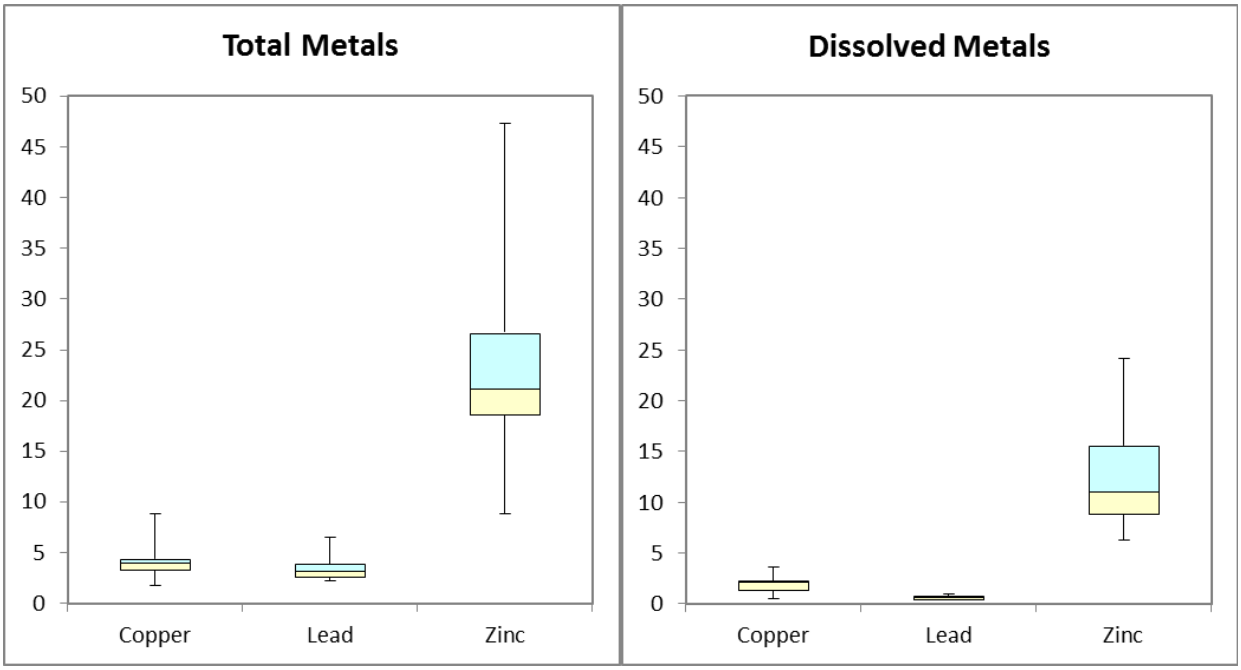
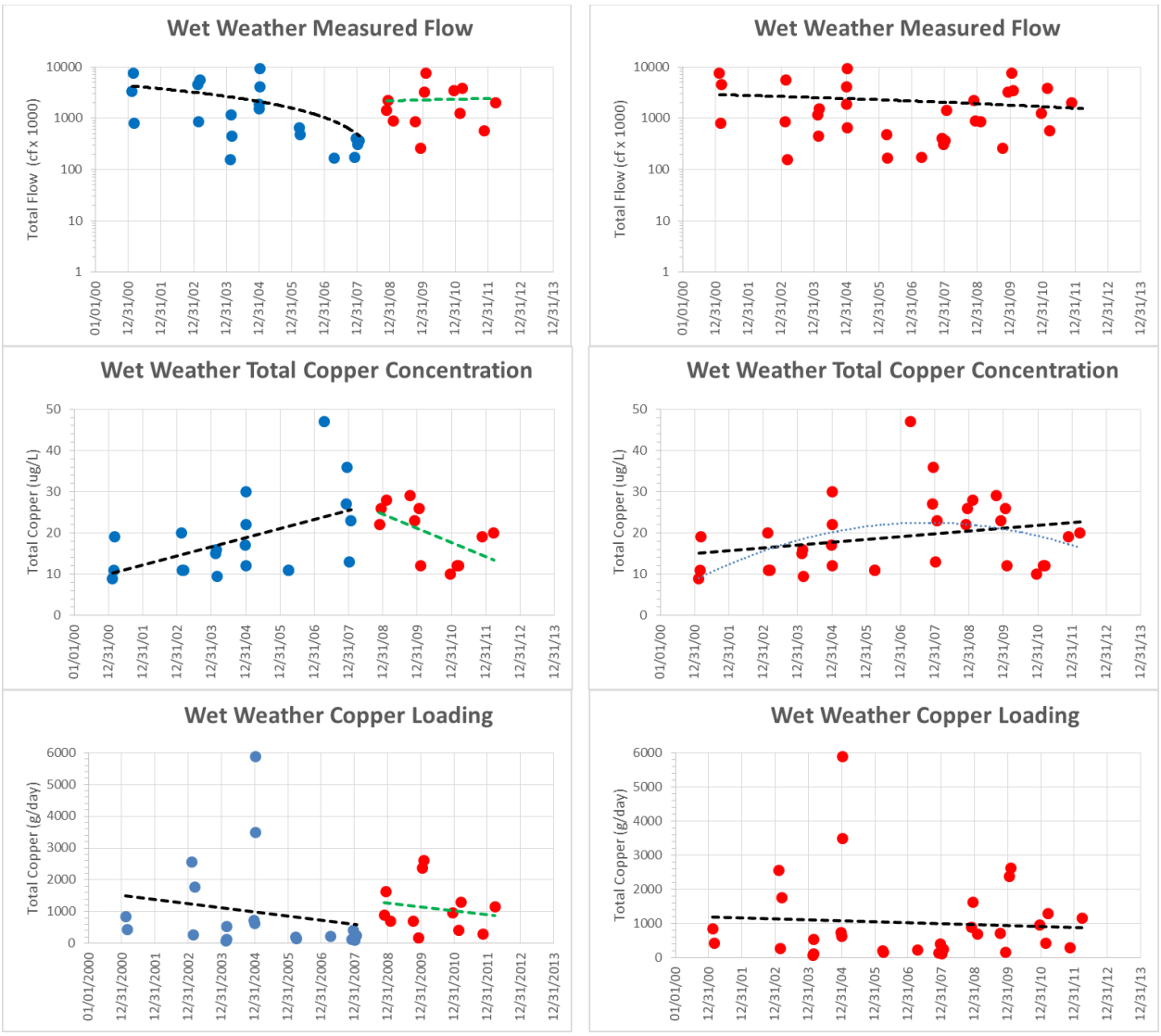
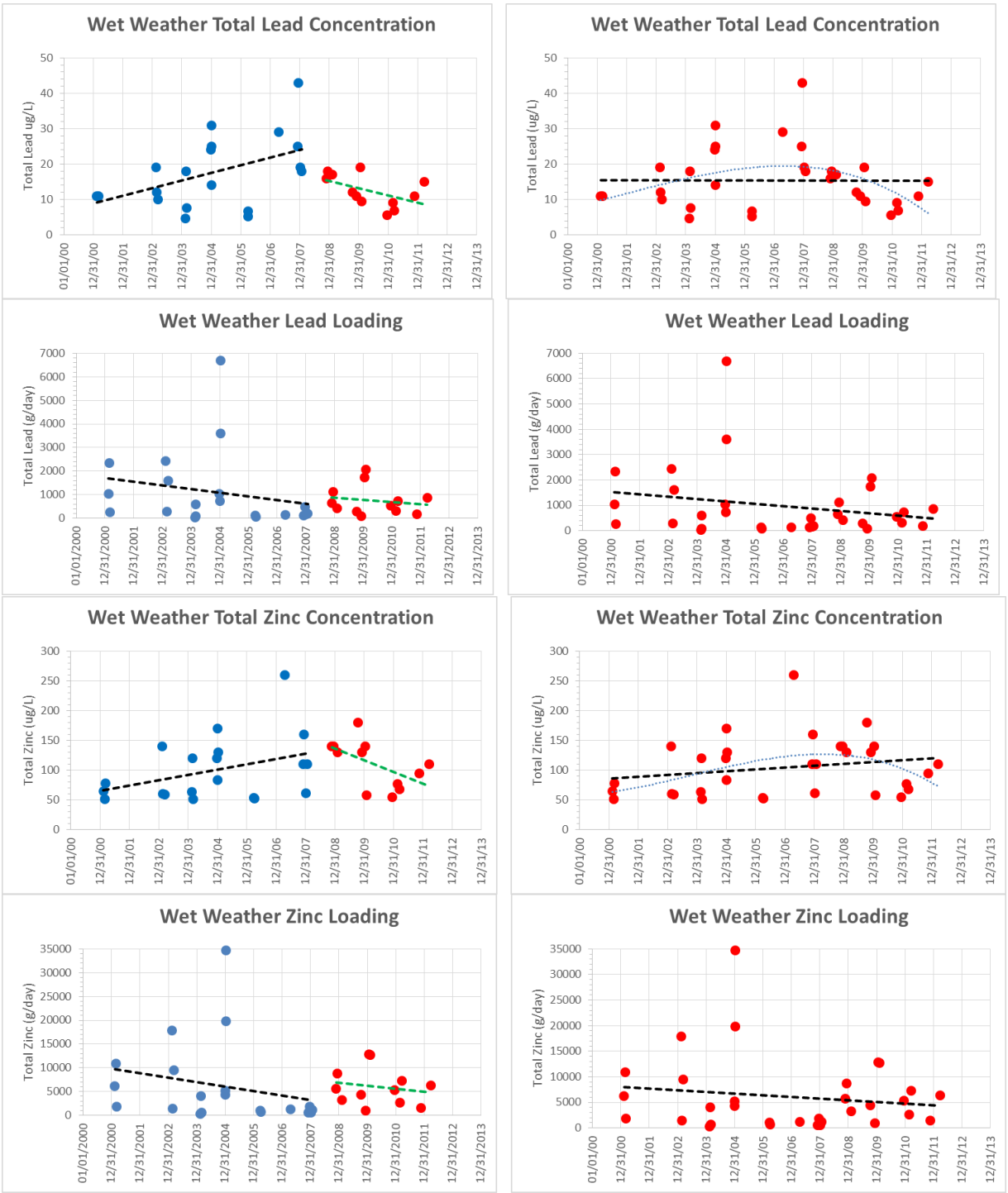


Figure 2-4: Total and dissolved metals in dry weather discharges from the Dominguez Gap pump station



Note: Graphs on the left illustrate samples taken before and after the effective date of the TMDL (10/29/2008). Graphs on the right illustrate trends without consideration of the effective date of the TMDL. Dashed lines are based upon simple linear regression. The fine dotted line represents a non-linear regression.

Figure 2-5: Stormwater flow, concentration and loads for total Cu, Pb and Zn at the Dominguez Gap



Note: Graphs on the left illustrate samples taken before and after the effective date of the TMDL (10/29/2008). Graphs on the right illustrate trends without consideration of the effective date of the TMDL. Dashed lines are based upon simple linear regression. The fine dotted line represents a non-linear regression.

Figure 2-5 (Cont.): Stormwater flow, concentration and loads for total Cu, Pb, Zn - Dominguez Gap pump station

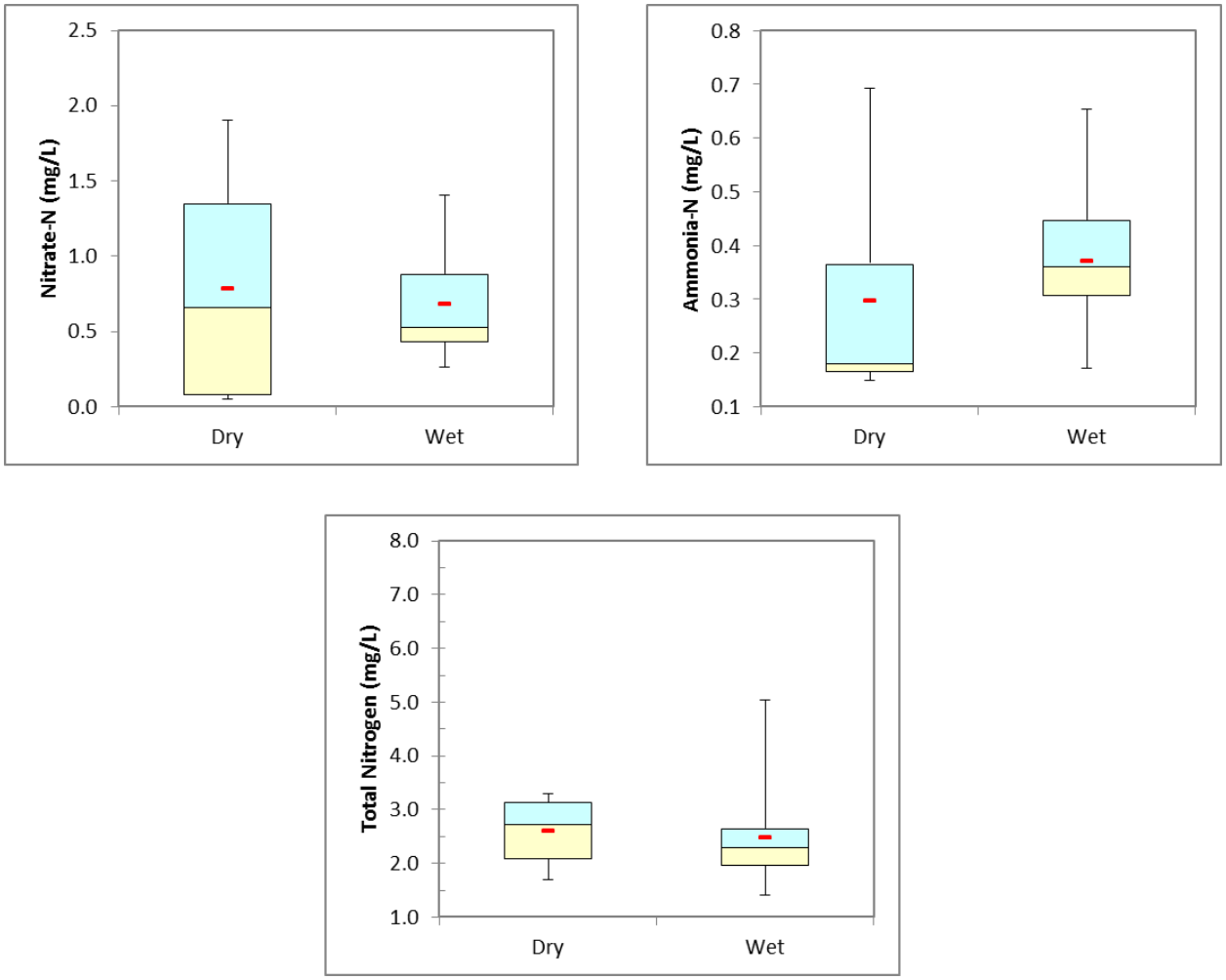


Figure 2-6: Distribution of Ammonia-N, Nitrate-N and Total Nitrogen measured in both dry and wet weather discharges from the Dominguez pump station, 2008-2013

2.2.6 LOS ANGELES RIVER BACTERIA SOURCE IDENTIFICATION STUDY/CLEANER RIVERS THROUGH EFFECTIVE STAKEHOLDER-LED TMDLS (CREST) STUDY

Multiple data sets were analyzed during the development of the LA River Bacteria TMDL. Data from the City of Los Angeles' Status and Trends monitoring program, the Monitoring and Reporting Programs for the City of Los Angeles' LA-Glendale and D.C. Tillman Water Reclamation Plants and the Burbank Water Reclamation Plant, and data from the Mass Emission and Tributary instream monitoring stations under the Monitoring and Reporting Program of the MS4 Permit were analyzed over a period beginning November 1997 and ending February 2008.

The data in Table 2-12 were compiled by the Regional Board for the Los Angeles River Watershed Bacteria TMDL. Exceedance percentages, which are calculated as the number of single sample exceedances of Rec-1 WQOs divided by sample count are shown for the monitoring locations relevant to the Lower LAR Watershed. The exceedance count and sample count are also listed next to the exceedance percentage in parentheses.

On average, E. Coli and fecal coliform samples exceeded WQOs over 80% of the time in the LA River, and over 75% of the time in LA River Tributaries.

It should be noted that the Regional Board recognizes that there are natural sources of bacteria within watersheds that may contribute to exceedances of the Rec-1 WQOs, and have implemented a reference system/antidegradation compliance procedure. According to the LA River Bacteria TMDL, under this protocol, "*a certain frequency of exceedance of the single sample objectives shall be permitted on the basis of the observed exceedance frequency in the selected reference system(s) or the targeted waterbody*"(Staff Report pg. 18). In addition, the LA River and the Rio Hondo are subject to the high flow suspension (HFS) of Rec-1 WQOs for bacteria during days with rainfall of 0.5" inches or greater and the following 24 hours, so many of the wet weather exceedances expressed above over- represent the bacterial impairment in these waterbodies[10].

A map of monitoring locations sampled is shown in Figure 2-7.

[10] Los Angeles River Watershed Bacteria Total Maximum Daily Load. Staff Report, California Regional Water Quality Control Board, Los Angeles Region. July 15, 2010

Table 2-12: LA River bacteria source identification study monitoring data exceedance summary

	Parameter	LA River Reach 1 Nov '97-Feb '08 Exceedance %	LA River Reach 2 Jan '01-Feb '08 Exceedance %	Compton Creek Jan '02-Feb '08 Exceedance %	Rio Hondo Reach 1 Jan '02-Feb '08 Exceedance %
Single Sample	Fecal Coliform	86.2% (50/58)	80.0% (4/5)	87.5% (14/16)	90.9% (10/11)
	E. Coli	83.1% (226/272)	81.9% (443/541)	53.3% (48/90)	69.1% (56/81)
	Exceedance Days	84.4% (276/327)	82.3% (445/541)	57.3% (59/103)	79.0% (64/81)
	Dry Weather	79.4% (189/238)	79.3% (345/435)	58.7% (54/92)	78.3% (54/69)
	Wet Weather	91.6% (87/95)	88.5% (100/113)	45.5% (5/11)	83.3% (10/12)
	Summer	77.0% (134/174)	79.2% (244/313)	90.5% (38/42)	49.2% (38/48)
	Winter	89.3% (142/159)	87.7% (201/229)	63.4% (21/33)	68.8% (22/32)
Geometric Means	Fecal Coliform	100.0% (11/11)	N/A	N/A	N/A
	E.Coli	100.0% (22/22)	100.0% (59/59)	N/A	N/A
	Exceedance Days	100.0% (33/33)	100.0% (59/59)	N/A	N/A
	Summer	100.0% (3/3)	100.0% (6/6)	N/A	N/A
	Winter	100.0% (30/30)	100.0% (53/53)	N/A	N/A

** Data expressed in terms of exceedance days of the Basin Plan Rec-1 WQO in which single sample bacteria densities exceed bacteria water quality standards for Rec-1 Beneficial Use.
***LA River is subject to the High Flow Suspension of Rec-1 WQOs, therefore these exceedances may be overrepresented

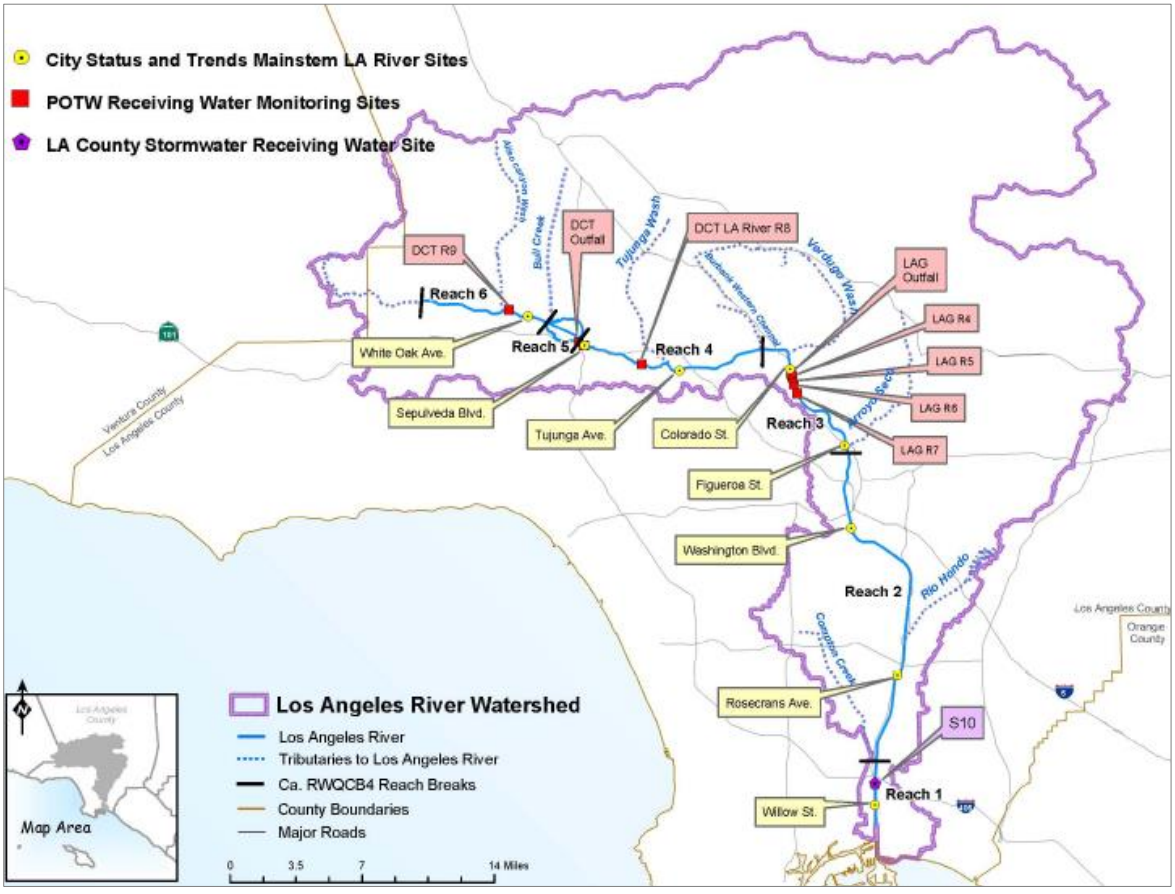


Figure 2-7: LA River Bacteria Source Identification Study monitoring locations

2.2.7 LA RIVER TRASH TMDL DATA

The Cities have successfully implemented the LA River Trash TMDL, achieving a greater than 80% reduction in trash through the installation of certified full capture catch basin inserts, trash nets, and retention basins. Table 2-13 displays each City's status in achieving 100% trash capture.

Table 2-13: Percentage of catch basins equipped with full capture devices by City

City	Percentage of Catch Basins Equipped with Full Capture Device
Downey	90
Lakewood	100
Pico Rivera	84
Paramount	94
Signal Hill	89
South Gate	86
Long Beach	90

2.2.8 SCCRWP POLLUTANT LOADING STUDY

The Southern California Coastal Water Research Project, which was formed in 1969 to "enhance the scientific understanding of linkages among human activities, natural events, and the health of the Southern California coastal environment" conducted a five-year study of the spatial and temporal patterns of stormwater contaminants from 2000 through 2005 in five watersheds throughout Los Angeles County. They collected data during 11 storm events from twelve mass emissions sites and eight land use types to characterize pollutant loading of trace metals, organic compounds, and bacteria. Ten (10) to fifteen (15) grab samples were collected for each event, and samples were targeted at early season storms and large rainfall events. Data was collected from the LA River at Wardlow, making the results of this study applicable to the Lower LAR Watershed.

Researchers found that stormwater concentrations of trace metals exceeded CTR WQOs in greater than 80% of the wet weather samples at mass emissions sites. They also found consistent fecal indicator bacteria exceedances at both mass emissions and land use sites. Results also indicated that annual loading of Polycyclic aromatic hydrocarbons (PAHs) from the Los Angeles River watershed into the Pacific Ocean is approximately 92.8 kg/year. The EPA regulatory guidelines suggest a practical PAH detection limit between 1 - 5ug/L, and this study mostly found mean PAH concentrations below this threshold. However, they suggest that PAH concentrations may be underreported due to the fact that most monitoring efforts collect composite samples, and this study observed almost all PAH pollutant loading to occur during the first flush of a storm event.

2.2.9 COUNCIL FOR WATERSHED HEALTH LOS ANGELES RIVER WATERSHED MONITORING PROGRAM

Since 2007, the Los Angeles River Watershed Monitoring Program (LARWMP), a group of stakeholders representing major permittees, regulatory and management agencies, and conservation groups led by the

Council for Watershed Health, has conducted watershed scale monitoring at targeted and random sites throughout the Los Angeles River watershed. A map of monitoring locations is shown in Figure 2-8.

Significant observations found during the 2010 monitoring season under this program are as follows[11]:

- "The ambient condition of streams in the Los Angeles River Watershed was assessed using a variety of indicators collected at randomly selected sites in three sub-regions (natural, urban and effluent dominated). Indicators included water chemistry, toxicity, bioassessment and physical habitat condition."
- "Dissolved oxygen, pH and temperature were greatest at effluent dominated sites and lowest at natural upper watershed sites. Water Reclamation Plants and urban run-off discharge into concrete lined channels, with limited canopy cover. Therefore, sunlight has the opportunity to increase water temperature and encourage photosynthesis, which results in cyclic oscillation in pH and dissolved oxygen."
- "The concentrations of zinc, selenium, and lead were highest at effluent dominated sites and arsenic, chromium and copper were higher at urban sites. Other than copper and selenium in urban streams, concentrations of the other metals were generally below CTR thresholds."
- "Effluent-dominated sites had higher median concentrations of dissolved nutrients compared to the other sub-regions and the range of values was greatest at the urban sites. Nitrogen concentrations at all watershed sub-regions were below the basin plan objective of 10 mg/L-N for nitrate and 1.0 mg/L-N for nitrite."
- "Watershed-wide, 80% of the random sites sampled had IBI scores that indicated degraded habitat or ecosystem conditions, most of these were concrete lined channels in the urban and effluent dominated sub-regions. The BMI communities were strongly affected by the 2009 Station Fire which reduced the biological condition in the upper watershed."
- "Physical habitat conditions, as measured by CRAM, were poorest in the lower watershed, where concrete channels predominate, and best in the upper watershed."
- "There was a strong positive correlation between good biological conditions (IBI scores) and canopy cover and stream slope. Each of these habitat characteristics was favorable for BMIs in the upper watershed where IBI scores were correspondingly high. IBI scores were generally lowest in the urban and effluent sub regions, where concrete lined channels predominate."

The Lower LAR Watershed will use these results, and continue to track future LARWMP results to help target watershed control measures identified in the WMP.

[11] Morris, K. et al.



Figure 2-8: LARWMP 2010 monitoring locations

2.3 SOURCE ASSESSMENT

This section identifies the potential sources of pollutants within the Lower LAR Watershed for the waterbody-pollutants classified in section 2.2. Information was gathered from several water quality monitoring programs and special studies related to pollutant sources and conditions that contribute to the highest water quality priorities to identify known and suspected stormwater and nonstormwater pollutants sources to and from the Municipal Separate Storm Sewer System (MS4).

The pollutants addressed in this section are bacteria, nutrients, metals, sediment, and trash. To generally describe the potential sources in the Lower LAR Watershed for these pollutants, pollutant sources have been divided into the following categories: NPDES discharges, road infrastructure, atmospheric deposition, and wastewater from sanitary sewer and SSOs.

2.3.1 NPDES SOURCES

There are two categories of pollutant sources, point sources and non-point sources. Point source discharges are regulated through National Pollutant Discharge Elimination System (NPDES) permits. Point sources include those associated with the MS4 (stormwater and urban runoff) and other NPDES discharges. Stormwater runoff in the watershed is regulated through four types of permits including MS4 permits, a statewide stormwater permit for Caltrans; a statewide Construction General Permit (CGP); and a statewide Industrial General Permit (IGP). The NPDES IGP regulates stormwater discharges and authorized non-stormwater discharges from ten specific categories of industrial facilities, including manufacturing facilities, oil and gas mining facilities, landfills, and transportation facilities. Furthermore, the NPDES CGP regulates stormwater discharges from construction sites that result in land disturbances equal to or greater than one acre. Point source discharges from thee IGP, CGP, residential, commercial and transportation activities can be a significant source of pollutant loads.

Non-point sources, by definition, include pollutants that reach waters from a number of land uses and are not regulated through NPDES permits. Non-point sources include existing contaminated sediments within the watershed and direct air deposition to the waterbody surface.

The following provides additional discussion regarding the presence of pollutants in stormwater runoff within the Lower LA River watershed.

BACTERIA

As discussed in Section 2.2.6 relating to the CREST study for the LA River Bacteria TMDL, based on the assessment from several monitoring programs, on average E. Coli and fecal coliform samples exceeded WQOs over 80% of the time in the LA River and over 75% of the time in LA River Tributaries. According to the Bacteria TMDL, dry weather urban runoff and stormwater conveyed by storm drains are the primary sources of elevated bacterial loadings in the watershed[12]. Significant contributors of bacteria are

[12] LARWQCB (Los Angeles Regional Water Quality Control Board). 2010. Los Angeles River Watershed Bacteria Total Maximum Daily Load. California Regional Water Quality Control Board- Los Angeles, CA

associated with categories such as anthropogenic, non-anthropogenic, and environmental sources, which may include:

SANITARY SEWERS OVERFLOWS (SSOS)

SSOs are potential sources of contaminants. Aging systems in need of repair or replacement, severe weather, improper system operation and maintenance (O&M), clogs, and root growth can contribute to sanitary sewer leaks and overflows. When sanitary sewers overflow or leak, they can release raw sewage into the environment, which can contain pollutants such as suspended solids, pathogenic organisms, toxic pollutants, oil and grease but in particular, high concentrations of bacteria and nutrients[13]. SSOs can occur during the dry or wet weather and at any point in the collection system, include overflows from manholes.

According to the Sanitary Sewer Overflow (SSO) database in the California Integrated Water Quality System (CIWQS), a total of 226 SSOs have been recorded within the watershed since 2006. Table 2-14 includes information on the total reported SSO discharges[14].

Table 2-14: Total number of SSOs and volume

Total SSOs	Total Volume (gal)
226	360,476

ANIMAL WASTES

The bacteria indicators used to assess water quality are not specific to human sewage; therefore, natural influences of fecal matter from animals and birds can also be a source of elevated levels of bacteria[12].

ILLICIT CONNECTIONS AND ILLICIT DISCHARGES (IC/IDS)

IC/IDs to the MS4 are also likely sources of bacteria in stormwater discharges[12]. Table 2-15 includes data based on annual reports submitted to the LA County DPW (the previous Principal Permittee), for illicit connections and illicit discharges. Current data on the constituents for the IC/IDs recorded during this period is not available.

Table 2-15: Illicit Connections/Illicit Discharges 2001-2012

Agency	Illicit Connections	Illicit Discharges
Downey	6	467
Lakewood	0	162
Long Beach	No Data	No Data
Lynwood	1	38
Pico Rivera	No Data	No Data
Signal Hill	0	88
South Gate	0	104
Total	7	917

[13] SWRCB (State Water Resources Control Board). 2014. Sanitary Sewer Overflow (SSO) Reduction Program. http://www.waterboards.ca.gov/wate_issues/programs/sso/.

[14] SWRCB (State Water Resources Control Board). 2014. California Integrated Water Quality System Project (CIWQS). Spill Public Report - Summary Page. http://www.waterboards.ca.gov/ciwqs

WASTEWATER TREATMENT PLANTS

According to the Bacteria TMDL Staff Report for the Los Angeles River, during dry weather, effluent discharged from wastewater reclamation plants accounts for roughly 72% of the flow in the river and less than 1% in the wet weather. Although wastewater treatment plants are not considered to be a source of exceedances of bacteria water quality objectives in the river, when these systems do fail they may be sources of bacteria loads during the wet or dry weather conditions.

OTHER SOURCES

Urban runoff has also been found to carry high levels of bacteria and can be expected to exceed water quality criteria for bacteria during and immediately after storm events. During dry weather, flows into the storm drain system include residential and commercial runoff from activities such as over-irrigation, car washes, pavement cleaning, etc. Organic debris from gardens, landscaping, parks, food waste and illegal dumping from recreational vehicle holding tanks among others, can be a source of elevated levels of total coliform bacteria. In addition, decaying vegetation and soils can play a role in bacterial loadings in the watershed[15].

NUTRIENTS

Possible sources of nutrients include runoff from residential and commercial areas due to landscaping activities and use of fertilizer for lawns and gardens, including organic debris. Activities such as washing cars, parking lots and driveways can contribute to nutrients pollutants in the MS4 since most of the detergents used contain phosphorus[16]. Other sources of nutrients include food wastes, domestic animal waste; and human waste from areas inhabited by the homeless. These pollutants build up and are then washed into the waterways through the storm drain system when it rains. These kinds of loads are typically highest during the first major storm flush and even after extended periods of dry weather when pollutants have accumulated. Other major categories of nutrients sources include:

- As discussed in the TMDL for Nitrogen Compounds and Related Effects, direct discharges from wastewater reclamation plants within the Los Angeles River comprise the largest source of nutrients loadings. The three largest POTWs within the LA River watershed are: Donald C. Tillman Water Reclamation Plant, Los Angeles Glendale Water Reclamation Plant, and Burbank Water Treatment Plant, which provide an average of 2,243 MT/yr in total nitrogen loadings[16].
- Golf courses – these are a major source of nutrients since fertilization activities and watering rates are generally much greater than the residential and commercial areas. The excess nutrients

[15] LARWQCB (Los Angeles Regional Water Quality Control Board). 2006. Total Maximum Daily Loads for Bacterial Indicator Densities in Ballona Creek, Ballona Estuary, and Sepulveda Channel. California Regional Water Quality Control Board- Los Angeles, CA

[16] LARWQCB (Los Angeles Regional Water Quality Control Board). 2003. Total Maximum Daily Loads for Nitrogen Compounds and Related Effects. California Regional Water Quality Control Board, Los Angeles Region, Los Angeles, CA.

accumulated in the soils can be transported to waterways through excess irrigation or stormwater runoff. There are approximately 15 golf courses within the watershed area.

METALS

Heavy metals including copper, lead, and zinc are Category 1 pollutants in the Lower LAR Watershed. Although naturally occurring, concentrations of these metals are a concern in many watersheds because of potential industrial and urban discharges. The Los Angeles River TMDL for Metals addresses the main types of sources within the watershed. During dry weather, Publicly Owned Treatment Works (POTWs) account for the majority of flow and metal loadings, the remaining loading sources are identified from other permitted NPDES discharges which include Industrial General Permit (IGP) covered facilities, Construction General Permit (CGP) covered facilities, and other types of urban activities[17]. According to the Los Angeles River Metals TMDL, most of the annual metal loadings are associated with wet weather. The final staff reports estimates stormwater flows contributing as much as 40 percent of the cadmium loading, 80 percent of the copper loading, 95 percent of the lead loading and 90 percent of the zinc loading on an annual basis.

POTWS

POTWS are considered significant contributors of metals in the river. During dry weather, they constitute the majority of discharge in the river. Monitoring data as evaluated in the Metals TMDL indicates POTWs as contributing fairly large percentages of the total dry-weather metal loadings. The concentrations of metals from the POTWs may be low, but loadings are high due to their large flows[18].

INDUSTRIAL GENERAL PERMIT ACTIVITIES

The types of facilities covered under the IGP have the potential for metal loads, in particular metal plating, transportation, scrap yards and recycling and manufacturing facilities.

According to the Stormwater Multiple Application and Report Tracking System (SMARTS) database, there are approximately 227 current active industrial permits within the watershed; and from 2002-2012 there have been approximately 287 combined, active/terminated, industrial permits. Approximately 141 violations were recorded on the SMARTS database for inspections conducted from 2002-2012[18]. No further data is available to determine the kind of violations or the kind of pollutants these facilities contributed to.

[17] LARWQCB (Los Angeles Regional Water Quality Control Board). 2005. Total Maximum Daily Load for Metals Los Angeles River and Tributaries. California Regional Water Quality Control Board- Los Angeles, CA prepared in Coordination with Environmental Protection Agency Region 9.

[18] SWRCB (State Water Resources Control Board). 2014. Storm Water Multiple Application and Report Tracking System (SMARTS). http://www.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

Table 2-16: Active IGP Facilities as of May 1, 2014[18]

Agency	Total
Downey	22
Lakewood	1
Long Beach	78
Lynwood	15
Paramount	40
Pico Rivera	12
Signal Hill	6
South Gate	53
Total	227

CONSTRUCTION GENERAL PERMIT ACTIVITIES

Discharges covered under the CGP also have the potential to contribute metals loading from construction sites. Sediment delivered from construction sites can contain metals from construction materials and heavy equipment. Additionally, metals can leach out of building materials and construction waste exposed to stormwater[19].

Pollutants sources from construction activities are not considered a major concern since the watershed is mainly built-out. However, according to the SMARTS database, there are approximately 78 current active constructions permits within the watershed; and from 2002-2012 there have been approximately 337 combined, active/inactive, construction permits[18]. Approximately 28 violations were recorded on the SMARTS database for inspections conducted from 2002-2012. No further data is available to determine the kind of violations or the kind of pollutants these facilities contributed to.

Table 2-17: Active CGP sites as of May 1, 2014[18]

Agency	Total
Downey	7
Lakewood	4
Long Beach	44
Lynwood	3
Paramount	2
Pico Rivera	9
Signal Hill	5
South Gate	4
Total	78

LAND USE ACTIVITIES

These include general wear and tear of automotive parts which can be a significant source of metals. For example, brake wear can release copper, lead, and zinc into the environment and this contributes to concentrations of metals in urban runoff. Motor oil and automotive coolants spills are another potential land use source of metals. Pesticides, algaecides, wood preservatives, galvanized metals, and

[19] Raskin, L., M.J. Singer, and A. DePaoli. 2004. Final Report to the State Water Resources Control Board Agreement number 01-269-250. University of California, Davis, CA.

paints used across the watershed can also contain these metals. In the watershed, sources for these heavy metals have been identified as automotive repair, maintenance, fueling, cleaning and painting locations, metal fabrication facilities, and transportation activities and facilities[20].

The fertilizers used for lawn and landscape maintenance are also a source of metals and organic chemicals. Fertilizers, herbicides, and pesticides contain metals such as cadmium, copper, mercury, zinc, lead, iron, and manganese, which are also distributed when applying fertilizers and pesticides[21].

Monitoring program activities, which includes the mass emission monitoring as discussed in the Metals TMDL Implementation Plan for Jurisdiction 1, dry weather analysis predicted an exceedance frequency ranging between 3 and 12 percent for copper and 5 to 9 percent for lead[22]. Samples analyzed from 2009-2010 indicated that no samples exceeded the numeric water quality targets for dry weather. Based on the same historic monitoring information, the TMDL Implementation Plan for Jurisdiction 1 indicated wet weather flows routinely exceed numeric water quality targets for copper and zinc and to a lesser degree lead and cadmium for Reaches 2 through 6.

TRASH

According to the Trash TMDL for the Los Angeles River, the primary source of trash in the river results from litter, which is intentionally or accidentally discarded in watershed drainage areas. Transport mechanisms include storm drains, wind action and direct disposal. Several studies have shown that commercial operations generate more pollutants than residential operations, and as much as three times the amount generated from light industrial operations[23]. The TMDL also states that based on several studies, urban runoff is the dominant source of trash. The large amounts of trash conveyed by urban stormwater to the LA River is evidenced by the amount of trash that accumulated at the base of the storm drains. The amount and type of trash that is washed into the storm drain system appears to be a function of the surrounding land use.

2.3.2 ROAD INFRASTRUCTURE SOURCES

Runoff from highways and roads carries a significant load of pollutants. Pollutants originate from cars, roadway degradation, and surrounding landscape. Typical contaminants associated with these include sediment, heavy metals, oils and grease, debris, fertilizers, and pesticides, among others[24]. The use and wear of cars is one of the most prevalent sources of roadway pollutants. A study found that cars are the leading source of metal loads in stormwater, producing over 50 percent of copper, cadmium, and zinc

[20] City of San Diego and Caltrans. 2012. Tecolote Watershed Comprehensive Load Reduction Plan. Final Report. San Diego, CA

[21] County of Los Angeles. 2010. Multi-pollutant TMDL Implementation Plan for the Unincorporated County Area of Los Angeles River Watershed. County of Los Angeles, Los Angeles, CA

[22] Los Angeles River Jurisdictional Group 1. 2010. Metals TMDL Implementation Plan. Los Angeles, CA

[23] LARWQCB. 2007. Trash Total Maximum Daily Loads for the Los Angeles River Watershed. Los Angeles, CA.

[24] Caltrans (California Department of Transportation). 2003. Discharge characterization study report. California Department of Transportation, Sacramento, CA.

loads[25]. Vehicle brake pads constitute the single largest source of copper[26]. Simultaneously, tires, and engine parts are also a significant source of metals pollutants; almost 50 percent of tire wear accounts for over 50 percent of the total cadmium and zinc loads[27]. Roadways can also be a source of nutrients because nutrients are found in fertilizers that are commonly applied.

Table 2-18: Typical Sources of Pollutants from Road Infrastructure[28]

Source	Cadmium	Chromium	Copper	Iron	Nickel	Lead	Zinc	PAHs	Nutrients	Synthetic Organic Chemicals
Gasoline	●		●			●	●			
Exhaust					●	●		●		●
Motor oil and grease				●	●	●	●	●		
Antifreeze	●	●	●	●		●	●	●		
Undercoating						●	●			
Brake Linings			●	●	●	●	●			
Tires	●		●			●	●	●		
Asphalt	●		●		●		●	●		
Concrete			●		●		●			
Diesel Oil	●	●				●	●			●
Engine wear				●	●	●	●			
Fertilizers, pesticides, and herbicides	●		●	●	●		●		●	●

2.3.3 ATMOSPHERIC DEPOSITION

Atmospheric deposition is the direct and indirect transfer of pollutants from the air to surface waters. Pollutants in the atmosphere deposit onto solid surfaces and can then be washed off by rain, becoming part of the stormwater runoff that reaches the watershed. Atmospheric deposition of pollutants can be a large source of contamination to surface waters. Typical pollutants associated with atmospheric deposition are metals, PAHs, PCBs, and, to a lesser extent, nutrients. These pollutants enter the atmosphere from point sources (i.e., industrial facility emitting metals into the air). A comparison of trace metal contributions from aerial deposition, sewage treatment plans, industrial activities, and power plants is shown in Table 2-19.

[25] Schueler, T., and H.K. Holland. 2000. The Practice of Watershed Protection. Center for Watershed Protection, Ellicott City.
[26] TDC Environmental 2004, Copper Sources in Urban and Shoreline Activities. San Francisco, CA.
[27] Davis A.P., M. Shokouhian, and S. Ni. 2001. Loading estimates of lead, copper, cadmium, and zinc in urban runoff from specific sources. Chemosphere.
[28] Nixon, H., and J.D. Saphores. 2007. Impacts of motor vehicle operation on water quality: Clean-up costs and policies. Transportation Research Part D. Transport and Environment.

In addition to the trace metals, nutrients are also atmospherically deposited. The annual loading of nitrogen through atmospheric deposition in the Los Angeles River watershed is 5,559 tons per year, with 845 tons per year in the neighboring Ballona Creek watershed.[29]

Table 2-19 Comparison of source annual loadings to Santa Monica Bay (metric tons/year)

Metal	Aerial Deposition	Non-Aerial Sources		
		Sewage Treatment Plants	Industrial	Power Plants
Chromium	0.5	0.6	0.02	0.14
Copper	2.8	16	0.03	0.01
Lead	2.3	<0.01	0.02	<0.01
Nickel	0.45	5.1	0.13	0.01
Zinc	12.1	21	0.16	2.4

2.3.4 EXISTING WATERSHED MODEL RESULTS

The technical modeling used to develop the Los Angeles River Metals TMDL applied hydrodynamic and water quality models to assess the effects of metal loadings under both dry and wet weather conditions[30]. For dry weather, the model indicated concentrations below the CTR standards, which was consistent with the monitoring data since POTWs provide most of the dry-weather flows and generally discharge effluent that meets water quality standards. Estimates of storm loadings by the wet weather model were higher than loadings estimated from monitoring data.

A quantification methodology was used in the Reach 2 Metals TMDL Implementation Plan to evaluate the effectiveness of non-structural BMPs and to estimate the pollutant load reductions achieved through BMP implementation[31]. Pollutant buildup and wash-off analyses were completed for specific sources of metals. Hydrologic simulations were used to estimate the wash-off pollutant from the watershed surface, while exponential functions were used to estimate pollutant buildup and wash-off associated with specific sources of metals in the watershed. This approach demonstrated the mass of accumulated sediment on a given day is an exponential function of the 1) maximum carrying capacity, 2) residual pollutant not washed off during the preceding runoff event, and 3) dry days prior to the event. Pollutant buildup occurs at the fastest rate in the initial days following a wash-off event, but declines as buildup approaches the maximum carrying capacity over longer dry periods.

Chapter 4 of this plan includes details of the Reasonable Assurance Analysis conducted for the LLAR Watershed. A computer based modeling system was used to quantify flow and loadings from known watershed pollutants sources. Pollutant loading estimates were developed for the modeled constituents

[29] Lu, R., K. Schiff, S. Solzenbach, and D. Keith. 2004. *Nitrogen Deposition on Coastal Watersheds in the Los Angeles Region*. Southern California Coastal Water Research Project Annual Report. 2003-2004. pp. 73– 81.

[30] Tetra Tech. 2004. Modeling Analysis for Development of TMDL for Metals in the Los Angeles River and Tributaries. Prepared for LARWQCB and EPA Region 9.

[31] CDM. 2010. Los Angeles and Tributaries Total Maximum Daily Load for Metals Final Implementation Plan for Reach 2 Participating Jurisdictions.

including bacteria (fecal coliform), nutrients (nitrogen and phosphorus), metals (copper, lead and zinc) and sediment. A summary of the model performance by constituent can be found in Appendix A-4-1.

2.3.5 SUMMARY

Typical sources of these pollutants are summarized in Table 2-20.

Table 2-20: Typical sources of pollutants[32]

	Pollutants			
Potential Source	Bacteria	Nutrients	Metals	TSS/ Turbidity
NPDES Sources				
Residential land areas	●	●		●
Agricultural activities (i.e., animal operations, land applications)	●	●		●
Metallurgical industries/activities			●	
Construction activities			●	●
Industrial/municipal activities	●		●	
POTW discharges			●	
Landscaping, fertilizers		●		
Homeless encampments	●			
Pet waste	●	●		
Wildlife	●			
Native geology		●	●	
Land surface erosion			●	●
Detergents		●		
Car washing				●
Road Infrastructure				
Transportation sources (i.e., copper brake pads, tire wear)			●	
Pavement erosion			●	●
Atmospheric Deposition				
Industrial activities			●	
Construction activities			●	
Roofing			●	
Resuspension of historic emissions in road dusts and soil particles			●	
Land surface erosion		●		
Sanitary Sewer and sanitary sewer overflows (SSOs)				
Sewer Leaks, SSOs, illicit discharges, septic systems	●	●		●
POTW discharges		●	●	

[32] City of San Diego and Caltrans. 2012. Tecolote Watershed Comprehensive Load Reduction Plan. Final Report. San Diego, CA

2.4 PRIORITIZATION

Section VI.C.5.a.iv of the MS4 Permit outlines factors that should be considered when developing the sequence of addressing pollutants of concern within the Lower LAR Watershed. Based on the source assessment analysis, Water Quality Priorities (WQPs) within the watershed have been determined based on the following:

HIGHEST WQPS: TMDLS

- TMDL pollutants with past due interim or final limits
- TMDL pollutants with interim and final limits that fall within the MS4 Permit term, or the time period: September 6, 2012 – October 25, 2017
- Pollutants that are in the same class as a TMDL pollutant

HIGH WQPS: OTHER RECEIVING WATER CONSIDERATIONS

- Pollutants on the 303(d) List for which MS4 discharges are a suspected source based on findings from the source assessment
- Pollutants that exceed receiving water limitations and the findings from the source assessment indicate the MS4 as a source (these pollutants will be evaluated based on monitoring data collected as part of the CIMP).

All Category 1 pollutants with TMDL compliance deadlines that are past due, or that fall within the MS4 Permit term are prioritized as a Highest WQP. In addition, pollutants that fall within the same class (as defined in Section 2.1) as a TMDL pollutant with a compliance deadline that is past due or falls within the MS4 Permit term are prioritized as a Highest WQP. All other pollutants that are associated with the MS4 (based on the Source Assessment in Section 2.3) are prioritized as a High WQP. Table 2-21 summarizes the WQPs for the watershed based on the criteria described above.

Table 2-21: WQPs

Category	Class	Pollutant	Waterbody	Associated with MS4	Priority
Category 1	Trash	Trash	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
	Nutrients	Nitrogen Compounds	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
	Metals	Copper	Los Angeles River Estuary	Yes	Highest
		Lead	Los Angeles River Estuary	Yes	Highest
		Zinc	Los Angeles River Estuary	Yes	Highest
	Pesticides	DDT	Los Angeles River Estuary	Yes	Highest
		PCBs	Los Angeles River Estuary	Yes	Highest
	SVOC	PAHs	Los Angeles River Estuary	Yes	Highest
	Bacteria	Coliform & Enterococcus	Los Angeles River Estuary	Yes	High
	Metals	Cadmium	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
		Copper	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
		Lead	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
		Zinc	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	Highest
	Bacteria	e.Coli	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	High
Category 2	Metals	Aluminum	Los Angeles River Reach 1	UTD	Highest
		Selenium	Los Angeles River Reach 1 & 2	UTD	Highest
	Bacteria	Coliform and Enterococcus	Los Angeles River Reach 1 & 2, Compton Creek, and Rio Hondo Reach 1	Yes	High
	Pesticides	Chlordane	Los Angeles River Estuary	UTD	High
		Diazinon	Los Angeles River Reach 1	UTD	High
	Water Quality Indicators/ General	BMI	Compton Creek	UTD	High
		Cyanide	Los Angeles River Reach 1	UTD	High
		Oil	Los Angeles River Reach 2	Yes	High
		pH	Los Angeles River Reach 1, Compton Creek, and Rio Hondo Reach 1	UTD	High
		Toxicity	Los Angeles River Estuary, Rio Hondo Reach 1	Yes	High
		MBAS	Los Angeles River Reach 1 & 2	UTD	High
	Trash	Trash	Los Angeles River Estuary	Yes	Highest
Category 3	Metals	Mercury	Los Angeles River Reach 1	UTD	Highest
		Nickel	Los Angeles River Reach 1	UTD	Highest
		Thallium	Los Angeles River Reach 1, Los Angeles River Reach 2	UTD	Highest
		Dissolved Oxygen	Los Angeles River Reach 1 & 2	UTD	High

	Water Quality Indicators/ General	pH	Rio Hondo Reach 1	UTD	High
	SVOC	Bis(2-ethylhexyl)phthalate	Los Angeles River Reach 1	UTD	High
		PAHs	Los Angeles River Reach 1 & 2	Yes	Highest
	Water Quality Indicators/ General	Chloride	Los Angeles River Reach 1 & 2, Rio Hondo Reach 1	UTD	High
		Cyanide	Rio Hondo Reach 1	UTD	High
	Pesticides	Chlorpyrifos	Compton Creek	UTD	High
		Diazinon	Rio Hondo Reach 1	UTD	High

UTD – Unable to determine at this time

3 SELECTION OF WATERSHED CONTROL MEASURES

This chapter identifies Watershed Control Measures (WCMs) to implement through the Participating Agencies' jurisdictional stormwater management programs, and collectively on a watershed scale. The WCMs are structural and/or nonstructural controls designed with the following objectives:

- Prevent or eliminate nonstormwater discharges to the MS4 that are a source of pollutants from the MS4 to receiving waters.
- Implement pollutant controls necessary to achieve all applicable interim and final water quality-based effluent limitations and/or receiving water limitations pursuant to corresponding compliance schedules.
- Ensure that discharges from the MS4 do not cause or contribute to exceedances of receiving water limitations.

The goal is to create an efficient program that focuses individual and collective resources on water quality priorities (WQPs). The WCMs are categorized as

- Minimum Control Measures (MCMs),
- Nonstormwater Discharge (NSWD) Measures and
- Targeted Control Measures (TCMs), which are designed to achieve applicable water quality-based effluent limitations and receiving water limitations.

Each WCM category may be further categorized as either structural or nonstructural (nonstructural includes operation and maintenance procedures and pollution prevention measures) as well as either existing or proposed. Combined with Chapter 4 (RAA) and Chapter 5 (Compliance Schedules), the WMP includes the nature, scope and timing of implementation for each WCM and provides interim milestones for the WCMs to achieve TMDL compliance. Also included are the responsibilities of each Permittee.

3.1 STRATEGY FOR SELECTION AND IMPLEMENTATION OF WATERSHED CONTROL MEASURES

Pursuant to Part VI.C.1.a of the MS4 Permit (Part VII.C.1.a - LB Permit), the Watershed Group has developed customized strategies, control measures and BMPs to implement the requirements of the MS4 Permit. Addressing WQPs will be based on a multi-faceted strategy initially focused on source control, including total suspend solids (TSS) reduction and runoff reduction. If pollutants are not generated or released, they will not be available for transport to the receiving waters. In addition, if soils can be stabilized, sediment controlled, and dry-weather runoff and initial flushes of stormwater runoff eliminated or greatly reduced, the major transportation mechanisms will be eliminated or greatly reduced, and fewer pollutants will reach the receiving waters.

The Watershed Group is particularly focused on source control because major sources of many of the highest WQPs, such as copper, lead and zinc, are released into the atmosphere, resulting in widespread aerial deposition onto impervious surfaces in the Watershed. In addition, these pollutants are discharged directly onto streets, highways, parking lots, and driveways from motor vehicle components such as brakes, wheel weights, and tires. The Participating Agencies have concluded that the most cost-effective and long-lasting way to address WQPs is to develop and support state-wide or regional measures that will encourage or require, if necessary, product or material substitution at the manufacturing stage. This can be a complex and time-consuming process, but the payoff in water quality improvement can be tremendous.

For example, the recent efforts of the California Stormwater Quality Association (CASQA) and Sustainable Conservation that led to the passage of the SB 346 legislation is a milestone that will significantly reduce the level of copper in metropolitan area waters throughout the state. SB 346 requires incremental reduction in the amount of copper in vehicle brake pads, which constitute the single largest source of copper in metropolitan environments. Based on available information, which was largely developed through a lengthy collaboration among brake pad manufacturers, government agencies, and environmental groups in the Brake Pad Partnership, a preliminary estimate of copper runoff reduction due to this piece of legislation was developed[1]. The estimate examined three scenarios and determined a 45 - 60% reduction in copper in runoff could be attributed to reduction of its use in brake pads. Already in effect, new edge codes required on brake pads sold in California will provide information on copper content and a notice that on and after January 1, 2014 any motor vehicle brake friction materials sold in California must contain no more than 0.1 percent by weight of the following materials: cadmium and its compounds, chromium (VI) salts, lead and its compounds, mercury and its compounds, and asbestiform fibers.

In addition, the Department of Toxic Substances Control (DTSC) adopted new Safer Consumer Product Regulations that became effective October 1, 2013. These regulations contain a process for identifying and prioritizing Chemicals of Concern in Priority Products containing these constituents, as well as a process for eliminating or reducing the adverse impacts of Chemicals of Concern in Priority Products. It will apply to most consumer products placed into the stream of commerce in California. It specifically applies to adverse environmental impacts, including adverse water quality impacts, and it contains a petition process for identification and prioritization of chemicals and projects. CASQA, supported by Watershed Group, has started the process of conducting research and building a file of critical information to support the designation of zinc in tires as a future priority product/constituent combination.

As explained later in this chapter, many of the new requirements of the MS4 Permit also involve enhanced source control measures that will be implemented such as enhanced inspections programs and outfall screening measures. The *Targeted Control Measures* section of this chapter supplements these efforts with targeted source control measures such as incentives for irrigation control and upgraded street

[1] Based on the Los Cerritos Channel Watershed Group commissioned study, "Estimate of Urban Runoff Copper Reduction in Los Angeles County from the Brake Pad Copper Reductions Mandated by SB 346."

sweeping equipment, designed with the objective of achieving interim and final water quality-based effluent limitations and/or receiving water limitations.

In concert with these initial source control efforts, which constitute 10% of the load reduction in the RAA (higher reductions may be realized), structural controls will also be implemented. The MS4 Permit mandates implementation of structural LID BMPs for certain classes of new developments and roadway projects. In addition, the *Targeted Control Measures* section of this chapter describes supplemental targeted structural BMPs. These structural controls are used to meet the load reduction requirements and structural BMP capacities for each participating agency as noted in Chapter 4 (the RAA) following the schedules provided for each agency in Chapter 5 (Compliance Schedules).

3.2 MINIMUM CONTROL MEASURES

The Minimum Control Measures (MCMs) are baseline WCMs required for all Permittees. The MCMs are defined in the MS4 Permit (excluding modifications set forth in an approved WMP) and are generally implemented individually by each Permittee. The objectives of the MCMs are to 1) result in a significant reduction in pollutants discharged into receiving waters and 2) satisfy the requirements of 40 CFR §122.26(d)(2)(iv). The MCMs are separate from Targeted Control Measures, which are developed by the Watershed Group and included in the WMP to specifically address WQPs.

The MS4 Permit allows the modification of several MCMs programs, so long as the modified actions are set forth in the approved WMP and are consistent with 40 CFR §122.26(d)(2)(iv). The modifications are based on an assessment to identify opportunities for focusing resources on WQPs. The term "modifications" refers only to instances where language from the MS4 Permit MCM provisions is removed and/or replaced. Any control measures that are strictly enhancements of the existing programs (i.e. do not conflict with the MS4 Permit MCM provisions) are included in the separate category of Targeted WCMs.

The following sections include a summary of the assessment of each MCM program as well as a determination as to whether each Participating Agency will implement the MCM provisions 1) as explicitly stated in the corresponding section of the MS4 Permit or 2) with modifications to focus resources on WQPs. Independent of the determinations made, the Agencies may consider additional MCM modifications through the Adaptive Management Process. Implementation of the MCMs will follow the approval of this WMP by the Regional Board Executive Officer following MS4 Permit §VI.D.1.b (LB Permit - §VII.D.1.ii).

3.2.1 LOS ANGELES COUNTY FLOOD CONTROL DISTRICT MINIMUM CONTROL MEASURES

The LACFCD will implement the MCMs as defined from §VI.D.1 to §VI.D.4 of the MS4 Permit. See Appendix A-3-4 for additional information.

3.2.2 ASSESSMENT OF MINIMUM CONTROL MEASURES (CITIES ONLY)

Pursuant to MS4 Permit §VI.C.5.b.iv.(1).(a) (LB Permit - §VII.C.5.h.i), the following section is an assessment of the MS4 Permit MCMs, intended to identify opportunities for focusing resources on WQPs.

3.2.2.1 DEVELOPMENT CONSTRUCTION PROGRAM

ASSESSMENT

Although controlling sediment is not a WQP, the reduction of sediment through an effective Development Construction Program will address WQPs. This is because sediment mobilizes other pollutants, including many of the WQP pollutants. As such the Development Construction Program is an integral component of each City's jurisdictional stormwater management program.

Compared to the prior MS4 Permit, the current Permit expands the provisions for the Development Construction Program. This expansion includes additional or enhanced requirements for plan review, site tracking, inspection frequencies, inspection standards, BMP implementation and employee training. If implemented effectively, these enhancements will aid in the control of sediment within the Watershed, and consequently, will address WQPs. As such, no modifications to the provisions of the Development Construction Program have been identified.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.8 of the MS4 Permit (§VII.D.K of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.2 INDUSTRIAL/COMMERCIAL FACILITIES PROGRAM

ASSESSMENT

The MS4 Permit provisions for the Industrial/Commercial Facilities Program provide opportunities for customization to address WQPs. Specifically, §VI.D.6.e.i.4 (§VII.D.G.5.i.4 - LB Permit) states that industrial inspection frequencies may be modified through the WMP development process. The Cities propose modifying the inspection frequencies of both industrial and commercial facilities based on a facility prioritization scheme that considers WQPs. For example, facilities that are deemed to have a high potential to discharge metals (a WQP pollutant) may be prioritized as "High" and inspected more frequently while facilities that have a small likelihood to adversely impact WQPs may be prioritized as "Low" and inspected less frequently.

DETERMINATION

Sections VI.D.6.d and VI.D.6.e of the MS4 Permit (Sections VII.D.G.4 and VII.D.G.5 of the LB Permit) will be replaced with the language in Table 3-3, which is located in the following *New Fourth Term Permit MCMs* section of this chapter and is identified as MCM-ICF-3.

In order to provide clarity to the Cities, one combined guidance document has been prepared for the Program, with the prioritization and revised inspection frequencies included – see Appendix A-3-1. The document is also intended to assist the Cities in the development and implementation of a jurisdictional program.

3.2.2.3 Illicit Connection and Illicit Discharges Elimination Program

Assessment

The purpose of the Illicit Connection and Illicit Discharges Elimination (ICID) Program is to detect, investigate and eliminate IC/IDs to the MS4. In order to address WQPs, a potential modification to MS4 Permit provisions would be the inclusion of a proactive approach for the detection of illicit discharges. However such an approach will be addressed through nonstormwater outfall based screening monitoring as outlined in the MRP. Also, such activities do not conflict with the MS4 Permit provisions for an IC/ID Program, and as such would be classified as a Targeted Control Measure. As such there is no need to modify the base provisions of the program.

Determination

The Cities will implement the MCMs as defined in §VI.D.10 of the MS4 Permit (§VII.D.M of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.4 Planning and Land Development Program

Assessment

Following MS4 Permit §VI.C.5.b.iv.1.a (LB Permit - §VII.C.5.h.i.), the Planning and Land Development Program was not assessed for potential modifications.

Determination

The Cities will implement the MCMs as defined in §VI.D.7 of the MS4 Permit (§VII.D.J of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.5 Public Agency Activities Program

Assessment

The Public Agency Activities Program is divided into several sub-programs. Many of the MS4 Permit provisions within the sub-programs consist of baseline BMPs that do not suggest modification. The sub-programs that do suggest a prioritized approach – such as street sweeping and catch basin cleaning frequencies – already provide this opportunity (frequencies are based on a City's assessment of trash and debris generation). The Public Facility Inventory sub-program also provides a prioritization opportunity, based on the tracking data obtained for each facility. However, since these facilities are not subject to regular "public agency" inspections as in the Industrial/Commercial Facilities Program, there is little utility

in incorporating such a prioritization. The provisions of the public construction activities sub-program are considered an integral component of the jurisdictional stormwater program, for the reasons explained in the assessment of the Development Construction Program provisions. In summary there is no need to modify the MS4 Permit provisions of the program.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.9 of the MS4 Permit (§VII.D.L of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.2.6 PUBLIC INFORMATION AND PARTICIPATION PROGRAM

ASSESSMENT

The MS4 Permit allows a City to implement the requirements of the Public Information and Participation Program (PIPP) 1) by participating in a County-wide effort, 2) by participating in a Watershed Group effort, 3) individually within its jurisdiction or 4) through a combination of these approaches. The Cities will implement the PIPP following a combination of approaches. Consequently some clarifications of the MS4 Permit provisions are necessary.

In terms of modifications to address WQPs, the MS4 Permit provisions for the PIPP are not particularly prescriptive, thus allowing the Cities the flexibility to focus efforts on WQPs through the development of the program. As such, there is no need to modify the MS4 permit provisions of the program.

DETERMINATION

The table below provides clarification on elements of the MS4 Permit provisions for the PIPP:

Permit section	Clarification
§VI.D.5.c.(i) - MS4 Permit §VII.D.F.3.i - LB Permit Public Participation	Each City will participate in a County-wide sponsored PIPP to provide a means for public reporting of clogged catch basin inlets and illicit discharges/dumping, faded or missing catch basin labels, and general stormwater and nonstormwater pollution prevention information.
§VI.D.5.d - MS4 Permit §VII.D.F.4- LB Permit Residential Outreach Program	Each City will work in conjunction with a County-wide sponsored PIPP to implement the Residential Outreach Program. Elements of the program that will not be administered or implemented as a county-wide effort (currently the provision to provide educational materials to K-12 school children) will be addressed individually by each City or jointly on a watershed level. Through the adaptive management process, PIPP participation may develop into a watershed group or individual effort, or some combination of these approaches.

In order to provide clarity to the Cities, one combined guidance document has been prepared for the Program, with the approach for each provision (i.e. joint or individual effort) included – see Appendix A-3-1. The document is also intended to assist the Cities in the development and implementation of a jurisdictional program.

3.2.2.7 PROGRESSIVE ENFORCEMENT AND INTERAGENCY COORDINATION

ASSESSMENT

Following MS4 Permit §VI.C.5.b.iv.1.a (LB Permit - §VII.C.5.h.i), the Progressive Enforcement and Interagency Coordination Program was not assessed for potential modifications.

DETERMINATION

The Cities will implement the MCMs as defined in §VI.D.2 of the MS4 Permit (§VII.D.2 of the LB Permit). To assist the Cities in the development and implementation of a jurisdictional program, a guidance document is included in Appendix A-3-1.

3.2.3 THIRD TERM MS4 PERMIT MINIMUM CONTROL MEASURES

Until the WMP is approved by the Executive Officer of the Regional Board, the MCM provisions of the prior third term MS4 permit continue to be implemented by the participating agencies. Some of the MCMs of the current MS4 Permit are relatively unchanged carry-overs from the prior third term permit. The remaining MCMs are either enhancements of the third term MCMs or entirely new provisions. These new and enhanced fourth term MCMs are described in the following section.

3.2.4 NEW FOURTH TERM MS4 PERMIT MINIMUM CONTROL MEASURES (CITIES ONLY)

Part VI.D of the MS4 Permit and Part VII.D of the LB Permit (the MCM provisions) introduces many new provisions and program elements to be developed and incorporated within each participating agency's jurisdictional stormwater program. This section briefly describes the new and enhanced MCMs required for the Cities (City MCMs), excluding those required for the LACFCD in §VI.D.4. An MCM is considered new if it was not required by the prior MS4 Permit and is considered enhanced if it is an enhancement of a related provision of the prior MS4 Permit.

The details of each provision may be found in the relevant sections of the MS4 Permit, which are included. Unless an alternate date is provided in the MS4 Permit or in this section, the adoption date for the City MCMs coincides with the approval of the WMP by the Regional Board's Executive Officer.

3.2.4.1 STRUCTURAL CONTROLS

The new and enhanced MCMs consist primarily of nonstructural control measures, with the marked exception of the Planning and Land Development provisions, described as follows.

LID AND HYDROMODIFICATION

MS4 Permit §VI.D.7 (LB Permit §VII.D.J)

The LID and hydromodification provisions of the Planning and Land Development program are a significant enhancement from the prior MS4 Permit. The implementation of structural LID BMPs at new

developments throughout the watershed will appreciably decrease the effective impervious area, reducing flow and, consequently, pollutant loads. The program is unique in that it will increase in effectiveness over time as more and more existing developments are redeveloped and bound to the LID/hydromodification requirements.

TRASH EXCLUDER INSTALLATION

MS4 Permit §VI.D.9.h.vii.(1) (LB Permit §VII.D.L.8. vii.(1))

In areas that are not subject to a trash TMDL, the Public Agency Activities Program includes a requirement to install excluders (or equivalent devices) on or in Priority A (MS4 Permit §VI.D.9.h.iii.(1)), LB Permit §VII.D.L.8. iii.(1)) area catch basins or outfalls to prevent the discharge of trash to the MS4. For LA MS4 Permittees, the deadline is no later than four years after the effective date of the Permit. This provision may be supplanted by the statewide trash amendments, which in their current draft iteration include the installation of full-capture devices in the priority land use areas of high density residential, industrial, commercial, mixed urban and public transportation stations as a compliance route.

3.2.4.2 NONSTRUCTURAL CONTROLS

Table 3-2 lists the new and enhanced nonstructural City MCMs as well as the new and enhanced NSWD measures. The BMP effectiveness from Table 3-2 is based on similar BMPs listed in Tetra Tech's Comprehensive Load Reduction Plan (CLRP) for Chollas Creek Watershed in San Diego County, 2012. The correlation of BMP effectiveness with WQPs is based on Table 3-1. The pages following Table 3-2 describe each of the listed controls.

Table 3-1 Pollutant Category versus Water Quality Classification

Waterbody-pollutant classification	Type of pollutant								
	Bacteria	Metals	Organics	Sediment	Pesticides	Nutrients	Oil and grease	Dissolved minerals	Trash
Category 1	✗	✗	✗		✗	✗			✗
Category 2	✗	✗	✗		✗	✗			✗
Category 3		✗	✗					✗	

Table 3-2 New Fourth Term MS4 Permit Nonstructural MCMs (Cities Only) and NSWDs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency							
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
		Planning and Land Development													
1	MCM-PLD-1	Amend development regulations to facilitate LID implementation	◆	◆	◈	◆	◆	✗	✗	✗	✗	✗	✗	✗	✗
2	MCM-PLD-2	Post-construction BMP tracking, inspections and enforcement	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗
		Existing Development													
3	MCM-ICF-1	Increase in facility types inspected and number of inspections conducted	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗
4	MCM-ICF-2	Business assistance program and BMP notification	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗
5	MCM-ICF-3 (TCM-ICF-1)	Prioritize facilities/inspections based on water quality priorities	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗
		Construction													
6	MCM-DC-1	Enhanced plan review program	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	✗	✗	✗
7	MCM-DC-2	Enhanced inspection standards and BMP requirements	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	✗	✗	✗

Table 3-2 New Fourth Term MS4 Permit Nonstructural MCMs (Cities Only) and NSWDs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency							
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
8	MCM-DC-3	Increased inspection frequencies	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	✗	✗	✗
9	MCM-TRA-1	Enhanced staff training program	◈	◈	◈	◆	◈	✗	✗	✗	✗	✗	✗	✗	✗
		Illicit Discharge Detection/Elimination													
10	MCM-ICID-1	Enhanced IC/ID enforcement and written procedures	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗
11	NSWD-1	Outfall screening and source investigations	◈	◈	◈	◈	◆	✗	✗	✗	✗	✗	✗	✗	✗
12	MCM-TRA-1	Enhanced staff/contractor training	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗
		Dry weather runoff reduction													
13	NSWD-1	Outfall screening and source investigations	◈	◈	◈	◈	◆	✗	✗	✗	✗	✗	✗	✗	✗
14	NSWD-2	Enhanced conditions for NSWDs, including irrigation reduction	◆	◆	◈	◆	◆	✗	✗	✗	✗	✗	✗	✗	✗
		Public Information and Participation													

Table 3-2 New Fourth Term MS4 Permit Nonstructural MCMs (Cities Only) and NSWDs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency							
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
15	MCM-PIP-1	Stormwater resources on City website	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗
		Public Agency Activities													
16	MCM-PAA-1	Enhanced BMP requirements for fixed facility/field activities	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗
17	MCM-PAA-2	Reprioritization of catch basins and clean-out frequencies	◆	◆	◆	◆	◇	✗	✗	✗	✗	✗	✗	✗	✗
18	MCM-PAA-3	Integrated Pest Management Program	◈	◈	◈	◇	◇	✗	✗	✗	✗	✗	✗	✗	✗
19	MCM-PAA-4	Enhanced measures to control infiltration from sanitary sewers	◆	◆	◇	◇	◇	✗	✗	✗	✗	✗	✗	✗	✗
20	MCM-PAA-5	Inspection and maintenance of Permittee owned treatment controls	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗
21	MCM-TRA-1	Enhanced inspector/staff training	◈	◈	◈	◈	◈	✗	✗	✗	✗	✗	✗	✗	✗

ENHANCED STAFF/CONTRACTOR TRAINING PROGRAMS ***MCM-TRA-1***

MS4 Permit §VI.D.7.d.iv.(b), §VI.D.8.l, §VI.D.9.k, §VI.D.10.f (LB Permit §VII.D.J.5.iv.(b), §VII.D.K.xiv, §VII.D.L.11, §VII.D.M.6)

Measures introduced:

- Prescriptive staff training requirements to the Development Construction, Illicit Connections and Illicit Discharges Elimination and Public Agency Activities Programs. For example, relevant staff involved with the Construction Program must be knowledgeable in procedures consistent with the State Water Board sponsored Qualified SWPPP Practitioner/Developer (QSP/QSD) program.
- Inspections of structural BMPs under the Planning and Land Development Program must be conducted by trained personnel.
- Outside contractors are bound to the same training standards as in-house staff

These new and enhanced provisions will increase the overall effectiveness of the jurisdictional stormwater management programs (JSWMPs).

AMEND DEVELOPMENT REGULATIONS TO FACILITATE LID IMPLEMENTATION ***MCM-PLD-1***

MS4 Permit §VI.C.4.c.i, §VI.D.7.d.i (LB Permit §VII.C.4.c.i, §VII.D.J.5.i)

The participating agencies have developed and adopted LID ordinances and Green Street Policies. These measures will facilitate LID implementation.

POST-CONSTRUCTION BMP TRACKING, INSPECTIONS AND ENFORCEMENT ***MCM-PLD-2***

MS4 Permit §VI.D.7.d.iv (LB Permit §VII.D.J.5.iv)

The Cities must track post-construction BMPs, conduct BMP verification and maintenance inspections and follow the Progressive Enforcement Policy in cases of non-compliance. This will improve the effectiveness of the Planning and Land Development program.

INCREASE IN FACILITY TYPES INSPECTED AND NUMBER OF INSPECTIONS CONDUCTED ***MCM-IFC-1***

MS4 Permit §VI.D.6.d, §VI.D.6.e (LB Permit §VII.D.G.4, §VII.D.G.5) also affected by NPDES No. CAS000001, the State Water Resources Control Board's (SWRCB) Industrial General Permit (IGP)

Measures introduced:

- Inspect nurseries and nursery centers
- Perform follow-up *No Exposure Verification* inspections for at least 25% of industries that have filed a *No Exposure Certification (NEC)*
- Inspect light industrial facilities. Under the SWRCB's IGP adopted in April 1, 2014, light industries previously excluded from coverage under the IGP must now obtain coverage. Light industry is defined as SICs 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39 and 4221-4225. This includes facilities ubiquitous in

industrial zones such as warehouses and machine shops. Although many of these facilities will likely qualify for the NEC, the type and number of facilities requiring inspection under the MS4 Permit will still increase.

These new and enhanced measures will increase the effectiveness of the Industrial/Commercial Facilities Program.

BUSINESS ASSISTANCE PROGRAM AND BMP NOTIFICATION ***MCM-IFC-2***

MS4 Permit: §VI.D.6.c (LB Permit §VII.D.G.3)

Measures introduced:

- Notify industrial/commercial owner/operators of applicable BMP requirements.
- Implement a Business Assistance Program to provide technical information to businesses to facilitate their efforts to reduce the discharge of pollutants in stormwater. The business assistance program described in the prior LA MS4 Permit was an optional provision.

These new and enhanced measures will increase the effectiveness of the Industrial/Commercial Facilities Program.

PRIORITIZE FACILITIES/INSPECTIONS BASED ON WATER QUALITY PRIORITIES ***MCM-IFC-3 (TCM-ICF-1)***

MS4 Permit: Modified MCM (replaces §VI.D.6.d, §VI.D.6.e), LB Permit: (replaces §VII.D.G.4, §VII.D.G.5)

A program has been developed to prioritize industrial/commercial facilities based on their potential to adversely impact WQPs. The resulting prioritization scheme determines the inspection frequency, replacing the uniform inspection frequency provided in the MS4 Permit. This allows Cities to concentrate efforts on WQPs. Sections VI.D.6.d and VI.D.6.e of the MS4 Permit (Sections VII.D.G.4 and VII.D.G.5 of the LB Permit) will be replaced with the language presented in Table 3-3.

TABLE 3-3

REPLACES §VI.D.6.D AND §VI.D.6.E OF THE MS4 PERMIT
***REPLACES*§VII.D.G.4 AND §VII.D.G.5 OF THE LB PERMIT**

MS4 PERMIT VI.D.6.d (LB Permit VII.D.G.4) Prioritize Critical Industrial/Commercial Sources

MS4 Permit VI.D.6.d.i (LB Permit VII.D.G.4.i) Prioritization Method

Prioritizing facilities by potential water quality impact provides an opportunity to optimize the effectiveness of the Industrial/Commercial Facilities Program and to focus efforts on water quality priorities. The inventory fields in Part VI.D.6.b.ii (VII.D.G.2.i) provide information that allows for such a facility prioritization. Based on these fields, Figure ICF-1 establishes a method for each City to prioritize all industrial/commercial facilities into three tiers – High, Medium and Low. A City may follow an alternative prioritization method provided it is based on water quality impact and results in a similar three-tiered scheme.

Prioritization factors

Factor	Description
A	Status of exposure of materials and industrial/commercial activities to stormwater
B	Identification of whether the facility is tributary to a waterbody segment with impairments[2] for pollutants that are also generated by the facility
C	Other factors determined by the City, such as size of facility, presence of exposed soil or history of stormwater violations

Utilizing these factors, follow steps 1, 2 and 3 below:

1. Collect necessary information to evaluate factors

Factor	Initial method	Subsequent method
A	Satellite imagery	Results of stormwater inspection
B	Cross reference Table 4 or Table 5* with tributary TMDL/ 303(d) pollutants	Cross reference inspection results with tributary TMDL/ 303(d) pollutants
C	Varies	

* See pages 9 and 10 of Appendix A-3-1 ICF (guidance for the Industrial/Commercial Facilities Program)

2. Evaluate factors

Factor	Result	Score
	Low or no exposure	0
A	Moderate exposure	½
	Significant exposure	1
B	No**	0
	Yes***	1
	Low	0
C	Medium	½
	High	1

** No pollutant generation/impairment matches
*** ≥ 1 pollutant generation/impairment matches

3. Prioritize facilities

		C Score		
		0	**½**	**1**
A×B Score	**0**	Low	Medium	High
	½	Medium	High	High
	1	High	High	High

This method serves only as a guide to prioritization. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C.

Figure ICF-1: Industrial/Commercial Facility Prioritization Scheme

[2] CWA §303(d) listed or subject to a TMDL

TABLE 3-3

REPLACES §VI.D.6.D AND §VI.D.6.E OF THE MS4 PERMIT
***REPLACES*§VII.D.G.4 AND §VII.D.G.5 OF THE LB PERMIT**

Step 3 in Figure ICF-1 may also be expressed by the relationships A·B + C ≥ 1 → High, 1 > A·B + C > 0 → Medium and A·B + C = 0 → Low. The purpose of multiplying A and B is to scale the impact of the presence of the pollutants at a facility (B) by the likelihood that they will be discharged to the MS4 (A). Factor C quantifies water quality concerns that are independent of A or B and as such is incorporated through addition. The purpose of this numerical approach is to provide consistency to the prioritization process. It is intended solely as a guide. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C as listed in Figure ICF-1.

MS4 Permit VI.D.6.d.i.(1), (LB Permit VII.D.G.4.(1)), Prioritization Condition
The following condition will be met during the prioritization process: ***The total number of low priority facilities is less than or equal to 3 times the number of high priority facilities***. This condition is applied to maintain a minimum inspection frequency as explained in Section VI.D.6.e.i.

MS4 Permit VI.D.6.d.i.(2), (LB Permit VII.D.G.4.(2)), Prioritization Frequency
The default priority for a facility is Medium. Facilities will be reprioritized as necessary following the results of routine inspections. The City may also use any readily available information that clarifies potential water quality impacts (e.g., satellite imagery) in order to prioritize a facility before the initial inspection. Reprioritization may also be conducted at any time as new water quality based information on a facility becomes available. During reprioritization, the ratio of low priority to high priority facilities will remain at 3:1 or lower. Figure ICF-2 is a flowchart of the prioritization process.
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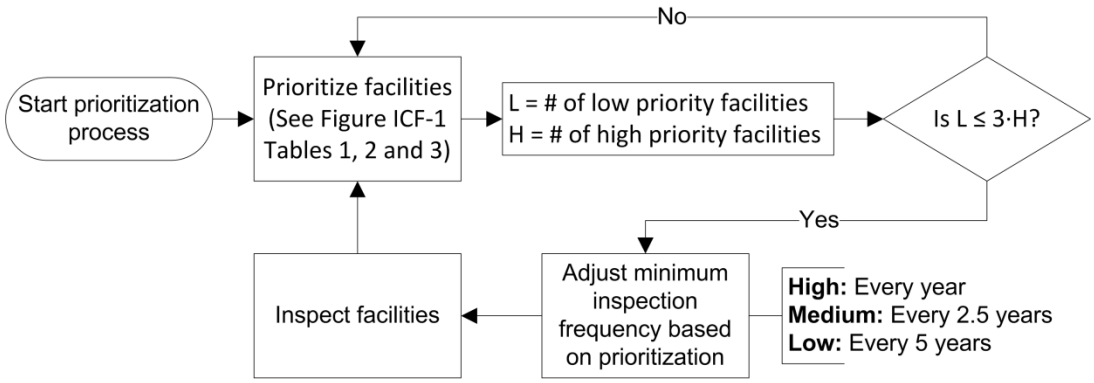


Figure ICF-2

MS4 Permit VI.D.6.e (LB Permit VII.D.G.5) Inspect Critical Industrial/Commercial Sources

MS4 Permit VI.D.6.e.i (LB Permit VII.D.G.5.i) Frequency of Industrial/Commercial Inspections
Following the facility prioritization method in Part VI.D.6.d.i, each City will inspect high priority facilities annually, medium priority facilities semi-quinquennially (once every 2.5 years) and low priority facilities quinquennially (once every five years). The frequencies may be altered by the exclusions defined in Part VI.D.6.e.i.(1). The condition in Part VI.D.6.d.i.(1) ensures at least the same average number of inspections conducted per year as the semi-quinquennial frequency defined in the MS4 Permit.

Each City will conduct the first compliance inspection for all industrial/commercial facilities within one year of the approval of their Watershed Management Program by the Executive Officer. A minimum interval of six months between the first and the second mandatory compliance inspection is required.
MS4 Permit VI.D.6.e.i.(1) (LB Permit VII.D.G.5.i(1)) Exclusions to the Frequency of Industrial Inspections

TABLE 3-3

REPLACES §VI.D.6.D AND §VI.D.6.E OF THE MS4 PERMIT
***REPLACES*§VII.D.G.4 AND §VII.D.G.5 OF THE LB PERMIT**

MS4 Permit VI.D.6.e.i.(1).(a) (LB Permit VII.D.G.5.i(1).(a)) Exclusion of Facilities Previously Inspected by the Regional Water Board

Each City will review the State Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS) database at defined intervals to determine if an industrial facility has recently been inspected by the Regional Water Board. The first interval will occur approximately 2 years after the effective date of the Order. The City does not need to inspect the facility if it is determined that the Regional Water Board conducted an inspection of the facility within the prior 24 month period. The second interval will occur approximately 4 years after the effective date of the Order. Likewise, the City does not need to inspect the facility if it is determined that the Regional Water Board conducted an inspection of the facility within the prior 24 month period.

MS4 Permit VI.D.6.e.i.(1).(b) (LB Permit VII.D.G.5.i(1).(b)) No Exposure Verification

As a component of the first mandatory inspection, each City will identify those facilities that have filed a No Exposure Certification with the State Water Board. Approximately 3 to 4 years after the effective date of the Order, each City will evaluate its inventory of industrial facilities and perform a second mandatory compliance inspection at a minimum of 25% of the facilities identified to have filed a No Exposure Certification. The purpose of this inspection is to verify the continuity of the no exposure status.

MS4 Permit VI.D.6.e.ii (LB Permit VII.D.G.5.ii) Scope of Industrial/Commercial Inspections

MS4 Permit VI.D.6.e.ii.(1) (LB Permit VII.D.G.5.ii.(1) Scope of Commercial Inspections

Each City will inspect all commercial facilities to confirm that stormwater and nonstormwater BMPs are being effectively implemented in compliance with municipal ordinances. At each facility, inspectors will verify that the operator is implementing effective source control BMPs for each corresponding activity. Each City will require implementation of additional BMPs where stormwater from the MS4 discharges to a significant ecological area (SEA), a water body subject to TMDL provisions in Part VI.E, or a CWA §303(d) listed impaired water body. Likewise, for those BMPs that are not adequately protective of water quality standards, a City may require additional site-specific controls.

MS4 Permit VI.D.6.e.ii.(2) (LB Permit VII.D.G.5.ii.(2) Scope of Industrial Inspections

Each City will confirm that each industrial facility:

a) Has a current Waste Discharge Identification (WDID) number for coverage under the Industrial General Permit, and that a Stormwater Pollution Prevention Plan (SWPPP) is available on-site; or
b) Has applied for, and has received a current No Exposure Certification for facilities subject to this requirement;
c) Is effectively implementing BMPs in compliance with municipal ordinances. Facilities must implement the source control BMPs identified in Table 10, unless the pollutant generating activity does not occur. The Cities will require implementation of additional BMPs where stormwater from the MS4 discharges to a water body subject to TMDL Provisions in Part VI.E, or a CWA §303(d) listed impaired water body. Likewise, if the specified BMPs are not adequately protective of water quality standards, a City may require additional site-specific controls. For critical sources that discharge to MS4s that discharge to SEAs, each City will require operators to implement additional pollutant-specific controls to reduce pollutants in stormwater runoff that are causing or contributing to exceedances of water quality standards.
d) Applicable industrial facilities identified as not having either a current WDID or No Exposure Certification will be notified that they must obtain coverage under the Industrial General Permit and will be referred to the Regional Water Board per the Progressive Enforcement Policy procedures identified in Part VI.D.2 of the MS4 Permit (Part VII.D.2 of the LB Permit).

ENHANCED PLAN REVIEW PROGRAM *MCM-DC-1*

MS4 Permit: §VI.D.8.h, §VI.D.8.i (LB Permit: §VII.D.K.x, §VII.D.K.xi)

In general the MS4 Permit introduces provisions that conform to the SWRCB's Construction General Permit. For construction sites one acre or greater, measures include the following:

- Construction activity operators must submit Erosion and Sediment Control Plans (ESCPs) prior to grading permit issuance, developed and certified by a QSD to SWPPP standards.
- Operators must propose minimum BMPs that meet technical standards. The cities must provide these standards.
- Develop procedures and checklists to review and approve relevant construction plans.

These new and enhanced measures will increase the effectiveness of the Development Construction Program, which in turn is expected to reduce TSS loading into the MS4. TSS reduction is an integral component in addressing WQPs.

ENHANCED INSPECTION STANDARDS/BMP REQUIREMENTS AT CONSTRUCTION SITES *MCM-DC-2*

MS4 Permit: §VI.D.8.d, §VI.D.8.i, §VI.D.8.j (LB Permit: §VII.D.K.vi, §VII.D.K.xi, §VII.D.K.xii)

Measures introduced:

- Ensure BMPs from the ESCPs are properly installed and maintained.
- Ensure the minimum BMPs for sites less than one acre are installed and maintained.
- Develop and implement standard operating procedures for City stormwater inspections of construction sites.
- Require activity-specific BMPs for paving projects.

These new and enhanced measures will increase the effectiveness of the Development Construction Program, which in turn is expected to reduce TSS loading into the MS4. TSS reduction is an integral component in addressing WQPs.

INCREASED INSPECTION FREQUENCIES *MCM-DC-3*

MS4 Permit: §VI.D.8.j (LB Permit: §VII.D.K.xii)

The inspection frequency for construction sites one acre or more has significantly increased. The prior LA MS4 Permit required a minimum of one inspection during the rainy season. The current MS4 Permit requires monthly inspections year-round, as well as mandatory inspections based on the phase of construction. This enhanced measure will increase the effectiveness of the Development Construction Program, which in turn is expected to reduce TSS loading into the MS4. TSS reduction is an integral component in addressing WQPs.

ENHANCED IC/ID ENFORCEMENT AND WRITTEN PROGRAM PROCEDURES *MCM-ICID-1*

MS4 Permit: §VI.D.2, §VI.D.10; LB Permit: §VII.D.2 , §VII.D.M

Measures introduced:

- Develop and implement a Progressive Enforcement Policy that applies to the IC/ID Elimination, Development Construction, Planning and Land Development and Industrial/Commercial Facilities Programs. The Progressive Enforcement Policy is an augmentation of the policy listed in the prior LA MS4 Permit, which was restricted to the Industrial/Commercial Facilities Program.
- Maintain written procedures for receiving complaints, conducting investigations and responding to spills.

These new and enhanced measures will increase the effectiveness of the IC/ID Elimination program, as well as the related enforcement components of the Development Construction, Planning and Land Development and Industrial/Commercial Facilities Programs.

STORMWATER RESOURCES ON CITY WEBSITE ***MCM-PIP-1***

MS4 Permit: §VI.D.5.d.i.(4) (LB Permit: §VII.D.F.4.i.(4))

Measures introduced:

- The MS4 Permit introduces a requirement to maintain a stormwater webpage or provide links to stormwater websites via the City's website. The website (in-house or linked) will include:
    - Educational material and
    - Opportunities for the public to participate in stormwater pollution prevention and clean-up activities.

ENHANCED BMP REQUIREMENTS FOR FIXED FACILITY/FIELD ACTIVITIES ***MCM-PAA-1***

MS4 Permit: §VI.D.9.e (LB Permit: §VII.D.L.5)

Measures introduced:

- Implement effective source control BMPs for 65 specific pollutant-generating activities such as mudjacking, shoulder grading and spall repair.
- Contractually require hired contractors to implement and maintain the activity specific BMPs. Conduct oversight of contractor activities to ensure the BMPs are implemented and maintained.

These new and enhanced measures will increase the effectiveness of the Public Agency Activities program.

REPRIORITIZATION OF CATCH BASINS AND CLEAN-OUT FREQUENCIES ***MCM-PAA-2***

MS4 Permit: §VI.D.9.h.iii (LB Permit: §VII.D.L.8.iii)

In areas not subject to a trash TMDL, measures introduced include the following:

- Determine priority areas and update the map of catch basins with GPS coordinates and priority.
- Include the rationale or data to support the priority designations.

These new and enhanced measures will increase the effectiveness of the Public Agency Activities program.

INTEGRATED PEST MANAGEMENT PROGRAM ***MCM-PAA-3***

MS4 Permit: §VI.D.9.g (LB Permit: §VII.D.L.7)

The MS4 Permit introduces entirely new, prescriptive requirements to implement an Integrated Pest Management (IPM) Program for public agency activities and at public facilities. These requirements include adopting and verifiably implementing policies, procedures and/or ordinances that support the IPM program. Intertwined with the IPM provisions are additional requirements to control and minimize the use of fertilizers. These new and expansive measures will increase the effectiveness of the Public Agency Activities program and address WQPs.

ENHANCED MEASURES TO CONTROL INFILTRATION FROM SANITARY SEWERS ***MCM-PAA-4***

MS4 Permit: §VI.D.9.ix (LB Permit: §VII.D.L.ix)

The MS4 Permit introduces specific requirements to control infiltration from the sanitary sewer into the MS4. The measures include adequate plan checking, preventative maintenance, spill response, enforcement, interagency coordination and staff/contractor education. The requirements may be fulfilled through implementation of a Sewer System Management Plan in accordance with the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.

INSPECTION AND MAINTENANCE OF PERMITTEE OWNED TREATMENT CONTROLS ***MCM-PAA-5***

MS4 Permit: §VI.D.9.x (LB Permit: §VII.D.L.x)

The MS4 Permit introduces requirements to implement an inspection and maintenance program for all Permittee owned treatment control BMPs, including post-construction treatment control BMPs. This measure will increase the effectiveness of the Public Agency Activities program.

3.3 NONSTORMWATER DISCHARGE MEASURES

The Participating Agencies will require dischargers that drain to their respective MS4s to implement the Nonstormwater Discharge (NSWD) Measures as defined in §III.A of the MS4 Permit (§IV.B of the LB Permit). If the Participating Agencies identify nonstormwater discharges from the MS4 as a source of pollutants that cause or contribute to exceedances of receiving water limitations, the WCMs will be modified and implemented – subject to the adaptive management process – to effectively eliminate the source of pollutants consistent with MS4 Permit §III.A and §VI.D.10 (LB Permit §IV.B and §VII.D.M). In these instances, potential WCMs may include prohibiting the nonstormwater discharge to the MS4, requiring the responsible party to 1) incorporate additional BMPs to reduce pollutants in the nonstormwater discharge or conveyed by the nonstormwater discharge or 2) divert to a sanitary sewer for treatment, or strategies to require the nonstormwater discharge to be separately regulated under a general NPDES permit.

It is important to note that the nonstormwater Outfall Based Screening and Monitoring Program (MRP §IX) introduces additional NSWD measures through the intensive procedures required for the identification of NSWDs from MS4 outfalls.

3.3.1 NEW FOURTH TERM PERMIT NONSTORMWATER DISCHARGE MEASURES

Parts III.A and VI.B (MRP IX) of the MS4 Permit (Parts IV.B and VII.B (MRP IX) of the Long Beach Permit introduce new provisions and program elements that address NSWDs. This section briefly describes these new and enhanced NSWD measures. A NSWD measure is considered new if it was not required by the prior MS4 Permit and is considered enhanced if it is an enhancement of a related provision of the prior MS4 Permit.

Table 3-2 from the previous section lists the new and enhanced nonstructural NSWD measures as well as the City MCMs. The BMP effectiveness from Table 3-2 is based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012. The correlation of BMP effectiveness with WQPs is based on Table 3-1. The following pages describe each of the listed controls. The details of each provision may be found in the relevant sections of the MS4 Permit, which are included. Unless an alternate date is provided in the MS4 Permit or in this section, the adoption date for the NSWD measures coincides with the approval of the WMP by the Regional Board's Executive Officer.

NSWD-1 OUTFALL SCREENING AND SOURCE INVESTIGATIONS ***NSWD-1***

MS4 Permit: §VI.B (MRP §IX) (LB Permit: MRP §IX)

The outfall screening and source investigation provisions of the MS4 Permit constitute an entirely new, expansive addition to each City's JSWMP. Implementing these new provisions will significantly support the control of unauthorized nonstormwater discharges.

ENHANCED CONDITIONS FOR EXEMPT NONSTORMWATER DISCHARGES ***NSWD-2***

MS4 Permit: §III.A (LB Permit: §IV.B)

The NSWD prohibitions of the MS4 Permit, which include specific measures to reduce irrigation runoff, are a significant enhancement from the prior LA MS4 Permit. Measures introduced include the following:

- Require the implementation of BMPs following established BMP manuals for discharges from non-emergency fire fighting activities and drinking water supplier distribution systems. Require specific BMPs for lake dewatering, landscape irrigation, pool and fountain discharges and non-commercial car washing.
- Require notification, monitoring (i.e. sampling) and reporting for drinking water supplier discharges and lake dewatering greater than 100,000 gallons.
- Require advance notification for any discharge of 100,000 gallons or more into the MS4.
- Minimize discharge of landscape irrigation through implementation of an ordinance specifying water efficient landscaping standards.
- Promote water conservation programs to minimize the discharge of landscape irrigation water into the MS4. This includes the following, where applicable:
    - Coordinate with local water purveyor(s) to promote:
        - Landscape water efficiency requirements for existing landscaping,
        - Drought tolerant, native vegetation, and
        - Less toxic options for pest control and landscape management.
    - Develop and implement a coordinated outreach and education program to minimize the discharge of irrigation water and pollutants associated with irrigation water.
- If monitoring results indicate that a conditionally exempt NSWD is a source of pollutants that causes or contributes to exceedances of applicable receiving water limitations and/or water quality-based effluent limitations, the Permittee must either:
    - Effectively prohibit the nonstormwater discharge to the MS4, or
    - Impose additional conditions, subject to approval by the Regional Water Board Executive Officer, or
    - Require diversion of the NSWD to the sanitary sewer, or
    - Require treatment of the NSWD prior to discharge to the receiving water.

Implementing these enhanced provisions will significantly support the control of unauthorized nonstormwater discharges.

3.4 TARGETED CONTROL MEASURES

Targeted Control Measures (TCMs) are additional control measures beyond the baseline MCMs and NSWD measures of the MS4 Permit that are intended to target the Watershed Group's WQPs. TCMs may be divided into two categories: nonstructural and structural. The selection of structural and nonstructural control measures to address WQPs within the Watershed Group is a vital component of the WMP planning process.

The Participating Agencies have already proposed and implemented a number of structural and nonstructural control measures in the watershed that collectively may contribute to considerable pollutant load reductions. These existing and planned BMPs provide a head start in the planning process to address WQPs within the Watershed Group. There are many different types of structural and nonstructural control measures that provide varying benefits from their implementation. The following sections describe Planned TCMs to be implemented, Potential TCMs that may be implemented (implementation is conditional upon factors such as site constraints, governing body approval, etc.) as well types of structural BMPs available to the Watershed Group.

3.4.1 CONTROL MEASURES IDENTIFIED IN TMDLS/IMPLEMENTATION PLANS

This section describes the control measures that have been previously identified in TMDLs and corresponding implementation plans and the status of their implementation. For those TMDLs that do not sufficiently identify control measures, or if implementation plans have not yet been developed, control measures are identified in the planned Targeted Control Measures as described in the following sections in this chapter.

3.4.1.1 LOS ANGELES RIVER NITROGEN COMPOUNDS AND RELATED EFFECTS

The Los Angeles River Nitrogen TMDL is the only TMDL applicable to the Lower Los Angeles River Watershed in which final water quality based effluent limits (WQBELs) went into effect prior to the MS4 Permit. The TMDL was adopted by the Regional Board (Resolution 2003-16) on December 4, 2003, and became effective on September 27, 2004.[3] Waste load allocations (WLAs) for point sources were established and required MS4 Permittees to: 1) submit a monitoring plan (completed March 23, 2005), and 2) incorporate monitoring at the Wardlow (S10) Mass Emission station in the LA River. Specific control measures were not included. The MS4 Permit modified the requirements of the TMDL by assigning WQBELs (MS4 Permit Appendix O).

CONTROL MEASURES AND IMPLEMENTATION

The LA River Nitrogen TMDL recommended implementation alternative allowed time for NPDES permitted Publically Owned Treatment Plants (POTWs) that discharge into the LA River to complete an upgrade of treatment facilities to nitrification/denitrification facilities without increasing current ammonia, nitrate and nitrite loads in the interim period. As the nitrification/denitrification facilities came on board, the

[3] MS4 Permit Fact Sheet (Page F-87)

reductions in ammonia and nitrate loads significantly reduced impairments caused by nutrient effects. These upgrades, in combination with the control measures the Watershed Group is implementing, appear to be effectively meeting the targets of the TMDL.

3.4.1.2 LOS ANGELES RIVER TRASH TMDL

In August 2007, The Regional Board adopted the Trash TMDL, which set a numeric limit of zero trash being discharged into the receiving water bodies from the storm drain system by the year 2016.

The MS4 permit provides four methodologies to determine compliance:

1. Full Capture Systems - The Regional Board's Executive officer has certified eight types of trash capture systems to be full capture[4]:
    a. Vortex Separation Systems (which include CDS units)
    b. Catch basin inserts (brush inserts; mesh screens; vertical and horizontal trash capture screens; and connector pipe screen (CPS).
    c. Specific designs of trash nets (including the Fresh Creek system at Hamilton Bowl)
    d. Two gross solids removal devices (including the Linear Radial systems at Hamilton Bowl)
2. Partial Capture Devices and institutional controls
    a. Partial capture devices estimated on demonstrated performance
    b. Daily Generation Rate (DGR) Studies
3. Combined Compliance Approaches
4. Minimum Frequency Assessment and Collection Approach (MFAC)[5]

CONTROL MEASURES AND IMPLEMENTATION

The Cities have implemented an effective combination of: (1) Full and partial capture catch basin inserts, (2) regional trash capture projects, and (3) institutional controls.

FULL CAPTURE INSERTS

In 2009, the Gateway Water Management Authority (GWMA) received funding from the State Revolving Fund through the American Recovery and Reinvestment Act to install full capture trash systems (CPS devices). The funding was for retrofitting all catch basins with full capture systems. Due primarily to physical constraints some of the catch basins could not be retrofitted and instead partial capture systems were installed. In some cases no systems were able to be installed due to retrofitting constraints.

PARTIAL CAPTURE SYSTEMS

During the installation of the full capture systems, on average, 8% - 16% of catch basins could not be retrofitted for a variety of reasons. This included: size constraints where the catch basin was found to be too small; catch basin outlets on the bottom which would compromise the CPS overflow capabilities and increase the chance of flooding; and inlets on the catch basins sides which would prevent the trash laden

[4] NPDES MS4 Permit, VI.E.5.b.

[5] Not a listed compliance option in the Los Angeles River Trash TMDL

flows from entering the CPS. Many of these catch basins could be retrofitted with an Automatic Retractable Screen (ARS) which has been demonstrated to be 86 percent effective[6].

Table 3-4: Number of catch basins installed with Full capture (CPS) and Partial Capture (ARS) systems

City	Catch basins installed with CPS	Catch basins in City	Catch basins with CPS (%)	Catch basins with only ARS	Catch basins with only ARS (%)
Downey	399	444	90	4	0.1
Lakewood	4	6	67	0	0
Long Beach	2707	3042	89	137	5
Lynwood	579	630	92	29	5
Paramount	230	245	94	0	0
Pico Rivera	56	67	84	8	12
Signal Hill	138	175	79	0 (2)	
South Gate	684	796	86	60	8

Regional Full Capture Systems

In addition to the catch basin inserts and screens, the following regional full capture systems are in place in the Lower LAR Watershed.

Table 3-5: Regional full trash capture systems

System	Description/location
Trash nets/radial systems	4 creek trash nets and two linear Radial systems installed in Hamilton Bowl beginning in the mid 2000s and subsequently by the City of Signal Hill as part of a Grant from the State Water Resources Board[7].
Long Beach trash nets	Trash nets have been installed at pump stations 3, 5, and 6 located along the LA River.
Long Beach CDS (vortex)	Walnut Ave and pump station 11
Lakewood Retention basin	Cherry Cove Park

Non-Structural and Institutional Controls

In addition to the structural controls summarized above, the agencies of the Lower LAR continue to implement a program of effective institutional controls. These programs are described below.

Daily Generation Rate Studies

Permittees have been authorized by the Regional Board to comply with the interim effluent limitations through the installation of partial capture devices and the implementation of institutional controls. The Cities of South Gate, Lynwood and Pico Rivera have participated in Daily Generation Rate (DGR) studies to determine the effectiveness of the institutional control measures in place (see Section 3.2 Minimum Control Measures, Section 3.3 Nonstormwater Discharge Measures, and Section 3.4 Targeted Control Measures for more detail on institutional control measures in the Lower LAR Watershed). The DGR uses a mass balance equation to estimate the amount of trash being deposited on the cities' public streets. To establish the DGR, trash from approximately 10% of the cities' curb miles in designated areas was collected prior to regularly scheduled street sweepings. The collected trash was quantified and used to

[6] City of Los Angeles Bureau of Sanitation, Watershed Protection Division, June 2006. *Technical Report: Assessment of Catch Basin Opening Screens Covers.*

[7] Systems are currently being replaced as part of recreational upgrade to Hamilton Bowl by the City of Long Beach

calculate the amount of trash flowing into the storm drain systems to determine the level of compliance. The studies have been conducted for several years and have determined that participating cities' are below the Trash TMDL levels and therefore in compliance. This compliance level is pre-insert and demonstrates that the participating cities' non-structural controls have a significant impact towards reducing the baseline amount of anthropogenic trash.

SUMMARY

The cities have implemented an effective program of structural and non-structural control measures and are currently meeting the interim WQBELs. See Section 5 Compliance Schedule for an analysis of achieved trash capture effectiveness to date along with future WQBEL compliance dates.

3.4.1.3 LOS ANGELES RIVER METALS TMDL

The Los Angeles River Metals TMDL was adopted by the Regional Board on June 2, 2005 and became effective on October 29, 2008. The TMDL establishes WQBELs for copper, lead and zinc. Separate WQBELs are established for each waterbody segment in the Los Angeles River and tributaries, but the TMDL does not extend to the Los Angeles River Estuary.

There are two reaches within the Lower LAR Watershed (Reach 1 and 2) and two tributaries (Compton Creek and the Rio Hondo) with WLAs under this TMDL. Responsible Agencies within the Lower LAR Watershed are listed in Table 3-6 along with the applicable segment to which they discharge or contribute runoff.

Table 3-6: Lower LAR Agencies and LAR Waterbody Segment

Agency	LAR Reach 1	LAR Reach 2	Compton Creek	Rio Hondo Reach 1
Downey		×		×
Lakewood	×			
Long Beach	×	×	×	
Lynwood			×	
Paramount		×		
Pico Rivera				×
Signal Hill	×			
South Gate			×	×
LACFCD	×	×	×	×

CONTROL MEASURES AND IMPLEMENTATION

The Los Angeles River metals TMDL established compliance goals by waterbody segment. The cities draining to Reach 1 of the Los Angeles River and Compton Creek joined to form Jurisdiction Group 1. Similarly, many agencies of Reach 2 of the Los Angeles River and the Rio Hondo joined to form Jurisdictional Group 2. The Lower LAR WMP encompasses parts of both Jurisdictional Groups.

On October 11, 2010 both of these Jurisdictional Groups submitted separate Implementation Plans to the Regional Board[8]. These implementation plans took slightly differing approaches to attaining compliance. Jurisdiction Group 1 focused on Source Control as a means of achieving WQBELs. In addition to Source Control Strategies, the Jurisdictional Group 1 Metals TMDL Implementation Plan took advantage of existing flood control basins and wetlands, which were and still are, receiving runoff from tributary areas along the lower portions of the LAR. Additionally, Structural Controls were discussed as potential BMPs to address metals if other control measures did not address the water quality issues.

The Jurisdictional Group 2 Metals TMDL Implementation Plan categorizes BMP implementation into three key areas:

- New Development and Significant Redevelopment – Water quality benefits to be obtained through ongoing implementation of new development and significant redevelopment activities;
- Non-structural BMPs – Identifying new or enhanced existing non-structural BMP activities that will result in reductions of metals in urban runoff; and
- Structural BMPs – Identifying and implementing the necessary structural BMPs to fill expected water quality gaps not addressed by any of the above.

The BMPs are discussed in these Implementation Plans are discussed in detail in Section 3.2 Minimum Control Measures, Section 3.3 Nonstormwater Discharge Measures, and Section 3.4 Targeted Control Measures and Section 3.4.2 Structural Targeted Control Measures.

MONITORING

In order to measure the progress toward achieving the Metals TMDL WQBELs, the two Jurisdictional Groups commenced a Coordinated Monitoring Program (CMP) beginning in October of 2008. This monitoring program consists of wet and dry weather sampling at two sampling stations in the Lower LAR Watershed (Wardlow Blvd. and Del Amo Blvd).

SUMMARY

The Participating Agencies have been and will continue to implement a multi-faceted approach towards achieving the Water Quality Based Effluent Limitations. The CMP monitoring that has been conducted to date indicates that the Lower LAR Watershed is meeting the TMDL dry weather targets. Specifically, the Reach 2 Implementation Plan indicates that the 2012 dry weather targets are currently being met and analyses of the Reach 2 watershed (which includes the Rio Hondo Spreading Grounds) indicates that the

8 Jurisdiction Group 1. Metals TMDL Implementation Plan Reach 1 of the Los Angeles River and Compton Creek for the Cities of Carson, Compton, Huntington Park, Lakewood, Long Beach, Lynwood, Signal Hill, and South Gate, and the California Department of Transportation (Caltrans). Prepared by John L. Hunter and Associates, Inc., Richard Watson and Associates, Inc., California Watershed Engineering, Inc., and Kinnetic Laboratories, Inc. October 11, 2010; and Los Angeles River and Tributaries Total Maximum Daily Loads for Metals Final Implementation Plan for Reach 2 Participating Jurisdictions. Prepared by CDM. October 11, 2010.

2012 wet weather target is currently being met.[9] With recent existing Reach 1 Regional Projects and the continued implementation of SUSMP/LID projects and nonstructural controls, the Group considers that the 2012 targets for Reach 1 have also been met.

Wet weather targets will be achieved through the Watershed Control Measures described in the rest of this Chapter and demonstrated by the Reasonable Assurance Analysis (Chapter 4).

3.4.1.4 LOWER LOS ANGELES RIVER BACTERIA TMDL

The Los Angeles River Bacteria TMDL (Resolution R1-007) was adopted by the Regional Board on July 9, 2010 and subsequently went into effect on March 23, 2012. The TMDL establishes WLAs for E.Coli in wet and dry weather and determines an allowable number of exceedances days of these objectives.

CONTROL MEASURES AND IMPLEMENTATION

For compliance purposes, the main stem of the river was broken down into segments, each with its own allocations and compliance schedule. During dry weather, the segments are phased into compliance through the development and implementation of a Load Reduction Strategy (LRS).

> *A LRS is "both [1] a suite of actions performed by MS4 Permittees along a Los Angeles River segment or tributary and [2] a document submitted to the Regional Board Executive Officer for approval. The document must describe the suite of actions that will be performed and demonstrate reasonable assurance of interim and final WLA attainment. A LRS may include 1) outfall methods such as structural methods like dry weather diversions, 2) source control and, in appropriate circumstances, 3) downstream methods to treat waters at the end of tributaries[10].*

Tables 3-7 summarizes the first compliance deadline and the submittal of the Load Reduction Strategy for the Agencies within the Lower LAR Watershed during dry weather. During wet weather there is not a phased implementation schedule similar to dry-weather. The final wet weather WQBELs go into effect on March 23, 2037.

[9] Los Angeles River and Tributaries Total Maximum Daily Loads for Metals Final Implementation Plan for Reach 2 Participating Jurisdictions. Prepared by CDM. October 11, 2010.

[10] Los Angeles Regional Water Quality Control Board. Los Angeles River Watershed Bacteria TDML Staff Report. Attachment A to Resolution No. R10-007. July 15, 2010.

Table 3-7: Lower LAR Load Reduction Strategy Submittal Deadline

Segment B, 2014-2022: Lower LAR Agencies discharging to Los Angeles River (main channel) Between Rosecrans Avenue and Patata Street RR Bridge)		
Agencies	Implementation Action	Deadline
South Gate, Downey, Lynwood, Paramount, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	September 23, 2014
Segment A, 2014-2024: Lower LAR Agencies discharging to Segment A of the Los Angeles River (main channel) Between Estuary (Willow Avenue) and Rosecrans Avenue		
Agencies	Implementation Action	Deadline
Lakewood, Long Beach, Lynwood, Paramount, Signal Hill, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	September 23, 2016
Rio Hondo 2014-2023:Lower LAR Agencies discharging to Rio Hondo		
Agencies	Implementation Action	Deadline*
Pico Rivera, South Gate, Downey, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	March 23, 2016
Compton Creek 2014-2025:Lower LAR Agencies with discharges entering Compton Creek		
Agencies	Implementation Action	Deadline*
Long Beach, Lynwood, South Gate, LACFCD, and Caltrans	Submit Load Reduction Strategy (LRS) to Regional Board	March 23, 2018

*If compliance targets are not being met, submit new LRS by September 23, 2026 to begin second phase

SUMMARY

The Agencies within the Lower LAR Watershed Group will submit a LRS in accordance with the deadlines in Table 3-7. The Control Measures discussed in the remainder of this Chapter will address bacteria loads and provide reasonable assurance of meeting WQBELs, however the LRS will outline a more targeted approach to address bacteria in the Lower LAR Watershed.

3.4.1.5 LOS ANGELES RIVER ESTUARY BACTERIA TMDL

On March 26, 2012, the US EPA adopted the Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL. This TMDL establishes numeric WLAs for E.Coli (freshwater), fecal coliform, enterococcus, and total coliform (marine) in the Los Angeles River Estuary (LARE) and the Long Beach shoreline beaches and determines an allowable number of exceedances days of these objectives.

This Watershed Management Program incorporates the LARE which extends from Willow Ave to the mouth of the Estuary (Queensway Bay near the site of the Queen Mary). The portion of this TMDL dealing with the Long Beach Shoreline beaches will be addressed in a separate watershed management program to be submitted by the City of Long Beach.

CONTROL MEASURES AND IMPLEMENTATION

In contrast to TMDLs adopted by the Regional Board, US EPA TMDLs do not contain an Implementation Plan or Schedule. The Regional Board has the option of adopting a separate implementation plan through a Basin Plan amendment or issuing a compliance schedule in a separate enforcement order. As the

Regional Board has not adopted either of these alternatives, and given the limited amount of time to comply with this TMDL, the Regional Board has determined that:

> *…numeric water quality based effluent limitation for these USEPA established TMDLS are infeasible at the present time. The Regional Board may at its discretion revisit this decision within the term of the [MS4 Permit] or in a future permit, as more information is developed to support the inclusion of numeric water quality based effluent limitations*[11].

In lieu of the inclusion of numerical limits in the MS4 Permit, the Agencies subject to this TMDL are required to propose and implement Best Management Practices (BMPs) in the Watershed Management Program to meet WLAs.

Table 3-8 summarizes the proposed timeline for submittal of the LRS for Agencies discharging to the LAR Estuary.

Table 3-8 Lower LAR Estuary Load Reduction Strategy Submittal Deadline

Lower LAR Permittees	Implementation Action	Deadline*
Long Beach, Signal Hill, and LACFCD	Submit Load Reduction Strategy (LRS) to Regional Board	April 28, 2017
	Complete Implementation of LRS	October 28, 2021
	Achieve interim (dry-weather) WQBEL and submit report to Regional Board	October 28, 2024
	Achieve final WQBELS or demonstrate that noncompliance is due to upstream contributions and submit report to Regional Water Board	September 23, 2030

*If compliance targets are not being met, a new LRS to begin the second phase will be submitted by October 28, 2025, with complete implementation of this LRS by April 28, 2029, and final WQBELs achieved by April 28, 2031.

The Lower LAR Agencies discharging to the LAR Estuary have already taken some early action steps towards low flow diversion projects to address bacteria loading. Table 3-9 summarizes the status of Control Measures that are currently in progress.

Table 3-9: Status of Lower LAR Dry-Weather Diversion Projects (as of June 1, 2014)

Agency	Conceptual Design	Approved Project	Design Plans	Constructed
Signal Hill	10% design complete	--	--	--
Long Beach	--	x	--	--

SUMMARY

In order to meet the LAR Estuary Bacteria TDML WLA, a LRS or equivalent will be developed and submitted to the Regional Board in accordance with the schedule outlined in Table 3-8. The Control Measures discussed in the remainder of this Chapter will address bacteria loads and provide reasonable assurance of meeting WQBELs, however the LRS will outline a more targeted approach to address bacteria in the

[11] California Regional Water Quality Control Board, Los Angeles Region Los Angele County MS4 Permit Response to Comments on the Tentative Order TMDL (General) Matrix.

Lower LAR Estuary Watershed. The CIMP is proposing initiating quarterly monitoring of the estuary for bacteria beginning in 2015.

3.4.1.6 DOMINGUEZ CHANNEL AND GREATER LOS ANGELES AND LONG BEACH HARBOR WATERS TOXIC POLLUTANTS TMDL

This TMDL was adopted by the Regional Board on May 5, 2011 and became effective on March 23, 2012. It establishes WQBELs for Copper, Lead, Zinc, PAHs, DDT, and PCBs. This TMDL effectively divides the Lower LAR into two compliance areas: (1) those areas tributary to the LAR above the estuary; and (2) those areas tributary directly to the estuary. The areas under this TMDL discharging directly to the Los Angeles and Long Beach Harbors will be addressed separately in the Long Beach individual WMP tentatively scheduled for submittal in March 2015.

CONTROL MEASURES AND IMPLEMENTATION

This TMDL does not assign a WLAs or WQBELs for agencies with discharges above the estuary. All of the Lower LAR Agencies subject to this TMDL (Cities of Signal Hill, Long Beach, Caltrans, and the LACFCD[12]) discharge to the LAR above the Estuary (which begins at Willow Street). For these agencies, The TMDL requires:

- Monitoring (which will be addressed separately in the CIMP) and
- A Report of Implementation, to be submitted on December 15, 2013 and annually thereafter to describe how current activities support the downstream TMDL. The MS4 Annual Report with the inclusion of data gathered from the CIMP will constitute reporting of activities in support of the downstream monitoring TMDL.

In addition, the Cities of Signal Hill and Long Beach, and the LACSD developed a Contaminated Sediment Management Plan to support the long-term recovery of sediment and water quality in the Long Beach Harbor, Eastern San Pedro Bay, and the LAR Estuary. This Plan outlines an approach to sediment contamination reduction. This approach summarizes a process for identifying and designating areas for remediation and determining the appropriate management alternatives to implement. The approach considers the following sediment management alternatives:

- Source Control
- Monitored Natural Recovery
- Enhanced Natural Recovery
- Capping
- In Situ Treatment
- Dredging

[12] Paramount and Lakewood are incorrectly included in MS4 Permit Table K-5. The TMDL does not list Paramount or Lakewood and being subject to the Estuary provisions of the TMDL. Lakewood and Paramount are listed in Table K-7 under the Los Cerritos Channel Watershed area. These two cities will not be further addressed under this section.

SUMMARY

The Watershed Control Measures described in this chapter will provide reasonable assurance that the Lower LAR Agencies are addressing the TMDL pollutants of concern in their discharges and conducting activities to support the achievement of WQBELs. Monitoring conducted through the CIMP along with an Annual Report of Implementation will document the Lower LAR Watershed Group's progress. In addition, the sediment management efforts in the LAR Estuary will likely achieve significant contaminant reduction.

As recognized by the footnote in Attachment K of the Permit, the Participating Agencies have entered into an Amended Consent Decree with the United States and the State of California, including the Regional Board. The footnote specifically states: "The requirements of this Order to implement the obligations of [the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL] do not apply to a Permittee to the extent that it is determined that the Permittee has been released from that obligation pursuant to the Amended Consent Decree entered in *United States v. Montrose Chemical Corp.*, Case No. 90-3122 AAH (JRx)." The submission of this WMP and its associated CIMP and any action or implementation taken pursuant to it shall not constitute a waiver of any such release of obligations established by that Amended Consent Decree.

3.4.2 NONSTRUCTURAL TARGETED CONTROL MEASURES

3.4.2.1 TOTAL SUSPENDED SOLIDS REDUCTION

As explained in the introduction to this chapter, emphasis is placed on source control as a cost-effective measure to reduce pollutant loads. In this WMP, the chief approach is controlling Total Suspended Solids (TSS) at the source, as explained in the following section. Combining this approach with true source control, low impact development, green streets, and the MCMs constitutes a strong and effective initial implementation of the WMP, providing time for funding measures to be put in place to pay for the design, construction, and operation of stormwater capture and low flow diversion facilities and to develop working relationships with water and wastewater agencies.

BACKGROUND

TSS is the governing pollutant for metals. This is consistent with that found within the USEPA approved *Los Angeles River Metals TMDL* which represents metals (copper, lead, and zinc) through their associations with sediment. Reducing TSS in the receiving waters is anticipated to result in a significant reduction of metals in the receiving waters since both pollutant groups adhere to sediment; therefore initial implementation will focus on TSS reduction. Initial emphasis on TSS reduction should reduce the volume of water that ultimately needs to be captured and infiltrated or used to achieve standards for the Category 1 pollutants being addressed by the WMP – namely metals. This would make implementation of the WMP more cost-efficient.

Documentation is not available for the Lower LAR watershed; however it is available for the adjacent Los Cerritos Channel (LCC) Watershed, of which many Lower LAR watershed Cities drain to in part. For that

watershed, Table 3-10 provides a summary of TSS concentrations at the Stearns Street monitoring site over a 13-year period based on 74 wet-weather observations and 25 dry-weather observations.

Table 3-10: TSS statistics measured at LCC TMDL Monitoring Site

Statistic	Wet weather (mg/L)	Dry weather (mg/L)
No. of observations	74	25
Minimum	17	2
Maximum	1700	128
1st Quartile	96	7.5
Median	155	13
3rd Quartile	260	41
Mean	227	27
Standard deviation (n-1)	256	30

Although the RAA is only assuming a 5% pollutant load reduction through implementation of the TSS Reduction Strategy, the Watershed Group is targeting greater reductions. In an analysis performed by the Los Cerritos Channel WMP Group, it was determined that the expected reduction in the mean concentration of TSS at Stearns Street from 227 mg/l to 150 mg/l, which would be a 34% reduction in the mean concentration of TSS. The reduced value is consistent with those found in other watersheds with similar land uses. A quantification of the program's potential effectiveness is included in Section 4.3.1.

TSS REDUCTION STRATEGY

The core of the TSS Reduction Strategy is the Group's soil stabilization/sediment control. Two key components of this strategy are implementation of enhanced erosion and sediment control at construction sites, in accordance with each city's Development Construction Program, and stabilization of exposed soil not associated with construction sites. Initial assessments conducted by the LCC Watershed Group have indicated that vacant lots, Caltrans rights-of-way and transmission line rights-of-way are the primary areas of exposed soil not associated with construction sites. Specific control measures for these areas are explained in the following section.

3.4.2.2 LIST OF NONSTRUCTURAL TARGETED CONTROL MEASURES

Table 3-11 lists planned and potential nonstructural TCMs for each participating agency. The BMP effectiveness from Table 3-2 is based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012. The correlation of BMP effectiveness with WQPs is based on Table 3-1. The pages following Table 3-11 describe each of the listed controls.

The responses for each agency under Table 3-11 are defined as follows:

- ✗ *Planned TCM*. Under the presumption that 1) the TCM will likely not require approval of the governing body and 2) the governing body approves adequate staff/budget (if necessary), the TCM will be implemented.

P *Potential TCM*. The TCM is under consideration by the agency, however implementation is contingent upon yet to be determined factors. These factors include approval by the governing body, additional time needed to inform the governing body and/or relevant staff and approval of service contracts. As such implementation cannot be assured at this time. If the Potential TCM is not adopted by the agency within the first two years of the implementation of the WMP, it will be reconsidered through the adaptive management process.

C *Completed TCM*. The TCM is preexisting (has been in effect for several years or more).

It is important to note that Caltrans and the LACFCD are operating regional stormwater programs and consequently incorporating localized institutional TCMs may not be feasible. As such their exclusion from such TCMs is justified.

The schedule of implementation for the TCMs is provided in Chapter 5.

Table 3-11 Nonstructural TCMs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency									
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	LACFCD	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
		Planning and Land Development															
1	TCM-PLD-1	Train staff/councils to facilitate LID and Green Streets implementation	◈	◈	◈	◈	◈	X	N/A	X	X	X	X	X	X	X
2	TCM-PLD-2	Ordinance requires LID BMPs for projects below MS4 Permit thresholds	◆	◆	◈	◆	◆	X	N/A		X				X	X
		Existing Development															
3	TCM-ICF-1 (MCM-ICF-3)	Prioritize facilities/inspections based on water quality priorities	◈	◈	◈	◈	◈	X	N/A	X	X	X	X	X	X	X
4	TCM-TSS-1	Exposed soil ordinance	◈	◈	◈	◆	◇		N/A		P		P	P	X	X
5	TCM-TSS-2	Erosion repair and slope stabilization on private property	◈	◈	◈	◆	◇		N/A		P		P	P	X	
6	TCM-TSS-3	Private parking lot sweeping ordinance	◆	◆	◆	◆	◇	X	N/A		P		P		X	
7	TCM-TSS-4	Sweeping of private roads and parking lots	◆	◆	◆	◆	◇	X	N/A		P		P		X	

Table 3-11 Nonstructural TCMs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency									
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	LACFCD	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
8	TCM-TSS-5	Negotiations with regulated utilities for erosion control within R.O.W.	◈	◈	◈	◆	◇				**Watershed Group**					
9	TCM-RET-1	Encourage retrofitting of downspouts (downspout disconnect)	◈	◈	◈	◈	◆	X	N/A		P	X	P	X		X
		Dry weather runoff reduction														
10	TCM-NSWD-1	Incentives for irrigation reduction practices	◆	◆	◈	◆	◆	X	N/A	X	X	X	X	X	X	X
		Public Information and Participation														
11	TCM-PIP-1	Refocused outreach to target audiences and water quality priorities	◆	◆	◆	◆	◆				**Watershed Group**					
		Public Agency Activities														
12	TCM-PAA-1	Upgraded sweeping equipment (e.g. regenerative)	◆	◆	◆	◆	◇	X	N/A	C	P	C	C	C	C	C
13	TCM-PAA-2	Adopt Sewer System Management Plan (SSMP)	◆	◆	◇	◇	◇	X	N/A	X	X	X	X	X	X	X
14	TCM-PAA-3	Increased street sweeping frequency or routes	◆	◆	◆	◆	◇	P	N/A			P	X			

Table 3-11 Nonstructural TCMs

#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency								
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	LACFCD	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
15	TCM-TSS-6	Erosion repair and slope stabilization on public property and right of way	◈	◈	◈	◆	◇	X	N/A		X		P		X	
		Reporting/Adaptive Management														
16	TCM-MRP-1	Enhanced tracking through use of online GIS MS4 Permit database	◈	◈	◈	◈	◈	X		X	P	X	X	P	X	X
		Jurisdictional SW Management														
17	TCM-SWM-1	Prepare guidance documents to aid in implementation of MS4 Permit MCMs	◈	◈	◈	◈	◈	X	X	X	X	X	X	X	X	X
		Initiatives														
18	TCM-INI-1	Copper reduction through implementation of SB 346	◆	◆	◆	◇	◇	X	X	X	X	X	X	X	X	X
19	TCM-INI-2	Lead reduction through implementation of SB 757	◆	◆	◆	◇	◇	X	X	X	X	X	X	X	X	X
20	TCM-INI-3	Support zinc reduction in tires through safer consumer product regs	◆	◆	◆	◇	◇				**Watershed Group**					
21	TCM-INI-4	Apply for grant funding for stormwater quality/capture projects	◆	◆	◈	◆	◆	X	X		X	X	X	X	X	X

X – Planned TCM. **P** – Potential TCM. **C** – Completed/implemented TCM. ◆ Primary pollutant reduction ◈ Secondary pollutant reduction ◇ Pollutant not addressed

BMP effectiveness ratings based on similar BMPs listed in Tetra Tech's CLRP for Chollas Creek Watershed in San Diego County, 2012.

ENHANCED TRACKING THROUGH USE OF ONLINE GIS MS4 PERMIT DATABASE ***TCM-MRP-1***

Measures:

- Enter the enhanced tracking requirements of the fourth term MS4 Permit on an online GIS database management system dedicated to Phase I MS4 Permit compliance. Program elements addressed include all the MCMs (Development Construction, Planning and Land Development, Industrial/Commercial Facilities, Public Agency Activities, Public Information and Participation and Illicit Connection/Discharge Elimination) and the Monitoring and Reporting Program.
- Use the consolidated tracking data to:
    - Improve the effectiveness of the JSWMP (e.g. examine geospatial trends in IC/IDs, which could be used to strategically distribute public education materials) and WMP.
    - Assess the JSWMP and improve the annual reporting process.
    - Guide the adaptive management process through this assessment.

Many of the cities are implementing the measures through the use of *MS4Front*, a propriety online GIS MS4 Permit database management system.

TRAIN STAFF TO FACILITATE LID AND GREEN STREETS IMPLEMENTATION ***TCM-PLD-1***

Measures:

- Conduct training for relevant staff in LID and Green Streets implementation prior to the onset of the programs. The elements of the training follow the provisions listed in MS4 Permit §VI.D.7.
- Educate governing bodies in LID and Green Streets implementation (optional).

Several cities have already accomplished these measures, which facilitate LID implementation and address WQPs.

ORDINANCE REQUIRES LID BMPS FOR PROJECTS BELOW MS4 PERMIT THRESHOLDS ***TCM-PLD-2***

Measures:

- Adopt an ordinance requiring LID BMPs for smaller development projects that are below the thresholds for inclusion under the Planning and Land Development MCM Program.

Downey, South Gate and Signal Hill have already accomplished this measure, which facilitates LID and addresses WQPs.

PRIORITIZE FACILITIES/INSPECTIONS BASED ON WATER QUALITY PRIORITIES ***TCM-ICF-1 (MCM-ICF-3)***

MS4 Permit: Modified MCM (replaces §VI.D.6.d, §VI.D.6.e)

A program has been developed to prioritize industrial/commercial facilities based on their potential to adversely impact WQPs. The resulting prioritization scheme determines the inspection frequency, replacing the uniform inspection frequency provided in the MS4 Permit. This allows Cities to concentrate efforts on WQPs.

The complete program is detailed in the Minimum Control Measures section of this chapter – see MCM-ICF-3.

EXPOSED SOIL ORDINANCE

TCM-TSS-1

This TCM is an element of the TSS Reduction Strategy.

- Adopt ordinances that require landscaping, erosion control, and sediment control on vacant lots and other significant sources of exposed dirt.
- These efforts are distinct from construction activity control measures, which are addressed under the Development Construction MCM program.

Within the neighboring Lower San Gabriel River Watershed, the City of Whittier has successfully adopted and implemented such an ordinance. The ordinance also requires drought tolerant landscaping/xeriscaping. The ordinance language may be used as a template to develop similar ordinances for the other participating agencies, and as such is included in Appendix A-3.2.

Due to the considerable amount of exposed dirt within their jurisdiction, the City of Signal Hill has agreed to develop and adopt a similar ordinance. This ordinance may also be used as a template for the remaining Watershed Group Cities.

EROSION REPAIR AND SLOPE STABILIZATION ON PRIVATE PROPERTY

TCM-TSS-2

This TCM is an element of the TSS Reduction Strategy. Measures include:

- If adopted, enforce the ordinances from TCM-TSS-1.
- Proactively enforce the existing stormwater ordinance regarding TSS-laden stormwater discharges (or potential discharges) from significant sources of exposed dirt and follow the Progressive Enforcement Policy. This may include observing site conditions prior to rain events and visual monitoring of stormwater discharges.

Within the neighboring Lower San Gabriel River Watershed, the City of Whittier has successfully implemented an ordinance that conforms to TCM-TSS-1. The following are pictures of some of the landscaped lots.



Wardman St and Philadelphia St, NW corner (1)


Wardman St and Philadelphia St, NW corner (2)


Greenleaf Ave and Philadelphia St, east side



Bailey St and Comstock Ave, NW corner

A similar effort will be undertaken by the City of Signal Hill. Pending adoption, the City of Signal Hill's Exposed Soil Ordinance (see the description for TCM-TSS-1) will also be implemented and enforced.

PRIVATE PARKING LOT SWEEPING ORDINANCE ***TCM-TSS-3***

This TCM is an element of the TSS Reduction Strategy.

- Adopt an ordinance that requires sweeping of private parking lots. Example Municipal Code language from the City of Signal Hill is included in Appendix A-3.3.

SWEEPING OF PRIVATE ROADS AND PARKING LOTS ***TCM-TSS-4***

This TCM is an element of the TSS Reduction Strategy.

- If adopted, enforce the ordinance from TCM-TSS-3.
- Proactively enforce the existing stormwater ordinance regarding TSS-laden stormwater discharges (or potential discharges) for private roads and parking lots and follow the Progressive Enforcement Policy. This may include observing site conditions prior to rain events and visual monitoring of stormwater discharges.

NEGOTIATIONS WITH REGULATED UTILITIES FOR EROSION CONTROL WITHIN R.O.W. ***TCM-TSS-5***

This TCM is an element of the TSS Reduction Strategy.

- As a Watershed Group, pursue agreements between cities and utilities regarding erosion and sediment control in rights-of-way.

Since Caltrans is a participant in the Watershed Group, the cities will work with Caltrans to ensure that its rights-of-way are stabilized in a timely manner. However, since the public and private utilities whose rights-of-way must be stabilized are not members of the Watershed Group, negotiations with the utilities on how best to keep sediment from their rights-of-way out of the storm drain system will be necessary.

EROSION REPAIR AND SLOPE STABILIZATION ON PUBLIC PROPERTY ***TCM-TSS-6***

This TCM is an element of the TSS Reduction Strategy.

- Implement landscaping, erosion control, and sediment control on significant sources of exposed dirt on public property.

ENCOURAGE RETROFITTING OF DOWNSPOUTS (DOWNSPOUT DISCONNECT) ***TCM-RET-1***

Measures:

- Encourage owners/operators of existing developments to disconnect existing downspouts from the MS4.

INCENTIVES FOR IRRIGATION REDUCTION PRACTICES ***TCM-NSWD-1***

Measures:

- Provide incentives such as rebates for irrigation reduction (i.e. runoff reduction) practices such as xeriscaping and turf conversion.
- Incentive programs include:
    - Metropolitan Water District of Southern California's "On-site Retrofit Pilot Program Incentives for Recycled Water Use". This program provides financial incentives to public or private owners to convert potable water irrigation or industrial water systems to recycled water service.
    - Metropolitan Water District of Southern California's "Water Savings Incentive Program". This program provides financial incentives for commercial, industrial, institutional, agricultural or large landscape customers to customize was efficiency projects that include installation of high-efficiency equipment, process improvements, water efficiency improvements, and water management services
    - Metropolitan Water District's "Turf Rebate Program." The program offers at least $2.00 per square foot of turf removed or replace by California-friendly drought-resistant plants.

- Metropolitan Water District's "Rain Barrel" rebate program. This program offers at least $75 per barrel installed on location. The purpose is to collect rainwater from gutters and downspouts for lawn and garden irrigation purposes.
- Metropolitan Water District's "Soil Moisture Sensor System." This program offers a rebate for installation of a Soil Moisture Sensor System or a Weather Based Irrigation Controller.
- Metropolitan Water District's "Rotating Nozzles" program. This program offers rebates to both residential and commercial entities to switch to high-efficiency nozzles.

All cities are currently involved in this effort through the Metropolitan Water District's water conservation rebate program. There are two cities in this Watershed Management Group that have incentive programs beyond the programs offered by Metropolitan Water District. The following City programs are supplemental to MWD rebate programs:

- **Lakewood** has rebate programs for turf removal and water-wise re-landscaping and for installing water-wise irrigation devices (while funds last).
  http://www.lakewoodcity.org/services/request/water/rebates.asp

- **Long Beach** has the "Lawn-to-Garden" program, which provides financial incentives while funds last for converting water-thirsty lawns to water-smart lawns.
  http://www.lblawntogarden.com/.

  In addition, the Synthetic Turf Pilot Program that offers an incentive for removing grass lawns and replacing them with synthetic turf (while funds last).
  http://www.lbwater.org/sites/default/files/file_attach/pdf/STPP%20Flyer%20FINAL_online.pdf

REFOCUSED OUTREACH TO TARGET AUDIENCES AND WATER QUALITY PRIORITIES ***TCM-PIP-1***

Measures:

- Within the Public Information and Education Program, elements such as material use/development and advertisements will address WQPs. The development of this effort will be ongoing throughout the MS4 Permit term, and may be regarded as a Watershed Group effort.

UPGRADED SWEEPING EQUIPMENT (E.G. REGENERATIVE) ***TCM-PAA-1***

Measures:

- Upgrade street sweeping equipment to regenerative or other high-efficiency new technology.

Most of the Cities contract street sweeping to private companies. These companies have already phased in regenerative sweepers. The City of Whittier has been phasing in regenerative sweepers and expects to be 100% regenerative by the end of the MS4 Permit term. The City of Long Beach operates vacuum sweepers over regenerative due to maintenance concerns. However the City is considering contracting

this service in the near future. If this occurs, the vacuum sweepers will likely be replaced with regenerative sweepers provided by the contractor.

ADOPT SEWER SYSTEM MANAGEMENT PLAN (SSMP): *TCM-PAA-2*

All agencies are enrolled in the statewide Waste Discharge Requirements for Sanitary Sewer Systems, which required the development and implementation of a SSMP in mid 2009. The goal of the SSMP is to reduce and prevent sanitary sewer overflows (SSOs), as well as mitigate any SSOs that do occur. This goal also addresses WQPs. Elements of the SSMP include:

- Sanitary sewer system operation and maintenance program
- Design and performance provisions
- Overflow emergency response plan
- FOG Control Program
- System Evaluation and Capacity Assurance Plan

Following these SSMP elements will address WQPs.

INCREASED STREET SWEEPING FREQUENCY OR ROUTES *TCM-PAA-3*

Measures:

- Increase the street sweeping frequency, jurisdiction-wide or in high trash-generating areas and/or include additional routes (e.g. center medians and intersections).

PREPARE GUIDANCE DOCUMENTS TO AID IMPLEMENTATION OF MS4 PERMIT MCMS *TCM-SWM-1*

This WMP includes in Appendix A-3-1 guidance documents and template forms to aid the Agencies in implementation of the MS4 Permit MCMs. These documents were developed to address two issues: 1) the MS4 Permit introduces many new and enhanced MCM provisions that do not have preexisting guidance documentation and 2) the model Stormwater Quality Management Program (SQMP) – which was required in the prior LA MS4 Permit and served as a guide to permit implementation – is now obsolete. Unlike the SQMP, the Agencies are not bound to the guidance and forms provided. They are provided as a resource to improve the effectiveness of the JSWMPs.

COPPER REDUCTION THROUGH IMPLEMENTATION OF SB 346 *TCM-INI-1*

This initiative TCM has been completed recently. The impact of the TCM over time has been incorporated into the RAA.

LEAD REDUCTION THROUGH IMPLEMENTATION OF SB 757 *TCM-INI-2*

This initiative TCM has been completed recently.

SUPPORT ZINC REDUCTION IN TIRES THROUGH SAFER CONSUMER PRODUCT REGULATIONS *TCM-INI-3*

Measures:

- As a Watershed Group, plan to work with others to use the Department of Toxic Substances Control's Safer Consumer Product Regulations to reduce the zinc in tires, which one of the greatest sources of zinc in urban areas.

APPLY FOR GRANT FUNDING FOR STORMWATER CAPTURE PROJECTS ***TCM-INI-4***

Measures:

- Initiate Individual or multi-jurisdictional efforts to apply for grant funding for stormwater quality/capture projects.

In April 2014, The Gateway Water Management Authority received grant funding of $1.3 million for LID projects in the Cities of Downey, Lynwood, Paramount, Pico Rivera, Signal Hill and South Gate (as well as Norwalk, Santa Fe Springs and Whittier).

3.4.3 STRUCTURAL TARGETED CONTROL MEASURES

Structural TCMs are Structural BMPs, in addition to MCMs, designed with the objective to achieve interim and final water quality-based effluent limitations and/or receiving water limitations. Structural TCMs are an important component of the Watershed Group's load reduction strategy. These BMPs are constructed to capture runoff and filter, infiltrate, or treat it. If properly maintained, these BMPs can have high pollutant removal efficiencies (see the *Performance Evaluation of Structural BMPs* element of this section); however, they tend to be more expensive than nonstructural BMPs. The two prevailing approaches for implementing Structural BMPs are regional and distributed approaches. Both serve important purposes and should be considered in combination to determine the best possible implementation strategy to meet the Watershed Group's water quality goals.

DISTRIBUTED BMPS

Distributed Structural BMPs are generally built at the site-scale. They are intended to treat stormwater runoff at the source and usually capture runoff from a single parcel or site.



Figure 3-1: Distributed BMP Schematic

REGIONAL BMPS

Regional BMPs refer to large structural BMPs that receive flows from neighborhoods or large areas and may serve dual purposes for flood control or groundwater recharge[13].

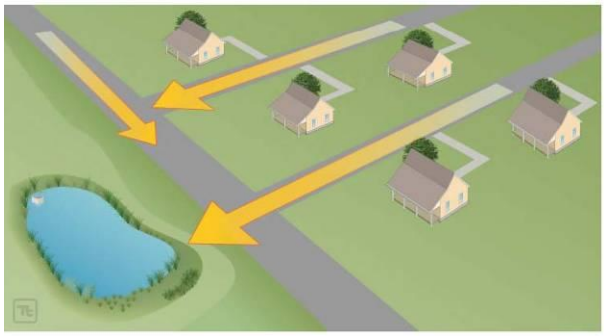


Figure 3-2: Regional BMP Schematic

3.4.3.1 STRUCTURAL BMP SUBCATEGORIES

Structural BMPs fall under a variety of subcategories that correspond to their function and water quality benefit. Some of the most common of these subcategories are described below. These subcategories will be used throughout the WMP to describe existing, planned, and potential regional and distributed BMPs.

INFILTRATION BMPS

Infiltration BMPs allow for stormwater to percolate through the native soils and recharge the underlying groundwater table, subsequently decreasing the volume of water discharged to the downstream waterbodies. These BMPs must be constructed in areas where the native soils have percolation rates and groundwater levels sufficient for infiltration.

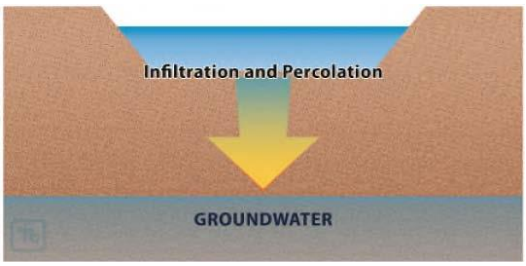


Figure 3-3: Infiltration BMP Schematic

INFILTRATION BASIN

An infiltration basin consists of an earthen basin with a flat bottom. An infiltration basin retains stormwater runoff in the basin and allows the retained runoff to percolate into the underlying soils. The bottom of an infiltration basin is typically vegetated with dryland grasses or irrigated turf grass.

[13] San Diego River Watershed Comprehensive Load Reduction Plan (2012)

Infiltration Trench

An infiltration trench is a long, narrow, rock-filled trench with no outlet other than for overflow. Runoff is stored in the void space between stones and infiltrates through the bottom and sides of the trench. Infiltration trenches provide the majority of their pollutant removal benefits through volume reduction. Pretreatment is important for limiting amounts of coarse sediment entering the trench which can clog and render the trench ineffective.

Bioretention with no Underdrain

Bioretention facilities with no underdrain are landscaped shallow depressions that capture and infiltrate stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, engineered media, and vegetation. As stormwater passes down through the media, pollutants are filtered, adsorbed, and biodegraded by the soil and vegetation.



Figure 3-4: Bioretention without underdrain schematic

Drywell

Drywells are similar to infiltration trenches in their design and function; however, drywells generally have a greater depth to footprint area ratio and can be installed at relatively deep depths. A drywell is a subsurface storage facility designed to temporarily store and infiltrate runoff. A drywell may be either a small excavated pit filled with aggregate or a prefabricated storage chamber or pipe segment.

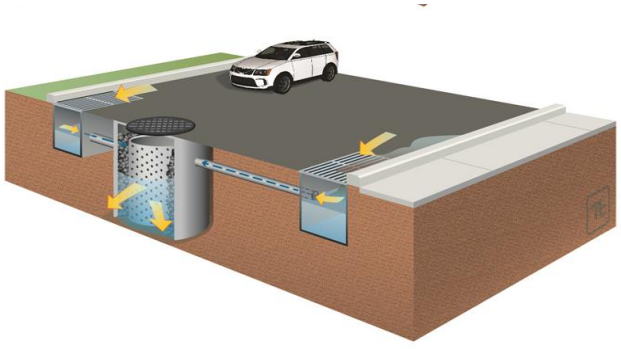


Figure 3-5: Drywell schematic

Porous pavement

Porous pavement (concrete, asphalt, and pavers) contain small voids that allow water to pass through to a gravel base. They come in a variety of forms; they may be a modular paving system (concrete pavers, grass-pave, or gravel-pave) or poured in place pavement (porous concrete, permeable asphalt). Porous pavements treat stormwater and remove sediments and metals within the pavement pore space and gravel base. While conventional pavement results in increased rates and volumes of surface runoff, properly constructed and maintained porous pavements allow stormwater to percolate through the pavement and enter the soil below. This facilitates groundwater recharge while providing the structural and functional features needed for the roadway, parking lot, or sidewalk. The paving surface, subgrade, and installation requirements of porous pavements are more complex than those for conventional asphalt or concrete surfaces.

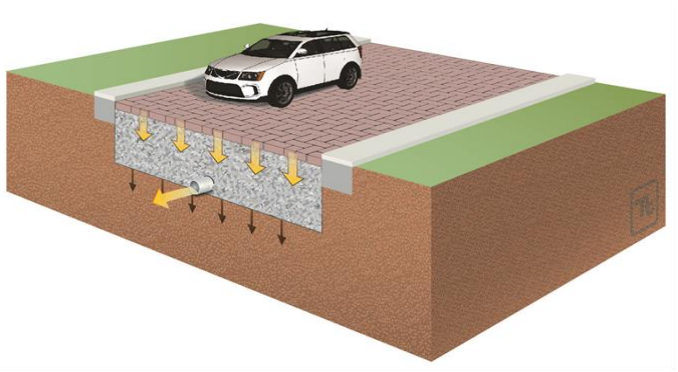


Figure 3-6: Porous pavement schematic

Biotreatment BMPs

Biotreatment BMPs treat stormwater through a variety of physical, chemical, and biological processes prior to being discharged to the MS4 system. These BMPs should be considered where Infiltration BMPs are infeasible.

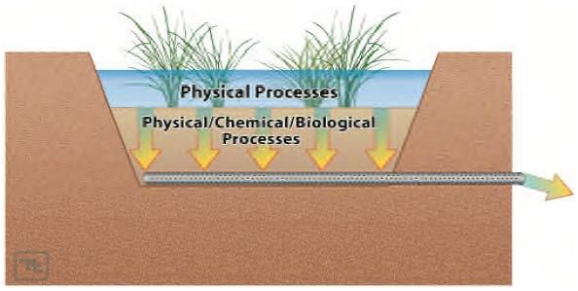


Figure 3-7: Biotreatment BMP schematic

Bioretention with Underdrains

Bioretention stormwater treatment facilities are landscaped shallow depressions that capture and filter stormwater runoff. These facilities function as a soil and plant-based filtration device that removes

pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, engineered media, and vegetation. As stormwater passes down through the media, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and vegetation. Bioretention with underdrain systems are utilized for areas containing native soils with low permeability or steep slopes, where the underdrain system routes the treated runoff to the storm drain system.

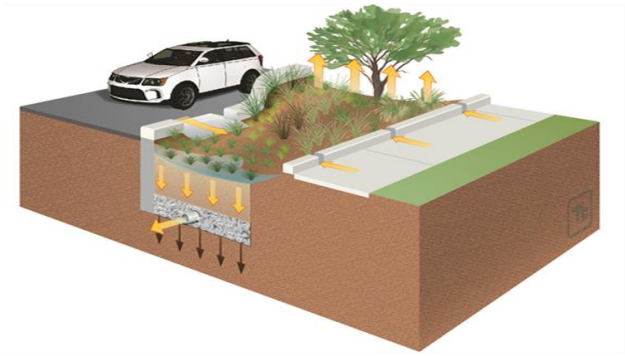


Figure 3-8: Bioretention with Underdrains schematic

VEGETATED SWALES

Vegetated swales are open, shallow channels with low-lying vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. Vegetated swales provide pollutant removal through settling and filtration in the vegetation (usually grasses) lining the channels. In addition, although it is not their primary purpose, vegetated swales also provide the opportunity for volume reduction through subsequent infiltration and evapotranspiration and reduce the flow velocity. Where soil conditions allow, volume reduction in vegetated swales can be enhanced by adding a gravel drainage layer underneath the swale allowing additional flows to be retained and infiltrated. Where slopes are shallow and soil conditions limit or prohibit infiltration, an underdrain system or low flow channel for dry weather flows may be required to minimize ponding and convey treated and/or dry weather flows to an acceptable discharge point. An effective vegetated swale achieves uniform sheet flow through a densely vegetated area for a period of several minutes (depending on design standard used).

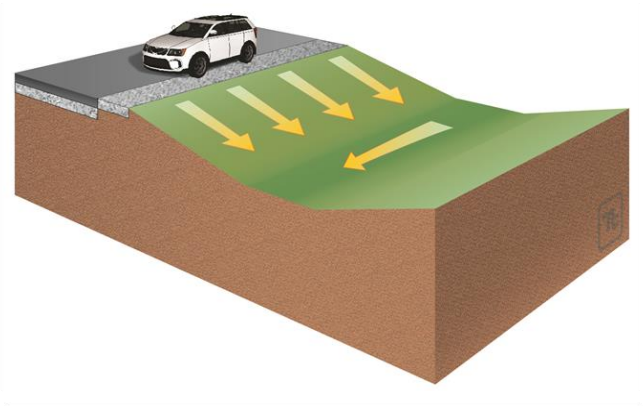


Figure 3-9: Vegetated swale schematic

Wet Detention Basin

Wet detention basins are constructed, naturalistic ponds with a permanent or seasonal pool of water (also called a “wet pool” or “dead storage”). Aquascape facilities, such as artificial lakes, are a special form of wet pool facility that can incorporate innovative design elements to allow them to function as a stormwater treatment facility in addition to an aesthetic water feature. Wet ponds require base flows to exceed or match losses through evaporation and/or infiltration, and they must be designed with the outlet positioned and/or operated in such a way as to maintain a permanent pool. Wet ponds can be designed to provide extended detention of incoming flows using the volume above the permanent pool surface.

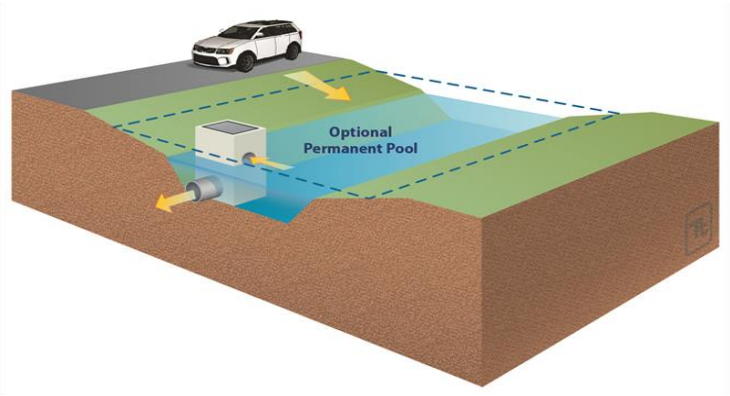


Figure 3-10: Wet detention basin schematic

Dry Extended Detention Basin

Dry extended detention basins are basins whose outlets have been designed to detain the stormwater runoff to allow particulates and associated pollutants to settle out. Dry extended detention basins do not have a permanent pool; they are designed to drain completely between storm events. They can also be used to provide hydromodification and/or flood control by modifying the outlet control structure and providing additional detention storage. The slopes, bottom, and forebay of Dry extended detention basins are typically vegetated.

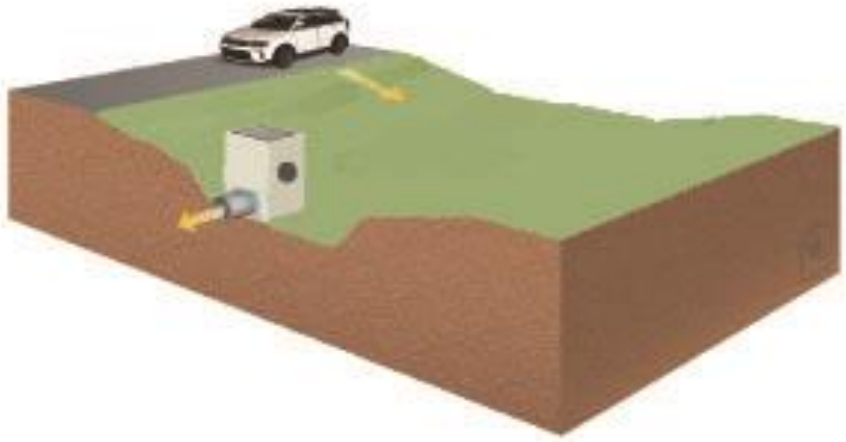


Figure 3-11: Dry extended detention basin schematic

PRE TREATMENT BMPS

Pre-treatment BMPs are typically not used as primary treatment; however, they are highly recommended for preliminary treatment in order to prolong the life and prevent clogging of the downstream system in a treatment train.

MEDIA FILTERS

Media filters are usually designed as multi-chambered stormwater practices; the first is a settling chamber, and the second is a filter bed filled with sand or another filtering media. As stormwater flows into the first chamber, large particles settle out, and then finer particles and other pollutants are removed as stormwater flows through the filtering medium. They can also be used as pre-treatment, with their location prior to any infiltration or biotreatment BMP.

CATCH BASIN INSERTS

Catch basins inserts typically include a grate or curb inlet and a sump to capture sediment, debris, and pollutants. Filter fabric can also be included to provide additional filtering of particles. The effectiveness of catch basins, their ability to remove sediments and other pollutants, depends on its design and maintenance. Some inserts are designed to drop directly into existing catch basins, while others may require retrofit construction. Similar to media filters, catch basin filters can also be used as a pre-treatment BMP for infiltration and biotreatment BMPs.



Figure 3-12: Pre-treatment BMP schematic

RAINFALL HARVEST

Rainfall Harvest BMPs capture rainwater to be reused in lieu of discharging directly to the MS4.

ABOVE GROUND CISTERNS

Cisterns are large above ground tanks that store stormwater collected from impervious surfaces for domestic consumption. Above ground cisterns are used to capture runoff. Mesh screens are typically used to filter large debris before the stormwater enters the cistern. The collected stormwater could potentially be used for landscape irrigation and some interior uses, such as toilets and washing machines. The collection and consumption of the stormwater results in pollution control, volume reduction, and peak flow reduction from the site.

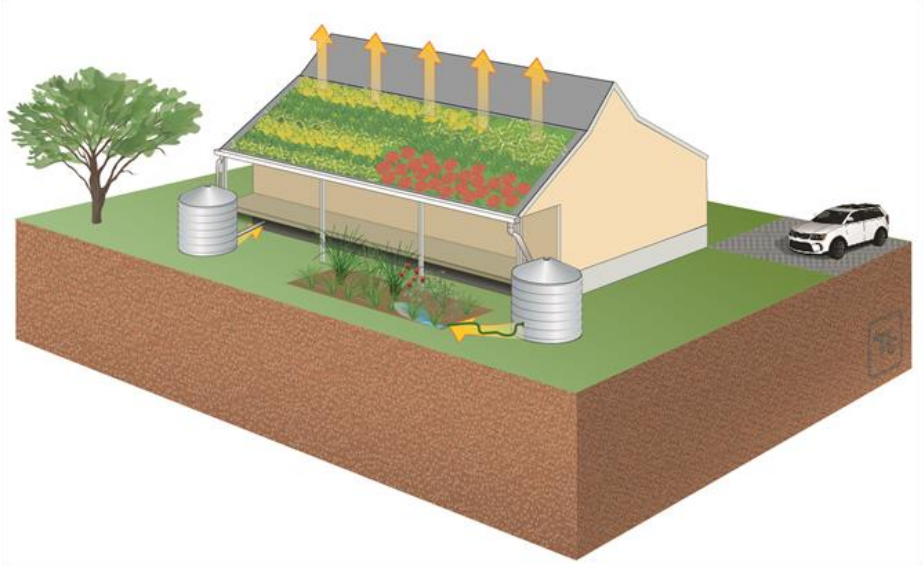


Figure 3-13: Above ground cisterns schematic

Underground Detention

Underground detention systems function similarly to above ground cisterns in that they collect and use stormwater from impervious surfaces. These systems are concealed underground and can allow for larger stormwater storage and capture additional impervious surfaces not easily captured in an above ground system (e.g. parking lots and sidewalks).



Figure 3-14: Underground detention schematic

DIVERSION SYSTEMS

LOW FLOW DIVERSION

Flow diversion systems collect and divert runoff. Flow diversion structures can primarily be used in two ways. First, flow diversion structures may be used to direct dry weather flows to a treatment facility, preventing the runoff from reaching a receiving water body. This is typically done with low flow runoff, which occurs during periods of dry weather. Second, flow diversion structures can also be modified by incorporating them into other BMPs. For example, diverted flow can be fed into a regional BMP. Properly designed stormwater diversion systems are very effective for preventing stormwater from being contaminated and for routing contaminated flows to a proper treatment facility.

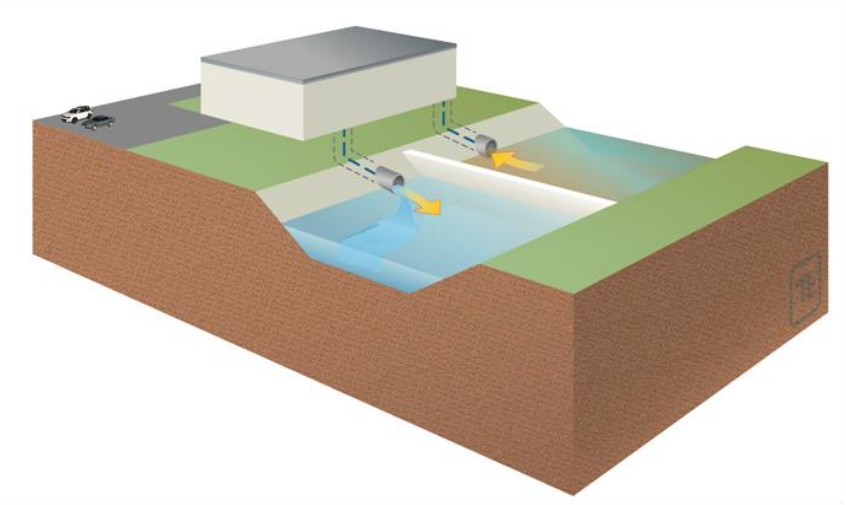


Figure 3-15: Low flow diversion schematic

3.4.3.2 PERFORMANCE EVALUATION OF STRUCTURAL BMPS

It is important to take the performance of stormwater BMPs into consideration during the planning and implementation process. This section provides an analysis of specific BMPs to determine the pollutant removal effectiveness of those BMPs. The International Stormwater BMP Database[14] (BMP Database) project website was used to analyze different BMP types for their effectiveness in removing specific pollutants. The website features a database of over 530 BMP studies, performance analysis results, BMP performance tools, monitoring guidance and other study-related publications. Performance studies relevant to BMPs matching the criteria for an effective regional or distributed application were analyzed to include the following:

- Bioretention
- Bioswale
- Detention Basin
- Grass Strip
- Porous Pavement
- Retention Pond
- Wetland Basin
- Wetland Channel

The average influent and effluent concentrations for the 95th percentile confidence interval were analyzed for pollutants of concern for the Lower LAR watershed available through the BMP Database. The following pollutants were analyzed:

- Cadmium (Dissolved)
- Cadmium (Total)
- Copper (Dissolved)
- Copper (Total)
- E. coli
- Enterococcus
- Fecal Coliform
- Kjeldahl Nitrogen (Total)
- Lead (Dissolved)
- Lead (Total)
- Nickel (Dissolved)
- Nickel (Total)
- Nitrogen (Total)
- NOx as Nitrogen
- TSS
- Zinc (Dissolved)
- Zinc (Total)

The majority of the BMPs analyzed by the BMP Database project are located in major transportation corridors. Land use categories such as residential, commercial, and industrial are not heavily represented in the analysis. The BMP effectiveness may also vary with regional conditions. Many BMPs were monitored in areas where a higher intensity and volume of rainfall than LA County is observed. Additionally, some of the BMPs monitored were designed in the 1990s, 1980s, or earlier. These are expected to have been designed with less stringent guidelines resulting in a more conservative analysis. Although the conditions

[14] Geosyntec Consultants, Wright Water Engineers. International Stormwater Best Management Practices (BMP) Database Pollutant Category Summary Statistical Addendum: TSS, Bacteria, Nutrients, and Metals. July 2012.

noted above may result in a slight variance in BMP effectiveness, the pollutant removal efficiencies are considered to be applicable.

It is important to note that the majority of pollutant load reduction is achieved using infiltration BMPs which result in an overall volume reduction. The analysis emphasizes reduction in concentrations of constituents, rather than volume or load reduction. Flow reduction analyses were not performed due to the dependence on rainfall intensity, soil types, and other site-specific conditions. The RAA has determined the volume reduction needed to meet compliance goals.

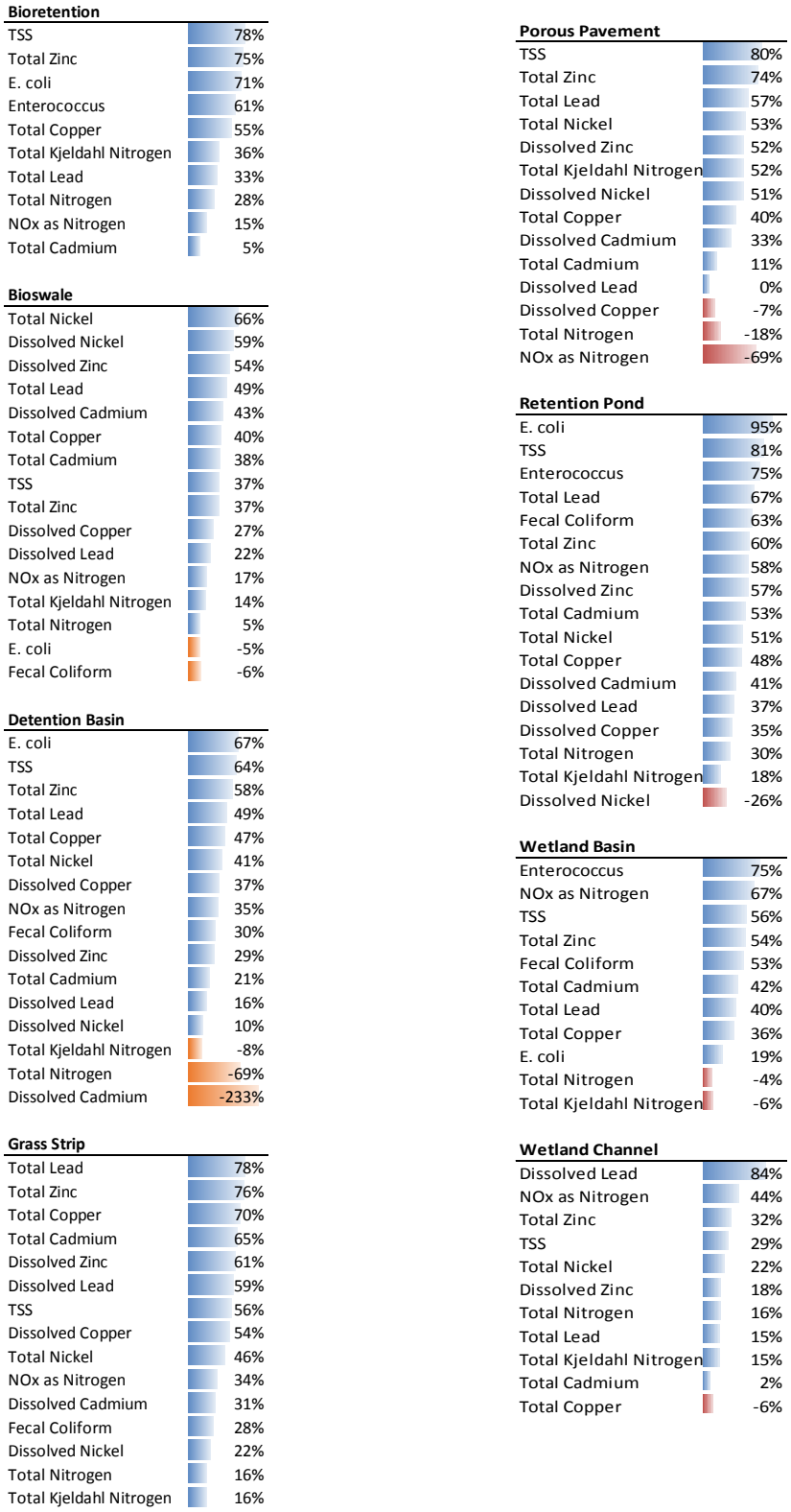
RESULTS

The analysis can be used to evaluate BMPs and support assumptions made in the RAA regarding effluent concentrations from specific BMPs. The required pollutant reductions determined through the RAA will be used to prioritize the BMPs to maximize effectiveness. The results of the BMP Database analysis are presented in a comparison format to easily visualize the pollutant removal efficiencies of each BMP type.

Each pollutant analyzed is a pollutant of concern for the Lower Los Angeles WMP watershed, with the exception of Total Suspended Solids (TSS). The reason for its inclusion is that studies have shown that there is a direct correlation between sediment concentration and various pollutants for which the watersheds are impaired. The data compiled from the BMP Database was used to determine the percent removal of each BMP for each pollutant. Each BMP was ranked in terms of pollutant removal efficiency for each pollutant type (see the following *BMP Pollutant Removal Effectiveness Comparison Charts*). Data for specific pollutants was not available for each BMP; therefore, only available data is presented.

The next analysis included taking the data and grouping the removal efficiencies under each BMP type. The pollutants were then ranked in terms of pollutant removal efficiency for each BMP type (see the *BMP Type Comparison Charts for Pollutant Removal* below). Data for specific pollutants was not available for each BMP; therefore, only available data is presented.

BMP Pollutant Removal Effectiveness Comparison Charts



RB-AR12360

BMP Type Comparison Charts for Pollutant Removal

Influent/Effluent Summary Statistics for Dissolved Cadmium (ug/L)

BMP Type	In	Out	Percent Removal
Bioswale	0.21	0.12	43%
Retention Pond	0.17	0.1	41%
Porous Pavement	0.06	0.04	33%
Grass Strip	0.13	0.09	31%
Detention Basin	0.15	0.5	-233%

Influent/Effluent Summary Statistics for Total Cadmium (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	0.52	0.18	65%
Retention Pond	0.49	0.23	53%
Wetland Basin	0.31	0.18	42%
Bioswale	0.5	0.31	38%
Detention Basin	0.39	0.31	21%
Porous Pavement	0.28	0.25	11%
Bioretention	0.99	0.94	5%
Wetland Channel	0.5	0.49	2%

Influent/Effluent Summary Statistics for Dissolved Copper (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	11.66	5.4	54%
Detention Basin	5.56	3.52	37%
Retention Pond	6.57	4.24	35%
Bioswale	11.01	8.02	27%
Porous Pavement	5.37	5.75	-7%

Influent/Effluent Summary Statistics for Total Copper (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	24.52	7.3	70%
Bioretention	17	7.67	55%
Retention Pond	9.57	4.99	48%
Detention Basin	10.62	5.67	47%
Porous Pavement	13.07	7.83	40%
Bioswale	10.86	6.54	40%
Wetland Basin	5.61	3.57	36%
Wetland Channel	4.52	4.81	-6%

Influent/Effluent Summary Statistics for E. coli (#/100 mL)

BMP Type	In	Out	Percent Removal
Retention Pond	2800	150	95%
Bioretention	150	44	71%
Detention Basin	1300	429	67%
Wetland Basin	785	632	19%
Bioswale	3990	4190	-5%

Influent/Effluent Summary Statistics for Enterococcus (#/100 mL)

BMP Type	In	Out	Percent Removal
Retention Pond	615	153	75%
Wetland Basin	615	153	75%
Bioretention	605	234	61%

Influent/Effluent Summary Statistics for Fecal Coliform (#/100 mL)

BMP Type	In	Out	Percent Removal
Retention Pond	1920	707	63%
Wetland Basin	13000	6140	53%
Detention Basin	1480	1030	30%
Grass Strip	32000	23200	28%
Bioswale	4720	5000	-6%

Influent/Effluent Summary Statistics for Total Kjeldahl Nitrogen (mg/L)

BMP Type	In	Out	Percent Removal
Porous Pavement	1.66	0.8	52%
Bioretention	0.94	0.6	36%
Retention Pond	1.28	1.05	18%
Grass Strip	1.29	1.09	16%
Wetland Channel	1.45	1.23	15%
Bioswale	0.72	0.62	14%
Wetland Basin	0.95	1.01	-6%
Detention Basin	1.49	1.61	-8%

Influent/Effluent Summary Statistics for Dissolved Lead (µg/L)

BMP Type	In	Out	Percent Removal
Wetland Channel	3.26	0.52	84%
Grass Strip	0.64	0.26	59%
Retention Pond	0.76	0.48	37%
Bioswale	1.39	1.08	22%
Detention Basin	0.79	0.66	16%
Porous Pavement	0.5	0.5	0%

Influent/Effluent Summary Statistics for Total Lead (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	8.83	1.96	78%
Retention Pond	8.48	2.76	67%
Porous Pavement	4.3	1.83	57%
Detention Basin	6.08	3.1	49%
Bioswale	3.93	2.02	49%
Wetland Basin	2.03	1.21	40%
Bioretention	3.76	2.53	33%
Wetland Channel	2.94	2.49	15%

Influent/Effluent Summary Statistics for Dissolved Nickel (µg/L)

BMP Type	In	Out	Percent Removal
Bioswale	4.93	2.04	59%
Porous Pavement****	0.88	0.43	51%
Grass Strip	2.68	2.09	22%
Detention Basin	2.82	2.55	10%
Retention Pond	1.68	2.11	-26%

Influent/Effluent Summary Statistics for Total Nickel (µg/L)

BMP Type	In	Out	Percent Removal
Bioswale	9.26	3.16	66%
Porous Pavement	3.64	1.71	53%
Retention Pond	4.46	2.19	51%
Grass Strip	5.41	2.92	46%
Detention Basin	5.64	3.35	41%
Wetland Channel	2.8	2.18	22%

Influent/Effluent Summary Statistics for Total Nitrogen (mg/L)

BMP Type	In	Out	Percent Removal
Retention Pond	1.83	1.28	30%
Bioretention	1.25	0.9	28%
Wetland Channel	1.59	1.33	16%
Grass Strip	1.34	1.13	16%
Bioswale	0.75	0.71	5%
Wetland Basin	1.14	1.19	-4%
Porous Pavement	1.26	1.49	-18%
Detention Basin	1.4	2.37	-69%

Influent/Effluent Summary Statistics for NOx as Nitrogen (mg/L)

BMP Type	In	Out	Percent Removal
Wetland Basin	0.24	0.08	67%
Retention Pond	0.43	0.18	58%
Wetland Channel	0.34	0.19	44%
Detention Basin	0.55	0.36	35%
Grass Strip	0.41	0.27	34%
Bioswale	0.3	0.25	17%
Bioretention	0.26	0.22	15%
Porous Pavement	0.42	0.71	-69%

Influent/Effluent Summary Statistics for TSS (mg/L)

BMP Type	In	Out	Percent Removal
Retention Pond	70.7	13.5	81%
Porous Pavement	65.3	13.2	80%
Bioretention	37.5	8.3	78%
Detention Basin	66.8	24.2	64%
Grass Strip	43.1	19.1	56%
Wetland Basin	20.4	9.06	56%
Bioswale	21.7	13.6	37%
Wetland Channel	20	14.3	29%

Influent/Effluent Summary Statistics for Dissolved Zinc (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	36.1	14	61%
Retention Pond	22.5	9.6	57%
Bioswale	52.7	24.5	54%
Porous Pavement	13.5	6.5	52%
Detention Basin	15.6	11.08	29%
Wetland Channel	11.6	9.5	18%

Influent/Effluent Summary Statistics for Total Zinc (µg/L)

BMP Type	In	Out	Percent Removal
Grass Strip	103.3	24.3	76%
Bioretention	73.8	18.3	75%
Porous Pavement	57.6	15	74%
Retention Pond	53.6	21.2	60%
Detention Basin	70	29.7	58%
Wetland Basin	48	22	54%
Bioswale	36.2	22.9	37%
Wetland Channel	23	15.6	32%

RESULTS ANALYSIS SUMMARY

The statistical analysis presented has many applications, including supporting BMP prioritization and the RAA analysis. As future applications are undertaken, the results can be analyzed in more detail. For this analysis, the following observations were discovered:

- Overall, the retention pond returned the best results in terms of pollutant removal efficiency for several pollutants, with more than 60% removal for E. coli, TSS, Enterococcus, total lead, fecal coliform and total zinc.
- Among the constituents analyzed, the percent removals were often the highest for metals, lead and zinc in particular.
- The poorest performance was often observed for nutrients and bacteria, with concentrations increasing for some BMP types. Leaching of nutrients from soils/planting media and resuspension of captured pollutants may be a cause of the increases observed in these BMPs[15].

It is important to note that the majority of pollutant removal associated with stormwater BMPs will be due to infiltration and overall volume reduction. Although this is the case, a small component may be associated with inflow to outflow pollution concentration reduction and the analysis focuses on this percent reduction. Percent reduction is easily understandable and convenient for reporting; therefore, the method seems to be appropriate for this analysis. Refer to the article "Voodoo Hydrology" in the July 2006 article of Stormwater Magazine[16] for further information on caveats to this method. Although the analysis does not cover volume reduction, the RAA analysis has estimated the pollutant reduction necessary to meet compliance.

3.4.3.3 EXISTING TARGETED STRUCTURAL BMPS

The existing structural BMPs in place within the Watershed Group area, with the exception of the Hollydale Regional and Circle Parks project, have been included in the RAA model. Figure 3-16 indicates the locations of existing BMPs. Refer to Chapter 4 for more details.

[15] Stormwater: BMP Effectiveness for Nutrients, Bacteria, Solids, Metals, and Runoff Volume (2012). Retrieved online at: http://www.stormh2o.com/

[16] http://www.stormh2o.com/SW/Editorial/Voodoo_Hydrology_37.aspx

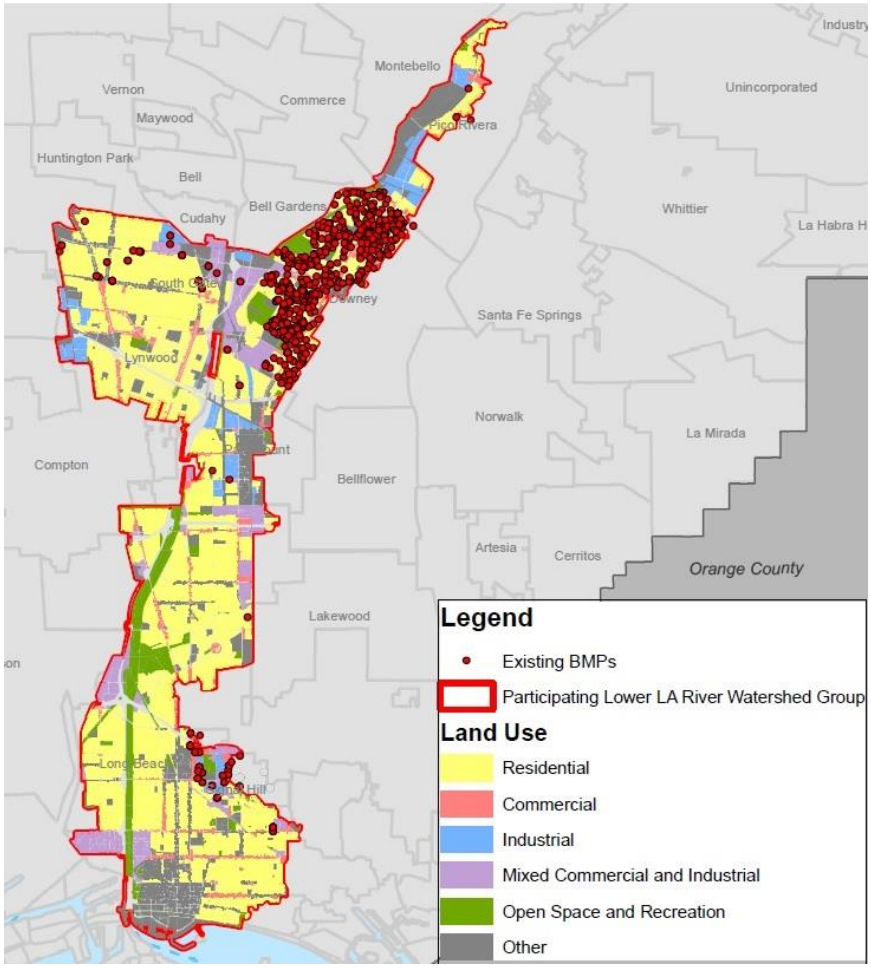


Figure 3-16: Locations of Existing Structural BMPs

A summary of the Hollydale Regional and Circle Parks project is as follows:

HOLLYDALE REGIONAL AND CIRCLE PARKS – STATUS: COMPLETED IN 2013

The Hollydale Regional and Circle Parks were developed adjacent to the Los Angeles River in the city of South Gate in 2013. The parks include vegetated swales which treat stormwater runoff and runon. Since the project was recently completed in 2013, it is expected that the environmental benefits for this project have not yet been observed in past monitoring.

3.4.3.4 PLANNED TARGETED CONTROL MEASURES

The projects listed below have been planned to some extent by the Participating Agencies. A literature review was conducted of existing TMDL Implementation Plans, the existing IRWMP, and other planning documents to collect data. The extent of planning of these projects ranges from a roundtable discussion to being in preliminary phases of design.

CHITTICK FIELD PARK - STATUS: TRASH CAPTURE SYSTEMS INSTALLED

This park is located in the city of Long Beach at 1900 Walnut Avenue. The site is already equipped with a large number of full-capture trash systems. The park is located in a relatively flat area with a large surrounding developed area. The site is approximately 19.9 acres and in periods of heavy rainfall, it already functions as a detention basin.

Additional features under consideration, according to the IRWMP, include replacing the concrete lined "low flow" swales with vegetated swales for biofiltration, construction of a new underground "low flow" pipe network to convey treated water to the basin pump station, and replacing the existing pump station with a new low flow pump station.

Although not yet planned, this location is also seen to have potential for a future regional BMP. Assuming the entire site were enhanced to incorporate infiltration, the maximum area for which stormwater runoff could be diverted to the park is 289 acres, totaling the maximum potential design capture volume to be 23.8 acre-feet. Alternatively, the operations of the pump station will be investigated to determine if the site could be used for enhanced detention (enabling particular pollutants additional time to settle out).

MULTI-AGENCY, MULTI-WATERSHED PROJECT TO INCORPORATE LOW IMPACT DEVELOPMENT (LID) BMPS INTO MAJOR TRANSPORTATION CORRIDORS IN THE GATEWAY REGION OF LOS ANGELES

(GATEWAY PROP 84 PROJECT - **GRANT APPLICATION APPROVED**)

This project is a planned regional project within multiple cities to include the cities of Bell Gardens, Downey, Pico Rivera, Paramount, South Gate, and Lynwood. The Gateway Water Management Authority (GWMA) applied for funds through the Prop 84 Grant Round 2 program to put towards this project, which was approved in May 2014. The project is in the design phase.

The project seeks to prevent stormwater contamination of surface waters in three watersheds, to include the Los Angeles River. This will be accomplished by installing LID BMPs to treat stormwater runoff, and its associated pollutants. Table 3-12 lists the BMPs to be implemented within the Cities and Figures 3-17 to 3-23 show the project locations within each city.

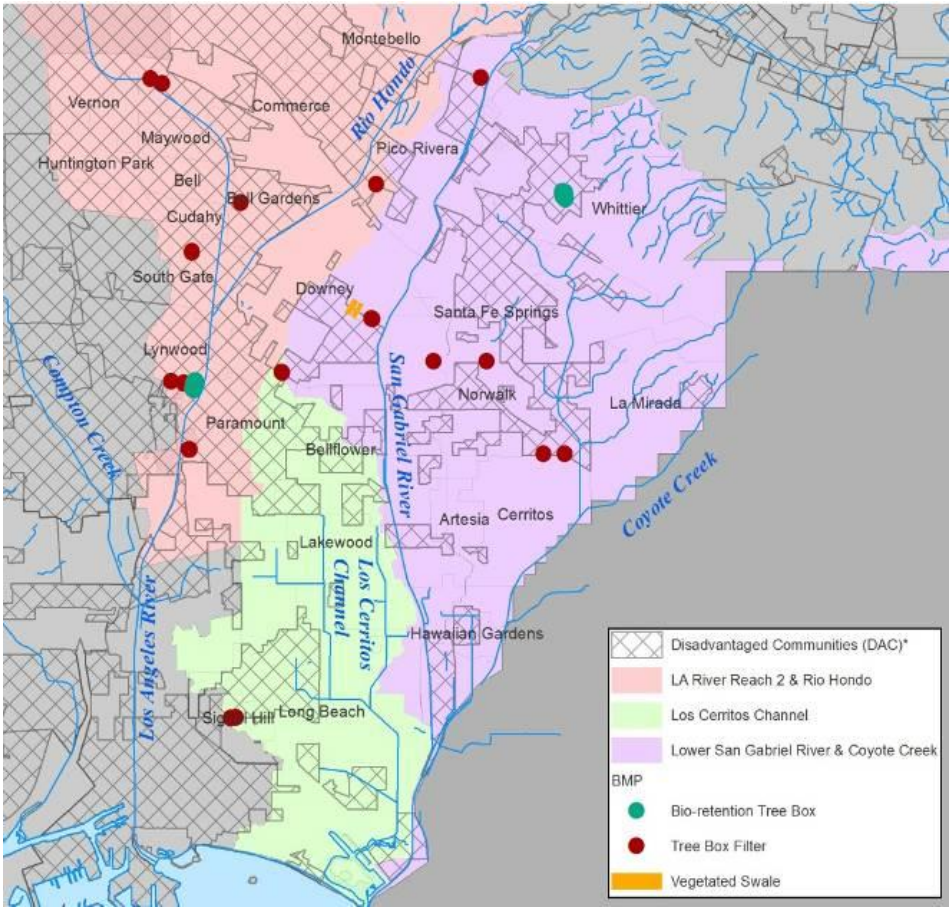


Figure 3-17: BMP Locations within the Gateway Prop 84 Project

Table 3-12: Proposed BMPs within the Gateway Prop 84 Project

City	LID BMPs	Location	Anticipated Treatment Volume[17]
Bell Gardens	(10) Bioretention Tree Wells	Locations to be determined	5,870 cf
	(3) Tree box filters	(1) Clark Street at Atlantic Avenue, (2) Clark Street at Wright Road	21,774 cf
Downey	(2) Tree box filters	(2) Alondra Boulevard west of Hunsaker Avenue	14,516 cf
Pico Rivera	(1) Tree box filters	(1) Slauson Avenue and Paramount Boulevard	7,258 cf
Paramount	(2) Tree box filters	(2) Alondra Boulevard west of Hunsaker Avenue	14,516 cf
South Gate	(2) Tree box filters	(2) Firestone Boulevard and Atlantic Avenue	14,516 cf
Lynwood	(2) Tree box filters	(2) Firestone Boulevard and Atlantic Avenue	14,516 cf

[17] Treatment volume calculations based on a 24-hour, 0.75 in storm, 6x6 tree box filter units and a 1200 LF swale.

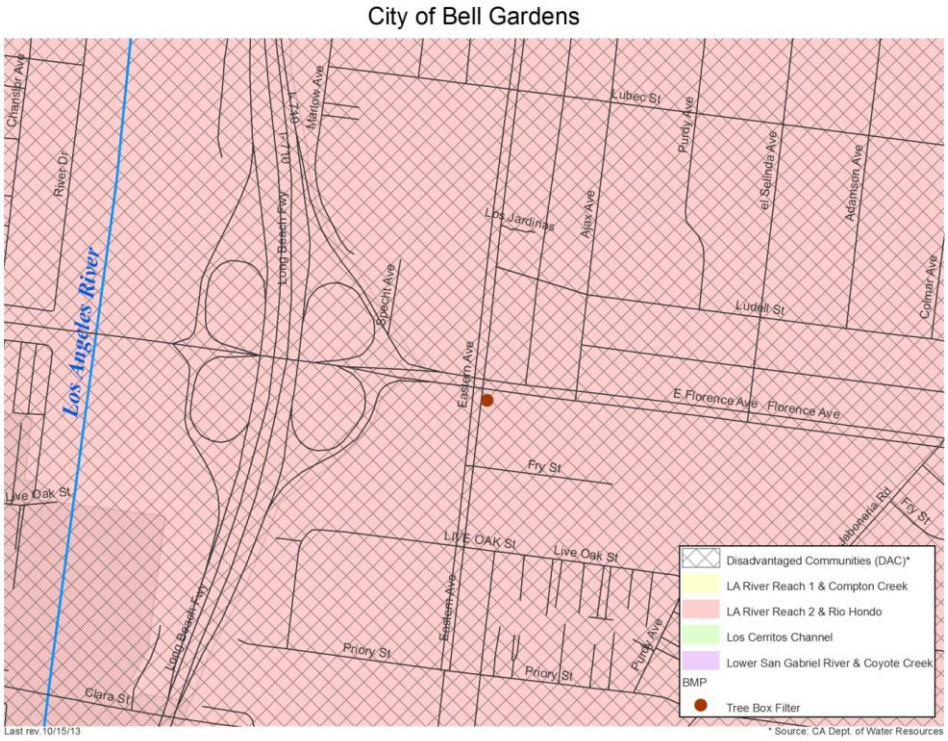


Figure 3-18: Gateway Prop 84 Project BMP locations proposed for the city of Bell Gardens

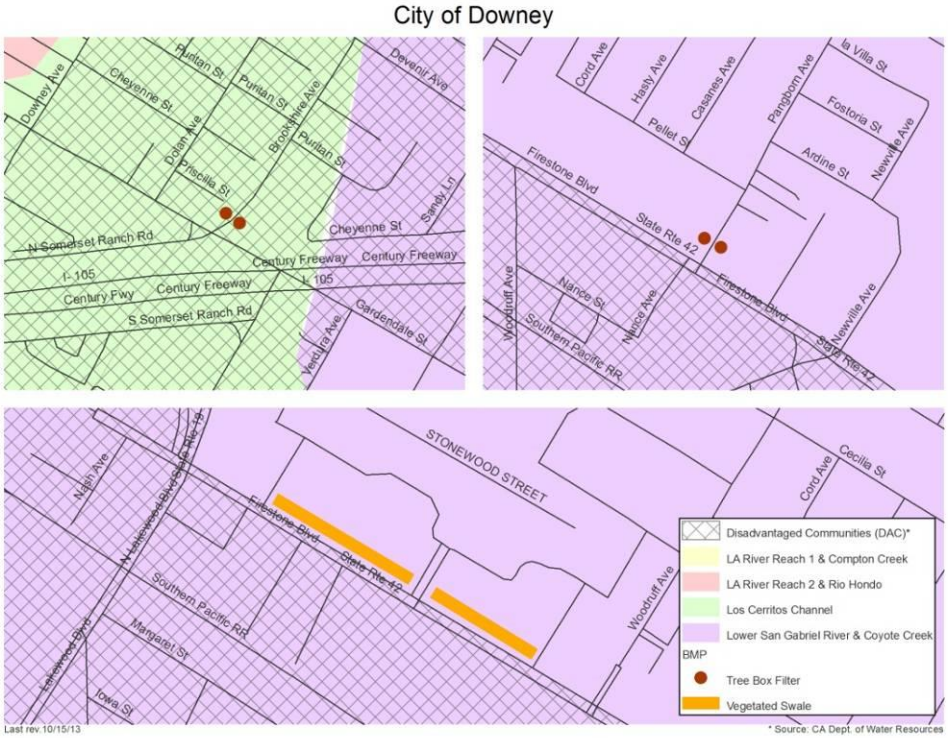


Figure 3-19: Gateway Prop 84 Project BMP locations proposed for the city of Downey

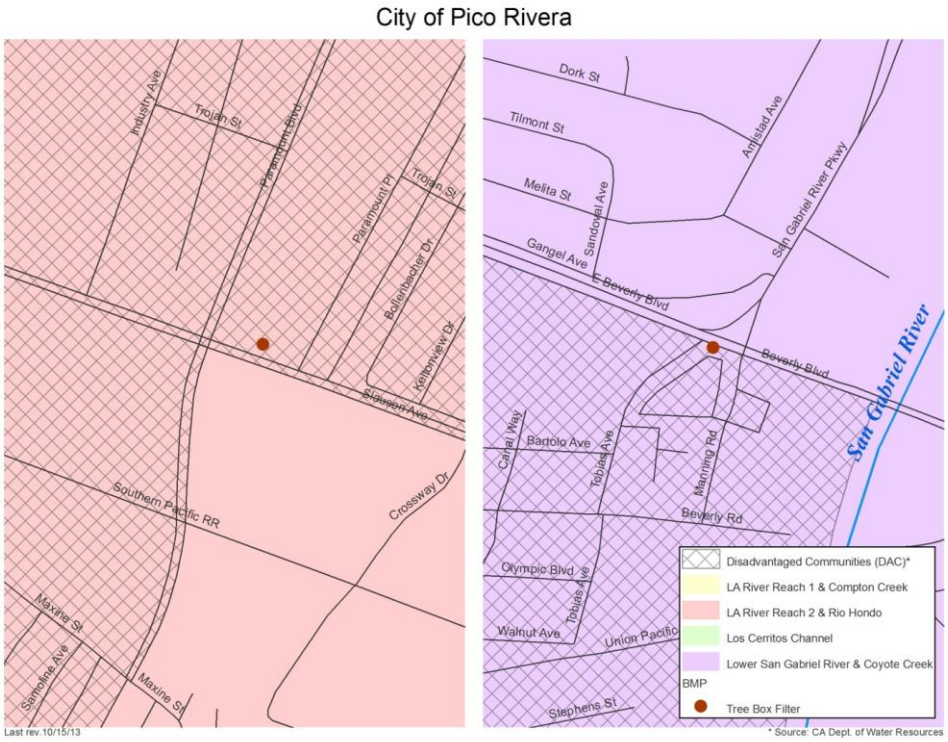


Figure 3-20: Gateway Prop 84 Project BMP locations proposed for the city of Pico Rivera

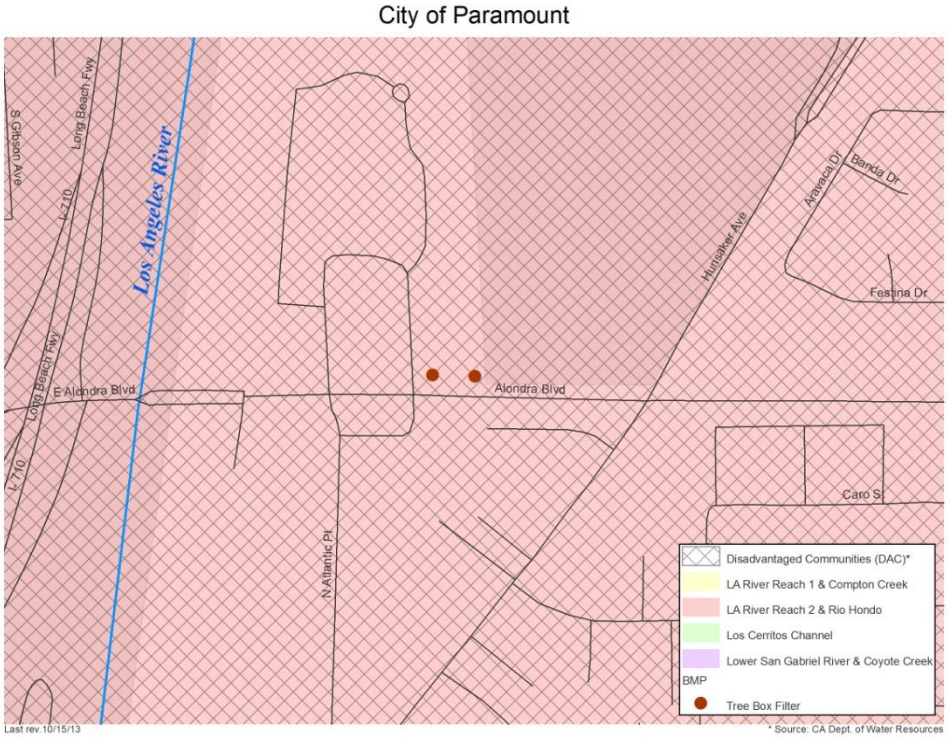


Figure 3-21: Gateway Prop 84 Project BMP locations proposed for the city of Paramount

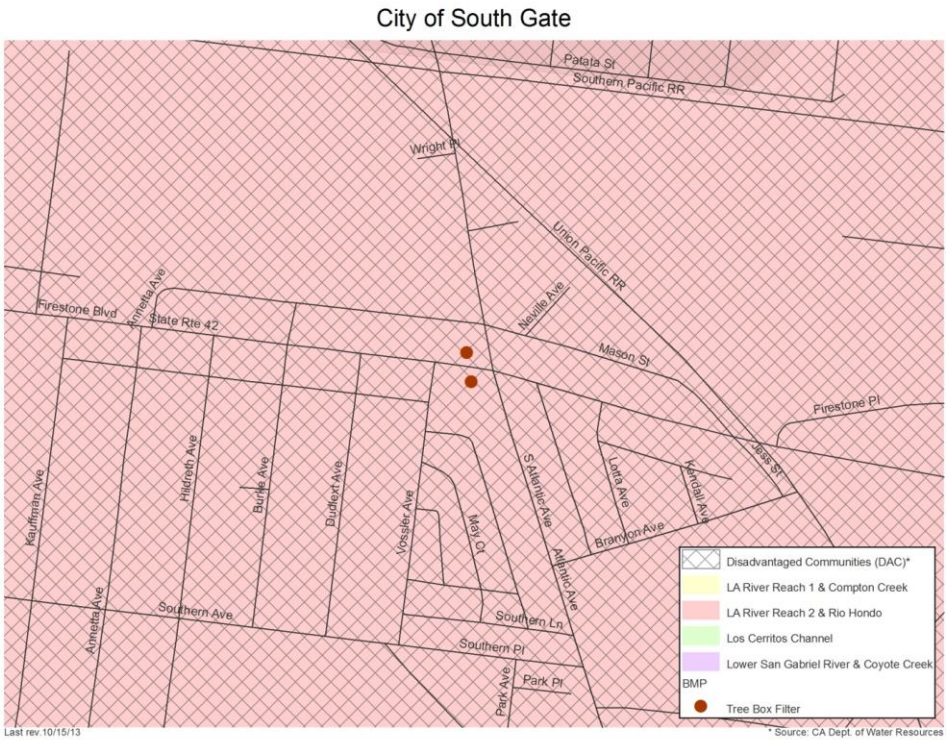


Figure 3-22: Gateway Prop 84 Project BMP locations proposed for the city of South Gate

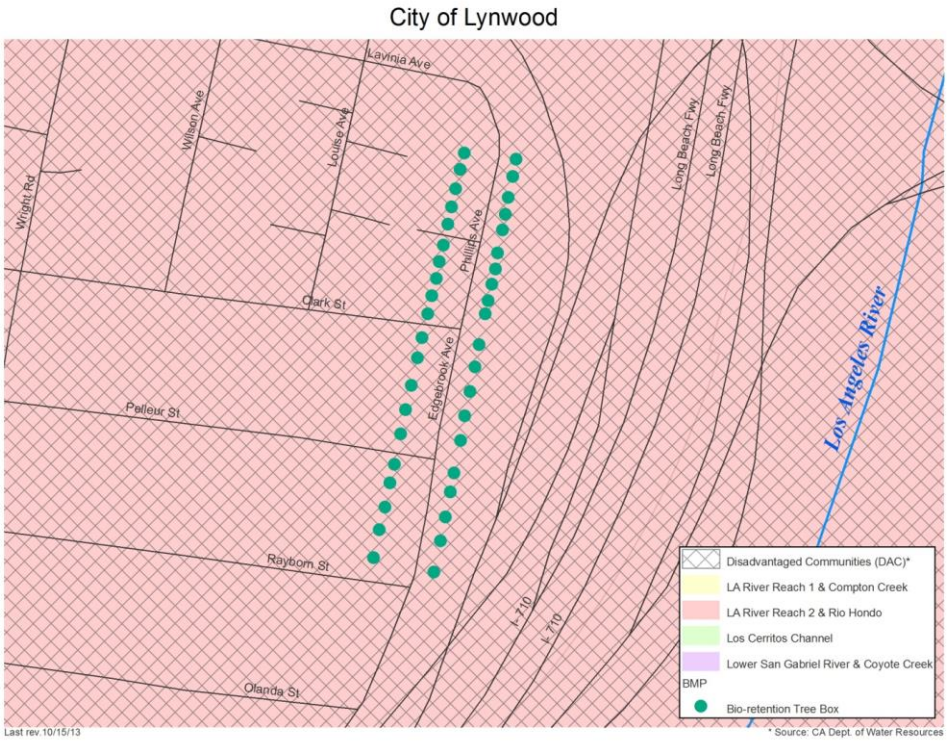


Figure 3-23: Gateway Prop 84 Project BMP locations proposed for the city of Lynwood

IRWMP Projects

The following project descriptions are from the Gateway Integrated Regional Watershed Management Plan (IRWMP). These projects have been discussed in detail with the Gateway Water Management Authority (GWMA) and are likely to be implemented once the required funding is acquired. Further details about each project can be found in the Gateway IRWMP documents.

Long Beach Municipal Urban Stormwater Treatment (MUST)Facility

This project would intercept and treat nonstormwater and initial stormwater (first flush) runoff flows for the cities of Long Beach, Signal Hill, Lynwood, and South Gate. After treatment, water would be recycled for irrigation use along the 710 Freeway and parks along the vicinity of the 710 Freewaywill serve the cities of . The facility will be located along the Drake-Chavez Greenbelt, southeast of the Shoemaker Bridge. The project proposes to treat water from 2,956 drainage acres from Major Basins No 2 & No 4 during Phase 1, 3,770 drainage acres from Major Basin No 3 during Phase 2, and possible additional drainage acres from Major Basin 10 in future expansions. The project would have the capacity to treat approximately 436,000 gallons of nonstormwater per day and store an additional 500,000 gallons. It is possible that further expansion could include capacity to treat and store stormwater from other regional areas. This project will contribute to improving water quality in the Lower Los Angeles River.

Fernwood Water Improvement Park

The Fernwood Water Improvement Park is a multi-benefit project that serves disadvantaged communities in the city of Lynwood while meeting IRWMP water management objectives. The project site is currently an empty 6.5 acre lot owned by the city of Lynwood located on a long stretch along Fernwood Avenue, between Atlantic Avenue and Long Beach Boulevard. The park will feature stormwater improvement elements such as infiltration areas and vegetated swales. The project also includes native shrubs and trees that will increase habitat for birds, butterfly species and mammals.

Construct Bioswales/Landscaping in various locations in Long Beach

This project will construct and/or reconstruct new and existing medians within the city of Long Beach to capture and treat stormwater runoff. The specific locations have not yet been identified; therefore, as this project progresses the RAA results will be taken into consideration in order to place the BMPs in locations with the highest potential for pollutant reduction.

Firestone Boulevard Median Project

This project is located in the city of South Gate and will enhance the Firestone corridor by installing a landscaped median that will utilize recycled water to irrigate the landscape. A reverse swale would also allow for stormwater runoff capture.

Tree Well Dry Weather Runoff and First Flow Stormwater Capture/TMDL Project

This project will be located within the city of South Gate and will consist of the installation of tree wells designed to capture dry weather flows and first storm flows in tree wells along the curb before the flow reaches the storm drain.

Pilot Plant for Treatment of Los Angeles River Water

This project is proposed in the city of Long Beach. This project will provide a skid mounted treatment train capable of treating 20 GPM of water within the Los Angeles River and the engineering support to confirm the effluent will be suitable for potable use. The Pilot Plant is to be installed near West Del Amo Boulevard and Oregon Avenue. The pilot plant will be in operation for 4 months with the option to increase the time of study to 24 months after review of initial data.

LAR Estuary Bacteria TMDL - Southwest Area Low Flow Diversion

This project will construct a system that will divert low stormwater flows from an existing storm drain outfall that services approximately 40% the Los Angeles River watershed located within the city of Signal Hill's boundaries directly into the Alamitos Sanitary Sewer Lift Station for eventual treatment by the Los Angeles County Sanitation District. This project will prevent nonstormwater flows and "first flush" storm flows from ultimately being emptied into the Hamilton Bowl Stormwater Retention facility and ultimately pumped into the Los Angeles River Estuary. This project contributes to the Gateway IRWMP Goal and Objective of protecting and enhancing water quality through the attainment of required TMDL levels in accordance with State Water Quality Control Board MS4 Permit requirements. This project is anticipated to cost approximately $1.7 million with an annual operations and maintenance cost of $200,000 per year.

LAR Estuary Bacteria TMDL - Southeast Area Low Flow Diversion

This project will construct a system that will divert low stormwater flows from an existing storm drain outfall that services approximately 50% the Los Angeles River watershed located within the city of Signal Hill's boundaries directly into the sanitary collection main for eventual treatment by the Los Angeles County Sanitation District. This project will prevent summer nonstormwater flows and "first flush" storm low flows from being emptied into the Hamilton Bowl Stormwater Retention facility and ultimately pumped into the Los Angeles River Estuary. This project contributes to the Gateway IRWMP Goal and Objective of protecting and enhancing water quality through the attainment of required TMDL levels in accordance with State Water Quality Control Board MS4 Permit requirements. This project is anticipated to cost approximately $1.7 million with an annual operations and maintenance cost of $200,000 per year.

Cha'wot Open Space Preservation and Stormwater Runoff Reduction

Located in the city of Signal Hill, this project proposes the purchase of available open space in the northerly hilltop area of Signal Hill to preserve existing nature and wildlife; provide walking, hiking, and recreational opportunities; naturally reduce stormwater runoff by preserving undeveloped open space; reduce the demand for potable water by reducing the amount of land available for development.

The details of this project do not currently incorporate water quality improvement strategies; however, it is recognized as a potential location for regional BMPs.

3.4.3.5 POTENTIAL SITES FOR FUTURE TARGETED CONTROL MEASURES

A preliminary assessment has been performed for the Lower LAR Watershed to determine potential areas to locate regional BMPs. This was done with a preliminary GIS approach by screening areas within 660 feet (1/8 mile) of a waterbody and currently designated as open space as well as other potentially useful zoning designations. The overall size of each site was used to calculate the maximum amount of volume which could be stored at the site and the maximum amount of area that could be diverted to the site assuming the entire site were redeveloped to incorporate infiltration.

The equations used were derived from the Orange County Technical Guidance Document (OC TGD)[18] and can be found below:

$$\mathbf{DCV = CdA_{TRIBUTARY} \times \left(\frac{43560}{12}\right)}$$

Driving Equation No. 1

$$D_{MAX} = K_{DESIGN} T \times \left(\frac{1}{12}\right)$$

Assume K_{DESIGN} = 0.3 in/hr

0.3 in/hr is the lowest infiltration rate where infiltration is deemed feasible per the MS4 Permit.

$$D_{MAX} = 0.3 \times 48 \times \frac{1}{12} = 1.2 \text{ feet}$$

$$A_{BMP} = \frac{DCV}{D_{MAX}}$$

$$\mathbf{A_{TRIBUTARY} = \frac{A_{BMP} \times 1.2}{Cd \times \left(\frac{43560}{12}\right)}}$$

Driving Equation No. 2

$$C = (0.75 \times IMP) + 0.15 = 0.9$$

Assume 100% imperviousness

Assume d=1.1

1.1 inches is the highest depth on the LA County 85th Percentile Isohyetal Map for the watershed.

$$\mathbf{A_{TRIBUTARY} = \frac{A_{BMP} \times 1.2}{0.9 \times 1.1 \times \left(\frac{43560}{12}\right)}}$$

Final Equation No. 1

$$\mathbf{DCV = A_{BMP} \times 1.2}$$

Final Equation No. 2

A_{BMP} has been assumed to be the total site area to determine the maximum tributary area that can be diverted to the site and the maximum volume the site can treat.

Where:

DCV:	Design Capture Volume	$A_{TRIBUTARY}$:	Area Tributary to BMP	T:	Drawdown Time
C:	Runoff Coefficient	D_{MAX}:	Maximum Effective Depth	A_{BMP}:	Footprint Area of BMP
d:	Rainfall Depth	K_{DESIGN}:	Design Infiltration Rate	IMP:	Percent Impervious

[18] Orange County. Technical Guidance Document for the Preparation of Conceptual/Preliminary and/or Project Water Quality Management Plans (WQMPs). May 19, 2011.

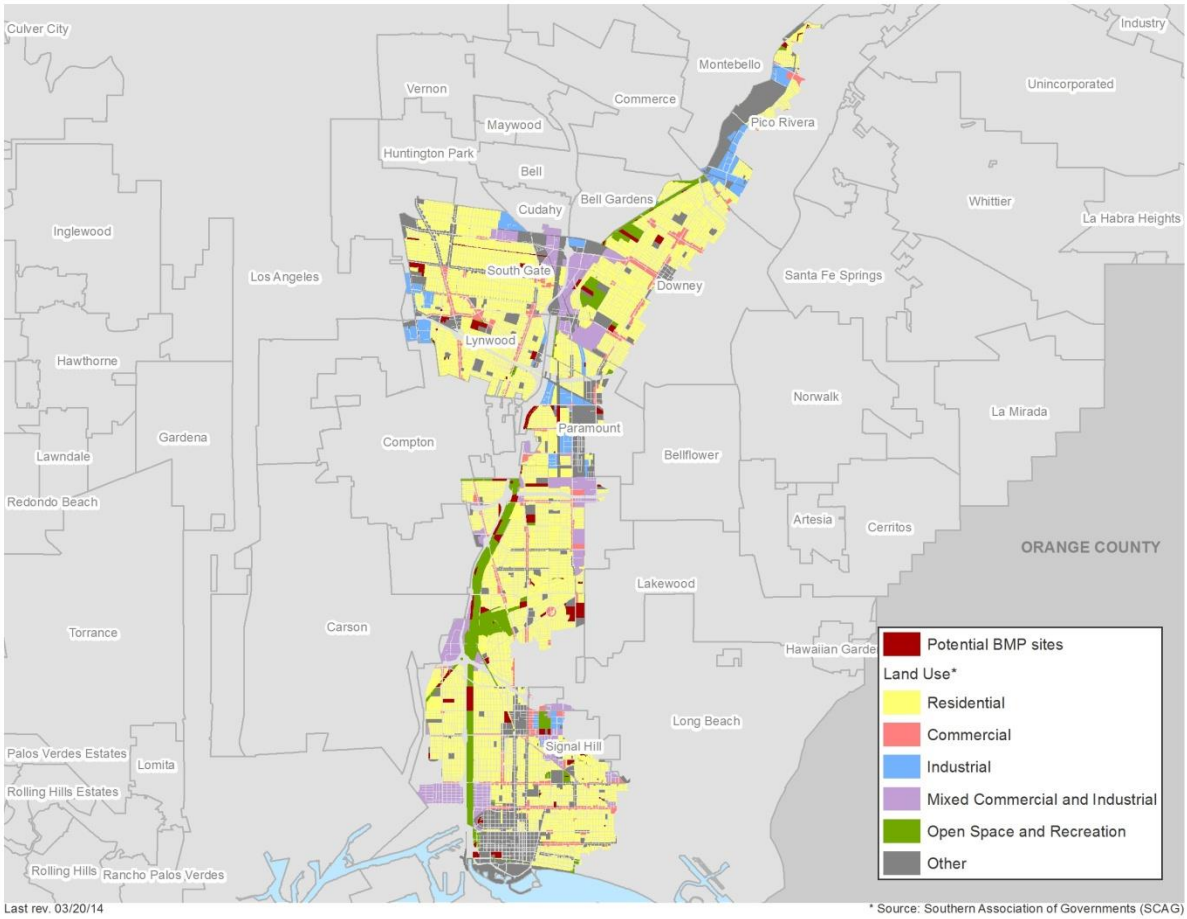


Figure 3-24: Potential Sites for Future Structural BMPs

Figure 3-24 and Table 3-13 indicate the locations of sites potentially available for future regional BMPs. These locations can serve as a starting point during the implementation phase of the WMP. They have been grouped by jurisdiction and listed in order by land use. The land use with the highest accessibility is listed first. Within each land use designation, the sites have been listed from largest to smallest. Note that with regional BMPs there are opportunities for multiple agencies to benefit from the same site. The land uses are ranked as follows:

OPEN SPACE AND RECREATION: Sites designated for open space, parks, and recreational activities were ranked with the highest potential for future regional BMPs. The reasoning being that these types of areas have the highest likeliness to be publically owned and not require land acquisition, generally have a high percentage of landscaped area available, and have a high opportunity for multiple benefits.

EDUCATIONAL USE: Sites designated for educational use were ranked with the second highest potential for future regional BMPs. The reasoning being that these types of areas although not city-

owned could have an easier land acquisition process than privately owned land, generally have a high percentage of landscaped area available, and have a high opportunity for multiple benefits.

GOVERNMENT INSTITUTION[19]: Sites designated for educational use were ranked with the third highest potential for future regional BMPs. This is due to the institution being government owned presenting a higher chance of collaboration than a privately owned facility. Although this may be the case, many government institutions may not be willing to take on maintenance responsibilities which would result in the necessity of land acquisition or maintenance agreements.

GOLF COURSES/COUNTRY CLUBS: Sites designated for golf courses or country clubs were ranked with the fourth highest potential for future regional BMPs. The reasoning being that these types of areas generally have a high percentage of landscaped area available and have a high opportunity for multiple benefits. Although this may be the case, land acquisition for these sites is expected to be a difficult accomplishment.

COMMERCIAL USE: Sites designated for commercial areas were ranked with the fifth highest potential for future regional BMPs. The reasoning being that these types of areas generally have a high percentage of parking area available which could potentially be retrofitted for infiltration opportunities. Although this may be the case, land acquisition for these sites is expected to be a difficult accomplishment.

The available sites will be further assessed to determine the best location for a regional BMP. Note that the sites presented do not represent the only sites available for the Watershed Group. The ultimate site selection process should take into account the following characteristics:

LOCATION IN RELATION TO RAA RESULTS: The RAA provides an estimation of runoff reduction to be provided in each area in order to meet the water quality objectives. The sites should be selected taking this into consideration.

GIS DATA: GIS data should be further analyzed to screen projects based on criteria such as land use, topography, hydrologic features, streets and roads, existing storm drain infrastructure, and storm drain invert depth.

PROJECT BENEFITS: It is preferred that a project contains multiple benefits in order to increase the overall benefit and support for the project. Benefits to take into consideration include, but are not limited to, the following:

- Water quality benefits
- Water supply benefits
- Recreational use
- Multi-agency benefits

[19] This land use is not in the current potential site list; however, it was included for future reference in the case that additional locations are gathered during the implementation or adaptive management process.

- Publically owned
- Storage availability
- Funding available
- Project readiness
- Flood control benefits
- Proximity to pollutant sources or impaired waters
- Adjacent to existing storm drain

PROJECT CONSTRAINTS: Not every project will be feasible; therefore, it is important to take into consideration any constraints that may result in project infeasibility. These constraints include, but are not limited to, the following:

- High groundwater
- Low infiltration rates
- Existing soil contamination/proximity to existing soil contamination
- Brownfields[20]
- Existing groundwater contamination/proximity to existing groundwater contamination
- Potential for soil instability (liquefaction zones, hillside areas)
- Existing private ownership (requires land acquisition)
- Cost Effectiveness
- Historical landmarks

[20] With certain legal exclusions and additions, the term "brownfield site" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant (*Environmental Protection Agency*).

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Downey	Open Space & Recreation	Furman Park	10419 Rives Ave.	33.9534	-118.1375	13.8	200	16.5
		open space	Guatemala Ave.	33.9681	-118.1283	13.4	195	16.1
		Apollo Park	12544 Rives Ave.	33.9267	-118.1546	11.0	160	13.2
		open space	Guatemala Ave.	33.9622	-118.1401	9.1	133	10.9
		open space	Sherry Ave.	33.9592	-118.1459	4.2	62	5.1
		Crawford Park	7000 Dinwiddie St.	33.9523	-118.1575	2.2	32	2.6
	Educational Use	Middle School	Excluded for privacy			22.0	320	26.4
		High School	Excluded for privacy			17.5	254	21.0
		Middle School	Excluded for privacy			14.9	217	17.9
		Elementary School	Excluded for privacy			7.2	105	8.7
		Elementary School	Excluded for privacy			6.4	93	7.7
		Elementary School	Excluded for privacy			6.1	89	7.3
		Elementary School	Excluded for privacy			5.8	85	7.0
		Elementary School	Excluded for privacy			4.8	70	5.8
		Elementary School	Excluded for privacy			2.1	30	2.5

[21] These numbers were generated using the Los Angeles County GIS Data Portal website (http://egis3.lacounty.gov/dataportal/) and the LA County Department of Public Works Spatial Information Library website (http://dpw.lacounty.gov/general/spatiallibrary/index.cfm?agree=agree). All areas may not be usable space for BMP retrofits.

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
	Golf Courses/ Country Clubs	Golf Course	Excluded for privacy			121.4	1,765	146
		Golf Club	Excluded for privacy			100.0	1,455	120
Lakewood	Open Space & Recreation	Cherry Cove Park	5159 Meadow Wood Ave.	33.8502	-118.1657	3.0	43	3.5
Long Beach	Open Space & Recreation	open space	710 Fwy	33.8669	-118.1958	46.3	674	55.6
		open space	710 Fwy	33.8536	-118.2036	40.9	595	49.1
		Houghton Park	6301 Myrtle Ave.	33.8695	-118.1838	23.3	338	27.9
		Scherer Park	4600 Long Beach Blvd.	33.8436	-118.1865	21.5	313	25.8
		open space	S. Sportsman Dr.	33.8804	-118.1906	16.3	237	19.5
		Veterans Memorial Park	101 E. 28th St.	33.8096	-118.1922	14.3	208	17.2
		open space	E. 208th St.	33.8425	-118.2049	14.2	206	17.0
		open space	Harbor St.	33.8193	-118.2168	14.1	205	16.9
		Hudson Park	2335 Webster Ave.	33.798	-118.2202	12.5	182	15.0
		Admiral Kidd Park	2125 Santa Fe Ave.	33.7958	-118.2156	11.0	160	13.2
		Silverado Park	1545 W. 31st St.	33.8146	-118.2132	10.5	153	12.6

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach	Open Space & Recreation	Wrigley Greenbelt	DeForest Ave. (Willow to 34th)	33.8153	-118.2055	10.0	145	11.9
		Cherry Park	1901 East 45th St.	33.8395	-118.1688	9.9	145	11.9
		open space	Inez St.	33.8796	-118.1796	9.5	138	11.4
		open space	Oregon Ave.	33.842	-118.2007	9.5	138	11.4
		open space	Lime Ave.	33.8796	-118.1836	8.3	120	9.9
		Coolidge Park	352 E. Neece St.	33.8722	-118.195	7.2	104	8.6
		Lincoln Park (Civic Center)	Pacific Ave. & Broadway St.	33.7684	-118.1955	7.0	101	8.4
		Martin Luther King Jr. Park	1950 Lemon Ave.	33.7926	-118.1769	6.8	98	8.1
	Open Space & Recreation	Santa Cruz Park	Cedar Ave. to Golden Ave.	33.7683	-118.2032	6.4	92	7.6
		Los Cerritos Park	3750 Del Mar Ave.	33.8267	-118.1994	6.2	90	7.4
		Drake Park	951 Maine Ave.	33.7785	-118.2018	6.0	87	7.1
		open space	E. 69th St.	33.8795	-118.1592	5.7	83	6.9
		Golden Park	Shoreline Dr.	33.7713	-118.2035	5.7	83	6.8
		open space	Baltic Ave.	33.8224	-118.2138	5.7	82	6.8
		Atlantic Plaza Park	1000 Via Wanda	33.8501	-118.1832	5.4	78	6.4

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach		Bixby Knolls Park	1101 San Antonio Dr.	33.8406	-118.1791	4.3	62	5.1
		Camp	Excluded for privacy	3.6	53	4.4		
		MacArthur Park	1321 Anaheim St.	33.7835	-118.1747	3.3	48	3.9
		open space	E. 72nd St.	33.8842	-118.1871	3.1	45	3.7
		Orizaba Park	1435 Orizaba Ave.	33.7851	-118.1579	2.7	39	3.2
		Jackson Park	1432 Jackson St.	33.8515	-118.1723	2.1	31	2.5
		open space	Caspian Ave.	33.8236	-118.2123	1.6	24	2.0
		Tanaka Park	1400 W. Wardlow Rd.	33.8235	-118.2134	1.4	20	1.7
		open space	Arlington St.	33.821	-118.215	1.2	17	1.4
		McBride Park (Cal Rec Center)	1550 Martin Luther King Ave.	33.7867	-118.1803	1.0	15	1.2
		Rose Park	8th St. & Orizaba Ave.	33.7772	-118.1568	0.8	11	0.9
		High School	Excluded for privacy			16.6	241	19.9
		High School	Excluded for privacy			14.0	204	16.8
		Middle School	Excluded for privacy			10.3	150	12.4
		Middle School	Excluded for privacy			10.2	148	12.2

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach	Educational Use	High School	Excluded for privacy			9.3	135	11.1
		Elementary School	Excluded for privacy			8.2	119	9.8
		Middle School	Excluded for privacy			8.0	116	9.6
		Elementary School	Excluded for privacy			6.4	92	7.6
		Elementary School	Excluded for privacy			6.3	91	7.5
		Middle School	Excluded for privacy			6.2	90	7.4
		School	Excluded for privacy			5.2	76	6.3
		Elementary School	Excluded for privacy			5.0	73	6.0
		School	Excluded for privacy			4.8	71	5.8
		Elementary School	Excluded for privacy			4.5	66	5.4
		Elementary School	Excluded for privacy			4.1	60	5.0
		Elementary School	Excluded for privacy			3.8	55	4.5
		Elementary School	Excluded for privacy			3.7	54	4.5
		Elementary School	Excluded for privacy			3.6	52	4.3
		Elementary School	Excluded for privacy			3.4	50	4.1
		Middle School	Excluded for privacy			3.1	45	3.8
		School	Excluded for privacy			3.1	45	3.7
	Educational Use	Elementary School	Excluded for privacy			2.9	42	3.5
		Elementary School	Excluded for privacy			2.6	37	3.1

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Long Beach		Elementary School	Excluded for privacy			2.6	37	3.1
		Elementary School	Excluded for privacy			2.4	35	2.9
		Elementary School	Excluded for privacy			2.1	30	2.5
		Middle School	Excluded for privacy			2.0	29	2.4
		Elementary School	Excluded for privacy			1.9	28	2.3
		Elementary School	Excluded for privacy			1.8	26	2.1
		School	Excluded for privacy			1.7	25	2.1
		Elementary School	Excluded for privacy			1.7	25	2.0
		Elementary School	Excluded for privacy			1.5	22	1.8
		Elementary School	Excluded for privacy			1.5	22	1.8
		Elementary School	Excluded for privacy			1.2	18	1.5
		High School	Excluded for privacy			1.1	15	1.3
		Academy	Excluded for privacy			0.7	10	0.8
	Golf Course/ Country Club	Country Club	Excluded for privacy			178.9	2,603	215
Lynwood	Open Space & Recreation	Lynwood City Park	11301 Bullis Rd.	33.9276	-118.203	10.0	145	12.0
		Yvonne Burke-John D. Ham Park	11832 Atlantic Ave.	33.9137	-118.1901	8.7	127	10.4
		Lynwood Meadows Park	State St. & Cedar Ave.	33.9227	-118.2189	1.5	21	1.8

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Lynwood		Rose Park	Flower St. & State St.	33.9263	-118.2178	1.5	21	1.7
		park	El Segundo Blvd.	33.9176	-118.2149	1.3	19	1.6
		Carnation Park	Los Flores Blvd. & State St.	33.9322	-118.2162	1.2	18	1.5
		open space	Atlantic Ave.	33.9134	-118.191	0.9	13	1.1
		park	El Segundo Blvd.	33.9177	-118.2135	0.8	12	1.0
	Educational Use	Lugo Park	Cortland St.	33.9185	-118.1828	5.1	74	6.1
		Lynwood High	Excluded for privacy			14.8	215	17.7
		Lynwood Middle	Excluded for privacy			7.6	111	9.1
		Marco Antonio Firebaugh High	Excluded for privacy			6.3	91	7.5
		Chavez Middle	Excluded for privacy			4.1	60	4.9
		Mark Twain Elementary	Excluded for privacy			3.8	55	4.5
		Lindbergh Elementary	Excluded for privacy			3.4	50	4.1
		Abbott Elementary	Excluded for privacy			3.1	46	3.8
		Will Rogers Elementary	Excluded for privacy			3.1	44	3.7
		Rosa Parks Elementary	Excluded for privacy			2.8	40	3.3
		Roosevelt Elementary	Excluded for privacy			2.7	39	3.2

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Lynwood	Educational Use	Hosler Middle	Excluded for privacy			2.5	37	3.0
		Wilson Elementary	Excluded for privacy			2.2	32	2.6
		Marshall Elementary	Excluded for privacy			2.1	31	2.5
		Helen Keller Elementary	Excluded for privacy			2.1	30	2.5
		Vista High	Excluded for privacy			1.9	28	2.3
		Washington Elementary	Excluded for privacy			1.5	21	1.8
		Lugo Elementary	Excluded for privacy			1.3	18	1.5
		Lincoln Elementary	Excluded for privacy			0.9	14	1.1
		Lynwood Community Adult	Excluded for privacy			0.9	13	1.1
	Commercial Use	Plaza	Excluded for privacy			11.89	173	12
Paramount	Open Space & Recreation	Ralph C. Dills Park	6500 San Juan St.	33.9001	-118.1843	14.9	217	17.9
		Paramount Park	14400 Paramount Blvd.	33.9018	-118.159	12.5	182	15.0
		Spane Park	14400 Gundry Ave.	33.9029	-118.1759	4.4	64	5.3
		Village Skate Park	7718 Somerset Blvd.	33.8959	-118.1649	0.7	10	0.9
		Meadows Park	15753 Gundry Ave.	33.8895	-118.1751	0.7	9	0.8

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
Paramount		open space	Somerset Blvd.	33.8965	-118.1837	0.4	5	0.4
	Educational Use	Elementary School	Excluded for privacy			8.1	117	9.7
		School	Excluded for privacy			4.3	62	5.1
		Elementary School	Excluded for privacy			3.3	49	4.0
		Elementary School	Excluded for privacy			3.2	46	3.8
		School	Excluded for privacy			2.8	41	3.4
		School	Excluded for privacy			2.0	30	2.5
	Educational Use	High School	Excluded for privacy			1.8	27	2.2
		Elementary School	Excluded for privacy			1.7	25	2.1
		Elementary School	Excluded for privacy			1.5	21	1.8
Pico Rivera	Open Space & Recreation	Rio Hondo Park	8421 San Luis Potosi Pl.	34.0119	-118.0921	11.9	172	14.2
		park	Calico Ave.	34.0175	-118.084	1.4	21	1.7
	Educational Use	open space	Cope Dr.	34.0147	-118.087	3.1	45	3.8
		Elementary School	Excluded for privacy			2.0	29	2.4
Signal Hill	Open Space & Recreation	Signal Hill Park	2175 Cherry Ave.	33.7963	-118.1693	6.9	100	8.2
		Hillbrook Park	1865 Temple Ave.	33.7911	-118.1593	0.5	7	0.6

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
		Calibrisas Park	2451 California Ave.	33.8017	-118.1809	0.5	7	0.5
		Raymond Arbor Park	1881 Raymond Ave.	33.7912	-118.1647	0.3	5	0.4
	Educational Use	Middle School	Excluded for privacy			7.4	108	8.9
		Elementary School	Excluded for privacy			6.5	95	7.9
		Elementary School	Excluded for privacy			3.9	57	4.7
South Gate	Open Space & Recreation	South Gate Park	4900 Southern Ave.	33.9442	-118.1866	72.8	1,059	87.4
		Circle Park & open space	10129 Garfield Ave.	33.9398	-118.1672	32.3	469	38.7
		Cesar Chavez Park	2541 Southern Ave.	33.9535	-118.2265	4.0	58	4.8
		Hollydale Community Park	12221 Industrial Ave.	33.9158	-118.1642	1.3	19	1.6
		Triangle Park	Southern Ave. & Atlantic Blvd.	33.9459	-118.1805	0.8	11	0.9
		Stanford Park	2715 Illinois Ave.	33.9516	-118.2222	0.7	11	0.9

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
South Gate		Hollydale Regional Park	5400 Monroe Ave.	33.9216	-118.1748	29.7	431	35.6
	Educational Use	Middle School	Excluded for privacy			20.7	301	24.9
		Learning Center	Excluded for privacy			15.1	220	18.1
		High School	Excluded for privacy			11.2	163	13.4
		High School	Excluded for privacy			10.0	145	12.0
		Middle School	Excluded for privacy			7.3	106	8.7
		Middle School	Excluded for privacy			6.0	87	7.2
		Elementary School	Excluded for privacy			3.3	49	4.0
		Elementary School	Excluded for privacy			3.3	48	4.0
		Elementary School	Excluded for privacy			2.6	38	3.2
		Elementary School	Excluded for privacy			2.4	36	2.9
	Educational Use	Elementary School	Excluded for privacy			2.1	30	2.5
		Elementary School	Excluded for privacy			2.0	29	2.4
		Elementary School	Excluded for privacy			1.9	28	2.3
		Elementary School	Excluded for privacy			1.8	26	2.1
		Elementary School	Excluded for privacy			1.3	19	1.6

Table 3-13: Potential site list

City Name	Land Use Designation	Site Name	Site Address	Latitude	Longitude	Approximate Site Area (Acres) [21]	Calculated Max Tributary Area ($A_{TRIBUTARY}$, Acres)	Max Design Capture Volume (DCV, Ac-ft)
		Elementary School	Excluded for privacy			1.3	19	1.6
		Elementary School	Excluded for privacy			1.1	16	1.3
		Elementary School	Excluded for privacy			0.9	13	1.1
		Continuation School	Excluded for privacy			0.2	3	0.3

3.4.4 RIGHT-OF-WAY BEST MANAGEMENT PRACTICES

Right-of-way BMPs are systems of multiple distributed BMPs placed within a street right-of-way. These BMPs are designed to reduce the volume of stormwater discharge into the MS4 and treat stormwater runoff from adjacent streets and developments. Common right-of-way BMPs include bioretention, biofiltration, and permeable pavement. See Section 3.3.2 for BMP descriptions. These BMPs can be implemented alone or in conjunction with one another.

A preliminary assessment has been performed to assess areas potentially available for right-of-way BMPs. This was done with a preliminary GIS approach by screening highways, arterial roads, and secondary (collector) roads located in non-residential areas within 200 feet of a catch basin location. The potential locations are indicated with grey circles on Figure 3-25.

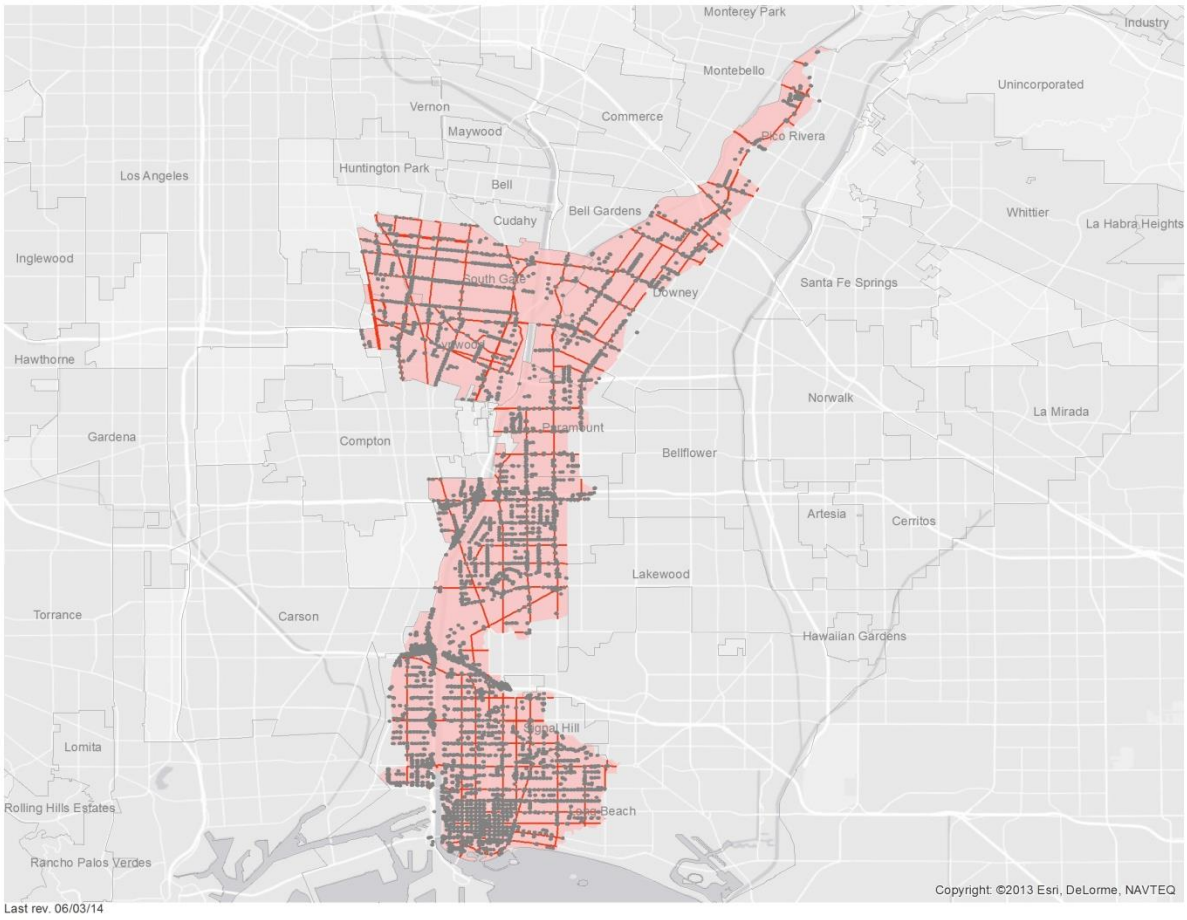


Figure 3-25: Areas potentially available for right-of-way BMPs

4 REASONABLE ASSURANCE ANALYSIS

4.1 EXECUTIVE SUMMARY

A required element the WMP is the Reasonable Assurance Analysis (RAA). The MS4 Permit specifies the RAA use a watershed based computer modeling system to demonstrate:

> *"that the activities and control measures…will achieve applicable WQBELs and/or RWLs with compliance deadlines during the Permit term".*

There are three computer modeling systems approved by the MS4 Permit and the Watershed Management Modeling System (WMMS) was selected to develop this RAA. The Los Angeles County Flood Control District (LACFCD), through a joint effort with U.S. Environmental Protection Agency (USEPA), developed WMMS specifically to support informed decisions associated with managing stormwater.

While the Permits prescribes the RAA as a quantitative demonstration that control measures will be effective, the RAA also promotes a modeling process to identify and prioritize potential control measures to be implemented by the WMP. In other words, the RAA not only demonstrates the cumulative effectiveness of BMPs to be implemented, it also supports their selection. Furthermore, the RAA incorporates the applicable compliance dates and milestones for attainment of the WQBELs and RWLs, and therefore supports BMP scheduling. The ultimate goal of WMMS is to identify cost-effective water quality improvement projects through an integrated, watershed-based approach.

On March 25, 2014, the Los Angeles Regional Water Quality Control Board (Regional Board) issued "RAA Guidelines" (LARWQCB 2014) to provide information and guidance to assist Permittees in development of the RAA. Appendix A-4-1 provides appropriate documentation on the modeling assumptions that meet the RAA Guidelines.

The RAA describes the process for identifying milestones the current and next Permit periods, as well as final milestones to meet applicable TMDLs. Modeling was performed to quantify necessary load reductions to achieve the milestones. Based on these load reduction targets, a pollutant reduction plan was established that outlines the types and sequencing of BMPs for each jurisdiction to achieve milestones throughout the schedule. The RAA provides a detailed list of the capacities needed for BMPs over time, incorporating the existing BMPs and control measures identified in the WMP. These recommendations serve as goals for each jurisdiction to seek opportunities for implementation over time, but strategies may change as opportunities for more cost-effective BMPs are identified throughout the schedule.

The RAA has determined that the metal zinc will be the primary or "limiting" pollutant and that by implementing the structural and non-structural measures in Chapter 3 to reduce zinc, the remaining pollutant reduction targets will be achieved for the Water Quality Priorities defined in Chapter 2. The rationale for this modeling approach is included Section 5.3.1 of the RAA (Appendix 4-1). Over the entire

Lower Los Angeles River Watershed, the RAA projects a need for structural controls to be sized to capture and or treat 803.2 acre -feet.

4.2 REASONABLE ASSURANCE ANALYSIS

The Reasonable Assurance Analysis for the Lower Los Angeles River Watershed is included in Appendix A-4-1. As data is collected through the monitoring program the model will be re-calibrated during the adaptive management process, which will allow for improved simulation of physical processes such as flow volumes and volume retention BMPs.

4.2.1 IRRIGATION REDUCTION

There is sufficient information available to justify a 25% reduction in irrigation through specific controls.

- **"Landscape Water Conservation Programs: Evaluation of Water Budget Based Rate Structures" (1997).**[1] This study was prepared for The Metropolitan Water District of Southern California to evaluate the effects of customer outreach programs and adjustment of water-budget based rate structures on landscape water use. Communities that installed these water conservation programs saw landscape irrigation water use reduced 20-37%.
- **"The Residential Runoff Reduction Study" (2004).**[2] This study was produced for the Municipal Water District of Orange County to determine the effects of certain interventions on water savings. This study used a control or baseline site, an educational only site, and a retrofit site that installed weather-based controller technology and public education. The observed reduction at the retrofit site was 50% from pre- to post-intervention, and a reduction of 71% when comparing to the control group (which had no intervention). The education site also saw a reduction of 21% when compared to the control group.
- **"20x2020 Water Conservation Plan" (2010).**[3] This water conservation plan was prepared by a host of California agencies in response to the Californian Governor's Delta plan initiative that mandates California to have to achieve a 20 percent reduction per capita water use statewide by 2020. This study demonstrated that, for the South Coast specifically (which includes Greater Los Angeles, Long Beach and Orange County), potential conservation savings from current actions—basic measures, such as regulatory activities and reinforcing codes related to plumbing and appliance efficiency—are 3% per capita, or 6 gallons per capita per day (GPCD). Potential conservation savings for "cost effective measures" (such as BMPs and new technologies) are 7% per capita at 80% compliance (13 GPCD at 80% compliance and 17 GPCD at 100% compliance). Total "basic measure" savings are 24 GPCD. Baseline water use level for

[1] Pekelney, D., & Chestnutt, T. (1997). Landscape Water Conservation Programs: Evaluation of Water Budget Based Rate Structures. *The Metropolitan Water District of Southern California*. P vi of the Summary.

[2] The Municipal Water District of Orange County & The Irvine Ranch Water District. (2004). The Residential Runoff Reduction Study. *The Municipal Water District of Orange County.* P ES1 and ES6.

[3] California Department of Water Resources, State Water Resources Control Board, California Bay-Delta Authority, California Energy Commission, California Department of Public Health, California Public Utilities Commission, California Air Resources Board, California Urban Water Conservation Council, & U.S. Bureau of Reclamation. (2010). 20x2020 Water Conservation Plan.

the South Coast region is 180 GPCD, which means with basic measures in place there is potential for 13.3% conservation savings. The study further demonstrates that with additional measures (such as residential weather-based irrigation controllers, landscape practices, recycled water, etc.) potential conservation savings are 29 GPCD, or 16% for the South Coast Region. While this study evaluates the effects of interventions on a *per capita* basis, the results of this study have implications on water reductions and water savings for watersheds as a whole.

- **"Landscape Management for Water Savings" (1998).**[4] This study resulted in a "43% increase in landscape water efficiency (water savings) from 1990-1997" after instituting conservation pricing, financial incentives, and education programs for customers and landscape professionals. The author makes a strong conclusion that most irrigation systems need to be recalibrated to only provide the amount of water necessary for the plants within the landscape to grow. Furthermore, the author provides several specific cases that demonstrate that when water resources are mismanaged by outdated irrigation systems or uninformed landscape professionals, this wastes precious water resources and costs the landscape owners excess money.

In addition, on July 28, 2014, an emergency regulatory action went into effect in response to the ongoing drought conditions within California[5]. This emergency regulatory action prohibits: 1) The application of water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots or structures; 2) The use of a hose to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle or similar; and 3) The application of water to driveways and sidewalks. These mandatory regulations are expected to reduce landscape and water runoff.

The study results show a strong nexus between public education (leading to an increased awareness of water conservation and usage) and a reduction in irrigation use. The Participating Agencies will develop an outreach and education program focusing on water conservation and landscape water use efficiency.

Based on study results and the initiation of regulations aimed to reduce irrigation water use, a 25% reduction of irrigation water utilized in the RAA is considered reasonable and conservative.

As part of the adaptive management process the Participating Agencies will evaluate these assumptions during Program implementation and develop alternate controls if it becomes apparent that the assumption is not supported.

[4] Ash, T. (1998). How to Profit from a Water Efficient Future. In *Landscape Management for Water Savings*. Tustin, CA: Municipal Water District of Orange County. P 8.

[5] Title 23, California Code of Regulations. Government Code Sections 11346.1 and 11349.6. OAL File No. 2014-0718-01 E.

4.3 NON-MODELED CONTROLS

Currently there is insufficient information to accurately model the implementation of the controls listed in Section 3.2.3 through 3.4.1. These non-modeled controls were instead assigned a modest fraction of 10% for their cumulative load reduction. As part of the adaptive management process the Participating Agencies will evaluate this assumption during Program implementation and develop alternate controls if it becomes apparent that the assumption is not supported. However, despite the uncertainty surrounding the specific load reductions for these controls, there is support to suggest that the assumption is in fact a modest one.

Chapter 3 provides qualitative assessments of potential pollutant reductions for new non-modeled, nonstructural and structural controls required by the 2012 MS4 Permit (Sections 3.2.4 and 3.3.1) as well as new non-modeled controls developed as part of this WMP (i.e., the "targeted" control measures of Section 3.4.1). The nonstructural measures are summarized in Tables 3-2 and 3-11. As explained in detail in Sections 3.2.4 and 3.3.1, the number and scope of the new and modified (i.e., enhanced) minimum provisions under the Permit is substantial. Of particular note are the Low Impact Development (LID) provisions—which replace prior SUSMP provisions—for new developments. Potential load reductions from future LID projects were not incorporated into the RAA and as such contribute to the 10% non-modeled assumption. Also, pollutant reductions may be expected from continued, preexisting minimum controls with an educational component, such as public education, inspections of industrial/commercial and construction sites, and illicit discharge detection and elimination. Such programs can benefit from a continued increase in behavior change over time. Finally, the TSS Reduction Program—one of the non-modeled targeted control—does allow for a rough estimate of potential load reductions, as outlined in the following subsection.

4.3.1 TSS REDUCTION PROGRAM QUANTIFICATION

Although expected pollutant reductions resulting from the TSS Reduction Strategy are not modeled empirically within WMMS, a rudimentary quantification of the program's potential effectiveness may be calculated through the application of the Revised Universal Soil Loss Equation (RUSLE). The RUSLE is defined as

$$A = RKLS$$

where

$A =$ Spatially and temporally averaged soil loss per unit area per unit time. The result is expressed in the units elected for K and R.
$R =$ Rainfall-runoff erosivity factor (per unit time, generally one year),
$K =$ Soil erodibility factor (mass per unit area – an area density – generally tons per acre),
$L =$ Slope length factor and
$S =$ Slope steepness factor.

Using local values of R, K and LS obtained through maps available on the State Water Resources Control Board's website for the Construction General Permit[6],

$$R \approx 40\ year^{-1}$$
$$K \approx 0.32\ \frac{tons}{acre}\ \text{and}$$
$$LS \approx 0.45$$

giving

$$A = (40\ year^{-1})\left(0.32\ \frac{tons}{acre}\right)0.45$$
$$A = 5.76\ \frac{tons}{acre\ year}.$$

Following the CGP Risk assessment procedures, 5.76 tons per acre year is within the "low sediment risk" designation.

During the cooperative preparation of the Lower San Gabriel River (SGR), Lower Los Angeles River and Los Cerritos Channel (LCC) WMPs, several participating agencies provided estimates of exposed soil within their jurisdiction that were not related to construction activities. The City of Bellflower, within the adjacent LCC and Lower SGR watersheds, field-verified these estimates which totaled approximately 18 acres or about 0.5% of the City. Following the calculated value for A, this equates to approximately 100 tons of soil loss per year. The City of Signal Hill determined that 104.37 acres of the 531 acres within the city that drain to the LA River consists of undeveloped vacant land (20%)—however this is an anomalous circumstance specific to the City. Applying the 104 acres to Signal Hill and extrapolating the 0.5% to the remaining area of the Lower LA River Watershed (27,194 acres), the soil loss tonnage is

$$M_{TSS} = fWA = (0.005 \cdot 27{,}194\ acres + 104\ acres)\left(5.76\ \frac{tons}{acre\ year}\right)$$
$$M_{TSS} = 240\ acres\left(5.76\ \frac{tons}{acre\ year}\right)$$
$$M_{TSS} \approx 1{,}400\ \frac{tons}{year}$$

where

$M_{TSS} =$ Estimated annual soil loss within the Lower LAR watershed in tons,
$f =$ Estimated fraction of exposed soil (non-construction) within a given urbanized area and
$W =$ Watershed area.

Historical monitoring results from the adjacent LCC Watershed suggest that approximately 1.8 grams of zinc adheres to every kilogram of TSS, so that the zinc discharge M_{Zn} associated with M_{TSS} is

[6] http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

$$M_{Zn} \approx \left(\frac{1.8}{1{,}000}\right) M_{TSS}$$
$$M_{Zn} \approx \left(\frac{1.8}{1{,}000}\right)\left(1{,}400\ \frac{tons}{year}\right)\left(\frac{2{,}000\ lbs}{1\ ton}\right)$$
$$M_{Zn} \approx 5{,}000\ \frac{lbs}{year}\ or\ 2{,}300\ \frac{kg}{year}.$$

The RAA predicts an annual zinc loading of 8,878 kg for the average storm year. Assuming that within the term of the MS4 Permits the TSS Reduction Strategy approaches an effectiveness goal of 10% (230 kg/year), this would equate to a load reduction of **2.6%**. Reductions of this magnitude provide support for the 10% load reduction assumed for non-modeled controls. Further development of the TSS Reduction program is anticipated to meaningfully aid in the achievement of targeted load reductions.

5 COMPLIANCE SCHEDULE

This Chapter provides the compliance schedule for each Participating Agency. The compliance schedule will be used to measure progress toward addressing the highest WQPs and achieving interim and final WQBELs and RWLs. Where deadlines are not specified within the MS4 Permit term, interim milestones are provided. The schedule is expressed as the needed structural BMP capacities over space and time. The Reasonable Assurance Analysis (RAA, Chapter 4) refines the capacity over space to the subwatershed level. The BMP capacities assume a 10% reduction over the MS4 Permit term through implementation of the nonstructural BMPs described in Chapter 3. The following section of this chapter includes the nonstructural BMP schedule.

Meeting the load reductions determined by the RAA results in an aggressive compliance schedule in terms of the technological, operational, and economic factors that affect the design, development, and implementation of the necessary control measures. Notably, as described in Chapter 6, there is currently no funding source to pay for these controls. Assuming finances are available, conversion of available land into a regional BMP is a protracted process that can take several years (not accounting acquisition, when required). As such the Group considers the compliance schedule to be as short as possible.

This is true for all WQPs—by the nature of the limiting pollutant approach, it is expected that each of the remaining WQPs will be controlled at a faster rate than zinc. So the aggressive schedule in place to target zinc provides an equally aggressive schedule to target the remaining WQPs, and as such it is considered to be as short as possible for all WQPs.

5.1 NONSTRUCTURAL BEST MANAGEMENT PRACTICES SCHEDULE

A 10% load reduction is assumed to result from the cumulative effect of nonstructural BMPs. These nonstructural BMPs consist of Minimum Control Measures, Nonstormwater Discharge Measures and Targeted Control Measures (MCMs, NSWD measures and TCMs) as described in Chapter 3.

5.1.1 NONSTRUCTURAL MINIMUM CONTROL MEASURES SCHEDULE

The MCMs will be implemented by the Participating Agencies upon approval of the WMP by the Regional Board Executive Officer or by the implementation dates provided in the MS4 Permit, where applicable. The scope of the MCM programs has expanded significantly from the prior third term MS4 Permit. This change is not entirely unexpected as a period of over ten years separates the adoption of the third and fourth term permits. Consequently significant pollutant reductions are anticipated through effective implementation of the new nonstructural MCMs. In particular, effective implementation of the Development Construction program will compliment the nonstructural TSS Reduction Strategy.

MCM provisions new to the Cities are described in WMP Section 3.2. Guidance documents have been prepared as an optional aid to Cities in MCM development/implementation – see Attachment 3.1.

5.1.2 NONSTRUCTURAL NON STORMWATER DISCHARGE MEASURES SCHEDULE

The NSWD measures will be implemented by the Participating Agencies upon approval of the WMP by the Regional Board Executive Officer or by the implementation dates provided in the MS4 Permit, where applicable. The scope of the NSWD measures has expanded from the prior third term MS4 Permit. In particular, NSWD source investigations are now tied into a robust outfall screening program required by the MS4 Permit Monitoring and Reporting Program and additional conditions have been placed on common exempt NSWDs, such as potable water discharges and irrigation runoff. Consequently significant pollutant reductions are anticipated through the resulting reductions in NSWD flows.

NSWD measures new to the Participating Agencies are described in WMP Section 3.3.

5.1.3 NONSTRUCTURAL TARGETED CONTROL MEASURES SCHEDULE

The specific Participating Agencies implementing each TCM is included in Table 3-5 in Chapter 3. The table also lists whether the TCM is a *planned* or a *potential* control measure. Potential control measures are contingent upon unknown factors such as governing body approval and as such implementation within the MS4 Permit term cannot be guaranteed. Descriptions of each nonstructural TCM are included in WMP Section 3.4.

Uncertainties associated with the targeted nonstructural controls complicate establishment of specific implementation dates. Despite this uncertainty, the Group has made a diligent effort to provide a clear schedule of specific actions within the current and next permit terms in order to achieve target load reductions. In addition, the status of these controls will be included in the annual watershed reports as well as through the adaptive management process in order to assess their progress in attaining targeted load reductions. Table 5-1 lists the nonstructural TCM compliance schedule.

TSS REDUCTION STRATEGY

The expanded start-date ranges for the TSS Reduction Strategy (TCM-TSS-1 to 6) are set to accommodate the time needed to develop, adopt and implement model ordinances. A successfully implemented ordinance from the City of Whittier is also included in this WMP as Appendix A-3-2. The remaining Cities will consider this ordinance as a template for their own TSS Reduction Strategy.

Complete implementation of this Program throughout the watershed is not expected by the end of the MS4 Permit term. However, as discussed in WMP Section 3.4, appreciable pollutant reductions may be realized with only partial implementation.

In the following table, for the nonstructural targeted control measures designated as a "jurisdictional effort", the Permittees that are responsible for completion of each milestone in the compliance schedule are identified in Table 3-11.

Table 5-1: Nonstructural TCM Compliance Schedule

Nonstructural TCM	Chapter 3 ID	Effort	Start date	Milestones
Prioritize facility inspections based on WQPs	TCM-ICF-1	J*	7/1/2015	Reprioritize facilities as new water quality data is collected.
Enhance tracking through use of online GIS MS4 Permit database	TCM-MRP-1	J	7/1/2015	Modify database to reflect MS4 Permit provisions by 7/1/2016.
Increased street sweeping frequency or routes	TCM-PAA-3	J	7/1/2015	Report on status with annual report submittal.
Apply for grant funding for stormwater quality projects	TCM-INI-4	W/J	7/1/2014	Suitable grants are pursued when practicable.
Refocused outreach to target audiences and WQPs	TCM-PIP-1	W/J	7/1/2015	Report on status with annual report submittal.
Train staff to facilitate LID and Green Streets implementation	TCM-PLD-1	J	7/1/2014	Complete first round by 7/1/2016. Continue periodic staff training.
LID ordinance for projects below MS4 Permit thresholds	TCM-PLD-2	J	7/1/2014	Adopt ordinance by 12/28/2017.
Encourage retrofitting of downspouts	TCM-RET-1	J	7/1/2015	Develop educational material by 1/1/2016. Supply to builders or contractors by 7/1/2016. Report on status with annual report submittal.
Prepare guidance documents to aid implementation of MCMs	TCM-SWM-1	W/J	7/1/2014	Develop documents by 7/1/2015. Revise documents as needed.
Exposed soil ordinance	TCM-TSS-1	J	7/1/2015	Develop by 12/28/2015. Adopt by 7/1/2017.
Erosion repair and slope stabilization on private property	TCM-TSS-2	J	7/1/2015	Report on status with annual report submittal.
Private parking lot sweeping ordinance	TCM-TSS-3	J	7/1/2015	Adopt ordinance by 7/1/2017.
Sweeping of private roads and parking lots	TCM-TSS-4	J	7/1/2015	Enforce TCM-TSS-3 by 12/28/2017.
Erosion repair and slope stabilization on public property	TCM-TSS-6	J	7/1/2015	Report on status with annual report submittal.
Copper reduction through implementation of SB 346	TCM-INI-1	W*	Ongoing	Milestones are independent of participating agency actions.
Lead reduction through implementation of SB 757	TCM-INI-2	W	Ongoing	Milestones are independent of participating agency actions.

Support safer consumer product regs for zinc reduction in tires	TCM-INI-3	W	Ongoing	Report on status with annual report submittal.
Incentives for irrigation reduction practices	TCM-NSWD-1	J	Ongoing	Ongoing; no interim or final milestones.
Upgraded sweeping equipment	TCM-PAA-1	J	Ongoing	Report on status with annual report submittal.
(Sanitary) Sewer System Management Plan	TCM-PAA-2	J	Ongoing	Ongoing; no interim or final milestones.
Negotiate with utilities for erosion control within ROW	TCM-TSS-5	W	Ongoing	Report on status with annual report submittal.

* W – Watershed Group effort, J – Jurisdictional effort

5.2 PLANNED PROJECT - PROPOSITION 84 GRANT AWARD

The cities of Bell Gardens, Downey, Pico Rivera, Paramount, South Gate, and Lynwood are participating in a regional multi-watershed project through the Gateway Water Management Authority (GWMA). This project applied for and was awarded funding though the Proposition 84 Grant. Initiation of this project will begin as soon as the grant contracts and funding are finalized which is expected to be in the fall of 2014. The BMPs include: thirteen (13) tree box filters and ten (10) bioretention tree wells. The project will install LID BMPs along transportation corridors to treat stormwater runoff and its associated pollutants. Table 5-2 lists the responsible Permittees for each LID BMP in the Proposition 84 Grant project and Table 5-3 lists the deadlines and status for certain project milestones.

Table 5-2: Permittees Responsible for LID BMPs in the Proposition 84 Grant Project

City	LID BMPs	Anticipated Treatment Volume[1]
Bell Gardens	(1) Tree box filter	7,258 cf
Lynwood	(10) Bioretention Tree Wells	5,870 cf
	(3) Tree box filters	21,774 cf
Paramount	(2) Tree box filters	14,516 cf
Pico Rivera	(2) Tree box filters	14,516 cf
South Gate	(2) Tree box filters	14,516 cf
Vernon	(2) Tree box filters	14,516 cf

[1] Treatment volume calculations based on a 24-hour, 0.75-inch storm, 6x6 tree box filter units, and a 1200 LF swale. Additional details and calculations used to determine treatment volumes can be found in Attachment 6: Technical Report

Table 5-3: Deadlines and Status for Prop 84 Tasks

Milestone	Deadline	Status
CEQA	January 2015	Completed
Monitoring Plan, Project Plan and Assessment, and Quality Assurance Project Plan	March 2015	Pending Approval
Preliminary Plans and Specifications	March 2015	Completed
Final Plans and Specifications	June 2015	Pending Approval
Awarded Construction Contract	July 2015	In Progress
Construction and Implementation	August 2015 – August 2016	Expected
Operation and Maintenance Plan	August 2016	Expected
Monitoring and Reporting	October 2016 – April 2017	Expected
Project Completion	April 2017	Expected

With the installation of these LID BMPs, this project is expected to reduce pollutant loads throughout the watershed. The full benefits of this project as it ties into interim and final compliance milestones will be determined during the adaptive management process. The project is currently in the design phase. Project milestones and implementation timeframes are listed below.

Design, Environmental Documentation and Design and Bid Solicitation Process

The Project went through review to determine compliance with the environmental requirements such as those outlined in the California Environmental Quality Act (CEQA) in January 2015.

The Monitoring Plan, the Project Assessment and Evaluation Plan, and the Quality Assurance Project Plan were all submitted in March 2015. The Project Assessment and Evaluation Plan was approved, and the Monitoring Plan and the Quality Assurance Project Plan are expected to be approved May 2015. Preliminary plans and specifications were developed and submitted in March 2015. Comments were received and addressed, and final plans and specifications are expected to be approved by June 2015. All proposed BMPs will be located on public property in the public right of way and therefore, issues obtaining site access are not expected as well as obtaining access agreements and easement deeds will not be required.

During the Project design and bid process, a preliminary engineering analysis will be performed for proposed designs and locations, preparation and review of design drawings and technical specifications. The Participating Agencies will collaborate in reviewing the submitted proposals and construction documents. Once the review process is complete a construction contract will be awarded and finalized by the end of July 2015.

Construction and Implementation

The Project construction and implementation process is expected to begin in August 2015. Construction is anticipated to last for approximately twelve months and completion is expected in August 2016. Associated activities for construction will include mobilization and site preparation, excavation, installation of BMPs and proper coordination with contractors. An Operation and Maintenance Plan will be developed by end of the year 2016. Monitoring and reporting will be conducted beginning in October 2016. Community event materials, survey results, and school outreach materials will all be developed by end of the year 2016. All construction, monitoring and administration activities are expected to be completed by April 2017.

5.3 STRUCTURAL BEST MANAGEMENT PRACTICE SCHEDULE

Uncertainties associated with the structural controls complicate establishment of specific implementation dates. Despite this uncertainty the Group has made a diligent effort to provide a clear schedule of specific actions within the current and next permit terms in order to achieve target load reductions.

5.3.1 STRUCTURAL MINIMUM CONTROL MEASURE SCHEDULE

Significant pollutant reductions are anticipated through each City's effective implementation of the new structural LID BMP requirements of the Planning and Land Development Program. These new MCM provisions are described in WMP Section 3.2. Guidance documents have been prepared as an optional aid to Cities in MCM development/implementation – see Attachment 3.1.

The Planning and Land Development Program will be implemented no later than June 28, 2014.

5.3.2 STRUCTURAL TARGETED CONTROL MEASURE SCHEDULE

The RAA (see Chapter 4) demonstrates the cumulative effectiveness of BMPs to be implemented, supports BMP selection, and provides volume reduction goals optimized across the entire watershed. The results are summarized for volume reduction (represented in acre-feet) for interim and final compliance milestones.

The plan depicted in the RAA is considered a potential initial scenario. Through the adaptive management process, the participating agencies may select different types of BMPs (e.g. increase implementation of green streets and reduce implementation of regional BMPs) or substitute alternative BMPs altogether (e.g., implement dry wells instead of green streets).

The wet weather volume reductions necessary for each milestone (31%, 50% and Final) for each City show the combined total estimated BMP volume (acre-feet) for right-of-way (ROW) BMPs and regional Low Impact Development (LID) BMPs on public or private parcels. Specific green streets projects were not investigated during this initial analysis for potential BMPs, therefore, the City-specific summary lists

potential regional LID BMPs that *could* be used to achieve the required interim milestones and targets. Since this WMP is a planning-level document, over time the Watershed Group will report and demonstrate that the summative effect of projects implemented add up to the required reductions for interim milestones and final targets.

Dry weather reductions are attained through a combination of non-structural practices and structural BMPs as they are implemented as part of the wet weather attainment of limits. As wet-weather BMPs are implemented, they serve to remove the dry-weather flows thus meeting the compliance set forth to achieve dry-weather reductions.

Where applicable, potential regional LID BMPs have been identified for the 31% and 50% milestones. Interim and final compliance dates identified in the RAA are the primary drivers for the structural targeted control measure schedule. As discussed in Section 3, several structural treatment project have already been completed and there are upcoming projects (e.g. Proposition 84 Grant). These projects constitute significant progress towards the 31% milestone by the 2017 target and the 50% milestone in 2024. Further implementation with feasibility studies of the projects identified within this WMP is subject to the financial strategy (See Chapter 6). Through implementation of the WMP and adaptive management there is the potential for the BMP capacity for the final compliance milestone to change, therefore, potential BMPs for final milestones were not identified.

Approach to Implementing Structural Controls

The Participating Agencies understand that targeting subsequent load reductions demands that the process of implementing structural controls begin as soon as possible. The initial phase of this process is as follows:

Right-of-Way BMPs (green street principles) - As the Participating Agencies prepare new capital improvement projects throughout their jurisdiction, a review to incorporate green street principles into the project will be done. Additionally, the Strategic Transportation Plan (STP), currently a draft document), prepared by the Gateway Water Management Authority, identifies major transportation corridors slated for significant redevelopment. The STP will require that structural stormwater BMPs be considered and incorporated into these projects where feasible. Implementation of the STP is expected to contribute to the achievement of the required metal reductions by the compliance deadlines.

Schedule: Every two years the adaptive management process will include an assessment of the effectiveness of both 1) right-of-way BMPs incorporated into CIP projects and 2) the STP in contributing toward targeted load reductions.

Regional BMPs - In each jurisdiction, potential Regional BMP locations have been identified and ranked. To maximize efficiency and resources, a feasibility study will be developed to aid in selection of the most effective BMPs. The study will provide criteria for selecting locations for regional BMPs, the process of

ground-truthing to concretely determine feasibility, and a schedule that demonstrates implementation of regional BMPs. In conjunction with development of the feasibility study, each Participating Agency will conduct a preliminary site assessment at the highest ranked potential BMP. The preliminary site assessment will include reviewing available plans, and identifying nearby stormdrain systems and drainage areas. Should information acquired during the preliminary assessment suggest the selected potential BMP to be infeasible, additional high ranked potential BMPs in that jurisdiction will be explored. By December 2016, each Participating Agency would have conducted sufficient preliminary site determinations to select a location sufficient for further exploration. Selected sites will be chosen for additional exploration to include field analysis.

Schedule: The preliminary site assessments and feasibility study will be completed by March 2016. Field analysis at selected sites will begin in December 2016.

Even though not all projects can be specified and scheduled at this time, the Participating Agencies are committed to constructing the necessary regional and right-of-way BMPs to meet the determined load reductions per applicable compliance schedules. Through implementation of the WMP and adaptive management there is the potential for the final compliance milestones to change.

Furthermore, the LACFCD will work with the Watershed group in their efforts to address source controls; assess, develop, and pursue funding for structural BMPs, and promote the use of water reuse and infiltration. As regional project scopes are further refined, the LACFCD will contribute to the WMP projects on a case-by-case basis, agreed upon with the Watershed Group.

5.4 POLLUTANT REDUCTION PLAN TO ATTAIN INTERIM & FINAL LIMITS

The following pages describe the pollutant reduction plans for each City for drainage areas within the Los Angeles River. Figure 5-1 is an illustration of the total structural BMP capacity needed to comply with final WQBELs/RWLs within the Lower LAR Watershed.

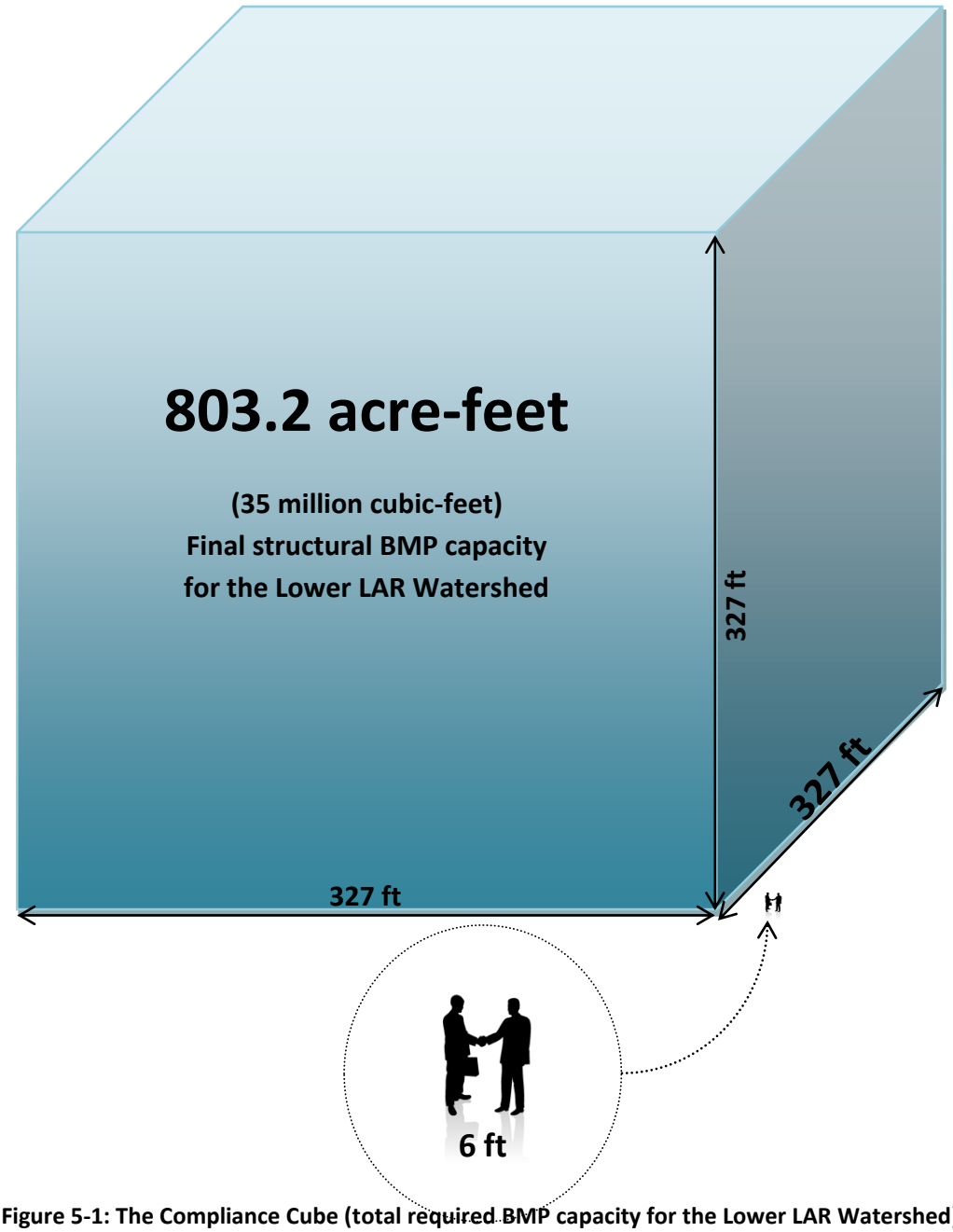


Figure 5-1: The Compliance Cube (total required BMP capacity for the Lower LAR Watershed)

5.4.1 CITY OF DOWNEY

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN*	
		Total Estimated BMP Volume (acre-ft)**	
		Incremental	Cumulative
Downey	31%	20	20
	50%	13.2	33.2
	Final	46.3	79.6

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.
** Values attained after the city's existing distributed BMP volumes totaling 1.9 acre-feet were incorporated.

According to the RAA results, the city of Downey will need to capture and/or treat 20 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 13.2 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 79.6 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Furman Park were transformed into an infiltration BMP, the park would have the potential of retaining 16.5 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 3.5 acre-feet to meet the 31% compliance milestone.

If Apollo Park were converted to an infiltration BMP, the park would have the potential of retaining 13.2 acre-feet of stormwater to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Furman Park	16.5
Right-of-Way BMPs	3.5
Total	20.0
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Apollo Park	13.2
Cumulative Total	33.2

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Downey	68,570	90%	90%	91.6%	---	---

[A] ARS partial capture systems are assigned 86% efficiency.
[B] Percentages are based on number of catch basins and number retrofitted.

5.4.2 CITY OF LAKEWOOD

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Lakewood	31%	1.1	1.1
	50%	0.0	1.1
	Final	0.0	1.1

According to the RAA results, the city of Lakewood will need to capture and/or treat 1.1 acre-feet of stormwater by September 30, 2017 to meet the 31% and 50% interim compliance milestone as well as the final compliance milestone.

To achieve the 31% interim compliance milestone of 1.1 acre-feet, Right-of-Way BMPs could be used.

31% and 50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Right-of-Way BMPs	1.1
Total	1.1

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Lakewood	N/A	67%[c]	67%[c]	100	---	---

[A] ARS partial capture systems are assigned 86% efficiency .

[B] Percentages are based on number of catch basins and number retrofitted.

[c] 67 percent reported due to limitations of the Regional Board's reporting format. Lakewood has 6 catch basins within the Los Angeles River watershed, 2 of the 6 catch basins have ARS and CPS units, the other 4 do not as they drain to a retention basin.

5.4.3 CITY OF LONG BEACH

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN*	
		Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Long Beach	31%	1.0	1.0
	50%	72.5	73.5
	Final	245.7	319.1

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.

According to the RAA results, the city of Long Beach will need to capture and/or treat 1.0 acre-foot of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 73.5 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 319.1 acre-feet by January 11, 2028 to meet the final compliance milestone.

To achieve the 31% interim compliance milestone of 1.0 acre-feet, Right-of-Way BMPs could be used. If Houghton Park, Scherer, and Veterans Memorial Park were transformed into infiltration BMPs, the parks would have the potential of retaining 70.9 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 1.6 acre-feet to meet the 50% compliance milestone. Alternatively, The city of Long Beach's Municipal Urban Stormwater Treatment (MUST) project, being designed to have a potential treatment capacity of approximately 4, 700 acres could be used to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Right-of-Way BMPs	1.0
Total	1.0
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Houghton Park	27.9
Scherer Park	25.8
Veterans Memorial Park	17.2
Right-of-Way BMPs	1.6
Cumulative Total	73.5

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Long Beach	149,759	NR[C]	NR[C]	92%	---	---

[A] ARS partial capture systems are assigned 86% efficiency. [B] Percentages are based on number of catch basins and number retrofitted. NR report was not required by the MS4 Permit in effect at that time.

5.4.4 CITY OF LYNWOOD

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Lynwood	31%	34.2	34.2
	50%	16.7	50.9
	Final	44.5	95.4

According to the RAA results, the city of Lynwood will need to capture and/or treat 34.2 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 50.9 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 95.5 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Lynwood City Park and Yvonne Burke-John D. Ham Park were transformed into infiltration BMPs, the parks would have the potential of retaining 22.4 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 11.8 acre-feet to meet the 31% compliance milestone.

If Lynwood Meadows Park and Rose Park were transformed into infiltration BMPs, the parks would have the potential of retaining 2.5 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 13.2 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Lynwood City Park	12.0
Yvonne Burke-John D. Ham Park	10.4
Right-of-Way BMPs	11.8
Total	34.2
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Lynwood Meadows Park	1.8
Rose Park	1.7
Right-of-Way BMPs	13.2
Cumulative Total	50.9

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Lynwood	46,467	92%	92%	96%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .

[B]Percentages are based on number of catch basins and number retrofitted

5.4.5 CITY OF PARAMOUNT

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN*	
		Total Estimated BMP Volume (acre-ft)**	
		Incremental	Cumulative
Paramount	31%	20.9	20.9
	50%	8.5	29.3
	Final	47.2	76.5

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.
** Values attained after the city's existing distributed BMP volumes totaling 7.1 acre-ft were incorporated in the RAA

According to the RAA results, the city of Paramount will need to capture and/or treat 20.9 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 29.3 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 76.5 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Ralph C. Dills Park was transformed into an infiltration BMP, the parks would have the potential of retaining 17.9 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 3.0 acre-feet to meet the 31% compliance milestone.

If Spane Park was transformed into an infiltration BMP, the parks would have potential of retaining 5.3 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 3.2 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Ralph C. Dills Park	17.9
Right-of-Way BMPs	3.0
Total	20.9
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Spane Park	5.3
Right-of-Way BMPs	3.2
Cumulative Total	29.3

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Paramount	44,490	94%	94%	94%	---	---

[A]ARS partial capture systems are assigned 86% efficiency. [B]Percentages are based on number of catch basins and number retrofitted.

5.4.6 CITY OF PICO RIVERA

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)	
		Incremental	Cumulative
Pico Rivera	31%	39.4	39.4
	50%	0.0	39.4
	Final	1.8	41.2

According to the RAA results, the city of Pico Rivera will need to capture and/or treat 39.4 acre-feet of stormwater by September 30, 2017 to meet the 31% and 50% interim compliance milestones, and 41.2 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Rio Hondo Park was transformed into an infiltration BMP, the parks would have the potential of retaining 14.2 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 25.2 acre-feet to meet the 31% and 50% compliance milestones.

31% & 50% Interim Compliance Milestones	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Rio Hondo Park	14.2
Right-of-Way BMPs	25.2
Cumulative Total	39.4

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Pico Rivera	22,549	84%	84%	93.7%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

5.4.7 CITY OF SIGNAL HILL

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN	
		Total Estimated BMP Volume (acre-ft)*	
		Incremental	Cumulative
Signal Hill	31%	1.2	1.2
	50%	13.8	15.0
	Final	7.1	22.1

*Values attained after the city's existing distributed BMP volumes totaling 0.2 acre-ft were incorporated

According to the RAA results, the city of Signal Hill will need to capture and/or treat 1.2 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 15 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 22.1 acre-feet by January 11, 2028 to meet the final compliance milestone.

Right-of-Way BMPs could be used for the 1.2 acre-feet to meet the 31% compliance milestone. These BMPs could be located within any city-owned street in order to avoid land acquisition.

If Signal Hill Park were transformed into infiltration BMPs, the park would have the potential of retaining 8.2 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 6.8 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Right-of-Way BMPs	1.2
Total	1.2
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Signal Hill Park	8.2
Right-of-Way BMPs	6.8
Cumulative Total	15.0

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
Signal Hill	14,220	89%	89%	90.5%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

5.4.8 CITY OF SOUTH GATE

Jurisdiction	Milestone	POLLUTANT REDUCTION PLAN*	
		Total Estimated BMP Volume (acre-ft)**	
		Incremental	Cumulative
South Gate	31%	30.6	30.6
	50%	28.4	59.1
	Final	109.1	168.1

* Values taken directly from RAA. Differences between the sum of the incremental reduction volumes and the cumulative reduction volumes are attributed to rounding errors of the second decimal place.
** Values attained after the city's existing distributed BMP volumes totaling 4.7 acre-ft were incorporated

According to the RAA results, the city of South Gate will need to capture and/or treat 30.6 acre-feet of stormwater by September 30, 2017 to meet the 31% interim compliance milestone, 59.1 acre-feet by January 11, 2024 to meet the 50% interim compliance milestone, and 168.1 acre-feet by January 11, 2028 to meet the final compliance milestone.

If Circle Park was transformed into an infiltration BMP, the park would have the potential of retaining 38.7 acre-feet of stormwater to meet the 31% compliance milestone.

If Cesar Chavez Park and Hollydale Community Park were transformed into infiltration BMPs, the parks would have potential of retaining 6.4 acre-feet of stormwater. Right-of-Way BMPs could be used for the remaining 14 acre-feet to meet the 50% compliance milestone.

31% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Circle Park	38.7
Total	38.7
50% Interim Compliance Milestone	
Potential BMP Site	Potential Design Capture Volume (ac-ft)
Cesar Chavez Park	4.8
Hollydale Community Park	1.6
Right-of-Way BMPs	14.0
Cumulative Total	59.1

TRASH TMDL COMPLIANCE[A,B]

Jurisdiction	Baseline lbs drip dry trash	10/1/2011-9/30/2012 target 70%	10/1/2013-9/30/2014 target 80%	10/1/2013-9/30/2014 target 90%	10/1/2014-9/30/2015 target 96.7%	10/1/2015-9/30/2016 target 100%
South Gate	72,333	86%	86%	92.5%	---	---

[A]ARS partial capture systems are assigned 86% efficiency .
[B]Percentages are based on number of catch basins and number retrofitted.

5.4.9 TRASH TMDL STRATEGY

The Participating Agencies have achieved greater than 90 percent compliance with the Trash TMDL by installing CPS (full capture) devices in catch basins throughout the Los Angeles River and tributaries watershed within their respective jurisdictions. The CPS installation program has been supplemented with automatic retractable screens and trash nets. The remaining catch basins not yet retrofitted with CPS devices are those that, due to physical restrictions, could not be retrofitted without major reconstruction of the catch basins.

The Participating Agencies will continue to implement watershed control measures (WCMs) to achieve the next two milestones of 96.7 and 100 percent and commit to working with the Regional Board in establishing an effective combination of: full capture, partial capture and WCMs that will meet the criteria of "deemed compliance" as will be established by the Executive Officer of the Regional Board or by the Regional Board itself.

5.4.10 LOS ANGELES RIVER ESTUARY BACTERIA TMDL

In order to meet the LAR Estuary Bacteria TDML WLA, a LRS will be developed and submitted to the Regional Board in accordance with the schedule outlined in Table 3-8 (restated here in Table 5-3). The Control Measures discussed in Chapter 3 address bacteria loads and provide reasonable assurance of meeting WQBELs, however the LRS will outline a more targeted approach to address bacteria in the Lower LAR Estuary Watershed.

Table 5-4 Lower LAR Estuary Load Reduction Strategy Submittal Deadline

Lower LAR Permittees	Implementation Action	Deadline*
Long Beach, Signal Hill, and LACFCD	Submit Load Reduction Strategy (LRS) to Regional Board	April 28, 2017
	Complete Implementation of LRS	October 28, 2021
	Achieve interim (dry-weather) WQBEL and submit report to Regional Board	October 24, 2024
	Achieve final WQBELS or demonstrate that noncompliance is due to upstream contributions and submit report to Regional Water Board	September 23, 2030

*If compliance targets are not being met, a new LRS to begin the second phase will be submitted by October 28, 2025, with complete implementation of this LRS by April 28, 2029, and final WQBELs achieved by April 28, 2031.

5.5 ESTIMATED COSTS OF STRUCTURAL BMPS

Future costs associated with regional and Right-of-Way BMPs were estimated by using costs associated with an existing regional project (Discovery Park) and estimated costs for potential regional projects. Potential regional project costs were obtained from Los Angeles County.[2] Table 5-2 includes the estimated total costs and cost per acre-foot for regional and Right-of-Way BMPs.

The cost estimates only represent permitting, material, construction, and operation and maintenance (O&M) cost - with the exception of Discovery Park which does not take into account O&M costs. The cost of land acquisition, which is estimated to be over $5,000,000 per acre, was not included since initial regional and Right-of-Way BMP projects are planned for public lands. Because of the preliminary nature of the projects, the estimates developed for the proposed BMPs on public property lie between the preliminary/order of magnitude and budget level estimates, with an expected accuracy of about minus 25 percent to plus 40 percent.[3]

Table 5-5 Existing or potential estimated structural BMP cost

Project Name	Total Estimated Cost	BMP Capacity (acre-feet)	Cost Per Acre Foot
Bethune Park	$570,000	0.9	$1,000,000
Enterprise Park	$1,240,000	3.9	$318,000
Reid Park	$1,400,000	0.6	$2,333,000
Belvedere Park	$3,700,000	13.8	$268,000
Discovery Park	$4,500,000 *	8.0	$562,500
Johnson Park	$5,060,000	20.0	$253,000
Charles White Park	$5,300,000	21.0	$252,380
Right-of Way BMPs**	-------	0.25	$250,000

* Cost does not include O&M.

** A specific project was not used for the cost estimate. Instead various projects were averaged.

Cost were derived by assuming approximately two-thirds of the projects implemented will be regional, with the remaining one-third being Right-of-Way projects. Using general assumptions for the projects above, the following costs are anticipated:

- A cost of $2,000,000 per acre foot is anticipated for projects treating less than 1 acre-foot
- A cost of $625,000 per acre foot is anticipated for projects treating between 1 and 10 acre-feet
- A cost of $260,000 per acre foot is anticipated for projects treating more than 10 acre-feet

[2] Multi-Pollutant TMDL Implementation for the Unincorporated County Area of Los Angeles River: Part 2

[3] Multi-Pollutant TMDL Implementation for the Unincorporated County Area of Los Angeles River: Part 2

5.5.1 TOTAL ESTIMATED COSTS OF STRUCTURAL BMPS

The following tables include the total estimated costs of structural BMPs for each City.

CITY OF DOWNEY STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft) Incremental	Cumulative	Total Estimated Cost
Los Angeles River	31%	19.9	19.9	$15,400,000 - $28,830,000
	50%	13.2	33.1	
	Final	45.9	79.2	

CITY OF LAKEWOOD STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft) Incremental	Cumulative	Total Estimated Cost
Los Angeles River	31%	1.1	1.1	$516,000 - $962,500
	50%	0.0	1.1	
	Final	0.0	1.1	

CITY OF LONG BEACH STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft) Incremental	Cumulative	Total Estimated Cost
Los Angeles River	31%	1.0	1.0	$62,230,000 - $116,160,000
	50%	72.5	73.5	
	Final	245.7	319.1	

CITY OF LYNWOOD STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	34.2	34.2	$18,600,000 - $34,770,000
	50%	16.7	50.9	
	Final	44.5	95.5	

CITY OF PARAMOUNT STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	20.8	20.8	$14,900,000 - $27,850,000
	50%	8.5	29.3	
	Final	47.2	76.5	

CITY OF PICO RIVERA STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	39.4	39.4	$8,030,000 - $15,000,000
	50%	0.0	39.4	
	Final	1.8	41.2	

CITY OF SIGNAL HILL STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft)		Total Estimated Cost
		Incremental	Cumulative	
Los Angeles River	31%	1.2	1.2	$4,300,000 - $8,050,000
	50%	13.8	15.0	
	Final	7.1	22.1	

CITY OF SOUTH GATE STRUCTURAL BMP COST ESTIMATE

Watershed	Milestone	POLLUTANT REDUCTION PLAN Total Estimated BMP Volume (acre-ft) Incremental	 Cumulative	Total Estimated Cost
Los Angeles River	31%	30.6	30.7	$32,800,000 - $61,200,000
	50%	28.4	59.1	
	Final	109.1	168.1	

6 FINANCIAL STRATEGY

This section outlines the financial strategy to implement the Lower LAR WMP in accordance with the MS4 Permit. The cost estimates provided herein are preliminary and based on the best available information to date. The estimates are also subject to revision as new information becomes available, including as the Watershed Control Measures (WCMs) are refined over the implementation period.

Financing the implementation of the Lower LAR WMP is the greatest challenge confronting the Watershed Group. In the absence of stormwater utility fees, the Participating Agencies have no dedicated revenue stream to pay for implementation of the WMP. In addition to current uncertainties associated with costs and funding, there are multiple uncertainties associated with future risks. The first TMDL compliance dates for the Lower LAR Watershed Group will be the interim metals milestones of 2017, 2024, and the final compliance date of 2028. Thus, there will be many deadlines that must be met despite limited resources. The Watershed Group will need to set priorities and seek funding in order to meet the various compliance deadlines.

Therefore, to address the Lower LAR Water Quality Priorities (WQPs), the Watershed Group is going to pursue a multi-faceted financial strategy to match the multi-faceted Strategy for the Selection and Implementation of WCMs outlined in Chapter 3. In addition, the Watershed Group has coordinated the proposed compliance schedule (see Section 5) with the financial strategy.

The latest Los Angeles and Long Beach MS4 permits have greatly magnified the cost challenges associated with managing stormwater. The absence of a stable stormwater funding mechanism not tied to municipal General Funds is becoming ever more critical. For that reason, the City Manager Committees of the California Contract Cities Association and the League of California Cities, Los Angeles Division, formed a City Managers' Working Group (Working Group) to review stormwater funding options after the LA County proposed Clean Water, Clean Beaches funding initiative failed to move forward. The result was a Stormwater Funding Report that notes, "the Los Angeles region faces critical, very costly, and seriously underfunded stormwater and urban runoff water quality challenges." The Report found that funding stormwater programs is so complex and dynamic, and the water quality improvement measures so costly, that Permittees cannot depend on a single funding option at this time. The City Managers' report includes a variety of recommendations, including: organizational recommendations; education and outreach program recommendations; recommendations for legislation; Clean Water, Clean Beaches recommendations; local funding options; and recommendations for the Regional Water Board[1].

The Watershed Group has considered the recommendations in the Stormwater Funding Report in developing this financial strategy. A critical component of the report is the observation that moving forward with a regional stormwater fee vote (like the LA County Clean Water, Clean Beaches funding initiative) would likely not occur until after June 2015, which means that the first funds would likely not

[1]League of California Cities. (2014). Providing Sustainable Water Quality Funding in Los Angeles County. Prepared By City Managers Working Group. Los Angeles County Division May 21, 2014.

be available until property tax payments are received in 2017. Assuming revenues of approximately $6 million per year available from a funding source based on the proposed Clean Water, Clean Beaches funding initiative, the Watershed Group could expect approximately $60 million to be available over 10 years[2]. However, these amounts may not be sufficient to pay for and maintain expensive stormwater capture and dry-weather low flow diversions to the sanitary sewer if the Watershed Group had to depend on such projects to come into compliance with receiving water limitations (RWLs) and water quality-based effluent limitations (WQBELs) specified in the MS4 Permit.

The Reasonable Assurance Analysis (RAA) for the Lower LAR WMP, indicates that the volume of water required to be captured within the Watershed to comply with RWLs and WQBELs is 803.2 acre-feet.

For cost estimation purposes, this WMP initially assumes that the Lower LAR Watershed could ultimately require the capacity to capture and infiltrate or use 803.2 acre-feet of water. Based on cost estimates for constructing regional and Right-of-Way BMPs, as discussed in Section 5.5, such a requirement could cost the watershed between $157 and $293 million for construction of these facilities (refer to Section 5.5 for more a detailed cost analysis).

The Watershed Group has been involved in the development of the financial strategy recommendations, and proposes to consider the recommendations of the City Managers Working Group to develop long-term solutions to stormwater quality funding. In the meantime, the Watershed Group will focus on the local funding options presented in the Stormwater Funding Report to secure the needed funding for initial implementation of the WMP.

During the early years of implementation, the Permittees anticipate having to depend largely on local fees such as commercial/industrial inspection fees, General Fund expenditures and, potentially, Clean Water State Revolving Fund program financing agreements to fund the implementation of the WCMs. The Watershed Group will seek opportunities to leverage the limited funds available. It will do this by financially supporting the efforts of others, such as the California Stormwater Quality Association (CASQA), to seek State approval of true source control measures such as implementation of the Safer Consumer Product Regulations adopted by the Department of Toxic Substances Control in 2013. The Group will also support programs to increase water conservation, reduce dry-weather discharges to the storm drain system, and reduce TSS during wet weather. Successfully accomplishing these efforts could reduce the money needed in the long term to capture and/or treat stormwater discharges to comply with TMDLs and address other WQPs.

Concurrently, the Watershed Group proposes to work with the California Contract Cities, the Los Angeles Division of the League of California Cities, and others to educate elected officials and voters about the water quality problems facing the region and the need to develop an equitable financing mechanism to fund the programs and facilities necessary to come into compliance with water quality regulations.

[2] Based on numbers derived for Los Cerritos Channel (LCC) during the development of the LCC WMP using expected annual revenue from a pro rata distribution of funds allocated to the Cities in the LCC Watershed and a possible proportional allocation of funds from the Watershed Authority Groups.

Legislative solutions will be necessary to clarify the application of Proposition 218 to fees for the capture and use of stormwater in light of a recent 6th Appellate Court decision and to ensure that any State water bond put on the ballot in fall 2014 contains funding for stormwater quality projects. The Group will also support local and statewide efforts to amend Proposition 218 to have stormwater fees treated in the same manner as water, sewage, and refuse fees. The Watershed Group and/or the Participating Agencies will also seek grants to implement rainwater capture and reuse or capture and infiltrate projects on publicly owned property.

In the long term, financing the WCMs for the Lower LAR Watershed will require establishing dependable revenue streams for local water quality programs. Accomplishing this formidable task will require the cooperation of many entities, including business and environmental organizations and the Regional Board.

7 LEGAL AUTHORITY

MS4 Permit §VI.C.5.b.iv.6 (LA)/ §VII.C.5.h.vi (LB)

This section covers information such as documentation and references/links to water quality ordinances for each participating that demonstrates adequate legal authority to implement and enforce Watershed Control Measures (WCMs) identified in this plan and as required in Section VI.D.5.b.iv.6 of the MS4 Permit. The goal of these WCMs is to create an efficient program that focuses on the watershed priorities by meeting the following objectives:

- Prevent or eliminate non-storm water discharges to the MS4 that are a source of pollutants from the MS4 to receiving waters.
- Implement pollutant controls necessary to achieve all applicable interim and final water quality-based effluent limitations and/or receiving water limitations pursuant to corresponding compliance schedules.
- Ensure that discharges from the MS4 do not cause or contribute to exceedances of receiving water limitations.

The WCMs include the minimum control measures, nonstormwater discharge measures and targeted control measures (i.e. controls to address TMDL and 303(d) listings). As the requirement to incorporate these WCMs is an element of the MS4 Permits, the legal authority to implement them results from each agency's legal authority to implement the NPDES MS4 Permit.

A copy of each participating agency's legal authority certification from their chief legal counsel can be found in Appendix A-7-1. Table 7-1 includes the section that covers water quality ordinance for each agency with a reference link.

Table 7-1 Water quality ordinance language

City	Water Quality Ordinance	Reference
Downey	Article V- Sanitation, Chapter 7, Stormwater and Urban Runoff Pollution and Conveyance Controls	http://qcode.us/codes/downey/
Section 5701. Watershed Management Program - *Notwithstanding other provisions in the Downey Municipal Codes, the MS4 Permit requires the City of Downey to implement the Watershed Management Program (WMP), and any subsequent amendments, are hereby incorporated into this Ordinance by reference. (Added by Ord. 1142, adopted 02-11-03; amended by Ord. 1320, adopted 11-12-13).*		
Lakewood	Article 05 (V) - Sanitation-Health, Chapter 8, Stormwater and Urban Runoff Pollution Control	http://weblink.lakewoodcity.org/weblink8/
5800 - Adoption of the Los Angeles County Stormwater Runoff Pollution Control Ordinance - *Except as otherwise provided in this Chapter, the stormwater runoff pollution control ordinance of the County of Los Angeles contained in Chapter 12.80 of Title 12- Environmental Protection of the Los Angeles County Code relating to control of pollutants carried by stormwater and runoff adopted by the County of Los Angeles on June 9, 1998, is hereby adopted and made a part hereof as though set forth in full. The same shall hereafter constitute the Stormwater and Runoff Pollution Control Ordinance of the City of Lakewood relating to the control of pollutants carried by stormwater and runoff and discharging*		

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into receiving water of the United Stated.		
Long Beach	Volume II-Title 18-Building and Construction, Chapter 18.61, NPDES and SUSMP Regulations	http://library.municode.com/index.aspx?clientId=16115
18.61.010 Purpose - *The purpose of this chapter is to provide regulations and give legal effect to certain requirements of the National Pollutant Discharge Elimination System (NPDES) permit issued to the City of Long Beach, and the subsequent requirements of the Standard Urban Storm Water Mitigation Plan (SUMSP), mandated by the California Regional Water Quality Control Board, Los Angeles Region (RWQCB). The intent of these regulations is to effectively prohibit non-storm water discharges into the storm drain systems or receiving waters and to require source control BMP to prevent or reduce the discharge of pollutants into storm water to the maximum extent practicable.* *The City of Long Beach is a participant member of this watershed group but is under a different MS4 Permit. Certification of legal authority will be in accordance with its MS4 Permit timeline.*		
LACFCD	Flood Control District Code, Chapter 21 - Stormwater and Runoff Pollution Control	https://library.municode.com/index.aspx?clientId=16274
21.01 - Purpose and Intent - *The purpose and intent of this chapter is to regulate the stormwater and non-stormwater discharges to the facilities of the Los Angeles County Flood Control District for the protection of those facilities, the water quality of the waters in and downstream of those facilities, and the quality of the water that is being stored in water-bearing zones underground.*		
Lynwood	Chapter 14- Water and Sewer, 14-12, Stormwater and Urban Runoff Pollution Control	http://www.codepublishing.com/ca/lynwood/
14-12.3 Purpose and Intent - (b) -*The intent of this Section is to protect and enhance the quality of watercourses, water bodies, and wetlands within the City in a manner consistent with the Federal Clean Water Act, the California Porter-Cologne Water Quality Control Act, and the Municipal NPDES Permit.* *(c) This Section is also intended to provide the legal authority necessary for the City to control discharges to and from those portions of the Municipal Stormwater System over which it has jurisdiction as required by the Municipal NPDES Permit, and thereby comply with the terms of the Municipal NPDES Permit while the CSWMP and the WMAP are being developed by the permittees under the Municipal NPDES Permit, and thereafter to implement the CSWMP and WMAP, or other programs, developed under the Municipal NPDES Permit. (Ord. #1443, §1)*		
Paramount	Chapter 48 - Urban Stormwater Management	http://www.paramountcity.com/code.cfm?task=detail2&ID=20
Sec. 48-2.1. Purpose and intent - *The purpose of this chapter is to protect the health and safety of the residents of the city by protecting the beneficial uses of receiving waters within the city from pollutants carried by storm water and non-storm water discharges. The intent of this chapter is to enhance and protect the water quality of the receiving waters of the city and the United States, consistent with the Act. (Ord. No. 892)* Sec. 48-2.2. Applicability of this chapter - *The provisions of this chapter shall apply to the discharge, deposit or disposal of any storm water and/or runoff to the storm drain system and/or receiving waters within any incorporated area covered by a NPDES municipal storm water permit. (Ord. No. 892)*		
Pico Rivera	Title 16- Environment, Chapter 16.04, Stormwater and Urban Runoff Pollution Prevention	http://qcode.us/codes/picoriver a

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16.01.010 Purpose and Intent (4) - *Reducing pollutant loads in storm water and urban runoff, from land uses and activities identified in the municipal NPDES permit.* *The provisions of this chapter are adopted pursuant to the Federal Water Pollution Control Act, also known as the "Clean Water Act," codified and amended at 33 U.S.C 1251 et seq. The intent of this chapter is to enhance and protect the water quality of the receiving waters of the United States in a manner that is consistent with the Clean Water Act and acts amendatory thereof of supplementary thereto; applicable implementing regulations; the Municipal NPDES permit, and any amendment, revisions, or re-issuance thereof. (Ord. 989 § 1 (part), 2002).*		
Signal Hill	Chapter 12.16- Stormwater/ Urban Runoff	http://www.amlegal.com/library/ca/signalhill.shtml
12.16.020 Purpose and Intent - *The purpose of this chapter is to protect the public health, welfare and safety and to reduce the quantity of pollutants being discharged to the waters of the United States through: (D) The protection and enhancement of the quality of the waters of the United States in a manner consistent with the provisions of the Clean Water Act;*		
South Gate	Title 6 - Health and Sanitation, Section 6.67, Storm Drains	http://codepublishing.com/CA/southgate/
6.67.010 General Provisions, A- Purpose and Intent - *The purpose of this chapter is to protect the public health, welfare and safety and to reduce the quantity of pollutants being discharged to the waters of the United States. This chapter has the following objectives: 4. The protection and enhancement of the quality of the waters of the United States in a manner consistent with the provisions of the Clean Water Act (CWA);*		

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8 COORDINATED INTEGRATED MONITORING PROGRAM

The Participating Agencies have developed a customized coordinated integrated monitoring program (CIMP). The CIMP, based on the provisions set forth in Part IV of the MRP (Attachment E) of the MS4 Permit, assesses progress toward achieving the water quality-based effluent limitations and receiving water limitations per the compliance schedules, and progress toward addressing water quality priorities. The customized monitoring program is designed to address the Primary Objectives detailed in Attachment E, Part II.A of the MS4 Permit and includes the following program elements:

- Receiving Water Monitoring
- Storm Water Outfall Monitoring
- Non-Storm Water Outfall Monitoring
- New Development/Re-Development Effectiveness Tracking
- Regional Studies

The CIMP is included in Appendix A-8-1.

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9 ADAPTIVE MANAGEMENT PROCESS

Adaptive management is the process by which new information about the state of the watershed is incorporated into the WMP. The WMP is adaptively managed following the process described in Permit §IV.C.8. The process is implemented by the participating agencies every two years from the date of WMP approval by the Regional Water Board (or by the Executive Officer on behalf of the Regional Water Board). The purpose of the adaptive management process is to improve the effectiveness of the WMP based on – but not limited to – consideration of the following:

1. Progress toward achieving interim and/or final water quality-based effluent limitations and/or receiving water limitations in §VI.E and Attachments L through R of the MS4 Permit, according to established compliance schedules;
2. Progress toward achieving improved water quality in MS4 discharges and achieving receiving water limitations through implementation of the watershed control measures based on an evaluation of outfall-based monitoring data and receiving water monitoring data;
3. Achievement of interim milestones;
4. Re-evaluation of the water quality priorities identified for the Watershed Management Area (WMA) based on more recent water quality data for discharges from the MS4 and the receiving water(s) and a reassessment of sources of pollutants in MS4 discharges;
5. Availability of new information and data from sources other than the MS4 Permittees' monitoring program(s) within the WMA that informs the effectiveness of the actions implemented by the Permittees;
6. Regional Water Board recommendations; and
7. Recommendations for modifications to the Watershed Management Program solicited through a public participation process.

9.1 MODIFICATIONS

Based on the results of the adaptive management process, the participating agencies may find that modifications of the WMP are necessary to improve effectiveness. Modifications may include new compliance deadlines and interim milestones, with the exception of those compliance deadlines established in a TMDL.

9.1.1 REPORTING

Modifications are reported in the Annual Report, as required pursuant to Part XVIII.A.6 of the Permit Monitoring and Reporting Program (No. CI-6958), and as part of the Report of Waste Discharge (ROWD) required pursuant to Part II.B of Attachment D – Standard Provisions. The background and rational for these modifications are included by addressing the following points:

- Identify the most effective control measures and describe why the measures were effective and how other control measures will be optimized based on past experiences.

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- Identify the least effective control measures and describe why the measures were deemed ineffective and how the control measures will be modified or terminated.
- Identify significant changes to control measures during the prior year and the rationale for the changes.
- Describe all significant changes to control measures anticipated to be made in the next year and the rationale for the changes. Those changes requiring approval of the Regional Water Board or its Executive Officer shall be clearly identified at the beginning of the Annual Report.
- Include a detailed description of control measures to be applied to New Development or Re-development projects disturbing more than 50 acres.
- Provide the status of all multi-year efforts that were not completed in the current year and will continue into the subsequent year(s).

9.1.2 IMPLEMENTATION

Modifications are implemented upon approval by the Regional Water Board Executive Officer or within 60 days of submittal if the Regional Water Board Executive Officer expresses no objections.

9.2 RECEIVING WATER LIMITATIONS

The adaptive management process fulfills the requirements in MS4 Permit §V.A.4 to address continuing exceedances of receiving water limitations.

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10 REPORTING PROGRAM & ASSESSMENT

10.1 ANNUAL REPORT

PERMIT MRP §XV.A (LA/LB)

Each year on or before December 15th, the participating agencies will submit, either jointly or individually, an annual report to the Regional Water Board Executive Officer. The annual report will present a summary of information that will allow the Regional Board to assess implementation and effectiveness of the watershed management program[1].

The reporting process is intended to meet the following objectives:

- Each agency's participation in one or more Watershed Management Programs.
- The impact of each agency's storm water and non-storm water discharges on the receiving water.
- Compliance with receiving water limitations, numeric water quality-based effluent limitations, and non-storm water action levels.
- The effectiveness of control measures in reducing discharges of pollutants from the MS4 to receiving waters.
- Whether the quality of MS4 discharges and the health of receiving waters is improving, staying the same, or declining as a result watershed management program efforts, and/or TMDL implementation measures, or other Minimum Control Measures.
- Whether changes in water quality can be attributed to pollutant controls imposed on new development, re-development, or retrofit projects.

Annual Report will identify data collected and strategies, control measures and assessments implemented for each watershed within the participating agency's jurisdiction. The report will include summaries for each of the following seven sections as required by the MS4 Permit:

1) Stormwater Control Measures - Summary of New Development/Re-development Projects, actions to comply with TMDL provisions
2) Effectiveness Assessment of Stormwater Control Measures - Summary of rainfall data, provide assessment and compare water quality data, summary to whether or not water quality is improving
3) Non-Stormwater Control Measures - Summary of outfalls screening
4) Effectiveness Assessment of Non-Storm Water Control Measures - Summary of the effectiveness of control measures implemented
5) Integrated Monitoring Compliance Report - Report with summary of all identified exceedances of outfall-based stormwater monitoring data, we weather receiving water monitoring data, dry weather receiving water data and non-storm water outfall monitoring data
6) Adaptive Management Strategies - Summary of effective, less effective control measures

[1] Annual reports will cover summary from previous fiscal year beginning June 1st through July 30th.

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7) Supporting Data and Information - Monitoring data summary

The participating agencies will submit annual reports as required by the MS4 Permit. The Regional Board is currently preparing a reporting format. Once available, the reporting form will be incorporated into the WMP as an appendix.

10.1.1 DATA REPORTING

PERMIT MRP §XIV.L (LA/LB)

Analytical data reports will be submitted on a semi-annual basis. Data will be sent electronically to the Regional Water Board's Storm Water site at MS4stormwaterRB4@waterboards.ca.gov. These data reports will summarize:

- Exceedances of applicable WQBELs, receiving water limitations, or any available interim action levels or other aquatic toxicity thresholds.
- Basic information regarding sampling dates, locations, or other pertinent documentation.

10.1.2 CHRONIC TOXICITY REPORTING

PERMIT MRP §XII.K (LA/LB)

Aquatic toxicity monitoring results will be submitted to the Regional Board on an annual basis as part of the integrated monitoring compliance report as well as in the semi-annual basis data report submittal.

10.2 WATERSHED REPORT

PERMIT MRP §XVII.A (LA/LB)

The participating agencies will submit biennial watershed reports as required by the MS4 Permit to the Regional Water Board Executive Officer. This biennial report, which will be included in the annual report in odd years, will include information related to the following sections:

- Watershed Management Area
- Subwatershed (HUC-12) Description
- Permittees Drainage Area within the Subwatershed

Per MS4 Permit § XVII.B, the participating agencies may reference the Watershed Management Program (WMP) in the odd-year report, when the required information is already included or addressed in this WMP, to satisfy baseline information requirements.

The Regional Board is currently preparing a reporting format. Once available, the reporting form will be incorporated into the WMP as an appendix.

10.3 TMDL REPORTING

PERMIT MRP §XIX (LA/LB)

The participating agencies will also submit an annual report to the Regional Water Board Executive Officer regarding progress of TMDL implementation within the watershed.

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The TMDLs that will be addressed in the report are:

- Trash
- Nitrogen Compounds
- Metals
- Bacteria, and
- Harbor Toxics

The Regional Board is currently preparing a reporting format. Once available, the reporting form will be incorporated into the WMP as an appendix.

RB-AR12428

Watershed Management Program Appendix 1

A-1-1 Definitions, Acronyms and Abbreviations

DEFINITIONS, ACRONYMS AND ABBREVIATIONS

The following are definitions for terms in this Watershed Management Program:

Bacteria Total Maximum Daily Load (TMDL) Dry Weather: Defined in the Bacteria TMDLs as those days with less than 0.1 inch of rainfall and those days occurring more than 3 days after a rain.

Bacteria Total Maximum Daily Load (TMDL) Wet Weather: Defined in the Bacteria TMDLs as a day with 0.1 inch or more of rain and 3 days following the rain event.

Baseline Waste Load Allocation: The Waste Load Allocation assigned before reductions are required. The progressive reductions in the Waste Load Allocations are based on a percentage of the Baseline Waste Load Allocation. The Baseline Waste Load Allocation for each jurisdiction was calculated based on the annual average amount of trash discharged to the storm drain system from a representative sampling of land use areas, as determined during the Baseline Monitoring Program.

Basin Plan: The Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, adopted by the Regional Water Board on June 13, 1994 and subsequent amendments.

Beneficial Uses: The existing or potential uses of receiving waters as designated by the Regional Board in the Basin Plan.

Best Management Practices (BMPs): BMPs are practices or physical devices or systems designed to prevent or reduce pollutant loading from and or volume of stormwater or nonstormwater discharges to receiving waters.

Commercial Development: Any development on private land that is not heavy industrial or residential. The category includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities; mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes.

Commercial Malls: Any development on private land comprised of one or more buildings forming a complex of stores which sells various merchandise, with interconnecting walkways enabling visitors to easily walk from store to store, along with parking area(s). A commercial mall includes, but is not limited to: mini-malls, strip malls, other retail complexes, and enclosed shopping malls or shopping centers.

Daily Generation Rate (DGR): The estimated amount of trash deposited within a representative drainage area during a 24hour period, derived from the amount of trash collected from streets and catch basins in the area over a 30-day period.

Disturbed Area: An area that is altered as a result of clearing, grading, and/or excavation.

Effluent Limitation: Any restriction imposed on quantities, discharge rates, and concentrations of pollutants, which are discharged from point sources to waters of the U.S.

Environmentally Sensitive Areas (ESAs): An area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments (California Public Resources Code § 30107.5). Areas subject to stormwater mitigation requirements are: areas designated as Significant Ecological Areas by the County of Los Angeles (Los Angeles County Significant Areas

Study, Los Angeles County Department of Regional Planning (1976) and amendments); an area designated as a Significant Natural Area by the California Department of Fish and Game's Significant Natural Areas Program, provided that area has been field verified by the Department of Fish and Game; an area listed in the Basin Plan as supporting the "Rare, Threatened, or Endangered Species (RARE)" beneficial use; and an area identified by a Permittee as environmentally sensitive.

Estuaries: Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater.

Hillside: Property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is 25% or greater and where grading contemplates cut or fill slopes.

Hydrologic Unit Code (HUC): A standardized watershed classification system in which each hydrologic unit is identified by a unique hydrologic unit code (HUC).

Illicit Connection: Any man-made conveyance that is connected to the storm drain system without a permit, excluding roof drains and other similar type connections. Examples include channels, pipelines, conduits, inlets, or outlets that are connected directly to the storm drain system.

Illicit Discharge: Any discharge into the MS4 or from the MS4 into a receiving water that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations.

Industrial/Commercial Facility: Any facility involved and/or used in the production, manufacture, storage, transportation, distribution, exchange or sale of goods and/or commodities, and any facility involved and/or used in providing professional and non-professional services. This category of facilities includes, but is not limited to, any facility defined by either the Standard Industrial Classifications (SIC) or the North American Industry Classification System (NAICS). Facility ownership (federal, state, municipal, private) and profit motive of the facility are not factors in this definition.

Industrial Park: A land development that is set aside for industrial development. Industrial parks are usually located close to transport facilities, especially where more than one transport modalities coincide: highways, railroads, airports, and navigable rivers. It includes office parks, which have offices and light industry.

Institutional Controls: Programmatic control measures that do not require construction or structural modifications to the MS4. Examples include street sweeping, public education, and clean out of catch basins that discharge to storm drains.

Integrated Pest Management (IPM): An ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties.

Low Impact Development (LID): LID consists of building and landscape features designed to retain or filter stormwater runoff.

Low Impact Development (LID) Plan: See "SUSMP" definition.

Maximum Extent Practicable (MEP): The process in choosing effective BMPs and rejecting applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs would not be technically feasible, or the cost would be prohibitive.

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National Pollutant Discharge Elimination System (NPDES): The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA §307, 402, 318, and 405.

Natural Drainage System: A natural drainage system is a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

New Development: Land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision.

Nonstormwater Discharge: Any discharge into the MS4 or from the MS4 into a receiving water that is not composed entirely of stormwater.

Not Detected (ND): Sample results which are less than the laboratory's minimum detection level.

Nuisance: Anything that meets all of the following requirements: (1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; (2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.; (3) occurs during, or as a result of, the treatment or disposal of wastes.

Receiving Water: A "water of the United States" into which stormwater runoff is or may be discharged.

Receiving Water Limitation: Any applicable numeric or narrative water quality objective or criterion, or limitation to implement the applicable water quality objective or criterion.

Redevelopment: Land-disturbing activity that results in the creation, addition, or replacement of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of a routine maintenance activity; and land disturbing activities related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

Significant Ecological Areas (SEAs): An area that is determined to possess an example of biotic resources that cumulatively represent biological diversity, for the purposes of protecting biotic diversity, as part of the Los Angeles County General Plan.

Source Control BMP: Any schedules of activities, prohibitions of practices, maintenance procedures, managerial practices or operational practices that aim to prevent stormwater pollution by reducing the potential for contamination at the source of pollution.

SUSMP: The Los Angeles Countywide Standard Urban Stormwater Mitigation Plan. The SUSMP shall address the Planning and Land Development conditions and requirements of the MS4 Permit.

Wet Season: The calendar period beginning October 1 through April 15.

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Acronym/Abbreviation	Full Phrase/Definition
µg/L	micrograms per Liter
303(d) List	California's Clean Water Act Section 303(d) List
ASBS	Areas of Special Biological Significance
Basin Plan	Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties
BMP	Best Management Practices
Caltrans Permit	The State Board's Caltrans NPDES Permit, Order No. 2012-0011-DWQ
CASQA	California Stormwater Quality Association
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGP	The State Board's Construction General Permit Order No. 2009-0009-DWQ, or as amended.
CIMP	The Lower Los Angeles River Watershed Group Coordinated Integrated Monitoring Program.
Cities	The Lower Los Angeles River Watershed Group participating cities, only.
County	The LACFCD and the LA County DPW
CTR	California Toxics Rule
CWA	Clean Water Act
CWC	California Water Code
DC	Development Construction Program
ELRS	Equivalent Load Reduction Strategy
EPA	United States Environmental Protection Agency
GIS	Geographical Information System
gpd	gallons per day
GWMA	Gateway Water Management Authority
HUC	Hydrologic Unit Code
ICF	Industrial/Commercial Facilities Program
ICID	Illicit Connection and Illicit Discharge Elimination Program
IGP	The State Board's Industrial Storm Water General Permit Order No. 2014-0057-DWQ, or as amended.
INI	Initiatives (as defined in the WMP)
IPM	Integrated Pest Management
JSWMP	Jurisdictional Stormwater Management Program
LA	Load Allocations
LA County DPW	Los Angeles County Department of Public Works
LA MS4 Permit	The Los Angeles Regional Water Quality Control Board Order No. R4-2012-0175, only (excluding LB MS4 and Caltrans Permits).
LACFCD	Los Angeles County Flood Control District
LB MS4 Permit	The Los Angeles Regional Water Quality Control Board Order No. R4-2014-0024, only (excluding LA MS4 and Caltrans Permits).
LID	Low Impact Development
LID Plan	Low Impact Development Plan

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Acronym/Abbreviation	Full Phrase/Definition
Lower LAR Watershed	Lower Los Angeles River Watershed
MCM	Minimum Control Measure
MEP	Maximum Extent Practicable
mg/L	milligrams per Liter
MGD	Million Gallons Per Day
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
MS4 Permit	The Los Angeles Regional Water Quality Control Board Order No. R4-2012-0175 and Order No. R4-2014-0024.
NAICS	North American Industry Classification System
NPDES	National Pollutant Discharge Elimination System
NSWD	Nonstormwater Discharge
Ocean Plan	Water Quality Control Plan for Ocean Waters of California
PAA	Public Agency Activities Program
Participating Agencies	The Lower Los Angeles River Watershed Group participating agencies, excluding Caltrans.
PEP	Progressive Enforcement Policy
Permittees	The County of Los Angeles and 85 cities within the coastal watersheds of Los Angeles County
PIP	Public Information and Participation Program
PLD	Planning and Land Development Program
PMP	Pollutant Minimization Plan
POTW	Publicly Owned Treatment Works
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
RAA	Reasonable Assurance Analysis
RAP	Reasonable Assurance Program
REAP	Rain Event Action Plan
Regional Board	California Regional Water Quality Control Board, Los Angeles Region
RP	Responsible Party
SEA	Significant Ecological Area
SIC	Standard Industrial Classification
SMARTS	State Water Resources Control Board's Storm Water Multiple Application and Report Tracking System
SQMP	Stormwater Quality Management Programs
SSO	Sewer Leaks, sanitary sewer overflow
State Board	California State Water Resources Control Board
State Listing Policy	State Board's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List

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Acronym/Abbreviation	Full Phrase/Definition
SUSMP	Standard Urban Stormwater Mitigation Plan
SWPPP	Stormwater Pollution Prevention Plan
SWQDv	Stormwater Quality Design Volume
TAC	Technical Advisory Committee
TCM	Targeted Control Measure
TMDL	Total Maximum Daily Load
TRA	Training
TSS	Total Suspended Solids
WAG	Watershed Authority Group
WDID	Waste Discharge Identification
WLA	Waste Load Allocations
WMP	The Lower Los Angeles River Watershed Group Watershed Management Program
WQBEL	Water Quality Based Effluent Limitations
WQO	Water Quality Objective
WQP	Water Quality Priority
WRP	Water Reclamation Plant

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Watershed Management Program Appendix 2

A-2-1 2010 303(d) List

Lower LA River Watershed 303(d) Listed Segments

REGION NAME	WATER BODY NAME	POLLUTANT	POLLUTANT CATEGORY	COMMENTS INCLUDED ON 303(d) LIST	POTENTIAL SOURCES	SOURCE CATEGORY
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Chlordane (sediment)	Pesticides	Historical use of pesticides and lubricants.	Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	DDT (sediment)	Pesticides	Historical use of pesticides and lubricants.	Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	PCBs (Polychlorinated biphenyls) (sediment)	Other Organics	Historical use of pesticides and lubricants.	Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Sediment Toxicity	Toxicity		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Estuary (Queensway Bay)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Ammonia	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Ammonia	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Cadmium	Metals/Metalloids		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Copper, Dissolved	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Copper, Dissolved	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Cyanide	Other Inorganics		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Diazinon	Pesticides		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Nutrients (Algae)	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Nutrients (Algae)	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Zinc, Dissolved	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	Zinc, Dissolved	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	pH	Miscellaneous		Point Source	Unspecified Point Source

Lower LA River Watershed 303(d) Listed Segments

Regional Board 4 - Los Angeles Region	Los Angeles River Reach 1 (Estuary to Carson Street)	pH	Miscellaneous		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Ammonia	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Ammonia	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Copper	Metals/Metalloids		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Nutrients (Algae)	Nutrients		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Nutrients (Algae)	Nutrients		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Oil	Nuisance		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Los Angeles River Reach 2 (Carson to Figueroa Street)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Compton Creek	Benthic-Macroinvertebrate Bioassessments	Miscellaneous		Source Unknown	Source Unknown
Regional Board 4 - Los Angeles Region	Compton Creek	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Compton Creek	Copper	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Compton Creek	Copper	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Compton Creek	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	pH	Miscellaneous		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Compton Creek	pH	Miscellaneous		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Coliform Bacteria	Pathogens		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Coliform Bacteria	Pathogens		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Copper	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Copper	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Lead	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Lead	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Toxicity	Toxicity		Nonpoint Source	Unspecified Nonpoint Source

Lower LA River Watershed 303(d) Listed Segments

Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Toxicity	Toxicity		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Trash	Trash		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Trash	Trash		Surface Runoff	Urban Runoff
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Trash	Trash		Urban Runoff/Storm Sewers	Urban Runoff
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Zinc	Metals/Metalloids		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	Zinc	Metals/Metalloids		Nonpoint Source	Unspecified Nonpoint Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	pH	Miscellaneous		Point Source	Unspecified Point Source
Regional Board 4 - Los Angeles Region	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)	pH	Miscellaneous		Nonpoint Source	Unspecified Nonpoint Source

Watershed Management Program Appendix 2

A-2-2 Mass Emission Station Monitoring Results

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	4.1	11.9	1.9	1.4	0	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.016	0	0.0763	0	0	0.051
pH	Comp	SM4500H B	0-14		8.85	7.01	7.44	7.09	8.44	9.87
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	14.2	8.34	7.6	6.74	8.6	5.04
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20	MPN/100ml	2200000	50000	900000	1300000	22000	500
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	1400000	30000	11000	800000	1100	20
Ratio Fecal Coliform/Total Coliform					0.64	0.6	0.012	0.62	0.05	0.04
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	700000	240000	230000	300000	500	700
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	170000	80000	80000	300000	500	300
General										
Chloride	Comp	EPA300.0	2	mg/L	111	6.73	10.9	13.2	121	108
Fluoride	Comp	EPA300.0	0.1	mg/L	0.48	0.11	0.24	0.15	0.49	0.6
Nitrate	Comp	EPA300.0	0.1	mg/L	29.9	2.99	3.84	2.52	1.45	3.6
Sulfate	Comp	EPA300.0	0.1	mg/L	123.8	9.42	13.8	22.6	147	124
Alkalinity	Comp	EPA310.1	4	mg/L	139	32	55	53.9	213	94
Hardness	Comp	EPA130.2	2	mg/L	210	48	52.8	76	340	230
COD	9i	EPA410.4	10	mg/L	101.9	21.8	93	34	176.3	110.5
TPH	Grab	EPA418.1	1	mg/L	1.6	0	4.3	1.5	0	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	996	133.2	175.1	212	1100	1146
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	572	96	108	146	732	780
Turbidity	Comp	EPA180.1	0.1	NTU	5.33	140	73.7	118.2	1.48	6.19
Total Suspended Solids	Comp	EPA160.2	2	mg/L	11	172	197	1045	105	97
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	10	20	14	10	42	44
MBAS	Comp	EPA425.1	0.05	mg/L	0.127	0	0.104	0.062	0.079	0.138
Total Organic Carbon	Comp	EPA415.1	1	mg/L	14.4	6.51	10.1	5.65	11.3	17.1
BOD	Comp	SM5210B	2	mg/L	65.86	16.2	12.2	7.6	62.9	198
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.684	0.087	0.37	0.181	0.78	0.288
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	0.774	0.441	0.491	0.193	0.809	0.356
NH3-N	Comp	EPA350.3	0.1	mg/L	2.34	0.184	0.373	0	1.47	3.59
Nitrate-N	Comp	SM4110B	0.5	mg/L	6.75	0.675	0.87	0.569	0.327	0.813
Nitrite-N	Comp	SM4110B	0.03	mg/L	0	0	0.63	0	0.609	1.34
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	4	0.135	3.26	12.5	1.98	3.9
Metals										
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	126	118	0	185	0	0
Dissolved Antimony	Comp	EPA200.8	5	ug/l	1.37	1.06	1	0.71	0.69	0.76
Total Antimony	Comp	EPA200.8	5	ug/l	1.37	1.09	1.05	0.86	0.69	0.77
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	2.06	2.61	1.25	0	3.43	0
Total Arsenic	Comp	EPA200.8	5	ug/l	2.06	5.84	1.32	1.48	3.43	0
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0.27	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	0.42	0	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	2.01	0.94	3.1	6.99	3.05	1.24
Total Chromium	Comp	EPA200.8	5	ug/l	3.15	11.8	4.64	9.47	12.5	2.63
Dissolved Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Total Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	14.1	5.21	5.51	7.07	4.77	10.4
Total Copper	Comp	EPA200.8	5	ug/l	25.9	19	12.9	9.56	10	14

RB-AR12441

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Dissolved Iron	Comp	EPA200.8	100	ug/l	0	276	679	0	0	0
Total Iron	Comp	EPA200.8	100	ug/l	306	375	686	404	206	166
Dissolved Lead	Comp	EPA200.8	5	ug/l	0.76	3.1	4.29	0	0.63	0
Total Lead	Comp	EPA200.8	5	ug/l	5.35	9.91	4.62	2.26	1.82	0.97
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	7.22	3.24	7.52	5.54	5.62	6.29
Total Nickel	Comp	EPA200.8	5	ug/l	10	16.1	8.61	6.84	21.8	6.99
Dissolved Selenium	Comp	EPA200.8	5	ug/l	4.07	0	0	0	2.04	0
Total Selenium	Comp	EPA200.8	5	ug/l	4.07	0	0	0	2.04	0
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	45.3	35	74	10	25.1	54
Total Zinc	Comp	EPA200.8	50	ug/l	54	50	83	46	25.1	85
Semi-Volatiles Organics (EPA 625)										
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dichloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dimethylpheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dinitropheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-chloro_3_methylpheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Pentachloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Dimethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0

RB-AR12442

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0	0	0.179	0.05	0.155	0.037

RB-AR12443

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0203-01	0203-02	0203-03	0203-05	0203-01	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	03/15/2003	10/10/2002	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

RB-AR12444

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	0	12	0	1.3	1.6	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.043	0	0.009	0	0	0.009
pH	Comp	SM4500H B	0-14		7.67	6.95	7.64	7.37	6.57	9.36
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	8.6	8.3	9.83	9.58	7.29	16.57
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20	MPN/100ml	1300000	170000	500000	170000	130000	2300
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	300000	80000	300000	80000	80000	40
Ratio Fecal Coliform/Total Coliform					0.23	0.47	0.6	0.47	0.62	0.017
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	500000	300000	240000	90000	300000	40
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	300000	80000	130000	90000	130000	40
General										
Chloride	Comp	EPA300.0	2	mg/L	15.7	4.56	17.5	759	27.2	90
Fluoride	Comp	EPA300.0	0.1	mg/L	0.33	0.11	0.21	0	0	0.3
Nitrate	Comp	EPA300.0	0.1	mg/L	7.03	4.79	5.04	7.06	23.7	14.2
Sulfate	Comp	EPA300.0	0.1	mg/L	20.2	9.17	17.5	12.8	12.1	87
Alkalinity	Comp	EPA310.1	4	mg/L	75	16	44	27.5	16.5	77
Hardness	Comp	EPA130.2	2	mg/L	110	40	119	40	20.8	210
COD	9i	EPA410.4	10	mg/L	101.1	29.9	113	117	25	67.9
TPH	Grab	EPA418.1	1	mg/L	1.1	1.2	1.1	0	1.2	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	395	122.3	209	160	93.3	912
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	224	86	116	98	64	556
Turbidity	Comp	EPA180.1	0.1	NTU	244	82.5	36.5	47.3	58.3	0.72
Total Suspended Solids	Comp	EPA160.2	2	mg/L	266	72	79	305	109	7
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	64	11	4.9	26	1	7
MBAS	Comp	EPA425.1	0.05	mg/L	0.156	0	0.056	0	0	0.055
Total Organic Carbon	Comp	EPA415.1	1	mg/L	27.9	5.11	8.79	4.39	4.74	5.89
BOD	Comp	SM5210B	2	mg/L	66.08	11.3	11.8	16	31.5	76.1
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.471	0.393	0.264	0.253		0.057
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	0.59	0.443	0.276	0.4		0.065
NH3-N	Comp	EPA350.3	0.1	mg/L	1.02	0.124	0	0		0.181
Nitrate-N	Comp	SM4110B	0.5	mg/L	1.59	1.08	1.14	1.29	5.352	3.21
Nitrite-N	Comp	SM4110B	0.03	mg/L	0.816	0	0.12	0	0	0.213
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	1.81	0.322	1.58	3.46	4.08	0.98
Metals										
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	335	182	123	140	484	117
Dissolved Antimony	Comp	EPA200.8	5	ug/l	2.53	0.89	1.16	0.64	0.6	0
Total Antimony	Comp	EPA200.8	5	ug/l	2.7	0.91	1.2	0.65	0.66	0
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	0	1.26	1.11	0	0	0
Total Arsenic	Comp	EPA200.8	5	ug/l	2.41	1.34	1.19	0	0	0
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	0.33	0	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	1.42	0.83	2.23	1.33	2.17	0.66
Total Chromium	Comp	EPA200.8	5	ug/l	3.25	11.8	6.05	5.81	9.44	2.15
Dissolved Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Total Chromium +6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	19.9	4.43	12.3	4.78	5.9	3.51
Total Copper	Comp	EPA200.8	5	ug/l	34	10.7	19.3	11.6	12.1	5.58

RB-AR12445

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Dissolved Iron	Comp	EPA200.8	100	ug/l	1070	181	283	0	218	0
Total Iron	Comp	EPA200.8	100	ug/l	1070	401	392	564	620	131
Dissolved Lead	Comp	EPA200.8	5	ug/l	2.25	1.46	2.74	0	0	0
Total Lead	Comp	EPA200.8	5	ug/l	20	2.48	2.82	3.14	3.85	0.71
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	7.55	1.63	4.05	2.05	1.51	3.76
Total Nickel	Comp	EPA200.8	5	ug/l	8.04	14.9	9.26	5.89	5.2	4.75
Dissolved Selenium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Selenium	Comp	EPA200.8	5	ug/l	1.27	0	0	0	0	0
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	61.3	29	55	15	19	66
Total Zinc	Comp	EPA200.8	50	ug/l	128	86	68	39	53	76
Semi-Volatiles Organics (EPA 625)										
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dichloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dimethylpheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dinitropheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-chloro_3_methylpheno	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Pentachloropheno	Comp	EPA625	2	ug/l	0	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l		0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l		0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l		0	0	0	0	0
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l		0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l		0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l		0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l		0	0	0	0	0
Dimethyl phthalate	Comp	EPA625	0.5	ug/l		0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l		0	0	0	0	0

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l		0	0	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l		0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l		0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l		0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l		0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l		0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l		0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l		0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l		0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l		0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l		0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l		0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l		0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0.54	0	0.49	0.042	0.065	0

RB-AR12447

WEATHER CONDITION					Wet					Dry
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0203-01	0203-02	0203-03	0203-04	0203-05	0203-02
DATE					11/08/2002	12/16/2002	02/11/2003	02/25/2003	03/15/2003	04/30/2003
	Sample Type	EPA Method	PQL	Units						
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

RB-AR12448

WEATHER CONDITION					Wet	Wet	Wet	Dry	Dry
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units					
Conventional									
Oil and Grease	Grab	EPA413.1	1	mg/L	0	3.2	4.8	0	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.062	0.02	0.009	0.057	0.036
pH	Comp	SM4500H B	0-14		7.35	6.55	6.3	7.47	7.05
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	2.5	6.6	9.54	9.64	13.48
Indicator Bacteria									
Total Coliform	Grab	SM9230B	20	MPN/100ml	800000	240000	1700000	220000	230
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	170000	240000	1300000	28000	230
Ratio Fecal Coliform/Total Coliform					0.21	1	0.764705882	0.127272727	1
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	500000	300000	170000	8000	700
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	170000	300000	36000	5000	700
General									
Chloride	Comp	EPA300.0	2	mg/L	29	7.58	8.18	131	101
Fluoride	Comp	EPA300.0	0.1	mg/L	0.39	0.19	0	0.51	0.23
Nitrate	Comp	EPA300.0	0.1	mg/L	0	5.1	7.58	12.6	27.5
Sulfate	Comp	EPA300.0	0.1	mg/L	26.9	16	11.3	154	97.4
Alkalinity	Comp	EPA310.1	4	mg/L	79.2	43	34	141	141
Hardness	Comp	EPA130.2	2	mg/L	105	50	42	215	230
COD	9i	EPA410.4	10	mg/L	121	33.5	22.7	80.6	197
TPH	Grab	EPA418.1	1	mg/L	0	0	3.8	0	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	350	153.2	133.8	1095	774
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	216	124	92	620	524
Turbidity	Comp	EPA180.1	0.1	NTU	36.7	81	2.43	1.03	1.96
Total Suspended Solids	Comp	EPA160.2	2	mg/L	1339	355	113	11	6
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	265	89	25	4	3
MBAS	Comp	EPA425.1	0.05	mg/L	0.202	0.12	0.123	0.07	0.07
Total Organic Carbon	Comp	EPA415.1	1	mg/L	45.4	10.8	7.06	13.2	7.05
BOD	Comp	SM5210B	2	mg/L	94.4	25.1	15.5	8.13	80.4
Nutrients									
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.895	0.325	0.254	0.615	0.544
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	1.07	0.38	0.296	8.24	0.64
NH3-N	Comp	EPA350.3	0.1	mg/L	2.8	0	0	0	0
Nitrate-N	Comp	SM4110B	0.5	mg/L	0	1.15	1.71	2.845	6.21
Nitrite-N	Comp	SM4110B	0.03	mg/L	0	0.052	0.03	1.6	0.49
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	4.92	2.08	0.806	3.3	0.978
Metals									
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	14600	117	144	0	0
Dissolved Antimony	Comp	EPA200.8	5	ug/l	1.63	1.45	1.39	0.93	0.85
Total Antimony	Comp	EPA200.8	5	ug/l	7.24	1.5	1.43	0.97	0.88
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	2.01	1.64	1.18	2.81	1.32
Total Arsenic	Comp	EPA200.8	5	ug/l	6.28	1.68	1.27	2.81	1.86
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	4.7	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	2.75	1.6	2.65	13.1	2.83
Total Chromium	Comp	EPA200.8	5	ug/l	35.3	6.12	6.23	26.1	4.78
Dissolved Chromium □6	Comp	EPA200.8	10	ug/l	0	0	0	0	0
Total Chromium □6	Comp	EPA200.8	10	ug/l	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	4.48	7.99	10.6	10	6.73
Total Copper	Comp	EPA200.8	5	ug/l	295	20.7	16.2	19.9	8.65
Dissolved Iron	Comp	EPA200.8	100	ug/l	476	171	144	0	0
Total Iron	Comp	EPA200.8	100	ug/l	28600	412	351	154	106
Dissolved Lead	Comp	EPA200.8	5	ug/l	2.34	2.35	3.22	0.92	0
Total Lead	Comp	EPA200.8	5	ug/l	1070	3.24	3.8	1.61	0.81
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	9.9	5.21	4.11	7.23	5.23
Total Nickel	Comp	EPA200.8	5	ug/l	38.8	6.35	7.3	7.39	7.47
Dissolved Selenium	Comp	EPA200.8	5	ug/l	1.49	0	0	2.48	1.41
Total Selenium	Comp	EPA200.8	5	ug/l	1.84	0	0	2.9	1.87
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	2.91	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	17.4	59	79	22.3	97
Total Zinc	Comp	EPA200.8	50	ug/l	1030	81	104	22.3	133
Semi-Volatiles Organics (EPA 625)									
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0
2,4-dichlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0
2,4-dimethylphenol	Comp	EPA625	2	ug/l	0	0	0	0	0
2,4-dinitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0
4-chloro_3_methylphenol	Comp	EPA625	3	ug/l	0	0	0	0	0
Pentachlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0

RB-AR12449

WEATHER CONDITION						Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units					
Base/Neutral									
Acenaphthene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l	0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l	62	0	24.6	22.1	50.9
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l	0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0.9	0	0
Dimethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	1.6	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l	0	0	0	4.7	0
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l	0	0	5.2	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0
Chlorinated Pesticides									
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0
Polychlorinated Biphenyls									
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0
Organohosphate Pesticides									
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0	0	0	0	0
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0

RB-AR12450

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units					
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0
Herbicides									
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

RB-AR12451

WEATHER CONDITION					Wet				Dry	
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	2/2/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	0	0	2	1.9	0	0
Total Phenols	Grab	EPA420.1	0.1	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0	0.01	0.01	0	0.025	0.005
pH	Comp	SM4500H B	0-14		7.01	6.49	6.51	6.95	7.72	6.49
Dissolved Oxygen	Grab	SM4500O G	1	mg/L	10.7	7.97	9.58	8.56	10.21	9.64
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20	MPN/100ml	240000	500000	170000	130000	50000	3000
Fecal Coliform	Grab	SM9230B	20	MPN/100ml	130000	500000	50000	17000	50000	1300
Ratio Fecal Coliform/Total Coliform					0.54	1.00	0.29	0.13	1.00	0.43
Fecal Streptococcus	Grab	SM9230B	20	MPN/100ml	500000	170000	90000	170000	230	2400
Fecal Enterococcus	Grab	SM9230B		MPN/100ml	300000	170000	13000	170000	230	2400
General										
Chloride	Comp	EPA300.0	2	mg/L	39.6	11.8	13.6	6.68	80.1	11.8
Fluoride	Comp	EPA300.0	0.1	mg/L	0.14	0.14	0.1	0	0.21	0.14
Nitrate	Comp	EPA300.0	0.1	mg/L	0	4.06	7.75	4.61	23.3	4.06
Sulfate	Comp	EPA300.0	0.1	mg/L	65.1	12.7	12.4	7.81	86.7	12.7
Alkalinity	Comp	EPA310.1	4	mg/L	116	43	39.6	31.9	99	43
Hardness	Comp	EPA130.2	2	mg/L	175	56	50.4	48	160	56
COD	9i	EPA410.4	10	mg/L	88.2	23.4	31.2	27.4	31.9	23.4
TPH	Grab	EPA418.1	1	mg/L	0	0	1.1	2.5	0	0
Specific Conductance	Comp	EPA120.1	1	umhos/cm	485	177.9	174.8	124.1	644	177.9
Total Dissolved Solids	Comp	EPA160.1	2	mg/L	296	134	108	80	418	134
Turbidity	Comp	EPA180.1	0.1	NTU	5.5	74	12.6	102	0.75	74
Total Suspended Solids	Comp	EPA160.2	2	mg/L	1186	317	129	305	91	317
Volatile Suspended Solids	Comp	EPA160.4	1	mg/L	342	86	41	74	23	86
MBAS	Comp	EPA425.1	0.05	mg/L	0.195	0.078	0.114	0.092	0.099	0.078
Total Organic Carbon	Comp	EPA415.1	1	mg/L	14.4	7.03	8.42	8.62	8.23	7.03
BOD	Comp	SM5210B	2	mg/L	79.9	8.6	24.1	27.3	22.7	8.6
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.857	0.427	0.327	0.311	0.353	0.427
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	1.03	0.481	0.381	0.355	0.387	0.481
NH3-N	Comp	EPA350.3	0.1	mg/L	3.66	0	0	0.109	0.124	0
Nitrate-N	Comp	SM4110B	0.5	mg/L	0	0.917	1.75	1.04	5.26	0.917
Nitrite-N	Comp	SM4110B	0.03	mg/L	0.113	0.043	0	0	0.304	0.043
Kjeldahl-N	Comp	EPA351.4	0.1	mg/L	12.8	7	3.1	2.66	1.554	7
Metals										
Dissolved Aluminum	Comp	EPA200.8	100	ug/l	0	0	0	0	0	0
Total Aluminum	Comp	EPA200.8	100	ug/l	750	0	0	0	107	0
Dissolved Antimony	Comp	EPA200.8	5	ug/l	1.41	1.09	1.78	1.05	1.62	1.09
Total Antimony	Comp	EPA200.8	5	ug/l	4.81	1.15	1.82	1.08	1.85	1.15
Dissolved Arsenic	Comp	EPA200.8	5	ug/l	1.83	1.35	1.4	1.28	1.01	1.35
Total Arsenic	Comp	EPA200.8	5	ug/l	4.29	1.42	1.46	1.51	1.36	1.42
Dissolved Berylium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1	ug/l	1.42	0	0	0	0	0
Dissolved Chromium	Comp	EPA200.8	5	ug/l	3.33	1.38	2.24	1.28	1.51	1.38
Total Chromium	Comp	EPA200.8	5	ug/l	15.5	5.72	2.72	1.9	5.49	5.72
Dissolved Chromium □6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Total Chromium □6	Comp	EPA200.8	10	ug/l	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5	ug/l	6.63	8.2	12.1	11.2	12.1	8.2
Total Copper	Comp	EPA200.8	5	ug/l	123	21.2	14	12.4	23.9	21.2
Dissolved Iron	Comp	EPA200.8	100	ug/l	394	0	0	0	0	0
Total Iron	Comp	EPA200.8	100	ug/l	12500	301	174	110	165	301
Dissolved Lead	Comp	EPA200.8	5	ug/l	0.815	1.15	1.85	0.76	1.66	1.15
Total Lead	Comp	EPA200.8	5	ug/l	71.1	2.12	2.48	2.06	2.09	2.12
Dissolved Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5	ug/l	9.77	2.38	4.17	2.26	6.93	2.38
Total Nickel	Comp	EPA200.8	5	ug/l	21.8	4.07	4.96	2.58	11.6	4.07
Dissolved Selenium	Comp	EPA200.8	5	ug/l	1.86	0	0	0	1.04	0
Total Selenium	Comp	EPA200.8	5	ug/l	1.86	0	0	0	1.13	0
Dissolved Silver	Comp	EPA200.8	1	ug/l	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1	ug/l	0.808	0	0	0	0	0
Dissolved Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5	ug/l	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50	ug/l	8.97	49	60	34	84	49
Total Zinc	Comp	EPA200.8	50	ug/l	395	68	86	50	87	68
Semi-Volatiles Organics (EPA 625)										
2- Chlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dichlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dimethylphenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
2,4-dinitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0

RB-AR12452

WEATHER CONDITION					Wet				Dry	
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	2/2/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units						
4-chloro_3_methylphenol	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Pentachlorophenol	Comp	EPA625	2	ug/l	0	0	0	0	0	0
Phenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4,6-trichlophenol	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Benzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethoxy) methane	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Chloroisopropyl) ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Bis(2-Chloroethyl) ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Bis(2-Ethylhexl) phthalate	Comp	EPA625	1	ug/l	48.2	35.6	20.8	0	29.5	35.6
4-Bromophenyl phenyl ether	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Chrysene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.5	ug/l	0	1.1	1.4	0	0.9	1.1
Dimethyl phthalate	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3	ug/l	0	0	4.3	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3	ug/l	0	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Fluorene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3	ug/l	0	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/l	0	0	0.3	0	0	0
Naphthalene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.3	ug/l	0	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.5	ug/l	0	0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-BHC (lindane)	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
gamma-chlordane	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
alpha-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
beta-Endosulfan	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.1	ug/l	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/l	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1	ug/l	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0

RB-AR12453

WEATHER CONDITION					Wet				Dry	
STATION NO.					TS06	TS06	TS06	TS06	TS06	TS06
STATION NAME					Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel	Rio Hondo Channel
EVENT NO.					0304-01	0304-02	0304-03	0304-01	0304-01	0304-02
DATE					10/31/2003	12/25/2003	1/1/2004	2/2/2004	10/28/2003	1/13/2004
	Sample Type	EPA Method	PQL	Units						
Aroclor-1254	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.5	ug/l	0	0	0	0	0	0
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/l	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/l	0.202	0	0	0	0	0
Prometryn	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Atrazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Simazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Malathion	Comp	EPA507	2	ug/l	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25	ug/l	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10	ug/l	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1	ug/l	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

RB-AR12454

Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
General Chemistry												
Cyanide	0.01	mg/L	0.004				0.013	1.200	0.009	0.005	0.055	0.024
pH	mg/L			6.5 pH 8.5			6.80	6.56	6.16	6.87	9.40	8.29
TPH	1						0.00	0.00	2.00	1.50	0.00	0.00
Oil and Grease	1	mg/L	75				1.70	0.00	2.20	1.60	0.00	0.00
Total Phenols	0.1	mg/L					0.00	9.60	0.00	0.00	0.00	0.00
Dissolved Oxygen	1	mg/L		5			6.26		7.90	8.30	8.82	11.98
Calcium	1	mg/L					32.10	13.60	12.00	12.00	56.10	80.00
Magnesium	1	mg/L					4.86	3.40	2.43	3.04	13.40	34.00
Potassium	1	mg/L					9.40	2.88	3.12	1.96	11.10	6.96
Sodium	1	mg/L					18.50	13.40	12.30	12.40	95.10	63.00
Bicarbonate	2	mg/L					111.00	37.60	163.70		61.00	0.00
Carbonate	2	mg/L					0.00	0.00	0.00	0.00	66.00	0.00
Chloride	2	mg/L		150			21.30	9.89	6.39	6.28	111.00	60.50
Fluoride	0.1	mg/L		2.2			0.35	0.10	0.12	0.00	0.58	0.41
Sulfate	0.1	mg/L		350			28.90	14.30	10.40	12.30	134.00	181.00
Alkalinity	0.1	mg/L					91.30	30.80	134.20	30.80	105.00	174.00
Hardness	2	mg/L					100.0	48.0	40.0	42.5	195.0	340
COD	10	mg/L					112.70	19.40	41.90	34.95	43.00	62.10
Specific Conductance	1	umhos/cm					291	119	122	126	843	830
Total Dissolved Solids	2	mg/L		1500			186	78	74	74	582	546
Turbidity	0.1	NTU	225				211.00	30.00	1.63	17.60	1.79	1.93
Total Suspended Solids	2	mg/L					1075	551	85	146	23	35
Volatile Suspended Solids	1	mg/L					162	71	39	13	12	13
MBAS	0.05	mg/L					0.64	0.09	0.06	0.00	0.10	0.06
Total Organic Carbon	1	mg/L					38.90	7.35	6.70	7.38	12.10	5.38
BOD	2	mg/L					45.90	24.10	15.50	8.58	53.70	60.90
Nutrients												
Dissolved Phosphorus	0.05	mg/L					0.37	0.17	0.27	0.14	0.21	0.18
Total Phosphorus	0.05	mg/L					0.69	0.24	0.46	0.25	0.49	0.23
Ammonia	0.1	mg/L					4.02	0.00	1.02	0.11	1.11	1.01
NH3-N	0.1	mg/L					3.32	0.00	0.84	0.00	0.91	0.84
Nitrate	0.1	mg/L					0.00	4.77	2.66	3.55	18.10	7.23
Nitrate-N	0.5	mg/L		10			0.00	1.08	0.60	0.80	4.09	1.63
Nitrite-N	0.03	mg/L		1			0.00	0.00	0.04	0.00	1.36	0.56
Kjeldahl-N	0.1	mg/L					12.40	2.94	1.40	1.22	2.44	1.61
Indicator Bacteria												
Total Coliform	20	MPN/100ml		10,000			5,000,000	500,000	1,600,000	900,000	1,300	16,000
Fecal Coliform	20	MPN/100ml		400			240,000	50,000	500,000	160,000	170	16,000
Fecal Streptococcus	20	MPN/100ml					500,000	500,000	220,000	220,000	500	40
Enterococcus	20	MPN/100ml		104			300,000	500,000	220,000	220,000	500	40
Metals												
Dissolved Aluminum	100	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Aluminum	100	ug/l		1000			1,440	5,768	1,790	2,840	0	362
Dissolved Antimony	5	ug/l					2.68	1.25	1.43	0.65	2.11	0.57
Total Antimony	5	ug/l		6			3.25	2.55	1.78	1.14	2.11	0.59
Dissolved Arsenic	5	ug/l					2.71	1.32	1.32	0.00	1.76	1.76
Total Arsenic	5	ug/l	32	50			2.92	3.14	1.76	1.76	1.76	1.99
Dissolved Barium	10	ug/l					41.10	23.90	19.40	19.40	33.90	48.50
Total Barium	10	ug/l					77.90	152.00	50.80	64.80	37.20	56.80
Dissolved Berylium	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Beryllium	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Boron	100	ug/l					560	100	0	0	730	369
Total Boron	100	ug/l					950	1,590	0	199	1,490	618
Dissolved Cadmium	1	ug/l			1.2-3.8	1.6-8.8	0.00	0.00	0.00	0.00	0.00	0.00
Total Cadmium	1	ug/l			1.2-4.2	1.6-9.6	0.50	1.20	0.51	0.49	0.00	0.00

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
Dissolved Chromium	5	ug/l			30.9-113.0	259.1-948.2	2.00	0.76	1.09	0.85	1.60	0.76
Total Chromium	5	ug/l		50	97.7-357.7	819.9-3000.7	6.38	18.50	6.12	6.93	1.60	3.13
Dissolved Chromium □6	10	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Chromium □6	10	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Copper	5	ug/l			4.1-15.9	5.7-25.2	10.80	5.36	8.06	5.79	9.92	6.07
Total Copper	5	ug/l	12		4.3-16.5	5.9-26.2	41.50	50.60	35.20	31.10	25.50	14.50
Dissolved Iron	100	ug/l					452	0	0	159	0	0
Total Iron	100	ug/l					3,020	19,092	2,450	3,620	207	196
Dissolved Lead	5	ug/l			0.9-5.2	23.5-132.5	4.45	0.00	0.00	1.58	0.00	0.00
Total Lead	5	ug/l	8		1.0-7.44	25.4-191.1	33.90	65.00	23.80	23.40	3.60	2.40
Dissolved Manganese	30	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Manganese	30	ug/l					228	220	30	72.40	0.00	0.00
Dissolved Mercury	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Mercury	1	ug/l	0.16	2			0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Nickel	5	ug/l			24.0-91.6	215.7-823.8	15.80	3.30	3.40	2.67	5.34	4.70
Total Nickel	5	ug/l	20	100	24.0-91.8	216.1-825.5	18.30	15.40	8.79	7.59	6.11	5.36
Dissolved Selenium	5	ug/l					0.00	0.00	0.00	0.00	2.84	3.44
Total Selenium	5	ug/l	60	50			0.00	0.00	0.00	0.00	2.84	4.73
Dissolved Silver	1	ug/l				.7-10.9	0.00	0.00	0.00	0.00	0.00	0.00
Total Silver	1	ug/l	80			.8-12.8	0.00	0.71	0.00	0.00	0.00	0.00
Dissolved Thallium	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Total Thallium	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dissolved Zinc	50	ug/l			53.9-206.4	53.9-206.4	72.40	31.80	70.00	34.40	29.90	13.80
Total Zinc	50	ug/l			55.1-211.0	55.1-211.0	135.00	200.00	150.00	107.00	40.80	34.30
Semi-Volatiles												
Acenaphthylene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Acetophenone	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Anthracene	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Antracene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aminobiphenyl	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzidine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(a)anthracene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(b)fluoranthene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(k)flouranthene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzo(a)pyrene	0.1	ug/l		0.2			0.00	0.00	0.00	0.00	0.00	0.00
Butyl benzyl phthalate	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Bis(2-chloroethyl)ether	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Bis(2-Chloroethoxy) methane	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Bis(2-Ethylhexl) phthalate	1	ug/l					0.00	0.00	0.00	0.00	0.00	24.30
Bis(2-chlorisopropyl) ether	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Bromophenyl phenyl ether	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Chloroaniline	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1-Chloronaphthalene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Chloronaphthalene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Chlorophenyl phenyl ether	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Chrysene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dimethyl phthalate	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
7,12-Dimethyl-benz(a)-anthracene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
alpha,alpha-Dimethylphenethylamine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dibenz(a,j)acridine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dibenzo(a,h)anthracene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,3-Dichlorobenzene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2-Dichlorobenzene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,4-Dichlorobenzene	0.05	ug/l		5			0.00	0.00	0.00	0.00	0.00	0.00
3,3-Dichlorobenzidine	0.05	ug/l		600			0.00	0.00	0.00	0.00	0.00	0.00
Diethyl phthalate	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Dimethyl phthalate	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
di-n-Butyl phthalate	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-Dinitrotoluene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,6-Dinitrotoluene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Diphenylamine	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2-Diphenylhydrazine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
di-n-Octyl phthalate	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Ethyl methanesulfonate	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Endrin ketone	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Fluoranthene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Fluorene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Hexachlorobenzene	0.5	ug/l		1			0.00	0.00	0.00	0.00	0.00	0.00
Hexachlorobutadiene	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Hexachloro-cyclopentadiene	3	ug/l		50			0.00	0.00	0.00	0.00	0.00	0.00
Hexachloroethane	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Indeno(1,2,3-cd)pyrene	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Isophorone	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Methylcholanthrene	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Methylmethanesulfonate	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Naphthalene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1-Naphthylamine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Naphthylamine	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Nitroaniline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
3-Nitroaniline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Nitroaniline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Nitrobenzene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-butyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-dimethyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-diphenyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitroso-di-n-propyl amine	0.3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
N-Nitrosopiperidine	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pentachlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Phenacetin	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Phenanthrene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Picoline	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pronamide	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pyrene	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2,4,5-Tetra-chlorobenzene	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
1,2,4-Trichlorobenzene	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Benzoic acid	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-chloro-3-methylphenol	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-chloro_3_methylphenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2- Chlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-dichlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,6-Dichlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-dimethylphenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4-dinitrophenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4,6 Dinitro-2-methylphenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2-Methylphenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-Metholphenol	3	ug/l					3.00	0.00	0.00	0.00	0.00	0.00
2-nitrophenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4-nitrophenol	3	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pentachlorophenol	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Phenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,3,4,6-Tetrachlorophenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4,5-Trichlorophenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4,6-trichlophenol	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00

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Table C-3. Water Quality Results for Constituents Measured at the Los Angeles River Mass Emission Site for the 2004-2005 Monitoring Season.

			Water Quality Objectives				Wet Weather Monitoring [2]				Dry Weather Monitoring [2]	
CONSTITUENT	PQL	UNITS	Ocean Plan	Basin Plan	Freshwater CTR (CCC)[1]	Freshwater CTR (CMC)[1]	10/17/2004	10/26/2004	12/5/2004	1/7/2005	11/16/2004	3/17/2005
PCBs												
Aroclor-1016	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1221	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1232	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1242	0.5	ug/l		0.03	0.014		0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1248	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1254	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Aroclor-1260	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Pesticides												
Aldrin	0.05	ug/l				3	0.00	0.00	0.00	0.00	0.00	0.00
alpha-BHC	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
beta-BHC	0.05	ug/l	0.008				0.00	0.00	0.00	0.00	0.00	0.00
delta-BHC	0.05	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
gamma-BHC (lindane)	0.05	ug/l		0.2		0.95	0.00	0.00	0.00	0.00	0.00	0.00
Chlordane	0.05	ug/l			0.0043	2.4	0.00	0.00	0.00	0.00	0.00	0.00
4,4'-DDD	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4,4'-DDE	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
4,4'-DDT	0.1	ug/l			0.001	1.1	0.00	0.00	0.00	0.00	0.00	0.00
Dieldrin	0.1	ug/l			0.056	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan 1	0.1	ug/l			0.056	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan 2	0.1	ug/l	0.018		0.056	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan sulfate	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Endrin	0.1	ug/l	0.004	2	0.036	0.086	0.00	0.00	0.00	0.00	0.00	0.00
Endrin aldehyde	0.1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Heptachlor	0.05	ug/l		0.01	0.0038	0.52	0.00	0.00	0.00	0.00	0.00	0.00
Heptachlor Epoxide	0.05	ug/l		0.01	0.0038	0.52	0.00	0.00	0.00	0.00	0.00	0.00
Methoxychlor	0.5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Toxaphene	1	ug/l		3	0.0002	0.73	0.00	0.00	0.00	0.00	0.00	0.00
Diazinon	0.01	ug/l		0.08			0.070	0.030	0.083	0.00	0.06	0.00
Chlorpyrifos	0.05	ug/l		0.07			0.00	0.00	0.00	0.00	0.00	0.00
Diuron	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Malathion	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Prometryn	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Simazine	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Atrazine	2	ug/l		3			0.00	0.00	0.00	0.00	0.00	0.00
Cyanazine	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Molinate	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Thiobencarb	1	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Herbicides												
Carbofuran	5	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
2,4,5-TP-Silvex	10	ug/l		70			0.00	0.00	0.00	0.00	0.00	0.00
2,4,5-TP	1	ug/l		50			0.00	0.00	0.00	0.00	0.00	0.00
Bentazon	2	ug/l					0.00	0.00	0.00	0.00	0.00	0.00
Glyphosate	25	ug/l		700			0.00	0.00	0.00	0.00	0.00	0.00

[1] CTR values for metals are hardness dependent; higher hardness gives higher WQO

[2] Values of 0 represent that the constituent was not detected above the PQL as defined in the Municipal Stormwater Permit. Results are presented in accordance with Method B of the permit.

RB-AR12458

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0506-01	0506-02	0506-03	0506-04	0506-01	0506-02
DATE					10/17/2005	12/31/2005	01/14/2006	02/17/2006	01/24/2006	04/25/2006
	Sample Type	EPA Method	PQL	Units						
Conventional										
Oil and Grease	Grab	EPA413.1	1	mg/L	2.00	2.50	0	0	0	0
Total Phenols	Grab	EPA420.1	0.10	mg/L	0	0	0	0	0	0
Cyanide	Grab	EPA335.2	0.01	mg/L	0.0052	0	0.019	0.035	0.040	0.057
pH	Comp	SM4500H B	0-14		7.32	7.19	7.42	7	8.24	8.29
Dissolved Oxygen	Grab	SM4500O G	1.00	mg/L	6.75	7.46	12.40	8.73	15.53	14.05
Indicator Bacteria										
Total Coliform	Grab	SM9230B	20.00	MPN/100ml	90,000,000	90,000	160,000	160,000	5,000	220,000
Fecal Coliform	Grab	SM9230B	20.00	MPN/100ml	24,000,000	50,000	2,400	16,000	500	9,000
Ratio Fecal Coliform/Total Coliform					0.27	0.56	0.02	0.10	0.10	0.04
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	5,000,000	30,000	16,000	16,000	220	700
Enterococcus	Grab	SM9230B		MPN/100ml	2,400,000	30,000	16,000	16,000	220	500
General										
Chloride	Comp	EPA300.0	2.00	mg/L	7.26	9.97	32.90	31.90	113.00	102.00
Fluoride	Comp	EPA300.0	0.10	mg/L	0.13	0.13	0.26	0.15	0.41	0.42
Nitrate	Comp	EPA300.0	0.10	mg/L	5.88	3.88	5.65	5.92	10.4	11.8
Sulfate	Comp	EPA300.0	0.10	mg/L	13.60	16.80	49.10	45.90	169.00	206.00
Alkalinity	Comp	EPA310.1	4.00	mg/L	40.7	40.7	72.6	84.7	183.7	121
Hardness	Comp	EPA130.2	2.00	mg/L	52.5	45	105	130	290	300
COD	Comp	EPA410.4	10.00	mg/L	66.9	29.7799	74.127	139	65.8	159
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	2.3	3.5	0	0	0	0
Specific Conductance	Comp	EPA120.1	1.00	umhos/cm	149.9	167.2	372	407	988	1214
Total Dissolved Solids	Comp	EPA160.1	2.00	mg/L	104.00	98.00	224.00	248.00	618.00	680.00
Turbidity	Comp	EPA180.1	0.10	NTU	6.49	4.99	2.93	7.33	2.34	0.98
Total Suspended Solids	Comp	EPA160.2	2.00	mg/L	542	238	295	104	18	17
Volatile Suspended Solids	Comp	EPA160.4	1.00	mg/L	99	55	83	40	10	11
MBAS	Comp	EPA425.1	0.05	mg/L	0.5844	0.228	0.146	0.345	0.086	0.107
Total Organic Carbon	Comp	EPA415.1	1.00	mg/L	18.1	11.6	18.7	31.6	9.84	8.57
BOD	Comp	SM5210B	2.00	mg/L	25.9	22.9	36.6	52.5	68.3	48.6
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	0		0	0	0	0
Nutrients										
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.057	0.239	0.194	0.437	0.392	0.1
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	0.3411	0.391	0.508	0.851	0.481	0.211
NH3-N	Comp	EPA350.3	0.10	mg/L	0.657	0.61317	0.572	2.77	4.879	1.05
Nitrate - N	Comp	SM4110B	0.50	mg/L	1.33	0.876	1.276	1.337	2.348	2.664
Nitrite - N	Comp	SM4110B	0.03	mg/L	0.134	0.094	0.335	0.371	1.093	1.6039
Kjeidahl-N	Comp	EPA351.4	0.10	mg/L	7.02	1.6156	3.383	11.5	5.88	2.04
Metals										
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	238	108	0	0	0	0
Total Aluminum	Comp	EPA200.8	100.00	ug/L	2,400	675	472	1,860	0	156
Dissolved Antimony	Comp	EPA200.8	5.00	ug/L	1.75	0.68	1.44	2.63	0	0.68
Total Antimony	Comp	EPA200.8	5.00	ug/L	2.76	1.31	2.11	3.19	0.60	0.8
Dissolved Arsenic	Comp	EPA200.8	5.00	ug/L	1.58	0	1.3	1.73	1.12	1.89
Total Arsenic	Comp	EPA200.8	5.00	ug/L	2.34	1.34	1.80	1.88	1.95	2.4
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	22.60	10.60	27.00	38.40	20.10	34.10
Total Barium	Comp	EPA200.8	10.00	ug/L	81.10	17.30	34.40	64.40	34.00	36.10
Dissolved Beryllium	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Beryllium	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Dissolved Cadmium	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Cadmium	Comp	EPA200.8	1.00	ug/L	0.60	0	0	0.47	0	0
Dissolved Chromium	Comp	EPA200.8	5.00	ug/L	0	2.02	2.48	1.8	1.44	4.37
Total Chromium	Comp	EPA200.8	5.00	ug/L	7.18	2.54	2.93	5.02	5.94	6.43
Dissolved Chromium □6	Comp	EPA200.8	10.00	ug/L	0	0	0	0	0	0
Total Chromium □6	Comp	EPA200.8	10.00	ug/L	0	0	0	0	0	0
Dissolved Copper	Comp	EPA200.8	5.00	ug/L	10.60	7.18	14.60	10.4	6.76	5.72
Total Copper	Comp	EPA200.8	5.00	ug/L	51.20	12.00	16.40	43.8	8.80	19.3
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	386	0	0	357	0	0
Total Iron	Comp	EPA200.8	100.00	ug/L	3120	204	877	1400	115	284
Dissolved Lead	Comp	EPA200.8	5.00	ug/L	3.86	0	0.64	2.15	0.87	0
Total Lead	Comp	EPA200.8	5.00	ug/L	37.80	1.57	4.59	20.1	1.08	1.72
Dissolved Mercury	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Mercury	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Dissolved Nickel	Comp	EPA200.8	5.00	ug/L	5.22	2.19	5.13	9.14	3.02	5.6
Total Nickel	Comp	EPA200.8	5.00	ug/L	11.80	4.21	7.30	10	5.34	36.5
Dissolved Selenium	Comp	EPA200.8	5.00	ug/L	0	0	1.14	0	2.51	3.08
Total Selenium	Comp	EPA200.8	5.00	ug/L	0	0	1.36	1.06	3.52	4.01
Dissolved Silver	Comp	EPA200.8	1.00	ug/L	0	0	0	0	0	0
Total Silver	Comp	EPA200.8	1.00	ug/L	0.26	0	0.28	0.48	0	0
Dissolved Thallium	Comp	EPA200.8	5.00	ug/L	0	0	0	0	0	0
Total Thallium	Comp	EPA200.8	5.00	ug/L	0	0	0	0	0	0
Dissolved Zinc	Comp	EPA200.8	50.00	ug/L	33.00	20.90	75.00	63.5	23.40	21.9
Total Zinc	Comp	EPA200.8	50.00	ug/L	249.00	28.60	129.00	178	34.40	32.5
Semi-Volatiles Organics (EPA 625)										
2-Chlorophenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
2-nitrophenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
4-nitrophenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
Pentachlorophenol	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
Phenol	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0

RB-AR12459

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0506-01	0506-02	0506-03	0506-04	0506-01	0506-02
DATE					10/17/2005	12/31/2005	01/14/2006	02/17/2006	01/24/2006	04/25/2006
	Sample Type	EPA Method	PQL	Units						
Base/Neutral										
Acenaphthene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Acenaphthylene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Anthracene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Benzidine	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Benzo(a)pyrene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Benzo(g,h,i)perylene	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
3,4 Benzofluoranthene	Comp	EPA625	2.00	ug/L	0	0	0	0	0	0
Benzo(k)flouranthene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Bis(2-Chloroethoxy)methane	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Bis(2-Chloroisopropyl)ether	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Bis(2-Chloroethyl)ether	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Bis(2-Ethylhexl)phthalate	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
2-Chloroethyl vinyl ether	Grab	EPA624	2.50	ug/L	0		0	0	0	0
2-Chloronaphthalene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Chrysene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
3,3-Dichlorobenzidine	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
Diethyl phthalate	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
Dimethyl phthalate	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
di-n-Butyl phthalate	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
1,2-Diphenylhydrazine	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
di-n-Octyl phthalate	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Fluoranthene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Fluorene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Hexachlorobenzene	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Hexachloro-cyclopentadiene	Comp	EPA625	3.00	ug/L	0	0	0	0	0	0
Hexachloroethane	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Isophorone	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0.61
Naphthalene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Nitrobenzene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
N-Nitroso-dimethyl amine	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
N-Nitroso-diphenyl amine	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.30	ug/L	0	0	0	0	0	0
Phenanthrene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Pyrene	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
1,2,4-Trichlorobenzene	Comp	EPA625	0.50	ug/L	0	0	0	0	0	0
Chlorinated Pesticides										
Aldrin	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
alpha-BHC	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
beta-BHC	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
delta-BHC	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Gamma-BHC (Lindane)	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
alpha-chlordane	Comp	EPA625	0.05	ug/L						
gamma-chlordane	Comp	EPA625	0.05	ug/L						
Chlordane	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4,4'-DDD	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4,4'-DDE	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
4,4'-DDT	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Dieldrin	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endosulfan I [alpha]	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endosulfan II [beta]	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endosulfan sulfate	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endrin	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Endrin aldehyde	Comp	EPA625	0.10	ug/L	0	0	0	0	0	0
Heptachlor	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Heptachlor Epoxide	Comp	EPA625	0.05	ug/L	0	0	0	0	0	0
Toxaphene	Comp	EPA625	1.00	ug/L	0	0	0	0	0	0
Polychlorinated Biphenyls										
Aroclor-1016	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1221	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1232	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1242	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1248	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1254	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0
Aroclor-1260	Comp	EPA608	0.50	ug/L	0	0	0	0	0	0

RB-AR12460

WEATHER CONDITION					Wet				Dry	
STATION NO.					S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT NO.					0506-01	0506-02	0506-03	0506-04	0506-01	0506-02
DATE					10/17/2005	12/31/2005	01/14/2006	02/17/2006	01/24/2006	04/25/2006
	Sample Type	EPA Method	PQL	Units						
Organohosphate Pesticides										
Chlorpyrifos	Comp	EPA507	0.05	ug/L	0	0	0	0	0	0
Diazinon	Comp	EPA507	0.01	ug/L	0	0	0	0	0	0
Prometryn	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Atrazine	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Simazine	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Cyanazine	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Malathion	Comp	EPA507	2.00	ug/L	0	0	0	0	0	0
Herbicides										
Glyphosate	Comp	EPA547	25.00	ug/L	0	0	0	0	0	0
2,4-D	Comp	EPA515.3	10.00	ug/L	0	0	0	0	0	0
2,4,5-TP-SILVEX	Comp	EPA515.3	1.00	ug/L	0	0	0	0	0	0

Note:
1) blank cell indicates sample was not analyzed
2) 0 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances

RB-AR12461

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2006-07Event03	2006-07Event07	2006-07Event08	2006-07Event02	2006-07Event15
DATE					12/09/2006	02/19/2007	02/22/2007	11/01/2006	04/09/2007
	Sample Type	EPA Method	PQL	Units					
Conventional									
Oil and Grease	Grab	EPA413.1	1	mg/L	1.100	1.500	-99	-99	-99
Total Phenols	Grab	EPA420.1	0.10	mg/L	-99	-99	-99	-99	-99
Cyanide	Grab	EPA335.2	0.01	mg/L	0.019	0.033	0.047	0.050	0.044
pH	Comp	SM4500H B	0-14		7.400	7.560	7.570	8.000	8.110
Dissolved Oxygen	Grab	SM4500O G	1.00	mg/L	5.780	8.160	8.430	15.580	17.000
Indicator Bacteria									
Total Coliform	Grab	SM9230B	20.00	MPN/100ml	2,800,000.000	1,700,000.000	50,000.000	8,000.000	3,000.000
Fecal Coliform	Grab	SM9230B	20.00	MPN/100ml	240,000.000	22,000.000	17,000.000	20.000	2,400.000
Ratio Fecal Coliform/Total Coliform					0.086	0.013	0.340	0.003	0.800
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	170,000.000	90,000.000	1,300.000	110.000	70.000
Enterococcus	Grab	SM9230B		MPN/100ml	170,000.000	90,000.000	1,300.000	40.000	70.000
General									
Chloride	Comp	EPA300.0	2.00	mg/L	56.200	35.000	36.700	106.000	116.000
Fluoride	Comp	EPA300.0	0.10	mg/L	0.310	0.271	0.250	0.470	0.590
Nitrate	Comp	EPA300.0	0.10	mg/L	3.380	-99	-99	19.800	-99
Sulfate	Comp	EPA300.0	0.10	mg/L	63.100	52.500	53.900	169.000	161.000
Alkalinity	Comp	EPA310.1	4.00	mg/L	157.300	71.500	71.500	185.900	199.100
Hardness	Comp	EPA130.2	2.00	mg/L	220.000	140.000	110.000	305.000	310.000
COD	Comp	EPA410.4	10.00	mg/L	578.000	51.220	42.910	64.240	35.606
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	1.800	1.300	-99	-99	-99
Specific Conductance	Comp	EPA120.1	1.00	umhos/cm	654.000	406.000	434.000	1180.000	1130.000
Total Dissolved Solids	Comp	EPA160.1	2.00	mg/L	374.000	224.000	240.000	644.000	640.000
Turbidity	Comp	EPA180.1	0.10	NTU	6.170	1.610	2.840	5.430	1.720
Total Suspended Solids	Comp	EPA160.2	2.00	mg/L	2162.000	219.000	113.000	67.000	20.000
Volatile Suspended Solids	Comp	EPA160.4	1.00	mg/L	608.000	56.000	25.000	34.000	18.000
MBAS	Comp	EPA425.1	0.05	mg/L	0.430	0.144	0.108	0.081	0.070
Total Organic Carbon	Comp	EPA415.1	1.00	mg/L	51.700	16.900	11.600	8.740	10.700
BOD	Comp	SM5210B	2.00	mg/L	46.400	70.000	17.800	95.400	72.400
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	-99	-99	-99	-99	-99
Nutrients									
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.911	0.290	0.289	0.253	-99
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	2.000	0.574	0.529	0.475	0.240
NH3-N	Comp	EPA350.3	0.10	mg/L	4.040	-99	-99	2.750	0.560
Nitrate - N	Comp	SM4110B	0.50	mg/L	0.760	-99	-99	4.471	-99
Nitrite - N	Comp	SM4110B	0.03	mg/L	0.400	0.122	0.040	1.449	0.560
Kjeidahl-N	Comp	EPA351.4	0.10	mg/L	30.680	4.900	2.320	5.820	3.080
Metals									
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	-99	-99	-99	-99	-99
Total Aluminum	Comp	EPA200.8	100.00	ug/L	10100.000	5200.000	3240.000	108.000	-99
Dissolved Antimony	Comp	EPA200.8	5.00	ug/L	1.590	1.970	1.720	0.880	0.720
Total Antimony	Comp	EPA200.8	5.00	ug/L	6.910	3.370	2.970	0.890	0.760
Dissolved Arsenic	Comp	EPA200.8	5.00	ug/L	1.530	1.480	1.380	2.890	1.610
Total Arsenic	Comp	EPA200.8	5.00	ug/L	7.990	2.800	2.050	3.160	1.760
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	60.000	29.700	29.300	42.600	38.300
Total Barium	Comp	EPA200.8	10.00	ug/L	544.000	106.000	74.700	43.800	42.100
Dissolved Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Dissolved Cadmium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Cadmium	Comp	EPA200.8	1.00	ug/L	5.170	0.940	0.270	-99	-99
Dissolved Chromium	Comp	EPA200.8	5.00	ug/L	3.000	1.810	4.570	4.610	2.370
Total Chromium	Comp	EPA200.8	5.00	ug/L	39.600	8.700	16.300	4.740	2.590
Dissolved Chromium □6	Comp	EPA200.8	10.00	ug/L	-99	-99	0.350	-99	-99
Total Chromium □6	Comp	EPA200.8	10.00	ug/L	-99	-99	0.350	-99	-99
Dissolved Copper	Comp	EPA200.8	5.00	ug/L	5.290	9.600	10.700	7.490	6.540
Total Copper	Comp	EPA200.8	5.00	ug/L	424.000	76.900	48.600	20.000	25.800
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	578.000	-99	-99	-99	-99
Total Iron	Comp	EPA200.8	100.00	ug/L	18500.000	3840.000	2770.000	271.000	-99
Dissolved Lead	Comp	EPA200.8	5.00	ug/L	2.420	-99	1.010	0.830	-99
Total Lead	Comp	EPA200.8	5.00	ug/L	240.000	25.900	19.300	3.170	1.930
Dissolved Mercury	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Mercury	Comp	EPA200.8	1.00	ug/L	0.447	-99	-99	-99	-99
Dissolved Nickel	Comp	EPA200.8	5.00	ug/L	7.710	5.410	4.780	4.890	4.060
Total Nickel	Comp	EPA200.8	5.00	ug/L	45.600	13.200	9.930	5.730	4.820
Dissolved Selenium	Comp	EPA200.8	5.00	ug/L	2.240	-99	-99	6.850	2.300
Total Selenium	Comp	EPA200.8	5.00	ug/L	4.120	1.280	-99	7.160	2.500
Dissolved Silver	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99
Total Silver	Comp	EPA200.8	1.00	ug/L	3.510	0.560	-99	-99	-99
Dissolved Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99
Total Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99
Dissolved Zinc	Comp	EPA200.8	50.00	ug/L	74.300	34.300	39.400	26.500	21.300
Total Zinc	Comp	EPA200.8	50.00	ug/L	2590.000	198.000	124.000	40.700	25.600
Semi-Volatiles Organics (EPA 625)									
2-Chlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
2-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
4-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
Pentachlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
Phenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2006-07Event03	2006-07Event07	2006-07Event08	2006-07Event02	2006-07Event15
DATE					12/09/2006	02/19/2007	02/22/2007	11/01/2006	04/09/2007
	Sample Type	EPA Method	PQL	Units					
Base/Neutral									
Acenaphthene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Acenaphthylene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Anthracene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Benzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Benzo(a)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Benzo(g,h,i)perylene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
3,4 Benzofluoranthene	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99
Benzo(k)flouranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Bis(2-Chloroethoxy)methane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Bis(2-Chloroisopropyl)ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Bis(2-Chloroethyl)ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Bis(2-Ethylhexl)phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
2-Chloroethyl vinyl ether	Grab	EPA624	2.50	ug/L	-99	-99	-99	-99	-99
2-Chloronaphthalene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Chrysene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
1,3-Dichlorobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
1,4-Dichlorobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
1,2-Dichlorobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
3,3-Dichlorobenzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
Diethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
Dimethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
di-n-Butyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
1,2-Diphenylhydrazine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
di-n-Octyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Fluoranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Fluorene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Hexachlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Hexachloro-cyclopentadiene	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99
Hexachloroethane	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Isophorone	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Naphthalene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Nitrobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
N-Nitroso-dimethyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
N-Nitroso-diphenyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99
Phenanthrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Pyrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
1,2,4-Trichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99
Chlorinated Pesticides									
Aldrin	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
alpha-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
beta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
delta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Gamma-BHC (Lindane)	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
alpha-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
gamma-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Chlordane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4,4'-DDD	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4,4'-DDE	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
4,4'-DDT	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Dieldrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endosulfan I [alpha]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endosulfan II [beta]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endosulfan sulfate	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Endrin aldehyde	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99
Heptachlor	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Heptachlor Epoxide	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99
Toxaphene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99
Polychlorinated Biphenyls									
Aroclor-1016	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1221	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1232	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1242	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1248	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1254	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99
Aroclor-1260	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99

WEATHER CONDITION					Wet			Dry	
STATION NO.					S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2006-07Event03	2006-07Event07	2006-07Event08	2006-07Event02	2006-07Event15
DATE					12/09/2006	02/19/2007	02/22/2007	11/01/2006	04/09/2007
	Sample Type	EPA Method	PQL	Units					
Organohosphate Pesticides									
Chlorpyrifos	Comp	EPA507	0.05	ug/L	-99	-99	-99	-99	-99
Diazinon	Comp	EPA507	0.01	ug/L	-99	-99	-99	-99	-99
Prometryn	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Atrazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Simazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Cyanazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Malathion	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99
Herbicides									
Glyphosate	Comp	EPA547	25.00	ug/L	-99	-99	-99	-99	-99
2,4-D	Comp	EPA515.3	10.00	ug/L	-99	-99	-99	-99	-99
2,4,5-TP-SILVEX	Comp	EPA515.3	1.00	ug/L	-99	-99	-99	-99	-99
Other									
Ammonia	Comp	SM4500-NH3 F	0.1	mg/L	4.890	-99	-99	3.330	0.680
Endrin ketone	Comp	EPA625	0.1	ug/L	-99	-99	-99	-99	-99
Methoxychlor	Comp	EPA608	0.5	ug/L	-99	-99	-99	-99	-99

Note:
1) blank cell indicates sample was not analyzed
2) -99 indicates concentration below minimum detection leve
3) PQL = minimum level
4) Highlighted cells show exceedances

WEATHER CONDITION					Wet					Dry	
STATION NO.					S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2007-08Event21	2007-08Event23	2007-08Event29	2007-08Event31	2007-08Event32	2007-08Event27	2007-08Event47
	Sample Type	EPA Method	PQL	Units							
Conventional											
Oil and Grease	Grab	EPA413.1	1	mg/L	1.10		1.60	1.60		-99	-99
Total Phenols	Grab	EPA420.1	0.10	mg/L	-99		0.12	0.11		-99	-99
Cyanide	Grab	EPA335.2	0.01	mg/L	0.0240		0.0130	-99		0.1090	0.0110
pH	Comp	SM4500H B	0-14		7.41	7.01	7.04	6.64	6.85	8.14	8.30
Dissolved Oxygen	Grab	SM4500O G	1.00	mg/L	7.97		8.31	6.04		15.04	15.70
Indicator Bacteria											
Total Coliform	Grab	SM9230B	20.00	MPN/100ml	90000		300000	90000		24000	270
Fecal Coliform	Grab	SM9230B	20.00	MPN/100ml	50000		300000	24000		9000	40
Ratio Fecal Coliform/Total Coliform											
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	17000		240000	220000		110	170
Enterococcus	Grab	SM9230B		MPN/100ml	17000		130000	220000		110	80
General											
Chloride	Comp	EPA300.0	2.00	mg/L	53.70	14.50	16.70	14.50	12.80	122	155
Fluoride	Comp	EPA300.0	0.10	mg/L	0.56	0.1350	0.2350	0.19	0.1690	0.5830	0.5940
Nitrate	Comp	EPA300.0	0.10	mg/L	-99	-99	-99	-99	-99	-99	-99
Sulfate	Comp	EPA300.0	0.10	mg/L	57.10	21	23.20	20.30	18.70	147	228
Alkalinity	Comp	EPA310.1	4.00	mg/L	167.20	53	39	36.30	35.20	171	165
Hardness	Comp	EPA130.2	2.00	mg/L	205	110	65	55	61	290	350
COD	Comp	EPA410.4	10.00	mg/L	123	40.40	72.40	38.50	45.43	119.70	85.60
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	-99		4.75	2.50		-99	-99
Specific Conductance	Comp	EPA120.1	1.00	umhos/cm	711	204	211	199	176	1056	1169
Total Dissolved Solids	Comp	EPA160.1	2.00	mg/L	472	112	122	122	102	694	738
Turbidity	Comp	EPA180.1	0.10	NTU	4.58	5.07	4.15	1.73	6.63	1.42	1.94
Total Suspended Solids	Comp	EPA160.2	2.00	mg/L	1990	975	193	65	124	142	9
Volatile Suspended Solids	Comp	EPA160.4	1.00	mg/L	429	154	49	18	20	35	9
MBAS	Comp	EPA425.1	0.05	mg/L	0.35	0.14	0.22	0.32	0.34	0.07	0.08
Total Organic Carbon	Comp	EPA415.1	1.00	mg/L	57.10	13.50	11.90	7.85	6.88	8.12	13.10
BOD	Comp	SM5210B	2.00	mg/L	128	16.80	27.80	17.40	12.90	25.20	15.40
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	-99		-99	-99		-99	-99
Nutrients											
Dissolved Phosphorus	Comp	EPA365.3	0.05	mg/L	0.6710	0.4760	0.13	0.31	0.22	0.21	0.25
Total Phosphorus	Comp	EPA365.3	0.05	mg/L	1.72	1.72	0.38	0.32	0.24	0.26	0.31
NH_3-N	Comp	EPA350.3	0.10	mg/L	2.85	0.48	0.75	0.4010	0.4410	-99	1.05
Nitrate - N	Comp	SM4110B	0.50	mg/L	-99	-99	-99	-99	-99	-99	-99
Nitrite - N	Comp	SM4110B	0.03	mg/L	-99	0.03	0.08	0.03	-99	0.09	0.05
Kjeidahl-N	Comp	EPA351.4	0.10	mg/L	19.40	5.60	4.16	2.18	1.33	1.28	3.38
Metals											
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Aluminum	Comp	EPA200.8	100.00	ug/L	7900	21500	2830	895	5560	356	-99
Dissolved Antimony	Comp	EPA200.8	5.00	ug/L	2.70	3.77	2.04	1.47	1.48	0.64	0.75
Total Antimony	Comp	EPA200.8	5.00	ug/L	6.87	8.02	3.81	1.79	3.01	0.85	0.82
Dissolved Arsenic	Comp	EPA200.8	5.00	ug/L	2.20	2.23	1.76	1.24	1.21	1.79	2.10
Total Arsenic	Comp	EPA200.8	5.00	ug/L	6.39	5.60	2.41	1.27	2.06	1.89	2.13
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	59.70	35.60	27.80	20	20.40	41	35.90
Total Barium	Comp	EPA200.8	10.00	ug/L	327	396	84.20	35.50	83.30	54.60	41.20
Dissolved Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Beryllium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Dissolved Cadmium	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Cadmium	Comp	EPA200.8	1.00	ug/L	3.69	4.57	0.76	0.27	0.69	0.30	-99
Dissolved Chromium	Comp	EPA200.8	5.00	ug/L	3.46	1.37	1.80	1.31	7.53	2.77	5.78
Total Chromium	Comp	EPA200.8	5.00	ug/L	46.70	37.90	9.16	3.19	21.60	3.72	6.10
Dissolved Chromium □6	Comp	EPA200.8	10.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Chromium □6	Comp	EPA200.8	10.00	ug/L	-99	-99	-99	0.27	8.54	0.25	-99
Dissolved Copper	Comp	EPA200.8	5.00	ug/L	4.86	8.54	18.90	9.64	7.93	6.81	5.80
Total Copper	Comp	EPA200.8	5.00	ug/L	123	255	57.60	25.90	43.80	14.70	21.50
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	857	187	186	-99	-99	-99	-99
Total Iron	Comp	EPA200.8	100.00	ug/L	14000	33200	2750	1300	3450	864	192
Dissolved Lead	Comp	EPA200.8	5.00	ug/L	7.35	5.63	5.70	1.36	1.84	-99	-99
Total Lead	Comp	EPA200.8	5.00	ug/L	142	393	50.20	15.70	50.80	4.68	1.46
Dissolved Mercury	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Mercury	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	0.1620	-99
Dissolved Nickel	Comp	EPA200.8	5.00	ug/L	11.20	4.97	7.61	3.45	3.13	4.13	6.16
Total Nickel	Comp	EPA200.8	5.00	ug/L	35.70	37.10	12.70	4.98	9.89	5.39	6.71
Dissolved Selenium	Comp	EPA200.8	5.00	ug/L	1.29	-99	-99	-99	-99	2.78	3.06
Total Selenium	Comp	EPA200.8	5.00	ug/L	1.82	1.04	-99	-99	-99	3.06	3.29
Dissolved Silver	Comp	EPA200.8	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Silver	Comp	EPA200.8	1.00	ug/L	1.28	1.69	0.33	-99	0.26	-99	-99
Dissolved Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Total Thallium	Comp	EPA200.8	5.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Dissolved Zinc	Comp	EPA200.8	50.00	ug/L	22.30	51.40	99.10	63.10	60	38.20	41.40
Total Zinc	Comp	EPA200.8	50.00	ug/L	657	1860	270	113	209	80.70	85
Semi-Volatiles Organics (EPA 625)											
2-Chlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99

WEATHER CONDITION					Wet					Dry	
STATION NO.					S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2007-08Event21	2007-08Event23	2007-08Event29	2007-08Event31	2007-08Event32	2007-08Event27	2007-08Event47
	Sample Type	EPA Method	PQL	Units							
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
4-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Pentachlorophenol	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Phenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Base/Neutral											
Acenaphthene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Acenaphthylene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Anthracene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzo(a)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzo(g,h,i)perylene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
3,4 Benzofluoranthene	Comp	EPA625	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Benzo(k)flouranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Chloroethoxy)methane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Chloroisopropyl)ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Chloroethyl)ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Bis(2-Ethylhexl)phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
2-Chloroethyl vinyl ether	Grab	EPA624	2.50	ug/L	-99		-99	-99		-99	-99
2-Chloronaphthalene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Chrysene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
1,3-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
1,4-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
3,3-Dichlorobenzidine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Diethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Dimethyl phthalate	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
di-n-Butyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
2,6-Dinitrotoluene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2-Diphenylhydrazine	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
di-n-Octyl phthalate	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Fluoranthene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Fluorene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachloro-cyclopentadiene	Comp	EPA625	3.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Hexachloroethane	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Isophorone	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Naphthalene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Nitrobenzene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
N-Nitroso-dimethyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
N-Nitroso-diphenyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
N-Nitroso-di-n-propyl amine	Comp	EPA625	0.30	ug/L	-99	-99	-99	-99	-99	-99	-99
Phenanthrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Pyrene	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
1,2,4-Trichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Chlorinated Pesticides											
Aldrin	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
alpha-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
beta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
delta-BHC	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Gamma-BHC (Lindane)	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
alpha-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
gamma-chlordane	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Chlordane	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4,4'-DDD	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4,4'-DDE	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
4,4'-DDT	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Dieldrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endosulfan I [alpha]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endosulfan II [beta]	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endosulfan sulfate	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endrin	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Endrin aldehyde	Comp	EPA625	0.10	ug/L	-99	-99	-99	-99	-99	-99	-99
Heptachlor	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Heptachlor Epoxide	Comp	EPA625	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Toxaphene	Comp	EPA625	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99

WEATHER CONDITION					Wet					Dry	
STATION NO.					S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE					2007-08Event21	2007-08Event23	2007-08Event29	2007-08Event31	2007-08Event32	2007-08Event27	2007-08Event47
	Sample Type	EPA Method	PQL	Units							
Polychlorinated Biphenyls											
Aroclor-1016	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1221	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1232	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1242	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1248	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1254	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Aroclor-1260	Comp	EPA608	0.50	ug/L	-99	-99	-99	-99	-99	-99	-99
Organohosphate Pesticides											
Chlorpyrifos	Comp	EPA507	0.05	ug/L	-99	-99	-99	-99	-99	-99	-99
Diazinon	Comp	EPA507	0.01	ug/L	-99	-99	-99	-99	-99	-99	-99
Prometryn	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Atrazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Simazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Cyanazine	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Malathion	Comp	EPA507	2.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Herbicides											
Glyphosate	Comp	EPA547	25.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4-D	Comp	EPA515.3	10.00	ug/L	-99	-99	-99	-99	-99	-99	-99
2,4,5-TP-SILVEX	Comp	EPA515.3	1.00	ug/L	-99	-99	-99	-99	-99	-99	-99
Other											
Ammonia	Comp	SM4500-NH3 F	0.1	mg/L	3.45	0.58	0.91	0.4850	0.5340	-99	1.27
Endrin ketone	Comp	EPA625	0.1	ug/L	-99	-99	-99	-99	-99	-99	-99
Methoxychlor	Comp	EPA608	0.5	ug/L	-99	-99	-99	-99	-99	-99	-99

Note:

1) blank cell indicates DATA is NOT AVAILABLE

2) PQL = minimum level

3) Highlighted cells show exceedances

4) -99 indicates a reported value cannot be achieved

Mass Emission Monitoring

WEATHER CONDITION					Wet											Dry		
STATION NO.					S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE	Sample	EPA			2008-09Event03	2008-09Event06	2008-09Event09	2008-09Event10	2008-09Event11	2008-09Event18	2008-09Event21	2008-09Event22	2008-09Event23	2008-09Event24	2008-09Event26	2008-09Event15	2008-09Event30	2008-09Event36
DATE	Type	Method	POL[3]	Units	11/04/2008	11/25/2008	12/15/2008	12/21/2008	12/24/2008	01/23/2009	02/05/2009	02/08/2009	02/13/2009	02/16/2009	03/04/2009	01/12/2009	03/23/2009	05/11/2009
Conventional																		
Oil and Grease	Grab	EPA1664A / EPA413.1	1	mg/L	2.9	0.8	1.4				1.2		5.5			-99	0.8	1.2
Total Phenols	Grab	EPA420.1	0.10	mg/L	-99	-99	-99				-99		-99			-99	-99	-99
Cyanide	Grab	SM4500-CNE	0.01	mg/L	0.01	-99	-99				-99		-99			0.008	0.027	-99
pH	Comp	SM4500H B	0.00	NONE	7.51	6.88					7.8		7.02			8.24	9.17	8.91
Dissolved Oxygen	Grab	SM4500 (OG)	1.00	mg/L	6.47	8.88	10.95				9.08		9.78			17.5	13.7	13.5
Indicator Bacteria																		
Total Coliform	Grab	SM9221B/SM9221E	20.00	MPN/100ml	16000000	500000	240000				16000		300000			9000	9000	9000
Fecal Coliform	Grab	SM9221E/SM9221B	20.00	MPN/100ml	16000000	24000	240000				500		16000			1300	230	130
Streptococcus	Grab	SM9230B	20.00	MPN/100ml	9000000	500000	24000				9000		160000			300	-99	2400
Enterococcus	Grab	SM9230B	20.00	MPN/100ml	9000000	240000	24000				9000		160000			130	-99	2400
General																		
Chloride	Comp	SM4110B	2.00	mg/L	57.6	13.2					22.8		18.1			111	111	137
Fluoride	Comp	SM4110B	0.10	mg/L	0.53	0.11					-99		-99			0.79	0.69	0.57
Nitrate	Comp	SM4110B	0.10	mg/L	11.8	4.58					3.82		4.03			7.47	5.34	3.21
Sulfate	Comp	SM4110B	1.00	mg/L	77.9	19.3					33.6		26			150	180	186
Alkalinity	Comp	SM2320B	1.00	mg/L	88	39					41		34			144	140	165
Hardness	Comp	SM2340C	2.00	mg/L	150	80					50		25			235	270	300
COD	Comp	SM5220D	10.00	mg/L	104	55.6					38.9		86.4			64	61.8	104
Total Petroleum Hydrocarbons	Grab	EPA418.1	1.00	mg/L	1.87	1.5	0.62				1.25		4.75			-99	-99	-99
Specific Conductance	Comp	SM2510B	1.00	umhos/cm	573	177					243		202			1039	1020	1240
Total Dissolved Solids	Comp	SM2540C	2.00	mg/L	384	114					144		134			674	668	754
Turbidity	Comp	SM2130B	0.10	NTU	4.44	20.1					27.2		11.8			1.62	2.42	1.6
Total Suspended Solids	Comp	SM25400D	1.00	mg/L	374	820		95	93	125	486	136	221	252	686	27	16	18
Volatile Suspended Solids	Comp	SM2540E	1.00	mg/L	87	142					65		47			8	8	7
MBAS	Comp	SM5540-C	0.05	mg/L	0.67	0.24					0.02		0.25			0.17	0.5	0.19
Total Organic Carbon	Comp	SM5310B / EPA415.1		mg/L	22.8	11.1					6.93		7.44			6.88	21.9	8.4
BOD	Comp	SM5210B	2.00	mg/L	30.9	19.8					6.99		14.1			30.5	26.1	34
Methyl Tertiary Butyl Ether (MTBE)	Grab	EPA624	1.00	ug/L	-99	-99	-99				-99		-99			-99	-99	-99
Nutrients																		
Dissolved Phosphorus	Comp	SM4500-PE	0.05	mg/L	0.37	0.3					0.28		0.15			-99	0.23	0.27
Total Phosphorus	Comp	SM4500-PE	0.05	mg/L	0.71	0.42					0.64		0.33			-99	0.27	0.38
NH3-N	Comp	SM4500-NH3 F	0.10	mg/L	0.61	0.73					-99		0.26			0.14	0.52	0.1
Nitrate - N	Comp	SM4110B	0.50	mg/L	2.66	1.03					0.86		0.91			1.69	1.21	0.72
Nitrite - N	Comp	SM4110B	0.03	mg/L	0.07	0.05					-99		-99			0.15	0.14	0.2
Kjeidahl-N	Comp	SM4500-NHorg C	0.10	mg/L	6.48	2.72					0.86		1.33			1.22	2.52	1.48
Metals																		
Dissolved Aluminum	Comp	EPA200.8	100.00	ug/L	-99	-99					-99		153			-99	-99	-99
Total Aluminum	Comp	EPA200.8	100.00	ug/L	530	1130					1710		1930			39.2	-99	50.3
Dissolved Antimony	Comp	EPA200.8	0.50	ug/L	2.42	1.58					0.86		1.16			0.56	1.52	0.79
Total Antimony	Comp	EPA200.8	0.50	ug/L	4.03	5.55					1.64		2.07			0.67	1.53	0.79
Dissolved Arsenic	Comp	EPA200.8	1.00	ug/L	2.14	1.23					1.01		0.91			1.35	1.86	2.1
Total Arsenic	Comp	EPA200.8	1.00	ug/L	3.58	3.99					2.83		1.47			1.54	1.86	2.18
Dissolved Barium	Comp	EPA200.8	10.00	ug/L	36.2	25.4					21		20.8			36.8	47.2	38.7
Total Barium	Comp	EPA200.8	10.00	ug/L	117	218					146		69			46.7	55.2	45.7
Dissolved Beryllium	Comp	EPA200.8	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Beryllium	Comp	EPA200.8	0.50	ug/L	-99	0.38					0.31		0.13			-99	-99	-99
Dissolved Cadmium	Comp	EPA200.8	0.25	ug/L	0.14	-99					0.12		0.11			0.13	0.16	-99
Total Cadmium	Comp	EPA200.8	0.25	ug/L	0.98	1.93					1		0.47			0.16	0.22	0.18
Dissolved Chromium	Comp	EPA200.8	0.50	ug/L	2.23	1.38					1.67		2.3			1.49	1	3.23
Total Chromium	Comp	EPA200.8	0.50	ug/L	14.4	28.5					20.2		9.09			3.21	1.28	4.51
Dissolved Chromium +6	Comp	EPA218.6	0.25	ug/L	-99	0.3					0.48		0.71			0.39	0.31	-99
Total Chromium +6	Comp	EPA218.6	0.25	ug/L	-99	0.3					0.48		0.71			0.39	0.31	-99
Dissolved Copper	Comp	EPA200.8	0.50	ug/L	14.8	10.6					5.63		9.69			4.78	11.9	4.07
Total Copper	Comp	EPA200.8	0.50	ug/L	63.7	124					34.5		33.4			9.15	20.6	10.5
Dissolved Iron	Comp	EPA200.8	100.00	ug/L	237	178					119		91.3			-99	-99	-99
Total Iron	Comp	EPA200.8	100.00	ug/L	4860	17900					15200		3190			316	113	115
Dissolved Lead	Comp	EPA200.8	0.50	ug/L	3.96	5.2					2.04		2.09			0.29	0.65	0.21
Total Lead	Comp	EPA200.8	0.50	ug/L	51.1	166					29.2		25			1.42	1.38	0.98
Dissolved Mercury	Comp	EPA245.1	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Mercury	Comp	EPA245.1	0.10	ug/L	-99	-99					-99		-99			0.04	-99	-99
Dissolved Nickel	Comp	EPA200.8	1.00	ug/L	8.71	4.05					2.28		2.75			4.78	6.9	5.26
Total Nickel	Comp	EPA200.8	1.00	ug/L	17.1	26.7					15.7		7.48			5.18	7.94	6.11
Dissolved Selenium	Comp	EPA200.8	1.00	ug/L	1.22	-99					-99		-99			2.14	2.61	3.2
Total Selenium	Comp	EPA200.8	1.00	ug/L	1.86	-99					-99		-99			2.34	2.69	3.32
Dissolved Silver	Comp	EPA200.8	0.25	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Silver	Comp	EPA200.8	0.25	ug/L	0.36	0.41					0.19		0.12			-99	-99	-99
Dissolved Thallium	Comp	EPA200.8	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Total Thallium	Comp	EPA200.8	0.50	ug/L	-99	-99					0.17		-99			-99	-99	-99
Dissolved Zinc	Comp	EPA200.8	10.00	ug/L	38.5	78.3					29.9		57.5			20.3	28.7	13.4
Total Zinc	Comp	EPA200.8	10.00	ug/L	264	936					140		147			43	31.5	25.7
Semi-Volatiles Organics (EPA 625)																		
2-Chlorophenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-dichlorophenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-dimethylphenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99

Mass Emission Monitoring

WEATHER CONDITION					Wet											Dry		
STATION NO.					S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE	Sample	EPA			2008-09Event03	2008-09Event06	2008-09Event09	2008-09Event10	2008-09Event11	2008-09Event18	2008-09Event21	2008-09Event22	2008-09Event23	2008-09Event24	2008-09Event26	2008-09Event15	2008-09Event30	2008-09Event36
DATE	Type	Method	POL [3]	Units	11/04/2008	11/25/2008	12/15/2008	12/21/2008	12/24/2008	01/23/2009	02/05/2009	02/08/2009	02/13/2009	02/16/2009	03/04/2009	01/12/2009	03/23/2009	05/11/2009
2,4-dinitrophenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-nitrophenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-chloro-3-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Pentachlorophenol	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Phenol	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4,6-trichlorophenol	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Base/Neutral																		
Acenaphthene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Acenaphthylene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Anthracene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzidine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2 Benzanthracene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzo(a)pyrene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzo(g,h,i)perylene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
3,4 Benzofluoranthene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Benzo(k)flouranthene	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Chloroethoxy)methane	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Chloroisopropyl)ether	Comp	EPA625	2	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Chloroethyl)ether	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Bis(2-Ethylhexl)phthalate	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-Bromophenyl phenyl ether	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Butyl benzyl phthalate	Comp	EPA625	0.30	ug/L	-99	-99					-99		-99			-99	-99	-99
2-Chloroethyl vinyl ether	Comp	EPA624	2.50	ug/L	-99	-99	-99				-99		-99			-99	-99	-99
2-Chloronaphthalene	Comp	EPA625	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4-Chlorophenyl phenyl ether	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Chrysene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Dibenzo(a,h)anthracene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
1,3-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
1,4-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2-Dichlorobenzene	Comp	EPA625	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
3,3-Dichlorobenzidine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Diethyl phthalate	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Dimethyl phthalate	Comp	EPA625	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
di-n-Butyl phthalate	Comp	EPA625	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-Dinitrotoluene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,6-Dinitrotoluene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
4,6 Dinitro-2-methylphenol	Comp	EPA625	3.00	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2-Diphenylhydrazine	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
di-n-Octyl phthalate	Comp	EPA625	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Fluoranthene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Fluorene	Comp	EPA625	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachlorobenzene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachlorobutadiene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachloro-cyclopentadiene	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Hexachloroethane	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Indeno (1,2,3-cd)pyrene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Isophorone	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Naphthalene	Comp	EPA625	0.20	ug/L	-99	-99					-99		-99			-99	-99	-99
Nitrobenzene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
N-Nitroso-dimethyl amine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
N-Nitroso-diphenyl amine	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
N-Nitroso-di-n-propyl amine	Comp	EPA625	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Phenanthrene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Pyrene	Comp	EPA625	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
1,2,4-Trichlorobenzene	Comp	EPA625	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Chlorinated Pesticides																		
Aldrin		EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
alpha-BHC	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
beta-BHC	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
delta-BHC	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Gamma-BHC (Lindane)	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
alpha-chlordane	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
gamma-chlordane	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Chlordane	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
4,4'-DDD	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
4,4'-DDE	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
4,4'-DDT	Comp	EPA608	0.01	ug/L	-99	-99					-99		-99			-99	-99	-99
Dieldrin	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endosulfan I [alpha]	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endosulfan II [beta]	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endosulfan sulfate	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endrin	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Endrin aldehyde	Comp	EPA608	0.10	ug/L	-99	-99					-99		-99			-99	-99	-99
Heptachlor	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99

RB-AR12469

Mass Emission Monitoring

WEATHER CONDITION					Wet											Dry		
STATION NO.					S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10	S10
STATION NAME					Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River	Los Angeles River
EVENT CODE	Sample	EPA			2008-09Event03	2008-09Event06	2008-09Event09	2008-09Event10	2008-09Event11	2008-09Event18	2008-09Event21	2008-09Event22	2008-09Event23	2008-09Event24	2008-09Event26	2008-09Event15	2008-09Event30	2008-09Event36
DATE	Type	Method	PQL [3]	Units	11/04/2008	11/25/2008	12/15/2008	12/21/2008	12/24/2008	01/23/2009	02/05/2009	02/08/2009	02/13/2009	02/16/2009	03/04/2009	01/12/2009	03/23/2009	05/11/2009
Heptachlor Epoxide	Comp	EPA608	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Toxaphene	Comp	EPA608	1.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Polychlorinated Biphenyls																		
Aroclor-1016	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1221	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1232	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1242	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1248	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1254	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Aroclor-1260	Comp	EPA608	0.50	ug/L	-99	-99					-99		-99			-99	-99	-99
Organophosphate Pesticides																		
Chlorpyrifos	Comp	EPA507	0.05	ug/L	-99	-99					-99		-99			-99	-99	-99
Diazinon	Comp	EPA507	0.01	ug/L	-99	-99					-99		-99			-99	-99	-99
Prometryn	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Atrazine	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Simazine	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Cyanazine	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Malathion	Comp	EPA507	2.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Herbicides																		
Glyphosate	Comp	EPA547	25.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4-D	Comp	EPA515.3	5.00	ug/L	-99	-99					-99		-99			-99	-99	-99
2,4,5-TP-SILVEX	Comp	EPA515.3	10.00	ug/L	-99	-99					-99		-99			-99	-99	-99
Other																		
Ammonia	Comp	SM4500-NH3 F	0.1	mg/l	0.74	0.88					-99		0.32			0.16	0.63	0.12
Endrin ketone	Comp	EPA625	1	ug/L	-99	-99					-99		-99			-99	-99	-99
Methoxychlor	Comp	EPA608	0.5	ug/L	-99	-99					-99		-99			-99	-99	-99

Note:
1) blank cell indicates sample was not analyzed
2) -99 indicates concentration below minimum detection level
3) PQL = minimum level
4) Highlighted cells show exceedances
5) Wet weather suspension of fecal coliform objective applies to 2008-09Event06, 2008-09Event09, and 2008-09Event21

RB-AR12470

Appendix B.2. 2009-2010 Annual Report Mass Emission and Tributary Dry Weather Concentration

Group	Parameter Code	Units	Analysis Method	Los Angeles Wardlow S10 2009-10Event02 07/14/2009	Los Angeles Wardlow S10 2009-10Event12 09/15/2009	Los Angeles Wardlow S10 2009-10Event14 12/01/2009	Los Angeles Wardlow S10 2009-10Event28 03/23/2010
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	20	20	300	300
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	20	230	130	40
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	20	230	130	40
Bacteria	Total Coliform	MPN/100mL	SM9221B	20	20	2,400	800
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	0.01	0.011	0.011	0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	0.002	0.002	0.002	0.002
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	0.05	0.05	0.05	0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	0.006	0.006	0.006	0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Endrin ketone	ug/L	EPA625	0	NS	NS	NS
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	0.003	0.003	0.003	0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	0.24	0.24	0.24	0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	0.003	0.01	0.01	0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	0.04	0.033	0.033	0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	0.005	0.005	0.005	0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	0.005	0.005	0.005	0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	0.04	0.033	0.033	0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.006	0.005	**0.027**	0.01
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	10.2	21.5	15.5	17.4
Conventionals	Oil and Grease	mg/L	EPA1664A	0.4	0.4	1.44	1.44
Conventionals	pH	pH units	SM4500H B	**9.25**	7.97	**8.54**	**9.4**
General	Alkalinity as CaCO3	mg/L	SM2320B	151	151	206	165
General	Ammonia	mg/L	SM4500-NH3 F	0.16	0.218	0.448	0.23
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	24.4	31.5	21.6	24
General	Chemical Oxygen Demand	mg/L	SM5220D	234	71.3	64.5	63.2
General	Chloride	mg/L	SM4110B	131	149	114	118
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.25	0.19	0.39	0.06
General	Fluoride	mg/L	SM4110B	0.43	0.507	0.892	0.479
General	Hardness as CaCO3	mg/L	SM2340C	260	255	300	290
General	Kjeldahl-N	mg/L	SM4500-NHorg C	6.18	1.6	1.98	1.08
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	0.4	0.4	1	0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.01 0.5	0.01 0.5	0.01 0.5	0.01 0.5
General	NH3-N	mg/L	SM4500-NH3 F	0.13	0.18	0.37	0.19
General	Nitrate (NO3)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate (NO3)	mg/L	SM4110B	1.07	5.49	15.7	2.35
General	Nitrate-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate-N	mg/L	SM4110B	0.03 0.5	1.24	3.55	0.53
General	Nitrite (NO2)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	SM4110B	0.03	0.17	0.0502	0.0766
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	0.5	0.21	0.52	0.07
General	Specific Conductance	umhos/cm	SM2510B	1011	1020	1040	980
General	Sulfate	mg/L	EPA300.1	NS	NS	NS	NS
General	Sulfate	mg/L	SM4110B	149	168	134	197
General	Total Dissolved Phosphate	mg/L	AM4500-PE	NS	NS	NS	NS
General	Total Dissolved Solids	mg/L	SM2540C	690	664	696	662
General	Total Organic Carbon	mg/L	SM5310B	14	NS	NS	NS
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	NS	10.9	7.84	20.8
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	0.4	0.4	1.5	1.5
General	Total Phosphate	mg/L	SM4500-PE	NS	NS	NS	NS
General	Total Suspended Solids	mg/L	SM2540D	135	14	110	38
General	Turbidity	NTU	SM2130B	5.5	2.53	4.07	4.48
General	Volatile Suspended Solids	mg/L	SM2540E	66	11	39	15

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Appendix B.2. 2009-2010 Annual Report Mass Emission and Tributary Dry Weather Concentration

Group	Parameter Code	Units	Analysis Method	Los Angeles Wardlow S10 2009-10Event02 07/14/2009	Los Angeles Wardlow S10 2009-10Event12 09/15/2009	Los Angeles Wardlow S10 2009-10Event14 12/01/2009	Los Angeles Wardlow S10 2009-10Event28 03/23/2010
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	0.07	0.067	0.067	0.067
Herbicides	2-4-D	ug/L	EPA515.3	0.015	0.015	0.015	0.015
Herbicides	Glyphosate	ug/L	EPA547	5	5	5	5
Metals	Dissolved Aluminum	ug/L	EPA200.8	50	50	50	50
Metals	Dissolved Antimony	ug/L	EPA200.8	0.82	0.2	0.932	0.887
Metals	Dissolved Arsenic	ug/L	EPA200.8	2.25	2.4	4.31	2.14
Metals	Dissolved Barium	ug/L	EPA200.8	38.3	1	45.2	41.2
Metals	Dissolved Beryllium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	0.1	0.1	0.689	0.275
Metals	Dissolved Chromium	ug/L	EPA200.8	1.54	0.5	2.05	1.57
Metals	Dissolved Chromium 6	ug/L	EPA218.6	0.37	0.25	0.25	0.25
Metals	Dissolved Copper	ug/L	EPA200.8	6.17	0.5	5.25	6.72
Metals	Dissolved Iron	ug/L	EPA200.8	50	50	50	50
Metals	Dissolved Lead	ug/L	EPA200.8	0.55	0.2	1.27	0.2
Metals	Dissolved Mercury	ug/L	EPA245.1	0.1	0.1	0.1	0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	7.27	0.5	4.81	4.5
Metals	Dissolved Selenium	ug/L	EPA200.8	2.6	0.5	5.84	2.67
Metals	Dissolved Silver	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	15.7	1	39.6	27.6
Metals	Aluminum	ug/L	EPA200.8	282	50	1200	1100
Metals	Antimony	ug/L	EPA200.8	0.82	0.948	1.05	1.13
Metals	Arsenic	ug/L	EPA200.8	2.38	2.56	4.31	2.57
Metals	Barium	ug/L	EPA200.8	48.2	44.6	62.4	63.1
Metals	Beryllium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Cadmium	ug/L	EPA200.8	0.1	0.1 0.25	0.783	0.34
Metals	Chromium	ug/L	EPA200.8	1.61	0.807	3.01	2.11
Metals	Chromium 6	ug/L	EPA218.6	0.25	0.25	0.25	0.25
Metals	Copper	ug/L	EPA200.8	13.8	10.5	12.3	16.7
Metals	Iron	ug/L	EPA200.8	556	50 100	979	1170
Metals	Lead	ug/L	EPA200.8	2.64	0.803	8.5	6.07
Metals	Mercury	ug/L	EPA245.1	0.1	0.1	0.1	0.1
Metals	Nickel	ug/L	EPA200.8	8.2	4.84	6.03	6.43
Metals	Selenium	ug/L	EPA200.8	2.75	2.23	**5.94**	2.88
Metals	Silver	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Thallium	ug/L	EPA200.8	0.1	0.1	0.1	0.1
Metals	Zinc	ug/L	EPA200.8	66.1	108	95.3	75.3
Organophosphate Pesticides	Atrazine	ug/L	EPA507	0.7	0.667	0.667	0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	0.02	0.02	0.02	0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	0.7	0.667	0.667	0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	0.003	0.003	0.003	0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	0.4	0.33	0.67	0.33
Organophosphate Pesticides	Malathion	ug/L	EPA625	NS	NS	NS	NS
Organophosphate Pesticides	Prometryn	ug/L	EPA507	0.7	0.67	0.67	0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	0.7	0.67	0.67	0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	0.065	0.065	0.065	0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	0.065	0.065	0.065	0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	0.4	3.3	3.3	3.3
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	1	1	1	1

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Appendix B.2. 2009-2010 Annual Report Mass Emission and Tributary Dry Weather Concentration

Group	Parameter Code	Units	Analysis Method	Los Angeles Wardlow S10 2009-10Event02 07/14/2009	Los Angeles Wardlow S10 2009-10Event12 09/15/2009	Los Angeles Wardlow S10 2009-10Event14 12/01/2009	Los Angeles Wardlow S10 2009-10Event28 03/23/2010
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	0.03	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	0.2	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	0.2	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	0.2	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	NS	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	3.4	3.33	3.33	3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	0.4	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	0.04	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	0.2	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	1.7	1.67	1.67	9.9
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	0.1	3.33	3.33	3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	0.04	0.033	0.033	0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	0.7	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	0.02	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	0.04	0.033	0.033	0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	0.02	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	1.7	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	0.07	0.067	0.067	0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	0.4	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	0.02	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	0.02	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	3.4	NS	NS	NS
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	3.4	NS	NS	NS

Values reported with a " " are not detected (ND) at the method detection level, and reported as MDL

Values reported with a " " and a " " were detected but not quantified (DNQ) between the method detection limit and reporting limit, they are

QNS = Quantity Not Sufficient

Appendix B.1. 2009-2010 Annual Report Wet Weather Mass Emission and Tributary Stations Concentrations

Group	Parameter Code	Units	Analysis Method	Los Angeles River Wardlow S10 2009-10Event13 10/13/2009	Los Angeles River Wardlow S10 2009-10Event15 12/07/2009	Los Angeles River Wardlow S10 2009-10Event16 12/11/2009	Los Angeles River Wardlow S10 2009-10Event19 01/17/2010
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	**900,000**	230	**300,000**	24,000
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	2,400,000	1,300	900,000	280,000
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	2,400,000	1,300	900,000	280,000
Bacteria	Total Coliform	MPN/100mL	SM9221B	3,000,000	50,000	900,000	5,000,000
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	0.011	0.011	0.011	0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	0.002	0.002	0.002	0.002
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	0.05	0.05	0.05	0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	0.006	0.006	0.006	0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Endrin ketone	ug/L	EPA625	NS	NS	NS	NS
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	0.003	0.003	0.003	0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	0.24	0.24	0.24	0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	0.01	0.01	0.01	0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	0.033	0.033	0.033	0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	0.005	0.005	0.005	0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	0.005	0.005	0.005	0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	0.004	0.004	0.004	0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	0.033	0.033	0.033	0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.005	**0.06**	0.007	0.01
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	7.73	9.13	10.7	8.03
Conventionals	Oil and Grease	mg/L	EPA1664A	1.44	1.44 5	1.44 5	1.44 5
Conventionals	pH	pH units	SM4500H B	7.45	**6.41**	6.66	7.34
General	Alkalinity as CaCO3	mg/L	SM2320B	69	34	41	69
General	Ammonia	mg/L	SM4500-NH3 F	1.91	0.79	0.364	0.446
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	19.3	24.7	9.01	9.61
General	Chemical Oxygen Demand	mg/L	SM5220D	76.4	79.9	154	29.3
General	Chloride	mg/L	SM4110B	22	11.3	7.38	11.4
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.42	0.33	0.24	0.22
General	Fluoride	mg/L	SM4110B	0.247	0.276	0.104	0.164
General	Hardness as CaCO3	mg/L	SM2340C	90	60	50	50
General	Kjeldahl-N	mg/L	SM4500-NHorg C	4.1	1.86	1.07	2
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	1	1	1	0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.7	0.51	0.01 0.5	0.01 0.5
General	NH3-N	mg/L	SM4500-NH3 F	1.58	0.653	0.301	0.369
General	Nitrate (NO3)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate (NO3)	mg/L	SM4110B	2.38	4.62	2.39	3.34
General	Nitrate-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrate-N	mg/L	SM4110B	0.5	1.04	0.54	0.754
General	Nitrite (NO2)	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	EPA300.1	NS	NS	NS	NS
General	Nitrite-N	mg/L	SM4110B	0.01	0.01	0.01	0.01
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	1.13	0.93	0.77	0.23
General	Specific Conductance	umhos/cm	SM2510B	286	153	129	1310
General	Sulfate	mg/L	EPA300.1	NS	NS	NS	NS
General	Sulfate	mg/L	SM4110B	29.9	14.9	12.1	16
General	Total Dissolved Phosphate	mg/L	AM4500-PE	NS	NS	NS	NS
General	Total Dissolved Solids	mg/L	SM2540C	188	106	88	86
General	Total Organic Carbon	mg/L	SM5310B	NS	NS	NS	NS
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	24.5	18.7	6.21	9.7
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	1.5	1.5	1.5 5	1.5 5
General	Total Phosphate	mg/L	SM4500-PE	NS	NS	NS	NS
General	Total Suspended Solids	mg/L	SM2540D	892	446	172	440
General	Turbidity	NTU	SM2130B	5.57	33.4	28.9	36.8
General	Volatile Suspended Solids	mg/L	SM2540E	138	79	70	76
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	0.067	0.067	0.067	0.067
Herbicides	2-4-D	ug/L	EPA515.3	0.015	0.015	0.015	0.015

Appendix B.1. 2009-2010 Annual Report Wet Weather Mass Emission and Tributary Stations Concentrations

Group	Parameter Code	Units	Analysis Method	Los Angeles River Wardlow S10 2009-10Event13 10/13/2009	Los Angeles River Wardlow S10 2009-10Event15 12/07/2009	Los Angeles River Wardlow S10 2009-10Event16 12/11/2009	Los Angeles River Wardlow S10 2009-10Event19 01/17/2010
Herbicides	Glyphosate	ug/L	EPA547	<5	<5	<5	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	<50	<50	142	<50
Metals	Dissolved Antimony	ug/L	EPA200.8	2.63	1.67	1.28	1.15
Metals	Dissolved Arsenic	ug/L	EPA200.8	1.98	1.42	1.03	1.51
Metals	Dissolved Barium	ug/L	EPA200.8	27	22.7	18.2	22.2
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Chromium	ug/L	EPA200.8	1.71	1.21	0.894	0.876
Metals	Dissolved Chromium 6	ug/L	EPA218.6	<0.25	<0.25	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	**15.6**	**9.45**	6.41	6.06
Metals	Dissolved Iron	ug/L	EPA200.8	219	156	127	131
Metals	Dissolved Lead	ug/L	EPA200.8	2.63	2.8	1.45	1.97
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	7.85	4	2.13	<0.5 <1
Metals	Dissolved Selenium	ug/L	EPA200.8	1.23	<0.5	<0.5	1.7
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	63.2	58.8	58.3	44.5
Metals	Aluminum	ug/L	EPA200.8	136	13500	7350	7650
Metals	Antimony	ug/L	EPA200.8	2.7	5.16	2.58	2.96
Metals	Arsenic	ug/L	EPA200.8	2.01	3.92	2.66	3.26
Metals	Barium	ug/L	EPA200.8	30.6	196	109	150
Metals	Beryllium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	<0.1	1.41	0.666	1.02
Metals	Chromium	ug/L	EPA200.8	2.25	17.7	9.78	14.3
Metals	Chromium 6	ug/L	EPA218.6	<0.25	<0.25	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	21.5	82.4	47.7	49.2
Metals	Iron	ug/L	EPA200.8	307	15800	10100	11400
Metals	Lead	ug/L	EPA200.8	3.12	97.6	40.8	53.4
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	8.77	20.5	11.2	13.3
Metals	Selenium	ug/L	EPA200.8	1.39	<0.5	<0.5	1.7
Metals	Silver	ug/L	EPA200.8	<0.1	0.422	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	64.4	492	185	290
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.667	<0.667	<0.667	<0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.667	<0.667	<0.667	<0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.67	<0.67	<0.33	<0.33
Organophosphate Pesticides	Malathion	ug/L	EPA625	NS	NS	NS	NS
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.67	<0.67	<0.67	<0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.67	<0.67	<0.67	<0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<3.3	<3.3	<3.3	<3.3
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.67	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.33	<0.33	<0.33	<0.33

Appendix B.1. 2009-2010 Annual Report Wet Weather Mass Emission and Tributary Stations Concentrations

Group	Parameter Code	Units	Analysis Method	Los Angeles River Wardlow S10 2009-10Event13 10/13/2009	Los Angeles River Wardlow S10 2009-10Event15 12/07/2009	Los Angeles River Wardlow S10 2009-10Event16 12/11/2009	Los Angeles River Wardlow S10 2009-10Event19 01/17/2010
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	3.33	3.33	3.33	3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	1	1	1	1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	1.67	1.67	1.67	8.86
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	3.33	3.33	3.33	3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	0.033	0.033	0.033	0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	0.67	0.67	0.67	0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	0.017	0.017	0.017	0.503
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	0.033	0.033	0.033	0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	0.017	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	1.67	1.67	1.67	1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	0.067	0.067	0.067	0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	0.33	0.33	0.33	0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	0.017	0.017	0.017	0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	0.017	0.017	0.017	0.413

Values reported with a " " are not detected (ND) at the method detection level, and reported as MDL

Values reported with a " " and a " " were detected but not quantified (DNQ) between the method detection limit and reporting limit, they are re

QNS = Quantity Not Sufficient

Exceedance of Water Quality Objective

Not an exceedance due to the High Flow Suspension Basin Plan Amendment (LARQCB 2003).

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	300000*	<20
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	2400	130
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	2400	130
Bacteria	Total Coliform	MPN/100mL	SM9221B	300000	230
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.011	<0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.033	<0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.033	<0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.017	0.018
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	13.2	17.2
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	<1.44
Conventionals	pH	pH units	SM4500H B	8.97*	8.65*
General	Alkalinity as CaCO3	mg/L	SM2320B	138	154
General	Ammonia	mg/L	SM4500-NH3 F	0.375	0.823
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	32.2	12.3
General	Chemical Oxygen Demand	mg/L	SM5220D	47.4	41.5
General	Chloride	mg/L	SM4110B	120	106
General	Dissolved Phosphorus	mg/L	SM4500-PE	<0.05	0.13

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
General	Fluoride	mg/L	SM4110B	0.677	0.573
General	Hardness as CaCO3	mg/L	SM2340C	220	270
General	Kjeldahl-N	mg/L	SM4500-NHorg C	1.38	3.36
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	>0.01&<0.5	>0.01&<0.5
General	NH3-N	mg/L	SM4500-NH3	0.31	0.68
General	Nitrate (NO3)	mg/L	SM4110B	5.65	7.64
General	Nitrate-N	mg/L	SM4110B	1.28	1.72
General	Nitrite-N	mg/L	SM4110B	0.117	<0.01
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	0.06	0.15
General	Specific Conductance	umhos/cm	SM2510B	949	852
General	Sulfate	mg/L	SM4110B	137	162
General	Total Dissolved Solids	mg/L	SM2540C	604	590
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	7.58	16.9
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	<1.5
General	Total Suspended Solids	mg/L	SM2540D	47	63
General	Turbidity	NTU	SM2130B	2.13	2.62
General	Volatile Suspended Solids	mg/L	SM2540E	25	28
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.067	<0.067
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	8.2	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	<50	123
Metals	Dissolved Antimony	ug/L	EPA200.8	0.845	<0.2
Metals	Dissolved Arsenic	ug/L	EPA200.8	<0.2	<0.2
Metals	Dissolved Barium	ug/L	EPA200.8	36.5	<1
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	1.05
Metals	Dissolved Chromium	ug/L	EPA200.8	0.713	<0.5
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	12.7	<0.5
Metals	Dissolved Iron	ug/L	EPA200.8	163	164
Metals	Dissolved Lead	ug/L	EPA200.8	2.1	<0.2
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	4.81	<0.5

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Metals	Dissolved Selenium	ug/L	EPA200.8	2	<0.5
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	66.9	91.6
Metals	Aluminum	ug/L	EPA200.8	337	428
Metals	Antimony	ug/L	EPA200.8	1.14	<0.2
Metals	Arsenic	ug/L	EPA200.8	2.3	<0.2
Metals	Barium	ug/L	EPA200.8	45.8	<1
Metals	Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	<0.1	1.31
Metals	Chromium	ug/L	EPA200.8	3.09	<0.5
Metals	Chromium +6	ug/L	EPA218.6	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	18.8	<0.5
Metals	Iron	ug/L	EPA200.8	448	675
Metals	Lead	ug/L	EPA200.8	2.6	<0.2
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	6.67	<0.5
Metals	Selenium	ug/L	EPA200.8	2.17	<0.5
Metals	Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	75.6	102
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.667	<0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.667	<0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.33	<0.33
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.67	<0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.67	<0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	Phenolics-Total Recoverable	mg/L	EPA625	<0.03	<0.03
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	<2.5	<2.5
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(b)flouranthene	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event2 9/21/2010	Los Angeles River @ Wardlow S10 2010-11Event13 1/24/2011
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.067	<0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.33	<3.33

Values reported with a "< "are not detected at the method detection level, and reported as <MDL
Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL
NS = Not Sampled

Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	9000000*	500000*	300000*	500000**	3000*
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	240000	900000	9000	1600000	16000
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	240000	900000	9000	1600000	16000
Bacteria	Total Coliform	MPN/100mL	SM9221B	9000000	5000000	300000	9000000	300000
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.011	NS	<0.011	<0.011	<0.011
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	NS	<0.002	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	NS	<0.05	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	NS	<0.006	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	NS	<0.003	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	NS	<0.5	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	NS	<0.24	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.01	NS	<0.01	<0.01	<0.01
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.033	NS	<0.033	<0.033	<0.033
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	NS	<0.005	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	NS	<0.005	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	NS	<0.004	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.033	NS	<0.033	<0.033	<0.033
Conventionals	Cyanide	mg/L	SM4500-CNE	0.036*	0.009	0.02	0.005	<0.005
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	11.6	5.48	13.2	9.01	10.5
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	7.29	<1.44	>1.44&<5	>1.44&<5
Conventionals	pH	pH units	SM4500H B	7.02	NS	6.95	6.23*	6.55
General	Alkalinity as CaCO3	mg/L	SM2320B	138	NS	49.5	30.8	41.8
General	Ammonia	mg/L	SM4500-NH3 F	1.89	NS	1.25	0.278	1.55
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	172	NS	12.5	7.94	18.7
General	Chemical Oxygen Demand	mg/L	SM5220D	126	NS	28.1	<10	49
General	Chloride	mg/L	SM4110B	44	NS	21.9	8.35	23.4
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.53	NS	0.23	0.16	0.227
General	Fluoride	mg/L	SM4110B	0.488	NS	0.262	0.157	0.312
General	Hardness as CaCO3	mg/L	SM2340C	140	NS	85	45	75
General	Kjeldahl-N	mg/L	SM4500-NHorg C	3.84	NS	5.08	0.88	15
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4	<0.4	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.96	NS	>0.01&<0.5	>0.01&<0.5	0.6
General	NH3-N	mg/L	SM4500-NH3	1.56	NS	1.03	0.23	1.28
General	Nitrate (NO3)	mg/L	SM4110B	5.06	NS	5.09	2.81	4.25
General	Nitrate-N	mg/L	SM4110B	1.14	NS	1.15	0.634	0.958
General	Nitrite-N	mg/L	SM4110B	0.076	NS	<0.03	<0.01	0.0422
General	Phosphorus- Total (as P)	mg/L	SM4500-PE	0.59	NS	0.34	0.2	0.234
General	Specific Conductance	umhos/cm	SM2510B	456	NS	267	122	234
General	Sulfate	mg/L	SM4110B	50.7	NS	30.2	13.6	36.1
General	Total Dissolved Solids	mg/L	SM2540C	316	NS	182	70	134
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	31	NS	35	37.4	8.6
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	>1.5&<5	<1.5	<1.5	<1.5
General	Total Suspended Solids	mg/L	SM2540D	2280	413	288	243	125

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
General	Turbidity	NTU	SM2130B	26.3	NS	6.73	32	8.91
General	Volatile Suspended Solids	mg/L	SM2540E	463	NS	57	32	60
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.067	NS	<0.067	<0.067	<0.067
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	NS	<0.015	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	8.52	NS	<5	<5	15.4
Metals	Dissolved Aluminum	ug/L	EPA200.8	1280	NS	1160	2250	625
Metals	Dissolved Antimony	ug/L	EPA200.8	<0.2	NS	<0.2	<0.2	<0.2
Metals	Dissolved Arsenic	ug/L	EPA200.8	2.65	NS	2.36	<0.2	<0.2
Metals	Dissolved Barium	ug/L	EPA200.8	189	NS	<1	<1	<1
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Chromium	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	NS	<0.25	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Dissolved Iron	ug/L	EPA200.8	3290	NS	2050	1900	735
Metals	Dissolved Lead	ug/L	EPA200.8	46.8	NS	20.3	20.8	13.2
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	15.2	NS	<0.5	<0.5	<0.5
Metals	Dissolved Selenium	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	346*	NS	194*	129*	183*
Metals	Aluminum	ug/L	EPA200.8	23900	NS	3900	6850	1730
Metals	Antimony	ug/L	EPA200.8	7.72	NS	<0.2	<0.2	<0.2
Metals	Arsenic	ug/L	EPA200.8	7.36	NS	2.91	<0.2	<0.2
Metals	Barium	ug/L	EPA200.8	495	NS	110	<1	<1
Metals	Beryllium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	5.03	NS	<0.1	<0.1	<0.1
Metals	Chromium	ug/L	EPA200.8	34.4	NS	11.7	11.4	<0.5
Metals	Chromium +6	ug/L	EPA218.6	<0.25	NS	<0.25	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	260	NS	52.3	<0.5	<0.5
Metals	Iron	ug/L	EPA200.8	30500	NS	8250	8150	2730
Metals	Lead	ug/L	EPA200.8	213	NS	30.8	33.4	19.8
Metals	Mercury	ug/L	EPA245.1	<0.1	NS	<0.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	42.7	NS	12.7	12.5	<0.5
Metals	Selenium	ug/L	EPA200.8	<0.5	NS	<0.5	<0.5	<0.5
Metals	Silver	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	NS	<0.1	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	1590	NS	316	180	184
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.667	NS	<0.667	<0.667	<0.667
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	NS	<0.02	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.667	NS	<0.667	<0.667	<0.667
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	NS	<0.003	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.33	NS	<0.33	<0.33	<0.33
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.67	NS	<0.67	<0.67	<0.67
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.67	NS	<0.67	<0.67	<0.67
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	NS	<0.065	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Acids)	Phenolics-Total Recoverable	mg/L	EPA 420.1	<0.03	<0.03	<0.03	<0.03	<0.03
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA625	<2.5	<2.5	<2.5	<2.5	<2.5
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	NS	<1	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo(b)flouranthene	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.033	NS	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.67	NS	<0.67	<0.67	<0.67
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.033	NS	<0.033	<0.033	<0.033
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33

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Group	Parameter	Units	Analytical Method	Los Angeles River @ Wardlow S10 2010-11Event3 10/5/2010	Los Angeles River @ Wardlow S10 2010-11Event4 10/30/2010	Los Angeles River @ Wardlow S10 2010-11Event6 11/19/2010	Los Angeles River @ Wardlow S10 2010-11Event8 12/17/2010	Los Angeles River @ Wardlow S10 2010-11Event14 2/16/2011
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.67	NS	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.067	NS	<0.067	<0.067	<0.067
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.33	NS	<0.33	<0.33	<0.33
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.017	NS	<0.017	<0.017	<0.017
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.33	NS	<3.33	<3.33	<3.33

Values reported with a "< "are not detected at the method detection level, and reported as <MDL
Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL
NS = Not Sampled
*Exceedance of Water Quality Objective
**Not an exceedance due to the High Flow Suspension Basin Plan Amendment (LARQCB 2003).

RB-AR12485

Appendix B.1. 2011-2012 Wet Weather Concentrations

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	3000000**	**240000***	9000000**	16000**	50000**
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	2200000	50000	1700000	160000	300000
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	2800000	50000	1700000	240000	300000
Bacteria	Total Coliform	MPN/100mL	SM9221B	16000000	900000	16000000	300000	160000
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002	<0.002	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.015	<0.015	<0.015	<0.015	<0.015
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006	<0.006	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003	<0.003	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24	<0.24	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.003	<0.003	<0.003	<0.003	<0.003
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004	<0.004	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.04	<0.04	<0.04	<0.04	<0.04
Conventionals	Cyanide	mg/L	SM4500-CNE	0.019	0.009	0.016	0.015	0.006
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	7.2	10.2	10.5	9.24	8.71
Conventionals	Oil and Grease	mg/L	EPA1664A	>1.44&<5	>1.44&<5	>1.44&<5	>1.44&<5	>1.44&<5
Conventionals	pH	pH units	SM4500H B	7.34	7.36	7.88	7.11	7.78
General	Alkalinity as $CaCO_3$	mg/L	SM2320B	44	49.5	41.8	42.9	68.2
General	Ammonia	mg/L	SM4500-NH3 D	1.96	0.944	0.387	1.09	0.315
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	28.4	22.4	11.3	19.8	15.9
General	Chemical Oxygen Demand	mg/L	SM5220D	52.5	36	22	25	32
General	Chloride	mg/L	EPA300.0	15.4	19.3	15	10.5	23.1
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.355	0.33	0.22	0.25	0.2
General	Fluoride	mg/L	EPA300.0	0.341	0.29	0.205	0.193	0.244
General	Hardness as $CaCO_3$	mg/L	SM2340C	90	85	60	60	90
General	Kjeldahl-N	mg/L	SM4500-NHorg C	3.88	3.66	1.24	6.56	1.3
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4	<0.4	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	0.56	0.637	>0.01&<0.5	0.717	0.606
General	NH_3-N	mg/L	SM4500-NH3	1.62	0.78	0.32	0.9	0.26
General	Nitrate (NO_3)	mg/L	EPA300.0	7.39	5.87	4.77	4.1	3.59
General	Nitrate-N	mg/L	EPA300.0	1.67	1.32	1.08	0.926	0.81
General	Nitrite-N	mg/L	EPA300.0	0.151	0.0435	>0.01&<0.03	0.0523	<0.01
General	Phosphorus - Total (as P)	mg/L	SM4500-PE	0.39	0.46	0.24	0.31	0.24
General	Specific Conductance	umhos/cm	SM2510 B	214	248	116	153	252
General	Sulfate	mg/L	EPA300.0	23.9	29.1	20.1	16.5	27.1
General	Total Dissolved Solids	mg/L	SM2540C	176	160	98	100	166
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	23.4	17.9	8.92	10.1	1.56
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	>1.5&<5	<1.5	<1.5	>1.5&<5	<1.5

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
General	Total Suspended Solids	mg/L	SM2540D	458	112	1160	276	704
General	Turbidity	NTU	SM2130B	46.9	11.5	39.1	14.5	13.9
General	Volatile Suspended Solids	mg/L	SM2540E	150	23	197	76	162
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.07	<0.07	<0.07	<0.07	<0.07
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015	<0.015	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	6.5	8.59	<5	14.1	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	3900	600	4750	900	1060
Metals	Dissolved Antimony	ug/L	EPA200.8	2.35	2.08	2.22	1.25	1.62
Metals	Dissolved Arsenic	ug/L	EPA200.8	2.25	1.43	2.21	1.25	1.82
Metals	Dissolved Barium	ug/L	EPA200.8	106	37.9	136	51.8	69.1
Metals	Dissolved Beryllium	ug/L	EPA200.8	>0.1&<0.5	<0.1	>0.1&<0.5	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	1.14	0.303	1.27	0.456	0.612
Metals	Dissolved Chromium	ug/L	EPA200.8	5.94	2.2	7.28	2.34	3.06
Metals	Dissolved Chromium +6	ug/L	EPA218.6	<0.25	>0.25&<5	>0.25&<5	<0.25	<0.25
Metals	Dissolved Copper	ug/L	EPA200.8	**56.2***	**25.7***	**57.2***	**27.7***	**36.9***
Metals	Dissolved Iron	ug/L	EPA200.8	3830	770	3500	1190	1630
Metals	Dissolved Lead	ug/L	EPA200.8	**61.5***	11.6	**82***	18	26.1
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	10.2	5.7	10.7	5.31	7.07
Metals	Dissolved Selenium	ug/L	EPA200.8	>0.5&<1	>0.5&<1	>0.5&<1	<0.5	>0.5&<1
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	**471***	**147***	**380***	**189***	**254***
Metals	Aluminum	ug/L	EPA200.8	6850	1830	8700	3000	3330
Metals	Antimony	ug/L	EPA200.8	5.7	3.18	6.04	2.92	3.6
Metals	Arsenic	ug/L	EPA200.8	3.12	1.6	3.71	1.57	2.45
Metals	Barium	ug/L	EPA200.8	163	51.3	216	81.5	100
Metals	Beryllium	ug/L	EPA200.8	>0.1&<0.5	<0.1	>0.1&<0.5	<0.1	>0.1&<0.5
Metals	Cadmium	ug/L	EPA200.8	1.4	0.329	1.43	0.594	0.727
Metals	Chromium	ug/L	EPA200.8	16.2	4.71	21.9	7.18	9.37
Metals	Chromium +6	ug/L	EPA218.6	<0.25	>0.25&<5	>0.25&<5	<0.25	<0.25
Metals	Copper	ug/L	EPA200.8	76.6	34.1	75.6	46	52.7
Metals	Iron	ug/L	EPA200.8	10100	2820	16600	4280	5780
Metals	Lead	ug/L	EPA200.8	79.5	15.6	116	23.1	36.4
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	15.8	8.4	19	8.7	11.3
Metals	Selenium	ug/L	EPA200.8	1.21	>0.5&<1	>0.5&<1	>0.5&<1	>0.5&<1
Metals	Silver	ug/L	EPA200.8	0.48	>0.1&<0.25	0.499	>0.1&<0.25	>0.1&<0.25
Metals	Thallium	ug/L	EPA200.8	>0.1&<1	<0.1	>0.1&<1	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	505	188	396	314	322
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02	<0.02	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003	<0.003	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.4	<0.4	<0.4	<0.4	<0.4
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.7	<0.7	<0.7	<0.7	<0.7
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065	<0.065	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	Phenolics - Total recoverable	mg/L	EPA420.1	<0.03	<0.03	>0.03&<0.1	<0.03	<0.03
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2	<0.2	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2	<0.2	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2	<0.2	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA624	<0.83	<0.83	<0.83	<0.83	<0.83
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.4	<3.4	<3.4	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1	<1	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo[b]fluoranthene	ug/L	EPA625	<3.33	<3.33	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67	<1.67	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33	<3.33	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.04	<0.04	<0.04	<0.04	<0.04
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.7	<0.7	<0.7	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.04	<0.04	<0.04	<0.04	<0.04

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow S10 2011-12Event05 10/5/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event07 11/11/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event08 11/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event13 1/21/12	Los Angeles River @ Wardlow Rd. S10 2011-12Event18 3/16/2012
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.7	<1.7	<1.7	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.07	<0.07	<0.07	<0.07	<0.07
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.4	<0.4	<0.4	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.02	<0.02	<0.02	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.4	<3.4	<3.4	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.4	<3.4	<3.4	<3.4	<3.4

Values reported with a "< "are not detected at the method detection level, and reported as <MDL

Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL

NS = Not Sampled

*Exceedance of Water Quality Objective

**Not an exceedance due to the High Flow Suspension Basin Plan Amendment (LARQCB 2003).

^Method detection level exceeds the waer quality benchmark.

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
Bacteria	Fecal Coliform	MPN/100mL	SM9221E	80	130
Bacteria	Fecal Enterococcus	MPN/100mL	SM9230B	<20	80
Bacteria	Fecal Streptococcus	MPN/100mL	SM9230B	<20	80
Bacteria	Total Coliform	MPN/100mL	SM9221B	300	500
Chlorinated Pesticides	4-4'-DDD	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	4-4'-DDE	ug/L	EPA608	<0.05	<0.05
Chlorinated Pesticides	4-4'-DDT	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Aldrin	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Dieldrin	ug/L	EPA608	<0.002	<0.002
Chlorinated Pesticides	Endosulfan I (alpha)	ug/L	EPA608	<0.015	<0.015
Chlorinated Pesticides	Endosulfan II (beta)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	Endosulfan sulfate	ug/L	EPA608	<0.05	<0.05
Chlorinated Pesticides	Endrin	ug/L	EPA608	<0.006	<0.006
Chlorinated Pesticides	Endrin aldehyde	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Heptachlor	ug/L	EPA608	<0.003	<0.003
Chlorinated Pesticides	Heptachlor Epoxide	ug/L	EPA608	<0.01	<0.01
Chlorinated Pesticides	Methoxychlor	ug/L	EPA608	<0.5	<0.5
Chlorinated Pesticides	Toxaphene	ug/L	EPA608	<0.24	<0.24
Chlorinated Pesticides	alpha-BHC	ug/L	EPA608	<0.003	<0.003
Chlorinated Pesticides	alpha-chlordane	ug/L	EPA608	<0.04	<0.04
Chlorinated Pesticides	beta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	delta-BHC	ug/L	EPA608	<0.005	<0.005
Chlorinated Pesticides	gamma-BHC (lindane)	ug/L	EPA608	<0.004	<0.004
Chlorinated Pesticides	gamma-chlordane	ug/L	EPA608	<0.04	<0.04
Conventionals	Cyanide	mg/L	SM4500-CNE	0.007	0.022
Conventionals	Dissolved Oxygen	mg/L	SM4500 (OG)	22.2	18.3
Conventionals	Oil and Grease	mg/L	EPA1664A	<1.44	<1.44
Conventionals	pH	pH units	SM4500H B	**9.14***	**9.31***
General	Alkalinity as $CaCO_3$	mg/L	SM2320B	105	184
General	Ammonia	mg/L	SM4500-NH3 D	0.303	0.121
General	BioChemical Oxygen Demand- Five-Day	mg/L	SM5210B	12	20.8
General	Chemical Oxygen Demand	mg/L	SM5220D	28.8	26
General	Chloride	mg/L	EPA300.0	117	111
General	Dissolved Phosphorus	mg/L	SM4500-PE	0.062	0.2
General	Fluoride	mg/L	EPA300.0	0.672	0.64
General	Hardness as $CaCO_3$	mg/L	SM2340C	190	280
General	Kjeldahl-N	mg/L	SM4500-NHorg C	1.52	1
General	Methyl Tertiary Butyl Ether (MTBE)	ug/L	EPA624	<0.4	<0.4
General	Methylene Blue Active Substances (MBAS)	mg/L	SM5540-C	>0.01&<0.5	>0.01&<0.5
General	NH_3-N	mg/L	SM4500-NH3	0.25	0.1
General	Nitrate (NO_3)	mg/L	EPA300.0	2.19	6.89
General	Nitrate-N	mg/L	EPA300.0	>0.03&<0.5	1.55
General	Nitrite-N	mg/L	EPA300.0	0.0517	0.214
General	Phosphorus - Total (as P)	mg/L	SM4500-PE	0.084	0.24
General	Specific Conductance	umhos/cm	SM2510 B	892	942
General	Sulfate	mg/L	EPA300.0	163	151
General	Total Dissolved Solids	mg/L	SM2540C	522	606
General	Total Organic Carbon	mg/L	SM5310B/EPA415.1	7.25	8.12

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
General	Total Petroleum Hydrocarbons	mg/L	EPA418.1	<1.5	<1.5
General	Total Suspended Solids	mg/L	SM2540D	22	12
General	Turbidity	NTU	SM2130B	3.68	1.48
General	Volatile Suspended Solids	mg/L	SM2540E	21	8
Herbicides	2-4-5-TP-SILVEX	ug/L	EPA515.3	<0.07	<0.07
Herbicides	2-4-D	ug/L	EPA515.3	<0.015	<0.015
Herbicides	Glyphosate	ug/L	EPA547	<5	<5
Metals	Dissolved Aluminum	ug/L	EPA200.8	>50&<100	<50
Metals	Dissolved Antimony	ug/L	EPA200.8	0.726	0.866
Metals	Dissolved Arsenic	ug/L	EPA200.8	>0.2&<1	1.23
Metals	Dissolved Barium	ug/L	EPA200.8	37	36
Metals	Dissolved Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Cadmium	ug/L	EPA200.8	<0.1	>0.1&<0.25
Metals	Dissolved Chromium	ug/L	EPA200.8	0.935	2.03
Metals	Dissolved Chromium +6	ug/L	EPA218.6	>0.25&<5	>0.25&<5
Metals	Dissolved Copper	ug/L	EPA200.8	11.3	9.38
Metals	Dissolved Iron	ug/L	EPA200.8	109	165
Metals	Dissolved Lead	ug/L	EPA200.8	2.3	1.07
Metals	Dissolved Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Dissolved Nickel	ug/L	EPA200.8	4.41	3.95
Metals	Dissolved Selenium	ug/L	EPA200.8	2.44	2.21
Metals	Dissolved Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Dissolved Zinc	ug/L	EPA200.8	94.4	69.2
Metals	Aluminum	ug/L	EPA200.8	179	107
Metals	Antimony	ug/L	EPA200.8	1.06	1.08
Metals	Arsenic	ug/L	EPA200.8	1.72	1.52
Metals	Barium	ug/L	EPA200.8	45.5	40.8
Metals	Beryllium	ug/L	EPA200.8	<0.1	<0.1
Metals	Cadmium	ug/L	EPA200.8	>0.1&<0.25	0.343
Metals	Chromium	ug/L	EPA200.8	4.4	3.25
Metals	Chromium +6	ug/L	EPA218.6	>0.25&<5	>0.25&<5
Metals	Copper	ug/L	EPA200.8	13	12.9
Metals	Iron	ug/L	EPA200.8	233	301
Metals	Lead	ug/L	EPA200.8	4.12	1.43
Metals	Mercury	ug/L	EPA245.1	<0.1	<0.1
Metals	Nickel	ug/L	EPA200.8	6.21	5.47
Metals	Selenium	ug/L	EPA200.8	3.3	2.97
Metals	Silver	ug/L	EPA200.8	<0.1	<0.1
Metals	Thallium	ug/L	EPA200.8	<0.1	<0.1
Metals	Zinc	ug/L	EPA200.8	103	73.2
Organophosphate Pesticides	Atrazine	ug/L	EPA507	<0.7	<0.7
Organophosphate Pesticides	Chlorpyrifos	ug/L	EPA507	<0.02	<0.02
Organophosphate Pesticides	Cyanazine	ug/L	EPA507	<0.7	<0.7
Organophosphate Pesticides	Diazinon	ug/L	EPA507	<0.003	<0.003
Organophosphate Pesticides	Malathion	ug/L	EPA507	<0.4	<0.4
Organophosphate Pesticides	Prometryn	ug/L	EPA507	<0.7	<0.7
Organophosphate Pesticides	Simazine	ug/L	EPA507	<0.7	<0.7
Polychlorinated Biphenyls	PCB-1016 (Aroclor 1016)	ug/L	EPA608	<0.065	<0.065

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
Polychlorinated Biphenyls	PCB-1221 (Aroclor 1221)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1232 (Aroclor 1232)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1242 (Aroclor 1242)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1248 (Aroclor 1248)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1254 (Aroclor 1254)	ug/L	EPA608	<0.065	<0.065
Polychlorinated Biphenyls	PCB-1260 (Aroclor 1260)	ug/L	EPA608	<0.065	<0.065
Semivolatile Organic Compounds (Acids)	2-4-6-Trichlorophenol	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dichlorophenol	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	2-4-Dimethylphenol	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-4-Dinitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	2-Chlorophenol	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	2-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Chloro-3-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	4-Nitrophenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Acids)	Pentachlorophenol	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Acids)	Phenol	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Acids)	Phenolics - Total recoverable	mg/L	EPA420.1	<0.03	>0.03&<0.1
Semivolatile Organic Compounds (Base/Neutral)	1-2-4-Trichlorobenzene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-2-Benzanthracene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	1-2-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-2-Diphenylhydrazine	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	1-3-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	1-4-Dichlorobenzene	ug/L	EPA625	<0.2	<0.2
Semivolatile Organic Compounds (Base/Neutral)	2-4-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-6-Dinitrotoluene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	2-Chloroethyl vinyl ether	ug/L	EPA624	<0.83	<0.83
Semivolatile Organic Compounds (Base/Neutral)	2-Chloronaphthalene	ug/L	EPA625	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	3-3-Dichlorobenzidine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	4-6-Dinitro-2-methylphenol	ug/L	EPA625	<1	<1
Semivolatile Organic Compounds (Base/Neutral)	4-Bromophenyl phenyl ether	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	4-Chlorophenyl phenyl ether	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Acenaphthylene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Anthracene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzidine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(a)pyrene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo(k)flouranthene	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Benzo[b]fluoranthene	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Benzo[g-h-i]perylene	ug/L	EPA625	<1.67	<1.67
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethoxy) methane	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroethyl) ether	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Chloroisopropyl) ether	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Bis(2-Ethylhexl) phthalate	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Butyl benzyl phthalate	ug/L	EPA625	<3.33	<3.33
Semivolatile Organic Compounds (Base/Neutral)	Chrysene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Dibenzo(a-h)anthracene	ug/L	EPA625	<0.04	<0.04
Semivolatile Organic Compounds (Base/Neutral)	Diethyl phthalate	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Dimethyl phthalate	ug/L	EPA625	<0.7	<0.7
Semivolatile Organic Compounds (Base/Neutral)	Fluoranthene	ug/L	EPA625	<0.02	<0.02

Group	Parameter	Units	Analysis Method	Los Angeles River @ Wardlow Rd. S10 2011-12Event04 9/20/2011	Los Angeles River @ Wardlow Rd. S10 2011-12Event12 1/9/2012
Semivolatile Organic Compounds (Base/Neutral)	Fluorene	ug/L	EPA625	<0.04	<0.04
Semivolatile Organic Compounds (Base/Neutral)	Hexachloro-cyclopentadiene	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobenzene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachlorobutadiene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Hexachloroethane	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Indeno(1-2-3-c-d)pyrene	ug/L	EPA625	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Isophorone	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-di-n-propyl amine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-dimethyl amine	ug/L	EPA625	<1.7	<1.7
Semivolatile Organic Compounds (Base/Neutral)	N-Nitroso-diphenyl amine	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Naphthalene	ug/L	EPA625	<0.07	<0.07
Semivolatile Organic Compounds (Base/Neutral)	Nitrobenzene	ug/L	EPA625	<0.4	<0.4
Semivolatile Organic Compounds (Base/Neutral)	Phenanthrene	ug/L	EPA625	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	Pyrene	ug/L	EPA625	<0.02	<0.02
Semivolatile Organic Compounds (Base/Neutral)	di-n-Butyl phthalate	ug/L	EPA625	<3.4	<3.4
Semivolatile Organic Compounds (Base/Neutral)	di-n-Octyl phthalate	ug/L	EPA625	<3.4	<3.4

Values reported with a "< "are not detected at the method detection level, and reported as <MDL

Values reported with a "<" and a ">" were detected between the method detection limit and reporting limit, they are reported as >MDL& <RL

NS = Not Sampled

*Exceedance of Water Quality Objective

Watershed Management Program Appendix 3

A-3-1 MCM Guidance

Public Information and Participation Program

Introduction

Permit §VI.D.5.a (LA)/ §VII.F.1 (LB)

Each participating city is required to develop and implement a Public Information and Participation Program (PIPP) that includes the requirements listed in Permit §VI.D.5.a (LB §VII.F). This document provides guidance that the participating cities can follow to implement a PIPP in compliance with the Permit.

The objectives of the PIPP are to:

- Measurably increase the knowledge of the target audiences about the MS4, the adverse impacts of stormwater pollution on receiving waters and potential solutions to mitigate the impacts.
- Measurably change the waste disposal and stormwater pollution generation behavior of target audiences by developing and encouraging the implementation of appropriate alternatives.
- Involve and engage a diversity of socio-economic groups and ethnic communities in Los Angeles County to participate in mitigating the impacts of stormwater pollution.

PIPP Implementation

Permit §VI.D.5.b (LA)/§VII.F.2 (LB)

The PIPP is implemented using the following approaches:

- By participating in a County-wide PIPP,
- By participating in one or more Watershed Group sponsored PIPPs, and
- individually within its jurisdiction.

Cities participating in a County-wide or Watershed Group PIPP provide contact info for their staff responsible for stormwater public education activities to the designated PIPP coordinator. Changes in contact information are provided within 30 days of the date that the change occurred.

Public Participation

Permit §VI.D.5.c (LA)/§VII.F.3 (LB)

Public Reporting

The means for public reporting of clogged catch basin inlets and illicit discharges/dumping, faded or missing catch basin labels, and general stormwater and non-stormwater pollution prevention information is provided through the use of the countywide 888-CLEAN-LA hotline. In addition, each participating city:

- Includes the reporting information – updated when necessary – in public information and the government pages of the telephone book as they are developed or published.
- Identifies staff or departments who will serve as the contact person(s) and will make this information available on its website.
- Provides current, updated hotline contact information to the general public within its jurisdiction.

RB-AR12495

Events

Events are organized to target residents and population subgroups. The purpose of the events is to educate and involve the community in stormwater and non-stormwater pollution prevention activities, such as education seminars, clean-ups, and community catch basin stenciling.

Residential Outreach Program

Permit §VI.D.5.d (LA)/§VII.F.4 (LB)

With the exception of item 5, which is no longer an element of the countywide PIP Program, each city implements the following activities for the Residential Outreach Program as part of a countywide program:

1. Conduct stormwater pollution prevention public service announcements and advertising campaigns
2. Prepare public education materials that include information on the proper handling (i.e., disposal, storage and/or use) of:
    a. Vehicle waste fluids
    b. Household waste materials (i.e., trash and household hazardous waste, including personal care products and pharmaceuticals)
    c. Construction waste materials
    d. Pesticides and fertilizers (including integrated pest management (IPM) practices to promote reduced use of pesticides)
    e. Green waste (including lawn clippings and leaves)
    f. Animal wastes
3. Distribute activity specific stormwater pollution prevention public education materials at the following points of purchase:
    a. Automotive parts stores
    b. Home improvement centers / lumber yards / hardware stores/paint stores
    c. Landscaping / gardening centers
    d. Pet shops / feed stores
4. Maintain stormwater websites or provide links to stormwater websites via each participating city's website. This includes educational material and opportunities for the public to participate in stormwater pollution prevention and clean-up activities listed in Part VI.D.4 of the Permit.
5. Provide independent, parochial, and public schools within each participating city's jurisdiction with materials to educate school children (K-12) on stormwater pollution. Material may include videos, live presentations and other information. A useful source of materials to work with, or leverage, is other statewide agencies and associations. These associations include the State Water Board's "Erase the Waste" educational program and the California Environmental Education Interagency Network (CEEIN) to implement this requirement.
6. When implementing the above activities, use effective strategies to educate and involve ethnic communities in stormwater pollution prevention through culturally effective methods.

RB-AR12496

Industrial/Commercial Facilities Program

Each participating city is required to implement an industrial/commercial facilities program that includes the provisions listed in Permit § VI.D.6 (LB §VII.G). This document provides guidance that the participating cities can follow to implement an industrial/commercial facilities program in compliance with the Permit.

Introduction

Permit § VI.D.6.a (LA)/ §VII.G.1 (LB)

The Industrial/Commercial Facilities Program is designed to prevent illicit discharges into the MS4 and receiving waters, reduce industrial/commercial discharges of stormwater to the maximum extent practicable, and prevent industrial/commercial discharges from the MS4 from causing or contributing to a violation of receiving water limitations. The program consists of the following components:

- Track,
- Educate,
- Inspect and
- Ensure compliance with municipal ordinances at industrial/commercial facilities determined to be critical sources of pollutants in stormwater.

Track Critical Industrial/Commercial Sources

Permit § VI.D.6.b (LA)/ §VII.G.2 (LB)

The critical sources to be tracked are listed in Table ICF-1.

Table ICF-1: Critical Sources

Facility Category	Facility	
Commercial Facilities	Restaurants	
	Automotive service facilities (including those located at automotive dealerships)	
	Retail Gasoline Outlets	
	Nurseries and Nursery Centers (Merchant Wholesalers, Nondurable Goods, and Retail Trade)	
Industrial Facilities	USEPA "Phase I" Facilities[1]	
	Other federally-mandated facilities[2]	Municipal landfills
		Hazardous waste treatment, disposal, and recovery facilities
		Industrial facilities subject to § 313 "Toxic Release Inventory" reporting requirements of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)[3]
General Facilities	All other commercial or industrial facilities determined to potentially contribute a substantial pollutant load to the MS4.	

[1] as specified in 40 CFR §122.26(b)(14)(i)-(xi)
[2] as specified in 40 CFR §122.26(d)(2)(iv)(C)
[3] 42 U.S.C. § 11023

RB-AR12497

Critical source facilities are tracked in an electronic database management system. The information stored for each critical source in the inventory is listed in Table ICF-2.

Table ICF-2: Inventory Information for Critical Sources

Information Category		Information
General	Name	Facility Name
	Location	Facility address
		Facility latitude and longitude coordinates
		Receiving water
	Contact	Owner/operator name
		Mailing address
		Phone number
		Email (if available)
Business Type		Standard Industrial Classification (SIC) code and/or North American Industry Classification System (NAICS) code
		Narrative description of the activities performed and/or principal products produced
Water quality		Status of exposure of materials to stormwater
		Pollutants generated by facility activities (A-ICF-1)
		Identification of whether the facility is tributary to a waterbody segment with impairments[4] for pollutants that are also generated by the facility.
Prioritization		High, medium or low. The default priority is medium.
NPDES Permit		For applicable facilities, identify coverage under the State Water Board's General NPDES Permit for the Discharge of Stormwater Associated with Industrial Activities (Industrial General Permit) or other individual or general NPDES permits or any waiver issued by the Regional or State Water Board pertaining to stormwater discharges.
		For Industrial General Permit facilities, identify whether the facility has filed a No Exposure Certification with the State Water Board.

Update Inventory

The critical sources inventory is updated at least annually. The update is accomplished through the collection of new information from sources such as field activities and readily available inter/intra-agency records (e.g. business licenses, pretreatment permits, sanitary sewer connection permits and the State Water Resources Control Board's Storm Water Multiple Application and Report Tracking System (SMARTS)).

[4] CWA § 303(d) listed or subject to a TMDL

Prioritization

Prioritizing facilities by their potential water quality impact provides an excellent opportunity to optimize the effectiveness of the Industrial/Commercial Facilities Program. The three inventory fields under the "Water Quality" category of Table ICF-2 provide information that allows for such a facility prioritization. Based on these fields, the following tables establish a method to prioritize all industrial/commercial facilities into three graded tiers – High, Medium and Low. The City may follow an alternative prioritization method provided it is based on water quality impact and results in a similar three-tiered scheme. In order to maintain a minimum inspection frequency equivalent to the mandates of the MS4 Permit, a condition must be applied to the prioritization process. This condition is explained on the following page.

Prioritization factors

Factor	Description
A	Status of exposure of materials and industrial/commercial activities to stormwater
B	Identification of whether the facility is tributary to a waterbody segment with impairments[5] for pollutants that are also generated by the facility
C	Other factors determined by the City, such as size of facility, presence of exposed soil or history of stormwater violations

Utilizing these factors, follow steps 1, 2 and 3 below:

1. Collect necessary information to evaluate factors

Factor	Initial method	Subsequent method
A	Satellite imagery	Results of stormwater inspection
B	Cross reference Table 4 or Table 5* with tributary TMDL/ 303(d) pollutants	Cross reference inspection results with tributary TMDL/ 303(d) pollutants
C	Varies	

* See pages 9 and 10 of Appendix A-3-1 ICF (guidance for the Industrial/Commercial Facilities Program)

2. Evaluate factors

Factor	Result	Score
	Low or no exposure	0
A	Moderate exposure	½
	Significant exposure	1
B	No**	0
	Yes***	1
	Low	0
C	Medium	½
	High	1

** No pollutant generation/impairment matches

*** ≥ 1 pollutant generation/impairment matches

3. Prioritize facilities

		C Score		
		0	**½**	**1**
A×B Score	**0**	Low	Medium	High
	½	Medium	High	High
	1	High	High	High

This method serves only as a guide to prioritization. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C.

Figure ICF-1: Industrial/Commercial Facility Prioritization Scheme

Step 3 may also be expressed by the relationships $A \cdot B + C \geq 1 \rightarrow$ High, $1 > A \cdot B + C > 0 \rightarrow$ Medium and $A \cdot B + C = 0 \rightarrow$ Low. The purpose of multiplying A and B is to scale the impact of the presence of the

[5] CWA §303(d) listed or subject to a TMDL

pollutants at a facility (B) by the likelihood that they will be discharged to the MS4 (A). Factor C quantifies water quality concerns that are independent of A or B and as such is incorporated through addition. The purpose of this numerical approach is to provide consistency to the prioritization process. It is intended solely as a guide. The City may also prioritize facilities based on a qualitative assessment of factors A, B and C as listed in Figure ICF-1.

Prioritization Condition

The facility prioritization impacts the inspection frequency. In fact the main objective of prioritizing the facilities is to adjust the inspection schedule to focus efforts on water quality priorities. The intent is not to reduce the total number of inspections. In order to maintain a total number of inspections in line with the expectations of the MS4 Permit (i.e. result in the same number of average inspections per year as a semi-quinquennial frequency), one additional condition must be imposed:

The total number of low priority facilities is less than or equal to 3 times the number of high priority facilities.

Prioritization condition

Prioritization Frequency

The default priority for a facility is Medium. Facilities will be reprioritized as necessary following the results of routine inspections. The City may also use any readily available information that clarifies potential water quality impacts (e.g., satellite imagery) in order to prioritize a facility before the initial inspection. Reprioritization may also be conducted at any time as new water quality based information on a facility becomes available. During reprioritization, the ratio of low priority to high priority facilities will remain at 3:1 or lower. Figure ICF-2 is a flowchart of the prioritization process.

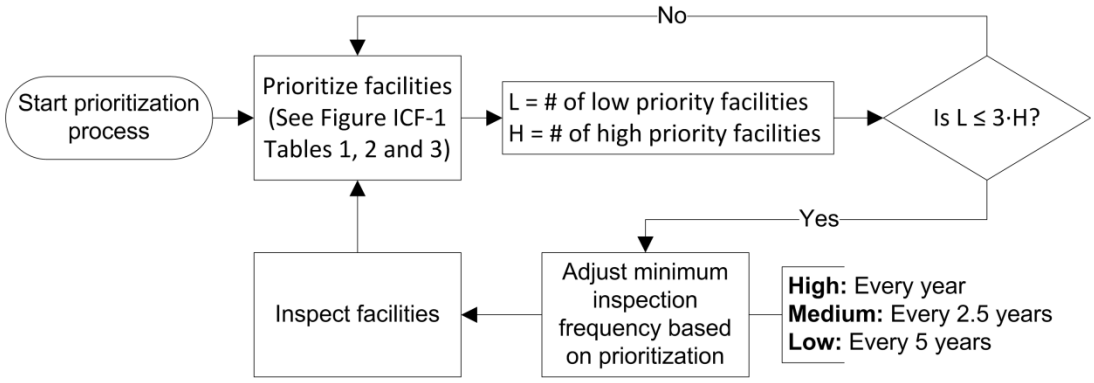


Figure ICF-2: Prioritization Process

Educate Industrial/Commercial Sources

Permit § VI.D.6.c (LA)/ §VII.G.3 (LB)

At least once during the five-year period of the MS4 Permit, the owner/operator of each of the inventoried critical sources is notified of the BMP requirements applicable to the facility/source.

Business Assistance Program

The Business Assistance Program provides technical information to businesses to facilitate their efforts to reduce the discharge of pollutants in stormwater. Assistance is targeted to select business sectors or

small businesses upon a determination that their activities may be contributing substantial pollutant loads to the MS4 or receiving water. Assistance may include technical guidance and provision of educational materials. The Program includes at least one of the following components:

- **Technical Guidance** – Provide on-site technical assistance, telephone, or e-mail consultation regarding the responsibilities of businesses to reduce the discharge of pollutants, procedural requirements, and available guidance documents. Guidance methods include but are not limited to:
    - Technical guidance through the critical source inspection program. During an inspection the inspector provides to the business owner/operator 1) on-site technical assistance and 2) contact information for continued consultation. The inspector may also refer staff to relevant fact sheets from the *CASQA Industrial and Commercial BMP Handbook*.
    - Technical guidance initiated with businesses through an informational letter, email, webpage or social media. The notice provides contact information of relevant stormwater staff for business assistance as well as hyperlinks to available guidance documents such as the *CASQA Industrial and Commercial BMP Handbook*.
- **Educational Materials** – Distribute stormwater pollution prevention educational materials to operators of 1) auto repair shops, car wash facilities, restaurants and 2) mobile sources including automobile/equipment repair, washing, or detailing, power washing services, mobile carpet, drape, or upholstery cleaning services, swimming pool, water softener, and spa services, portable sanitary services and commercial applicators and distributors of pesticides, herbicides and fertilizers, if present. Material sources and distribution methods include but are not limited to:
    - Distribution method – The presence of these businesses within an agency's jurisdiction may be determined through business licenses or other readily available inter/intra-agency records.
    - Material sources – Educational materials are available at USEPA's Nonpoint Source (NPS) Outreach Toolbox at http://cfpub.epa.gov/npstbx/index.html. The toolbox is a database of nationwide public education materials that is intended for use by state and local campaigns. The toolbox contains a variety of resources to help develop an effective and targeted outreach campaign.

Inspect Critical Industrial/Commercial Sources

Modified from Permit §VI.D.6.d-e (LA)/ §VII.G.4-5(LB)

Frequency of Inspections

Following the facility prioritization method described in this guidance document, the City will inspect high priority facilities annually, medium priority facilities semi-quinquennially (once every 2.5 years) and low priority facilities quinquennially (once every five years). The frequencies may be altered by the exclusions defined in the following section. The prioritization condition on Page ICF-4 ensures at least the same average number of inspections conducted per year as the semi-quinquennial frequency defined in the MS4 Permit.

The City will conduct the first compliance inspection of industrial/commercial facilities within one year of the approval of the Watershed Management Program by the Executive Officer. There will be a minimum interval of six months between the first and the second mandatory compliance inspections.

Exclusions to the Frequency of Industrial Inspections

Exclusion of Facilities Previously Inspected by the Regional Water Board

The State Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS) database[6] is reviewed at defined intervals to determine if an industrial facility has recently been inspected by the Regional Water Board. The first interval is two years after the effective date of the MS4 Permit (LA: December 28, 2014, LB: March 28,, 2016) and the second interval is four years after the effective date (LA: December 28, 2016, LB: March 28, 2018). If it is determined through the review that the Regional Water Board conducted an inspection of a facility within the prior 24 month period, then the facility does not require an inspection.

No Exposure Verification

The initial inspection identifies those facilities that have filed a No Exposure Certification with the State Water Board. Three to four years after the effective date of the MS4 Permit, a second inspection is performed for at least 25% of the facilities identified to have filed a No Exposure Certification. The purpose of this inspection is to verify the continuity of the no exposure status.

Scope of Inspections

A template inspection form is included as Attachment ICF-A.

Scope of Commercial Inspections

Commercial critical source facilities are inspected to confirm that stormwater and non-stormwater BMPs are effectively implemented in compliance with municipal ordinances. At each facility, inspectors verify that the operator is implementing effective source control BMPs for each corresponding activity. The implementation of additional BMPs is required where stormwater from the MS4 discharges to a significant ecological area (SEA), a water body subject to TMDL provisions[7], or a CWA §303(d) listed impaired water body. For those BMPs that are not adequately protective of water quality standards, additional site-specific controls may be required.

Scope of Mandatory Industrial Facility Inspections

At each industrial critical source the inspector confirms that the facility

- Has a current Waste Discharge Identification (WDID) number for coverage under the Industrial General Permit, and that a Storm Water Pollution Prevention Plan (SWPPP) is available on-site; or
- Has applied for, and has received a current No Exposure Certification for facilities subject to this requirement;
- Is effectively implementing BMPs in compliance with municipal ordinances. Facilities must implement the source control BMPs identified in Table ICF-3, unless the pollutant generating activity does not occur. Additional BMPs must be implemented where stormwater from the MS4

[6] SMARTS is accessible at https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp
[7] As described in Part VI.E of the MS4 Permit

discharges to a water body subject to TMDL Provisions in Part VI.E of the MS4 Permit, or a CWA § 303(d) listed impaired water body. If the specified BMPs are not adequately protective of water quality standards, additional site-specific controls may be required. For critical sources that discharge to MS4s that discharge to SEAs, operators must implement additional pollutant-specific controls to reduce pollutants in stormwater runoff that are causing or contributing to exceedances of water quality standards.

- Applicable industrial facilities identified as not having either a current WDID or No Exposure Certification are notified that they must obtain coverage under the Industrial General Permit and will be referred to the Regional Water Board per the Progressive Enforcement Policy procedures identified in Part VI.D.2 of the MS4 Permit.

Source Control BMPs

Permit § VI.D.6.f (LA)/ §VII.G.6 (LB)

Effective source control BMPs for the activities listed in Table ICF-3 are implemented at commercial and industrial facilities, unless the pollutant generating activity does not occur:

Significant Ecological Areas (SEAs)

Permit § VI.D.6.g (LA)/ §VII.H (LB)

For critical sources that discharge to MS4s that discharge to SEAs, each Permittee will require operators to implement additional pollutant-specific controls to reduce pollutants in stormwater runoff that are causing or contributing to exceedances of water quality standards.

Progressive Enforcement

Permit § VI.D.6.h (LA)/ §VII.I (LB)

Each Permittee will implement its Progressive Enforcement Policy to ensure that Industrial / Commercial facilities are brought into compliance with all stormwater requirements within a reasonable time period. See Part VI.D.2 of the MS4 Permit for requirements for the development and implementation of a Progressive Enforcement Policy.

Table ICF-3: Source Control BMPs at Commercial and Industrial Facilities

Pollutant-Generating Activity	BMP Description	BMP Fact Sheet*
Unauthorized Non-Storm water Discharges	Effective elimination of non-stormwater discharges	SC-10
Accidental Spills/ Leaks	Implementation of effective spills/ leaks prevention and response procedures	SC-11
Vehicle/ Equipment Fueling	Implementation of effective fueling source control devices and practices	SC-20
Vehicle/ Equipment Cleaning	Implementation of effective equipment/vehicle cleaning practices and appropriate wash water management practices	SC-21
Vehicle/ Equipment Repair	Implementation of effective vehicle/ equipment repair practices and source control devices	SC-22
Outdoor Liquid Storage	Implementation of effective outdoor liquid storage source controls and practices	SC-31
Outdoor Equipment Operations	Implementation of effective outdoor equipment source control devices and practices	SC-32
Outdoor Storage of Raw Materials	Implementation of effective source control practices and structural devices	SC-33
Storage and Handling of Solid Waste	Implementation of effective solid waste storage/ handling practices and appropriate control measures	SC-34
Building and Grounds Maintenance	Implementation of effective facility maintenance practices	SC-41
Parking/ Storage Area Maintenance	Implementation of effective parking/ storage area designs and housekeeping/ maintenance practices	SC-43
Stormwater Conveyance System Maintenance	Implementation of proper conveyance system operation and maintenance protocols	SC-44
Pollutant-Generating Activity	**BMP Description from Regional Water Board Resolution No. 98-08**	
Sidewalk Washing	1. Remove trash, debris, and free standing oil/grease spills/leaks (use absorbent material, if necessary) from the area before washing; and 2. Use high pressure, low volume spray washing using only potable water with no cleaning agents at an average usage of 0.006 gallons per square feet of sidewalk area.	
Street Washing	Collect and divert wash water to the sanitary sewer – publically owned treatment works (POTW). Note: POTW approval may be needed.	

* Source: CASQA Industrial and Commercial Stormwater BMP Handbook, 2003

Table ICF-4: Potential Pollutants from Industrial Activities*

Activity or Facility Type	Potential Pollutants								
	Sediments	Nutrients	Metals	Organics and Toxicants**	Floatable Materials	Oxygen-Demanding Substances	Oil and Grease	Bacteria	Pesticides
Vehicle & Equipment Fueling			X	X					
Vehicle & Equipment Washing and Steam Cleaning	X	X	X	X		X	X		
Vehicle & Equipment Maintenance and Repair			X	X			X		
Outdoor Loading & Unloading of Materials	X	X	X	X	X	X	X		
Outdoor Container Storage of Liquids		X	X	X		X	X		X
Outdoor Process Equipment Operations and Maintenance	X		X	X			X		
Outdoor Storage of Raw Materials, Products, and Byproducts	X	X	X	X	X	X	X		
Waste Handling & Disposal			X	X	X	X	X	X	
Contaminated or Erodible Surface Areas	X	X	X	X	X	X	X	X	
Building and Grounds Maintenance	X	X	X		X	X		X	X
Building Repair, Remodeling, and Construction	X		X		X	X			
Parking/Storage Area Maintenance			X	X	X		X		

* Source: CASQA Industrial and Commercial Stormwater BMP Handbook, 2003

** This includes all toxic pollutants other than pesticides

Table ICF-5: Potential Pollutants by Industrial/Commercial Facility Type*

Activity or Facility Type	Potential Pollutants								
	Sediments	Nutrients	Metals	Organics and Toxicants**	Floatable Materials	Oxygen-Demanding Substances	Oil and Grease	Bacteria	Pesticides
Vehicle mechanical repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Airplane mechanical repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Boat mechanical repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Equipment repair, maintenance, fueling, or cleaning	X	X	X	X		X	X		
Automobile and other vehicle body repair or painting			X	X			X		
Mobile automobile or other vehicle washing	X	X	X			X	X		
Automobile (or other vehicle) parking lots and storage			X		X		X		
Retail or wholesale fueling			X	X	X		X		
Pest control services									X
Eating or drinking establishments		X		X	X	X	X	X	X
Mobile carpet, drape or furniture cleaning	X			X					
Cement mixing or cutting	X								
Masonry	X								
Painting and coating			X	X			X		
Botanical or zoological gardens and exhibits	X	X			X	X		X	X
Landscaping	X	X			X	X		X	X
Nurseries and greenhouses	X	X			X	X		X	X
Golf courses, parks and other recreational areas/facilities	X	X			X	X		X	X
Cemeteries	X	X			X	X		X	X
Pool and fountain cleaning		X	X	X	X	X		X	
Marinas			X	X	X	X	X	X	
Port-a-Potty servicing		X			X	X		X	

* Source: Orange County Drainage Area Management Plan, 2003

** This includes all toxic pollutants other than pesticides

Planning and Land Development Program

The Cities are required to implement a Planning and Land Development program that includes the provisions listed in the MS4 Permit (LA MS4 Permit §VI.D.7, LB MS4 Permit §VII.J). This document provides guidance that the participating cities can follow to implement a Planning and Land Development program in compliance with the MS4 Permit.

Introduction

Permit §VI.D.7.a (LA)/§VII.J.1 (LB)

The Planning and Land Development Program for all New Development and Redevelopment projects subject to the MS4 Permit includes measures to:

- Lessen the water quality impacts of development by using smart growth practices such as compact development, directing development towards existing communities via infill or redevelopment, and safeguarding of environmentally sensitive areas.
- Minimize the adverse impacts from stormwater runoff on the biological integrity of Natural Drainage Systems and the beneficial uses of water bodies in accordance with requirements under CEQA (Cal. Pub. Resources Code §21000 et seq.).
- Minimize the percentage of impervious surfaces on land developments by minimizing soil compaction during construction, designing projects to minimize the impervious area footprint, and employing Low Impact Development (LID) design principles to mimic pre-development hydrology through infiltration, evapotranspiration and rainfall harvest and use.
- Maintain existing riparian buffers and enhance riparian buffers when possible.
- Minimize pollutant loadings from impervious surfaces such as roof tops, parking lots, and roadways through the use of properly designed, technically appropriate BMPs (including Source Control BMPs such as good housekeeping practices), LID Strategies, and Treatment Control BMPs.
- Properly select, design and maintain LID and Hydromodification Control BMPs to address pollutants that are likely to be generated, reduce changes to pre-development hydrology, assure long-term function, and avoid the breeding of vectors.[1]
- Prioritize the selection of BMPs to remove stormwater pollutants, reduce stormwater runoff volume, and beneficially use stormwater to support an integrated approach to protecting water quality and managing water resources in the following order of preference:
    - On-site infiltration, bioretention and/or rainfall harvest and use.
    - On-site biofiltration, off-site groundwater replenishment, and/or off-site retrofit.

[1] Treatment BMPs when designed to drain within 96 hours of the end of rainfall minimize the potential for the breeding of vectors. See California Department of Public Health *Best Management Practices for Mosquito Control in California* (2012) at http://www.westnile.ca.gov/resources.php

RB-AR12507

Applicability *Permit §VI.D.7.b (LA)/§VII.J.2-3 (LB)*

New Development Projects

The New Development and Redevelopment categories below will require a Standard Urban Stormwater Mitigation Plan (SUSMP), also known as a Low Impact Development (LID) Plan, containing stormwater mitigation measures in compliance with MS4 Permit requirements. Development projects subject to conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s), are listed below:

1. All development projects (including single family hillside homes) equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area
2. Industrial parks with 10,000 square feet or more of surface area
3. Commercial malls with 10,000 square feet or more surface area
4. Retail gasoline outlets with 5,000 square feet or more of surface area
5. Restaurants (SIC 5812) with 5,000 square feet or more of surface area
6. Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces
7. Automotive service facilities (SIC 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) with 5,000 square feet or more of surface area
8. Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA), where the development will:
    a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and
    b. Create 2,500 square feet or more of impervious surface area
9. Redevelopment projects in subject categories that meet Redevelopment thresholds identified below

Redevelopment Projects

Redevelopment projects subject to agency conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution, prior to completion of the project(s), are:

1. Land-disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site on development categories identified above.
2. Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.
3. Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire

development.

4. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency Redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.
5. Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

Special Provisions

1. Street and road construction of 10,000 square feet or more of impervious surface area
    a. These projects will follow an approved green streets manual to the maximum extent practicable. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects. The Cities will require a Standard Urban Mitigation Plan (SUSMP), also known as a Low Impact Development (LID) Plan, containing stormwater mitigation measures in compliance with the approved green streets manual requirements.
2. Single family hillside homes will require a less extensive plan. To the extent that an agency may lawfully impose conditions, mitigation measures or other requirements on the development or construction of a single-family home in a hillside area as defined in the applicable agency's Code and Ordinances, the Cities will require that during the construction of a single-family hillside home, the following measures are implemented:
    a. Conserve natural areas
    b. Protect slopes and channels
    c. Provide storm drain system stenciling and signage
    d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability
    e. Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

RB-AR12509

New Development/ Redevelopment Project Performance Criteria *Permit §VI.D.7.c (LA)/§VII.J.4 (LB)*

Integrated Water Quality/Flow Reduction/Resources Management Criteria

All New Development and Redevelopment projects identified above will control pollutants, pollutant loads, and runoff volume emanating from the project site by: (1) minimizing the impervious surface area and (2) controlling runoff from impervious surfaces through infiltration, bioretention and/or rainfall harvest and use.

Projects will retain on-site the Stormwater Quality Design Volume (SWQDv) defined as the runoff from the 0.75-inch, 24-hour rain event or the 85th percentile, 24-hour rain event, as determined from the Los Angeles County 85th percentile precipitation isohyetal map[2], *whichever is greater*. Exceptions include technical infeasibility, opportunity for regional groundwater replenishment, local ordinance equivalence, or hydromodification, as described in the sections below.

When evaluating the potential for on-site retention, the Cities will consider the maximum potential for evapotranspiration from green roofs and rainfall harvest and use.

Alternative Compliance for Technical Infeasibility or Opportunity for Regional Groundwater Replenishment

In instances of technical infeasibility or where a project has been determined to provide an opportunity to replenish regional groundwater supplies at an offsite location, the Cities may allow projects to comply with the MS4 Permit through the alternative compliance measures as described below:

1. To demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use, and that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect. Conditions where technical infeasibility may result including those indicated in

[2] Found at <http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf>

2. Table PLD- **1** below. To utilize alternative compliance measures to replenish groundwater at an offsite location, the project applicant will demonstrate *(i)* why it is not advantageous to replenish groundwater at the project site, *(ii)* that groundwater can be used for beneficial purposes at the offsite location, and *(iii)* that the alternative measures will also provide equal or greater water quality benefits to the receiving surface water than the Water Quality/Flow Reduction/Resource Management Criteria.

Table PLD- 1: Technical Infeasibility Criteria

1.	The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv on-site.
2.	Locations where seasonal high groundwater is within 5 to 10 feet of the surface,
3.	Locations within 100 feet of a groundwater well used for drinking water,
4.	Brownfield development sites where infiltration poses a risk of causing pollutant mobilization,
5.	Other locations where pollutant mobilization is a documented concern. Pollutant mobilization is considered a documented concern at or near properties that are contaminated or store hazardous substances underground.
6.	Locations with potential geotechnical hazards
7.	Smart growth and infill or Redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the on-site volume retention requirement.

Alternative Compliance Measures

When a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site, or is proposing an alternative offsite project to replenish regional groundwater supplies, the agency will require one of the following mitigation options:

1. On-site Biofiltration

   If using biofiltration due to demonstrated technical infeasibility, then the project must biofiltrate 1.5 times the portion of the SWQDv that is not reliably retained on-site, as calculated by Equation 1 below.

   $$B_v = 1.5 * [SWQD_v - R_V]$$ *Equation 1*

   Where:

   Bv = biofiltration volume

   SWQDv = the stormwater runoff from a 0.75 inch, 24-hour storm or the 85th percentile storm[3], *whichever is greater*.

   Rv = volume reliably retained on-site

   The MS4 Permit does not mention flowrate based biotreatment BMPs; however, proprietary biotreatment systems are often sized using flowrate rather than volume. Additionally, in cases where a pump is needed prior to entering the biotreatment BMP, the system requires sizing based on the controlled flow from the pump. Therefore, if it is infeasible to size a biotreatment BMP with volume-based calculations, the flowrate may be substituted in lieu of volume. Similarly, the flow rate must be determined using the design storm of 0.75 inch, 24-hour storm event or the 85th percentile storm[1], whichever is greater.

   Conditions for On-site Biofiltration include the following:

   a. Biofiltration systems will meet the design specifications provided in Attachment H to the MS4 Permit unless otherwise approved by the Regional Water Board Executive Officer.

[3] Found at <http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf>

b. Biofiltration systems discharging to a receiving water that is included on the Clean Water Act section 303(d) list of impaired water quality-limited water bodies due to nitrogen compounds or related effects will be designed and maintained to achieve enhanced nitrogen removal capability. See Attachment H of the MS4 Permit for design criteria for underdrain placement to achieve enhanced nitrogen removal.

2. Offsite Infiltration

Offsite infiltration when implemented will use infiltration or bioretention BMPs to intercept a volume of stormwater runoff equal to the SWQDv, less the volume of stormwater runoff reliably retained on-site, at an approved offsite project and provide pollutant reduction (treatment) of the stormwater runoff discharged from the project site in accordance with the Water Quality Mitigation Criteria. The required offsite mitigation volume will be calculated by Equation 2 below.

$$M_v = 1.0 * [SWQD_v - R_v] \qquad \textit{Equation 2}$$

Where:

M_v = mitigation volume

$SWQD_v$ = runoff from the 0.75 inch, 24-hour storm event or the 85th percentile storm[4], *whichever is greater*

R_v = the volume of stormwater runoff reliably retained on-site.

3. Groundwater Replenishment Projects

Regional projects to replenish regional groundwater supplies at offsite locations may be proposed, provided the groundwater supply has a designated beneficial use in the Basin Plan. Regional groundwater replenishment projects must use infiltration, groundwater replenishment, or bioretention BMPs to intercept a volume of stormwater runoff equal to the SWQDv for New Development and Redevelopment projects, subject to conditioning and approval for the design and implementation of post-construction controls, within the approved project area. The projects must provide pollutant reduction (treatment) of the stormwater runoff discharged from development projects, within the project area, subject to conditioning and approval for the design and implementation of post-construction controls to mitigate stormwater pollution in accordance with the Water Quality Mitigation Criteria.

Regional groundwater replenishment projects being implemented in lieu of onsite controls will mitigate the volume as calculated using Equation 2 above.

Regional groundwater replenishment projects will be located in the same sub-watershed (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) as the New Development or Redevelopment projects which did not implement on-site retention BMPs. Locations outside of the HUC-12 but within the HUC-10 subwatershed area may be considered if there are no opportunities within the HUC-12 subwatershed or if greater pollutant reductions and/or groundwater

[4] Found at <http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf>

replenishment can be achieved at a location within the expanded HUC-10 subwatershed. *The use of a mitigation, groundwater replenishment, or retrofit project outside of the HUC-12 subwatershed is subject to the approval of the Executive Officer of the Regional Water Board*.

4. Offsite Project -Retrofit Existing Development

   Use infiltration, bioretention, rainfall harvest and use and/or biofiltration BMPs to retrofit an existing development, with similar land uses as the New Development or land uses associated with comparable or higher stormwater runoff event mean concentrations (EMCs) than the new development. Comparison of EMCs for different land uses will be based on published data from studies performed in southern California. The retrofit plan will be designed and constructed to:

   a. Intercept a volume of stormwater runoff equal to the mitigation volume (Mv) as described above in Equation 2, except biofiltration BMPs will be designed to meet the biofiltration volume or flowrate as described in Equation 1, and

   b. Provide pollutant reduction (treatment) of the stormwater runoff from the project site as described in the Water Quality Mitigation Criteria.

5. Conditions for Offsite Projects

   Project applicants seeking to utilize these alternative compliance provisions may propose other offsite projects, which the agency in which the project is located may approve if they meet the requirements of this subpart.

   a. Location of offsite projects. Offsite projects will be located in the same sub-watershed (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) as the New Development or Redevelopment project. Locations outside of the HUC-12 but within the HUC-10 subwatershed area may be considered if there are no opportunities within the HUC-12 subwatershed or if greater pollutant reductions and/or groundwater replenishment can be achieved at a location within the expanded HUC-10 subwatershed. *The use of a mitigation, groundwater replenishment, or retrofit project outside of the HUC-12 subwatershed is subject to the approval of the Executive Officer of the Regional Water Board.*

   b. Project applicant must demonstrate that equal benefits to groundwater recharge can be met on the project site.

   c. A prioritized list of potential offsite mitigation, groundwater replenishment and/or retrofit projects will be developed within each agency, and when feasible, the mitigation will be directed to the highest priority project within the same HUC-12 or if approved by the Regional Water Board Executive Officer, the HUC-10 drainage area, as the New Development project.

   d. Infiltration/bioretention will be the preferred LID BMP for offsite mitigation or groundwater replenishment projects. Offsite retrofit projects may include green streets, parking lot retrofits, green roofs, and rainfall harvest and use. Biofiltration BMPs may be considered for retrofit projects when infiltration, bioretention or rainfall harvest and use is technically infeasible.

   e. The agency in which the project is located will develop a schedule for the completion of offsite projects, including milestone dates to identify, fund, design, and construct the projects. Offsite

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projects will be completed as soon as possible, and at the latest, within 4 years of the certificate of occupancy for the first project that contributed funds toward the construction of the offsite project, unless a longer period is otherwise authorized by the Executive Officer of the Regional Water Board. For public offsite projects, the agency in which the project is located must provide in their annual reports a summary of total offsite project funds raised to date and a description (including location, general design concept, volume of water expected to be retained, and total estimated budget) of all pending public offsite projects. Funding sufficient to address the offsite volume must be transferred to the agency (for public offsite mitigation projects) or to an escrow account (for private offsite mitigation projects) within one year of the initiation of construction.

f. Offsite projects must be approved by the agency in which the project is located and may be subject to approval by the Regional Water Board Executive Officer, if a third-party petitions the Executive Officer to review the project. Offsite projects will be publicly noticed on the Regional Water Board's website for 30 days prior to approval.

g. The project applicant must perform the offsite projects as approved by either the agency or the Regional Water Board Executive Officer or provide sufficient funding for public or private offsite projects to achieve the equivalent mitigation stormwater volume.

6. Regional Stormwater Mitigation Program

An agency or agency group may apply to the Regional Water Board for approval of a regional or sub-regional stormwater mitigation program to substitute in part or wholly for New and Redevelopment requirements for the area covered by the regional or sub-regional stormwater mitigation program. Upon review and a determination by the Regional Water Board Executive Officer that the proposal is technically valid and appropriate, the Regional Water Board may consider for approval such a program if its implementation meets all of the following requirements:

a. Retains the runoff from the 85th percentile, 24-hour rain event or the 0.75 inch, 24-hour rain event, whichever is greater;

b. Results in improved stormwater quality;

c. Protects stream habitat;

d. Promotes cooperative problem solving by diverse interests;

e. Is fiscally sustainable and has secure funding; and

f. Is completed in five years including the construction and start-up of treatment facilities.

7. Water Quality Mitigation Criteria

All New Development and Redevelopment projects that have been approved for offsite mitigation or groundwater replenishment projects will also provide treatment of stormwater runoff from the project site. These projects will design and implement post-construction stormwater BMPs and control measures to reduce pollutant loading as necessary to:

a. Meet the pollutant specific benchmarks listed in Table PLD2 at the treatment systems outlet or prior to the discharge to the MS4, and

b. Ensure that the discharge does not cause or contribute to an exceedance of water quality standards at the agency's downstream MS4 outfall.

The project proponent may be allowed to install flow-through modular treatment systems including sand filters, or other proprietary BMP treatment systems with a demonstrated efficiency at least equivalent to a sand filter. The sizing of the flow through treatment device will be based on a rainfall intensity of 0.2 inches per hour, or the one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, *whichever is greater*.

Table PLD- 2: Benchmarks Applicable to New Development Treatment BMPs.

Conventional Pollutants					
Pollutant	Suspended Solids mg/L	Total P mg/L	Total N mg/L	TKN mg/L	
Effluent Concentration	14	0.13	1.28	1.09	
Metals					
Pollutant	Total Cd µg/L	Total Cu µg/L	Total Cr µg/L	Total Pb µg/L	Total Zn µg/L
Effluent Concentration	0.3	6	2.8	2.5	23

New developments and redevelopments will not cause or contribute to an exceedance of applicable water quality-based effluent limitations established in the MS4 Permit pursuant to Total Maximum Daily Loads (TMDLs).

8. Hydromodification (Flow/ Volume/ Duration) Control Criteria

All New Development and Redevelopment projects located within natural drainage systems will implement hydrologic control measures, to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. The purpose of the hydrologic controls is to minimize changes in post-development hydrologic stormwater runoff discharge rates, velocities, and duration. This will be achieved by maintaining the project's pre-project stormwater runoff flow rates and durations.

Description

Hydromodification control in natural drainage systems will be achieved by maintaining the Erosion Potential (Ep) in streams at a value of 1, unless an alternative value can be shown to be protective of the natural drainage systems from erosion, incision, and sedimentation that can occur as a result of flow increases from impervious surfaces and prevent damage to stream habitat in natural drainage system tributaries[5]. Hydromodification mitigation approaches should meet the criteria below:

a. Hydromodification control may include one, or a combination of on-site, regional or sub-regional hydromodification control BMPs, LID strategies, or stream and riparian buffer restoration measures. Any in-stream restoration measure shall not adversely affect the beneficial uses of the natural drainage systems.

b. Natural drainage systems that are subject to the hydromodification assessments and controls,

[5] See Attachment J of the MS4 Permit, "*Determination of Erosion Potential*"

as described in this section, include all drainages that have not been improved (e.g., channelized or armored with concrete, shotcrete, or rip-rap) or drainage systems that are tributary to a natural drainage system, except as provided in Exemptions to Hydromodification Controls, see below. The clearing or dredging of a natural drainage system does not constitute an "improvement."

c. Until the State Water Board or the Regional Water Board adopts a final Hydromodification Policy or criteria, the Hydromodification Control Criteria described in this section will be implemented to control the potential adverse impacts of changes in hydrology that may result from New Development and Redevelopment projects located within natural drainage systems.

Exemptions to Hydromodification Controls

New Development and Redevelopment projects may be exempt from implementation of hydromodification controls where assessments of downstream channel conditions and proposed discharge hydrology indicate that adverse hydromodification effects to beneficial uses of Natural Drainage Systems are unlikely. Conditions for exemptions include the following:

a. Projects involving replacement, maintenance or repair of an agency's existing flood control facility, storm drain, or transportation network.

b. Redevelopment Projects in the center of urban areas that do not increase the effective impervious area or decrease the infiltration capacity of pervious areas compared to the pre-project conditions.

c. Projects that have any increased discharge directly or via a storm drain to a sump, lake, area under tidal influence, into a waterway that has a 100-year peak flow (Q100) of 25,000 cfs or more, or other receiving water that is not susceptible to hydromodification impacts.

d. Projects that discharge directly or via a storm drain into concrete or otherwise engineered (not natural) channels (e.g., channelized or armored with rip rap, shotcrete, etc.), which, in turn, discharge into receiving water that is not susceptible to hydromodification impacts.

e. LID BMPs implemented on single family homes are sufficient to comply with hydromodification criteria.

Hydromodification Control Criteria

The Hydromodification Control Criteria to protect natural drainage systems are as follows:

a. Except for exemptions described above, projects disturbing an area greater than 1 acre but less than 50 acres within natural drainage systems will be presumed to meet pre-development hydrology if one of the following demonstrations is made:

    i. The project is designed to retain on-site, through infiltration, evapotranspiration, and/or harvest and use, the stormwater volume from the runoff of the 95th percentile, 24-hour storm, or

ii. The runoff flow rate, volume, and velocity for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour rainfall event and the duration for the post-development condition is not less than the pre-development condition for the 2-year, 24-hour rainfall event. This condition may be substantiated by simple screening models, including those described in Hydromodification Effects on Flow Peaks and Durations in Southern California Urbanizing Watersheds (Hawley et al., 2011) or other models acceptable to the Executive Officer of the Regional Water Board, or

The MS4 Permit states projects will meet Hydromodification Control Criteria if "*The...duration for the post-development condition **do[es] not exceed** the pre-development condition for the 2-year, 24-hour rainfall event*." The runoff duration (Tc) is generally associated with longer values resulting in lower concern for hydromodification impacts. Implementation of LID BMPs generally results in runoff not immediately (or not at all) discharging from the site, increasing the time of concentration. Thus, the interpretation presented herein is that Hydromodification Control Criteria would be met if the runoff duration for the post-development condition is **not less than** the pre-development condition for the 2-year, 24-hour rainfall event.

iii. The Erosion Potential (Ep) in the receiving water channel will approximate 1, as determined by a Hydromodification Analysis Study and the equation presented in Attachment J of the MS4 Permit. Alternatively, agencies can opt to use other work equations to calculate Erosion Potential with Executive Officer approval.

b. Projects disturbing 50 acres or more within natural drainage systems will be presumed to meet pre-development hydrology based on the successful demonstration of one of the following conditions:

i. The site infiltrates on-site at least the runoff from a 2-year, 24hour storm event, or

ii. The runoff flow rate, volume, and velocity for the post-development condition does not exceed the pre-development condition for the 2-year, 24-hour rainfall event and the duration for the post-development condition is not less than the pre-development condition for the 2-year, 24-hour rainfall event. These conditions must be substantiated by hydrologic modeling acceptable to the Regional Water Board Executive Officer, or

iii. The Erosion Potential (Ep) in the receiving water channel will approximate 1, as determined by a Hydromodification Analysis Study and the equation presented in Attachment J of the MS4 Permit.

Alternative Hydromodification Criteria

The requirement for Hydromodification Controls will be satisfied by implementing the hydromodification requirements in the County of Los Angeles Low Impact Development Manual (2009) for all projects disturbing an area greater than 1 acre within natural drainage systems.

3. Watershed Equivalence

Regardless of the methods through which applicants implement alternative compliance measures,

the subwatershed-wide (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) result of all development must be at least the same level of water quality protection as would have been achieved if all projects utilizing these alternative compliance provisions had complied with the Integrated Water Quality/Flow Reduction/Resource Management Criteria, described herein.

4. Annual Report

   Annual Reports will be provided to the Regional Water Board to include a list of mitigation project descriptions and estimated pollutant and flow reduction analyses (compiled from design specifications submitted by project applicants, as approved. Within 4 years of the MS4 Permit adoption, the Annual Reports will include a comparison of the expected aggregate results of alternative compliance projects to the results that would otherwise have been achieved by retaining on site the SWQDv.

Implementation *Permit §VI.D.7.d (LA)/§VII.J.5 (LB)*

Local Ordinance Equivalence

Alternative requirements in the local ordinances for the agencies of this WMP will provide equal or greater reduction in stormwater discharge pollutant loading and volume as would have been obtained through strict conformance with the Integrated Water Quality/Flow Reduction Resources Management Criteria, Alternative Compliance Measures for Technical Infeasibility, or Opportunity for Regional Groundwater Replenishment sections herein and, if applicable, the Hydromodification (Flow/Volume Duration) Control Criteria section herein.

Project Coordination

A process for effective approval of post-construction stormwater control measures will be developed to include:

a. Detailed LID site design and BMP review including review of BMP sizing calculations, BMP pollutant removal performance, and municipal approval; and

b. An established structure for communication and delineated authority between and among municipal departments that have jurisdiction over project review, plan approval, and project construction through memoranda of understanding or an equivalent agreement.

Maintenance Agreement and Transfer

Prior to issuing approval for final occupancy, the Cities will require that all New Development and Redevelopment projects subject to post-construction BMP requirements, with the exception of simple LID BMPs implemented on single family residences, provide an operation and maintenance plan, monitoring plan, where required, and verification of ongoing maintenance provisions for LID practices, Treatment Control BMPs, and Hydromodification Control BMPs including but not limited to: final map conditions, legal agreements, covenants, conditions or restrictions, CEQA mitigation requirements, conditional use permits, and/ or other legally binding maintenance agreements (see Attachments PLD-A and PLD-B for MCA and MCA Termination sample templates, respectively). Agencies will require maintenance records be kept on site.

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Verification at a minimum will include the developer's signed statement accepting responsibility for maintenance until the responsibility is legally transferred; and either:

a. A signed statement from the public entity assuming responsibility for BMP maintenance; or

b. Written conditions in the sales or lease agreement, which require the property owner or tenant to assume responsibility for BMP maintenance and conduct a maintenance inspection at least once a year; or

c. Written text in project covenants, conditions, and restrictions (CCRs) for residential properties assigning BMP maintenance responsibilities to the Home Owners Association; or

d. Any other legally enforceable agreement or mechanism that assigns responsibility for the maintenance of BMPs.

All development projects subject to post-construction BMP requirements will provide a plan for the operation and maintenance of all structural and treatment controls. The plan will be submitted for examination of relevance to keeping the BMPs in proper working order. Where BMPs are transferred to agency for ownership and maintenance, the plan will also include all relevant costs for upkeep of BMPs in the transfer. Operation and Maintenance plans for private BMPs will be kept on-site for periodic review by agency inspectors.

A tracking system and an inspection and enforcement program will be maintained for New Development and Redevelopment post-construction stormwater as shown in Table PLC-3. Enforcement action will be taken per the established Progressive Enforcement Policy as appropriate based on the results of the inspection. See Section for requirements for the development and implementation of a Progressive Enforcement Policy (Appendix A-3-1_PEP).

Table PLD-3: Tracking, Inspection, and Enforcement Program Components

Program	Description	Components	
GIS or other Electronic System	A GIS or other electronic system will be implemented for tracking projects that have been conditioned for post-construction BMPs.	– Municipal Project ID – State WDID No. – Project Acreage – BMP Type and Description – BMP Location (coordinates) – Date of Maintenance Agreement – Date of Acceptance	– Maintenance Records – Inspection Date and Summary – Corrective Action – Date Certificate of Occupancy Issued – Replacement or Repair Date
Inspections[6]	Inspect all development sites upon completion of construction and prior to the issuance of occupancy	Proper installation of: – LID measures, – Structural BMPs,	

[6] The inspection may be combined with other inspections provided it is conducted by trained personnel.

	certificates.	– Treatment control BMPs, and – Hydromodification control BMPs.
Operation and Maintenance[7]	Verify proper operation and maintenance of post-construction BMPs. Inspection at least once every 2 years after project completion.	– Follow a Post-construction BMP Maintenance Inspection checklist (See Attachment PLD-C) – Assess operation and maintenance conditions relating to post-construction BMPs, including BMP repair, replacement, or re-vegetation.

Plan Certification

Each SUSMP/LID Plan should contain proper certifications. The following approach is suggested for SUSMP/LID Plan submittals:

- Form signed by the property owner/applicant stating the category in which the project falls under to easily define the NPDES requirements (see Attachment PLD-D for Form PC sample template).
- Form signed by the property owner/applicant certifying that the BMPs will be implemented, monitored, and maintained per SUSMP/LID Plan requirements (see Attachment PLD-E for Form P1 sample template).
- Form signed and stamped by a California registered civil engineer stating the proposed structural BMPs and certifying the methods and requirements are in compliance with the MS4 Permit requirements (see Attachment PLD-F for Form P2 sample template).

[7] For post-construction BMPs operated and maintained by parties other than the agency in which the BMP(s) is located, the agency will require the other parties to document proper maintenance and operations.

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Development Construction Program

The Cities are required to develop, implement and enforce a construction program that includes the provisions listed in MS4 Permit §VI.D.8 (LB §VII.K). This document provides guidance to assist the Cities in implementing a construction program in compliance with the MS4 Permit.

Objectives

Permit §VI.D.8.a (LA)/§VII.K.1 (LB)

The objectives of the construction program are to:

- Prevent illicit construction-related discharges of pollutants into the MS4 and receiving waters.
- Implement and maintain structural and non-structural BMPs to reduce pollutants in stormwater runoff from construction sites.
- Reduce construction site discharges of pollutants to the MS4 to the MEP.
- Prevent construction site discharges to the MS4 from causing or contributing to a violation of water quality standards.

Erosion and Sediment Control Ordinance

Permit §VI.D.8.b (LA)/ §VII.K.1 (LB)

The construction program requires an established, enforceable erosion and sediment control ordinance for all construction sites that disturb soil.

Applicability

Permit §VI.D.8.c (LA)/ §VII.K.1.v (LB)

The construction program addresses construction activity as defined in Table DC-1.

Table DC-1: Definitions

Construction Activity	
Definition	Any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that results in land disturbance.
Examples	Grading, vegetation clearing, soil compaction, paving, repaving and linear underground/overhead projects (LUPs) that result in land disturbance.
Exclusions	Emergency construction required to immediately protect public health and safety, *routine maintenance* as defined below and agricultural activities.
Routine Maintenance (construction program exclusion)	
Definition	Projects required to maintain the integrity of structures, including but not limited to the following:
Examples	Maintaining the original line and grade, hydraulic capacity, or original purpose of the facility.
	Performing restoration work to preserve the original design grade, integrity and hydraulic capacity of flood control facilities.
	Performing road shoulder work, regrading dirt/gravel roadways/shoulders and cleaning out ditches.
	Update existing lines (includes replacing with new materials or pipe) and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
	Repair leaks
Exclusion	New lines (i.e. not associated with existing facilities and not part of a project to update or replace existing lines) or facilities constructed to comply with applicable codes, standards and regulations.

The greater part of the construction program is dedicated to construction sites that disturb one acre or more of soil (with the exception of agricultural activities). This coincides with the size threshold for coverage under the State Water Resources Control Board's NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. The program provisions exclusive to sites less than one acre are addressed first.

Construction Sites Less than One Acre

Permit §VI.D.8.d (LA)/§VII.K.1.vi (LB)

BMPs (< 1 acre)

Through the use of the erosion and sediment control ordinance and/or building permit, construction sites are required have in place an effective combination of erosion and sediment control BMPs from Table DC-2 to prevent erosion and sediment loss and the discharge of construction wastes.

Table DC-2: Applicable Set of BMPs for All Construction Sites

BMP Type	BMP
Erosion Controls	Scheduling
	Preservation of Existing Vegetation
Sediment Controls	Silt Fence
	Sand Bag Barrier
	Stabilized Construction Site Entrance/Exit
Nonstormwater Management	Water Conservation Practices
	Dewatering Operations
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management
	Concrete Waste Management
	Sanitary/Septic Waste Management

Inventory (< 1 acre)

All construction sites with soil disturbing activities that require a permit, regardless of size, are identified and stored in an inventory. Existing permit databases or other tracking systems may be used to file this information. The list of permitted sites is provided to the Regional Water Board upon request.

Inspections (< 1 acre)

Construction sites are inspected on as needed based on the evaluation of the factors that are a threat to water quality. In evaluating the threat to water quality, the following factors are considered: soil erosion potential, site slope, project size and type, sensitivity of receiving water bodies, proximity to receiving water bodies, nonstormwater discharges, past record of noncompliance by the operators of the construction site and any water quality issues relevant to the particular MS4.

Enforcement (< 1 acre)

The Progressive Enforcement Policy (MS4 Permit §VI.D.2) is implemented to ensure that construction sites are brought into compliance with the erosion and sediment control ordinance within a reasonable time period.

Construction Sites One Acre or Greater

Operators of public and private construction sites within a city's jurisdiction are required to select, install, implement, and maintain BMPs that comply with the erosion and sediment control ordinance.

Construction Site Inventory / Electronic Tracking System *Permit §VI.D.8.g (LA)/§VII.K.1.ix (LB)*

An electronic system is used to inventory all issued grading permits, encroachment permits, demolition permits, building permits, or construction permits (and any other municipal authorization to move soil and/ or construct or destruct that involves land disturbance). A database management system or GIS system is recommended. This inventory is continuously updated as new sites are permitted and sites are completed. The inventory / tracking system contains at a minimum the items listed in Table DC-3.

Table DC-3: Inventory Information for Constructions Sites

Information Type		Information
General	Name	Project Name
	Location	Site address and/or latitude and longitude coordinates
		Receiving water
	Contact	Names of owner and contractor
		Mailing addresses of owner and contractor
		Phone numbers of owner and contractor
		Emails (if available) of owner and contractor
Status		Start and end dates
		Permit approval date and anticipated completion date
		Erosion and Sediment Control Plan (ESCP) approval date
		Status of NOI submittal and CGP coverage
		Current construction phase (where feasible)
Size		Size of project and area of disturbance
Water quality		Proximity to waterbodies listed as impaired[1] by sediment related pollutants
		Proximity to waterbodies for which a sediment-related TMDL has been adopted and approved by USEPA
		Status as a significant threat to water quality (based on a consideration of factors listed in Appendix 1 to the CGP)
Inspection		Inspection frequency
Post construction		List of post-construction structural BMPs subject to O&M requirements

Construction Plan Review and Approval Procedures *Permit §VI.D.8.h (LA)/§VII.K.1.x (LB)*

Plan review procedures are developed and implemented such that the following minimum requirements are met:

- Prior to issuing a grading or building permit, each operator of a construction activity within the city's jurisdiction of which the project is located is required to prepare and submit an ESCP prior to the disturbance of land for review and written approval. The construction site operator is prohibited from commencing construction activity prior to receipt of written approval by the city of which the project is located. An ESCP is not approved unless it contains appropriate site-

[1] CWA §303(d) listed or subject to a TMDL

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specific construction site BMPs that meet the minimum requirements of the erosion and sediment control ordinance.

- ESCPs must include the elements of a Storm Water Pollution Prevention Plan (SWPPP). SWPPPs prepared in accordance with the requirements of the Construction General Permit can be accepted as ESCPs.
- At a minimum, the ESCP must address the following elements:
    - Methods to minimize the footprint of the disturbed area and to prevent soil compaction outside of the disturbed area.
    - Methods used to protect native vegetation and trees.
    - Sediment/Erosion Control.
    - Controls to prevent tracking on and off the site.
    - Nonstormwater controls (e.g., vehicle washing, dewatering, etc.).
    - Materials Management (delivery and storage).
    - Spill Prevention and Control.
    - Waste Management (e.g., concrete washout/waste management; sanitary waste management).
    - Identification of site Risk Level as identified per the requirements in Appendix 1 of the Construction General Permit.
- The ESCP must include the rationale for the selection and design of the proposed BMPs, including quantifying the expected soil loss from different BMPs.
- The ESCP must be developed and certified by a Qualified SWPPP Developer (QSD).
- All structural BMPs must be designed by a licensed California Engineer.
- The landowner or the landowner's agent must sign a statement on the ESCP as follows (see Attachment DC-A for sample OC-1 template):

  "I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law."

- Prior to issuing a grading or building permit, the city of which the project is located verifies that the construction site operators have existing coverage under applicable permits, including, but not limited to the State Water Board's Construction General Permit, and State Water Board 401 Water Quality Certification.
- A checklist is used to conduct and document review of each ESCP (see Attachment DC-B for the ESCP Checklist sample template).

BMP Implementation Level *Permit §VI.D.8.i (LA)/§VII.K.1.xi (LB)*

The Cities will implement technical standards for the selection, installation and maintenance of construction BMPs for all construction sites within its jurisdiction.

The BMP technical standards require:

- The use of BMPs that are tailored to the risks posed by the project. Sites are ranked from Low Risk (Risk 1) to High Risk (Risk 3). Project risks are calculated based on the potential for erosion from the site and the sensitivity of the receiving water body. Receiving water bodies that are listed on the Clean Water Act (CWA) Section 303(d) list for sediment or siltation are considered High Risk. Likewise, water bodies with designated beneficial uses of SPWN, COLD, and MIGR are also considered High Risk. The combined (sediment/receiving water) site risk is calculated using the methods provided in Appendix 1 of the Construction General Permit. At a minimum, the BMP technical standards include requirements for High Risk sites as defined in Table DC-7.
- The use of BMPs for all construction sites, sites equal or greater to 1 acre, and for paving projects per Table DC-6 and Table DC-8.
- Detailed installation designs and cut sheets for use within ESCPs.
- Maintenance expectations for each BMP, or category of BMPs, as appropriate.

Permittees are encouraged to adopt respective BMPs from latest versions of the California BMP Handbook, Construction or Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual and addenda. Alternatively, Permittees are authorized to develop or adopt equivalent BMP standards consistent for Southern California and for the range of activities presented in Tables DC-5 through DC-8.

The local BMP technical standards are readily available to the development community and are clearly referenced within the Cities' stormwater or development services websites, ordinances, permit approval processes and/or ESCP review forms. The local BMP technical standards are also readily available to the Regional Water Board upon request.

Local BMP technical standards are available for the BMPs listed in Tables DC-5 through DC-8.

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Table DC-4: Minimum Set of BMPs for All Construction Sites

BMP Type	BMP
Erosion Controls	Scheduling
	Preservation of Existing Vegetation
Sediment Controls	Silt Fence
	Sand Bag Barrier
	Stabilized Construction Site Entrance/Exit
Nonstormwater Management	Water Conservation Practices
	Dewatering Operations
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management
	Concrete Waste Management
	Sanitary/Septic Waste Management

Table DC-5: Additional BMPs Applicable to Construction Sites Disturbing 1 Acre or More

BMP Type	BMP
Erosion Controls	Hydraulic Mulch
	Hydroseeding
	Soil Binders
	Straw Mulch
	Geotextiles and Mats
	Wood Mulching
Sediment Controls	Fiber Rolls
	Gravel Bag Berm
	Street Sweeping and/ or Vacuum
	Storm Drain Inlet Protection
	Scheduling
	Check Dam
Additional Controls	Wind Erosion Controls
	Stabilized Construction Entrance/ Exit
	Stabilized Construction Roadway
	Entrance/ Exit Tire Wash
Non-Storm Management	Vehicle and Equipment Washing
	Vehicle and Equipment Fueling
	Vehicle and Equipment Maintenance
Waste Management	Material Delivery and Storage
	Spill Prevention and Control

Table DC-6: Additional Enhanced BMPs for High Risk Sites

BMP Type	BMP
Erosion Controls	Hydraulic Mulch
	Hydroseeding
	Soil Binders
	Straw Mulch
	Geotextiles and Mats
	Wood Mulching
	Slope Drains
Sediment Controls	Silt Fence
	Fiber Rolls
	Sediment Basin
	Check Dam
	Gravel Bag Berm
	Street Sweeping and/or Vacuum
	Sand Bag Barrier
	Storm Drain Inlet Protection
Additional Controls	Wind Erosion Controls
	Stabilized Construction Entrance/Exit
	Stabilized Construction Roadway
	Entrance/Exit Tire Wash
	Advanced Treatment Systems*
Nonstormwater Management	Water Conservation Practices
	Dewatering Operations (Ground water dewatering only under NPDES Permit No. CAG994004)
	Vehicle and Equipment Washing
	Vehicle and Equipment Fueling
	Vehicle and Equipment Maintenance
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management

*Applies to public roadway projects.

Table DC-7: Minimum Required BMPs for Roadway Paving or Repair Operation (For Private or Public Projects)

#	BMP
1.	Restrict paving and repaving activity to exclude periods of rainfall or predicted rainfall unless required by emergency conditions.
2.	Install gravel bags and filter fabric or other equivalent inlet protection at all susceptible storm drain inlets and at manholes to prevent spills of paving products and tack coat.
3.	Prevent the discharge of release agents including soybean oil, other oils, or diesel to the stormwater drainage system or receiving waters.
4.	Minimize non stormwater runoff from water use for the roller and for evaporative cooling of the asphalt.
5.	Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage and dispose of properly.
6.	Collect liquid waste in a container, with a secure lid, for transport to a maintenance facility to be reused, recycled or disposed of properly.
7.	Collect solid waste by vacuuming or sweeping and securing in an appropriate container for transport to a maintenance facility to be reused, recycled or disposed of properly.
8.	Cover the "cold-mix" asphalt (i.e., pre-mixed aggregate and asphalt binder) with protective sheeting during a rainstorm.
9.	Cover loads with tarp before haul-off to a storage site, and do not overload trucks.
10.	Minimize airborne dust by using water spray or other approved dust suppressant during grinding.
11.	Avoid stockpiling soil, sand, sediment, asphalt material and asphalt grindings materials or rubble in or near stormwater drainage system or receiving waters.
12.	Protect stockpiles with a cover or sediment barriers during a rain.

Construction Site Inspection *Permit §VI.D.8.j (LA)/§VII.K.1.xii (LB)*

The Cities' legal authority is used to implement procedures for inspecting public and private construction sites. The inspection procedures are implemented as follows:

Inspection Frequency

- Inspect the public and private construction sites as specified in Table DC-8.
- All phases of construction are inspected as follows:
    - Prior to Land Disturbance – Prior to allowing an operator to commence land disturbance, each Permittee shall perform an inspection to ensure all necessary erosion and sediment structural and non-structural BMP materials and procedures are available per the erosion and sediment control plan.
    - During Active Construction, including Land Development[2] and Vertical Construction[3] – In accordance with the frequencies specified in Table DC-8, inspections are performed to ensure all necessary erosion and sediment structural and non-structural BMP materials and procedures are available per the erosion and sediment control plan throughout the construction process.
    - Final Landscaping / Site Stabilization[4] – At the conclusion of the project and as a condition of approving and/or issuing a Certificate of Occupancy, the constructed site is inspected to ensure that all graded areas have reached final stabilization and that all

[2] Activities include cuts and fills, rough and finished grading; alluvium removals; canyon cleanouts; rock undercuts; keyway excavations; stockpiling of select material for capping operations; and excavation and street paving, lot grading, curbs, gutters and sidewalks, public utilities, public water facilities including fire hydrants, public sanitary sewer systems, storm sewer system and/or other drainage improvement.
[3] The build out of structures from foundations to roofing, including rough landscaping.
[4] All soil disturbing activities at each individual parcel within the site have been completed.

trash, debris, and construction materials, and temporary erosion and sediment BMPs are removed.

- Based on the required frequencies above, each construction project is inspected a minimum of three times.

Table DC-8: Inspection Frequencies for Sites One Acre or Greater

Site	Inspection Frequency Shall Occur
All sites 1 acre or larger that discharge to a tributary listed by the state as an impaired water for sediment or turbidity under the CWA §303(d)	(1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA[5], (2) within 48 hours of a ½-inch rain event and at (3) least once every two weeks
Other sites 1 acre or more determined to be a significant threat to water quality[6]	
All other construction sites with 1 acre or more of soil disturbance not meeting the criteria above	At least monthly

Inspection Standard Operating Procedures

Standard operating procedures are implemented, and revised as necessary, that identify the inspection procedures followed by the Cities' inspectors (see Attachment DC-C for suggested standard operating procedures). Inspections of construction sites – and the standard operating procedures – include, but are not limited to:

1. Verification of active coverage under the Construction General Permit for sites disturbing 1 acre or more, or that are part of a planned development that will disturb 1 acre or more and a process for referring non-filers to the Regional Water Board.
2. Review of the applicable ESCP and inspection of the construction site to determine whether all BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions (see Attachment DC-B for the ESCP Checklist sample template).
3. Assessment of the appropriateness of the planned and installed BMPs and their effectiveness.
4. Visual observation and record keeping of nonstormwater discharges, potential illicit discharges and connections, and potential discharge of pollutants in stormwater runoff.
5. Development of a written or electronic inspection report generated from an inspection checklist used in the field (see Attachment DC-D and DC-E for the Large Site and Small Site[7] Inspection Forms, respectively).
6. Tracking of the number of inspections for the inventoried construction sites throughout the reporting period to verify that the sites are inspected at the minimum frequencies listed in Table DC-8.

Enforcement *Permit §VI.D.8.k (LA)/§VII.K.1.xiii (LB)*

The Progressive Enforcement Policy is implemented to ensure that construction sites are brought into compliance with all stormwater requirements within a reasonable time period.

[5] www.srh.noaa.gov/forecast

[6] In evaluating the threat to water quality, the following factors shall be considered: soil erosion potential; site slope; project size and type; sensitivity of receiving water bodies; proximity to receiving water bodies; nonstormwater discharges; past record of non-compliance by the operators of the construction site; and any water quality issues relevant to the particular MS4.

[7] A "large site" refers to a site greater than or equal to 1 acre while a "small site" refers to a site less than one acre.

Permittee Staff Training *Permit §VI.D.8.l(LA)/§VII.K.1.xiv(LB)*

Staff whose primary job duties are related to implementing the construction stormwater program are adequately trained.

The Cities may conduct in-house training or contract with consultants. Training is provided to the following staff positions of the MS4:

- Plan Reviewers and Permitting Staff – Staff and consultants are trained as qualified individuals, knowledgeable in the technical review of local erosion and sediment control ordinance, local BMP technical standards, ESCP requirements, and the key objectives of the State Water Board QSD program. The training is provided either internally to staff or staff is required to obtain QSD certification.
- Erosion Sediment Control/Stormwater Inspectors – Inspectors are either 1) knowledgeable in inspection procedures consistent with the State Water Board sponsored program QSD, 2) a Qualified SWPPP Practitioner (QSP) or 3) a designated person on staff trained in the key objectives of the QSD/QSP programs supervises inspection operations. The training is provided either provided internally to staff or staff is required to obtain QSD/QSP certification. Each inspector is knowledgeable of the local BMP technical standards and ESCP requirements.
- Third-Party Plan Reviewers, Permitting Staff, and Inspectors – If outside parties are utilized to conduct inspections and/or review plans, these staff are trained per the requirements listed above. Outside contractors can self-certify, providing they certify they have received all applicable training required in MS4 Permit §VI.D.8 and have documentation to that effect.

Public Agency Activities Program

Each participating city is required to develop and implement a program for public agency facilities and activities that includes the requirements listed in MS4 Permit §VI.D.9 (LB §VII.L). This document provides guidance to assist the Cities in implementing a public agency activities program in compliance with the MS4 Permit.

Objectives

Permit §VI.D.9.a (LA)/§VII.L.1 (LB)

The objectives of the Public Agency Activities program are to:

- Minimize stormwater pollution impacts from Permittee-owned or operated facilities.
- Minimize stormwater pollution impacts from public agency activities.
- Identify opportunities to reduce stormwater pollution impacts from areas of existing development.

MS4 Permit requirements for Public Agency Facilities and Activities consist of the following components which will be discussed in more detail in the sections below:

- Public Construction Activities Management
- Public Facility Inventory
- Inventory of Existing Development for Retrofitting Opportunities
- Public Facility and Activity Management
- Vehicle and Equipment Wash Areas
- Landscape, Park, and Recreational Facilities Management
- Storm Drain Operation and Maintenance
- Streets, Roads, and Parking Facilities Maintenance
- Emergency Procedures
- Municipal Employee and Contractor Training

1. Public Construction Activities Management

Permit §VI.D.9.b (LA)/§VII.L.2 (LB)

Each participating city is required to develop and implement a Development Construction Program that meets the requirements the Development Construction Section of this WMP, and Part VI.D.8 of the LA MS4 Permit at municipally owned or operated (i.e., public or Permittee sponsored) construction projects. In addition, each participating city is required to develop and implement a Planning and Land Development Program that meets the requirements in the Planning and Land Development Section of this WMP, and the MS4 Permit at municipally owned or operated (i.e., public or Permittee sponsored) construction projects.

2. Public Facility Inventory

Permit §VI.D.9.c (LA)/§VII.L.3 (LB)

The Public Agency Activities Program requires the maintenance of an inventory of all Permittee-owned or operated (i.e., public) facilities that are potential sources of stormwater pollution. The incorporation of facility information into a GIS is recommended. Sources that are tracked include but are not limited to the following:

- Animal control facilities
- Chemical storage facilities
- Composting facilities

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- Equipment storage and maintenance facilities (including landscape maintenance-related operations)
- Fueling or fuel storage facilities (including municipal airports)
- Hazardous waste disposal facilities
- Hazardous waste handling and transfer facilities
- Incinerators
- Landfills
- Materials storage yards
- Pesticide storage facilities
- Fire stations
- Public restrooms
- Public parking lots
- Public golf courses
- Public swimming pools
- Public parks
- Public works yards
- Public marinas
- Recycling facilities
- Solid waste handling and transfer facilities
- Vehicle storage and maintenance yards
- Stormwater management facilities (e.g., detention basins)
- All other Permittee-owned or operated facilities or activities that are determined to contribute a substantial pollutant load to the MS4.

The following minimum fields of information are included in the inventory for each Permittee-owned or operated facility:

- Name of facility
- Name of facility manager and contact information
- Address of facility (physical and mailing)
- A narrative description of activities performed and potential pollution sources.
- Coverage under the Industrial General Permit or other individual or general NPDES permits or any applicable waiver issued by the Regional or State Water Board pertaining to stormwater discharges.

The inventory is updated at least once during the 5-year MS4 Permit term. The update are accomplished through collection of new information obtained through field activities or through other readily available inter and intra-agency informational databases (e.g., property management, land-use approvals, accounting and depreciation ledger account, and similar information).

3. Inventory of Existing Development for Retrofit Opportunities

Permit §VI.D.9.d (LA)/§VII.L.4 (LB)

The Public Agency Activities Program requires the development of an inventory of retrofitting opportunities. Retrofit opportunities are identified within the public right-of-way or in coordination with a TMDL implementation plan(s). The goals of the existing development retrofitting inventory are to address the impacts of existing development through regional or sub-regional retrofit projects that

reduce the discharges of stormwater pollutants into the MS4 and prevent discharges from the MS4 from causing or contributing to a violation of water quality standards as defined in the MS4 Permit.

Existing areas of development are screened to identify candidate areas for retrofitting using watershed models or other screening level tools. The areas of existing development identified during the screening process are then evaluated and ranked to prioritize retrofitting candidates. Criteria for this evaluation may include, but is not limited to the following:

- Feasibility, including general private and public land availability;
- Cost effectiveness;
- Pollutant removal effectiveness;
- Tributary area potentially treated;
- Maintenance requirements;
- Landowner cooperation;
- Neighborhood acceptance;
- Aesthetic qualities;
- Efficacy at addressing concern; and
- Potential improvements to public health and safety.

The results of this evaluation are considered in the following programs:

- Highly feasible projects expected to benefit water quality are given a high priority to implement source control and treatment control BMPs in the WMP.
- High priority retrofit projects are considered as candidates for off-site mitigation projects per LA MS4 Permit §VI.D.7.c.iii(4)(d) (LB §VII.J.4.iii(4)).
- Where feasible, the existing development retrofit program is coordinated with flood control projects and other infrastructure improvement programs per LA MS4 Permit §VI.D.9.e.ii(2) (LB §VII.L.5.ii(2)).

Site specific retrofit projects are encouraged through cooperation with private landowners. The following practices are considered in cooperating with private landowners to retrofit existing development:

- Demonstration retrofit projects;
- Retrofits on public land and easements that treat runoff from private
- developments;
- Education and outreach;
- Subsidies for retrofit projects;
- Requiring retrofit projects as enforcement, mitigation or ordinance compliance;
- Public and private partnerships;
- Fees for existing discharges to the MS4 and reduction of fees for retrofit implementation.

4. Public Facility and Activity Management

Permit §VI.D.9.e (LA)/§VII.L.5 (LB)

4.1. Industrial General Permitted Facilities

Permit §VI.D.9.e.i & §VI.D.9.e.v (LA)/§VII.L.5.i (LB)

All Permittee owned or operated facilities where industrial activities are conducted that require coverage are required to obtain coverage under the Industrial General Permit by submitting a Notice of Intent (NOI) to the State Water Resources Control Board (State Board) and preparing a Stormwater

Pollution Prevention Plan (SWPPP). Facilities that may require coverage are listed by category in 40 Code of Federal Regulations (CFR) Section 122.26(b)(14), and include:

- Facilities subject to stormwater effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards (40 CFR Subchapter N)
- Manufacturing facilities
- Mining and oil and gas facilities
- Hazardous waste treatment, storage, or disposal facilities
- Landfills, land application sites, and open dumps that receive industrial waste
- Recycling facilities
- Steam electric generating facilities
- Transportation facilities
- Sewage treatment plants
- Certain facilities if materials are exposed to stormwater

Municipally owned or operated facilities that have obtained coverage under the IGP implement and maintain BMPs consistent with the associated SWPPP, and are therefore not required to implement and maintain the activity specific BMPs as described in the sections below.

4.2. Flood Management Projects *Permit §VI.D.9.e.ii (LA)/§VII.L.5.ii (LB)*

The following measures are implemented for municipally owned or operated flood management projects:

- Procedures are developed to assess the impacts of flood management projects on the water quality of receiving water bodies;
- Existing structural flood control facilities area evaluated to determine if retrofitting the facility to provide additional pollutant removal from stormwater is feasible.

4.3. Contracted Public Agency Activities *Permit §VI.D.9.e.iv (LA)/§VII.L.5.iv (LB)*

Any contractors hired to conduct Public Agency Activities, including, but not limited to the following must be contractually obligated to implement and maintain the activity specific BMPs outlined in the sections below:

- Storm and/or sanitary sewer system inspection and repair,
- Street sweeping,
- Trash pick-up and disposal, and
- Street and right-of-way construction and repair

It is the responsibility of each Permittee to ensure that these BMPs are being properly implemented and maintained through oversight of contracted activities. Example contractor/lessor contract language is provided in attachment PA-A.

4.4. BMPS for Municipal Activities

Permit §VI.D.9.e.iii & Permit §VI.D.9.e.vi (LA)/§VII.L.5.iii & VII.L.5.vi (LB)

Municipal maintenance and field staff are the ones responsible for implementing effective source control BMPs[1], such as those described in Table PA-1 (or an equivalent set of BMPs) when such activities occur at municipally owned or operated facilities and field operations (i.e. project sites). These sites include, but are not limited to the facility types identified in the Public Facility Inventory, and at any area that includes the activities described in Table PA-1, or that have the potential to discharge pollutants in stormwater. The Caltrans Stormwater Quality Handbook Maintenance Staff Guide (Caltrans Handbook)[2] is an additional resource that describes BMPs to prevent the stormwater-related pollutants most likely to come from common maintenance facility operations and field activities. It provides a straightforward working-level approach to implementing BMPs for common maintenance activities by categorizing these activities into Families, and associating each Family with certain types of BMPs in Activity Cut Sheets. The activities described in Sections 5-10 below are representative of typical municipal operations, and correspond to the activities and BMPs listed in Table PA-1. Where appropriate, each section will identify the appropriate Maintenance Activity Family and corresponding Caltrans Activity Cut Sheets from this table for ease of reference.

Although Table PA-1 and the CalTrans Handbook are excellent references for selecting BMPs for some of the most common municipal activities, they may not represent a comprehensive inventory of activities encountered by maintenance staff and field personnel. Likewise, for those BMPs that are not adequately protective of water quality standards, additional site-specific BMPS may be needed. For example, the implementation of additional BMPs is required where stormwater from the storm drain system discharges to a water body subject to a TMDL, a Clean Water Act §303(d) listed water body, or a significant ecological area (SEA). Attachment PA-B contains a map of SEAs in LA County and Attachment K of the LA MS4 Permit contains a matrix of Permittees and TMDLs.

[1] BMP is defined by the California Stormwater Quality Association as "*any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution*". Source Control BMPs are operational practices that prevent pollution by reducing potential pollutants at the source. They typically do not require maintenance or construction, and may consist of programmatic controls such as street sweeping. Treatment Control BMPs are methods of treatment to remove pollutants from stormwater, and can include constructed treatment devices such as an infiltration basin.

[2] The handbook is available at http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/management_ar_rwp/CTSW-RT-02-057.pdf and may also be found by entering the words "Caltrans Stormwater Quality Handbook Maintenance Staff Guide" in a web search engine.

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Table PA-1: General and Activity Specific BMPs and Their Associated Caltrans Handbook Activity Cut Sheet

Maintenance Activity Family	BMP	Caltrans Activity Cut Sheet Number
General BMPs	Scheduling and Planning	B-4
	Spill Prevention and Control	
	Sanitary/Septic Waste Management	
	Material Use	
	Safer Alternative Products	
	Vehicle/Equipment Cleaning, Fueling and Maintenance	
	Illicit Connection Detection, Reporting and Removal	
	Illegal Spill Discharge Control	
	Maintenance Facility Housekeeping Practices	
Flexible Pavement	Asphalt Cement Crack and Joint Grinding/ Sealing	B-9
	Asphalt Paving	B-10
	Structural Pavement Failure (Digouts) Grinding and Paving	B-11
	Emergency Pothole Repairs	B-13
	Sealing Operations	B-14
Rigid Pavement	Portland Cement Crack and Joint Sealing	B-15
	Mudjacking and Drilling	B-16
	Concrete Slab and Spall Repair	B-17
Slope/ Drains/ Vegetation	Shoulder Grading	B-19
	Nonlandscaped Chemical Vegetation Control	B-21
	Nonlandscaped Mechanical Vegetation Control/Mowing	B-23
	Nonlandscaped Tree and Shrub Pruning, Removal	B-24
	Fence Repair	B-25
	Drainage Ditch and Channel Maintenance	B-26
	Drain and Culvert Maintenance	B-28
	Curb and Sidewalk Repair	B-30
Litter/ Debris/ Graffiti	Sweeping Operations	B-32
	Litter and Debris Removal	B-33
	Emergency Response and Cleanup Practices	B-34
	Graffiti Removal	B-36
Landscaping	Chemical Vegetation Control	B-37
	Manual Vegetation Control	B-39
	Landscaped Mechanical Vegetation Control/ Mowing	B-40
	Landscaped Tree and Shrub Pruning, Removal	B-41
	Irrigation Line Repairs	B-42
	Irrigation (Watering), Potable and Nonpotable	B-43
Environmental	Storm Drain Stenciling	B-44
	Roadside Slope Inspection	B-45
	Roadside Stabilization	B-46
	Stormwater Treatment Devices	B-48
	Traction Sand Trap Devices	B-49
Public Facilities	Public Facilities	B-50
Bridges	Welding and Grinding	B-52
	Sandblasting, Wet Blast with Sand Injection, Hydroblasting	B-54
	Painting	B-56
	Bridge Repairs	B-57
Other Structures	Pump Station Cleaning	B-59
	Tube and Tunnel Maintenance and Repair	B-61
	Tow Truck Operations	B-63
	Toll Booth Lane Scrubbing Operations	B-64
Electrical &	Sawcutting for Loop Installation	B-65
Traffic Guidance	Thermoplastic Striping and Marking	B-67
	Paint Striping and Marking	B-68
	Raised/ Recessed Pavement Marker Application/Removal	B-70

	Sign Repair and Maintenance	B-71
	Median Barrier and Guard Rail Repair	B-73
	Emergency Vehicle Energy Attenuation Repair	B-75
Storm Maintenance	Minor Slides and Slipouts Cleanup/ Repair	B-78
Management and Support	Building and Grounds Maintenance	B-80
	Storage of Hazardous Materials (Working Stock)	B-82
	Material Storage Control (Hazardous Waste)	B-84
	Outdoor Storage of Raw Materials	B-85
	Vehicle and Equipment Fueling	B-86
	Vehicle and Equipment Cleaning	B-87
	Vehicle and Equipment Maintenance and Repair	B-88
	Aboveground and Underground Tank Leak and Spill Control	B-90

5. Vehicle and Equipment Wash Areas

Permit §VI.D.9.f (LA)/§VII.L.6 (LB)

This section corresponds to Maintenance Activity Family Management and Support and corresponding Caltrans Activity Cut Sheet B-87.

Vehicle and equipment cleaning at a municipal facility may introduce a number of potential pollutants into the storm drain system. Municipal maintenance and field staff are responsible for implementing and maintaining the activity specific BMPs listed in Table PA-1 for all fixed vehicle and equipment washing; including fire fighting and emergency response vehicles. In addition, maintenance and field staff are responsible for preventing discharges of wash water from entering the storm drain system. Table PA-2 shows the potential pollutants associated with vehicle and equipment cleaning.

Table PA-2: Potential Pollutants Generated from Cleaning Activities

Activity	**Potential Pollutants**					
Vehicle and Equipment Cleaning	Sediment	Nutrients	Trash	Metals	Oil & Grease	Organics

Discharges of wash waters to the storm drain system are prevented by implementing the following measures at existing facilities with vehicle or equipment wash areas:

- Wash water is self-contained and hauled away for proper disposal offsite.
- Wash areas are equipped with a clarifier, or an alternative pre-treatment device, and water is plumbed to the sanitary sewer in accordance with applicable waste water provider regulations.
- Wastewater from all new vehicle and equipment wash facilities, or redeveloped or replaced existing facilities is prevented from discharging to the MS4 by equipping the facility with a clarifier, or an alternative pre-treatment device, and plumbing water to the sanitary sewer in accordance with applicable waste water provider regulations, or by self-containing all water water/wash water and hauling to a point of legal disposal.

6. Landscape, Park, and Recreational Facilities Management

Permit §VI.D.9.g (LA)/ §VII.L.7 (LB)

This section corresponds to multiple Activity Cut Sheets within the Slope/Drains/Vegetation, Landscape, Environmental, and Management and Support Families.

Maintenance practices at parks and recreational facilities generally include fertilizer and pesticide applications, vegetation maintenance and disposal, irrigation, swimming pool chemical maintenance and draining, and trash and debris management. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. Municipal maintenance and field staff are responsible for implementing and maintaining the activity specific BMPs listed in Table PA-1for all public right-of-

ways, flood control facilities and open channels, lakes and reservoirs, and landscape, park, and recreational facilities and activites. Table PA-3 shows the potential pollutants associated with recreational facilities..

Table PA-3: Potential Pollutants Generated from Recreational Facilities

Activity	Potential Pollutants				
Vehicle and Equipment Cleaning	Sediment	Nutrients	Trash	Bacteria	Pesticides

6.1 Model Integrated Pest Management Program

Permit §VI.D.9.g.ii & VI.D.9.g.iii (LA)/§VII.L.7.ii & VII.L.7.iii (LB)

An IPM policy is in place to minimize pesticide and fertilizer use, and encourage the use of IPM techniques for Public Agency facilities and activities. The attached IPM Program template (Attachment PA-C), adapted from the Orange County Drainage Area Management Plan (DAMP) IPM Policy developed by the University of California, Division of Agriculture and Natural Resources, provides an example of an effective IPM program. This IPM Program template is based on regulations, management guidelines, and research-based recommendations established by federal, state and local agencies and universities with particular expertise in pest management.

As part of the IPM policy, a commitment and schedule to reduce the use of pesticides that cause impairment t of surface waters is implemented through the following procedures:

- An inventory of all pesticides used by municipal departments, divisions, and operational units is prepared and updated annually.
- Pesticides used by staff and hired contractors are quantified.
- The use of IPM alternatives is demonstrated, where feasible, to reduce pesticide use.

Municipal maintenance and field staff applying pesticides are certified in the appropriate category by the California Department of Pesticide Regulation, or are under the direct supervision of a pesticide applicator certified in the appropriate category.

7. Storm Drain Operation and Maintenance

Permit §VI.D.9.h (LA)/ §VII.L.8 (LB)

This section corresponds to the Litter/Debris/Graffiti Family: Litter and Debris Removal Cut Sheet, pg. B-33, and the Environmental Family: Storm Drain Stenciling Cut Sheet, pg. B-44

The storm drain system functions primarily to collect and convey surface runoff to receiving waters during storms in order to prevent flooding. It is a common municipal activity to maintain the storm drain system so that it functions hydraulically as intended during storms. Municipal maintenance and field staff are responsible for implementing and maintaining the activity specific BMPs listed in Table PA-1 for storm drain operation and maintenance, and ensuring that all material removed from the MS4 does not reenter the system by dewatering solid material in a contained area and disposing of liquid material in accordance with any of the following measures:

- Self-containing and hauling off for legal disposal; or
- Applying to the land without runoff; or
- Equipping with a clarifier or alternative pre-treatment device and plumbing to the sanitary sewer in accordance with applicable waste water provider regulations.

Table PA-4 shows potential pollutants generated during storm drain operation and maintenance.

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Table PA-4: Potential Pollutants Generated from Storm Drain Operation and Maintenance

Activity	Potential Pollutants								
	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances
Inspection and Cleaning of Conveyance Structures	×	×	×		×		×		×
Controlling Illicit Connections and Discharges	×	×	×	×	×	×	×	×	×
Controlling Illegal Dumping	×	×	×	×	×	×	×	×	×
Maintenance of Inlet and Outlet Structures	×		×		×	×			

7.1 Catch Basin Cleaning

Permit §VI.D.9.h.iii (LA)/ §VII.L.8.iii (LB)

There is no preferred method for cleaning catch basins as long as the method used is successful in removing accumulated sediment and debris. The methods used are determined in the field with the goal of minimizing the amount of escaped material, and preventing this material from entering the storm drain system. A template catch basin cleaning log is provided in Attachment PA-D.

7.1.1 Catch Basins Cleaning in Areas not Subject to a Trash TMDL

In areas that are not subject to a trash TMDL, catch basin inlets are prioritized based on the amount of trash generated, and inspected according to the schedule in Table PA-5.

Table PA-5: Inspection Frequencies for Catch Basin Inlets

Trash Generating Frequency	Priority	Inspection Frequency
Consistently generates the highest volumes of trash and/or debris	A	A minimum of three times during the wet season (October-April) and once during the dry season every year
Consistently generates moderate volumes of trash and/or debris	B	A minimum of once during the wet season and once during the dry season every year
Generates low volumes of trash and/or debris	C	A minimum of once per year

An inventory of catch basins is maintained and updated regularly. This inventory includes the following components:

- GPS coordinates of each catch basin
- Priorities for inspection
- Rationale or data to support catch basin priority designations
- Inspection and cleaning records

Catch basins are cleaned as necessary based on the inspections conducted. At a minimum, catch basins determined to be at least 25% full of trash are cleaned out.

7.1.2 Catch Basin Cleaning in Areas Subject to a Trash TMDL

In areas subject to a Trash TMDL, all applicable provisions of LA MS4 Permit Section VI.E (LB Part Part VIII) in conformance with the appropriate TMDL implementation schedule, are implemented. This includes an effective combination of full capture, partial capture, institutional controls, or minimum frequency of assessment and collection as described in LA MS4 Permit Section VI.E (LB Part Part VIII).

7.2 Catch Basin Labels and Open Channel Signage

Permit §VI.D.9.h.vi (LA)/ §VII.L.8.vi (LB)

All municipally owned storm drain inlets are labeled with a "No Dumping, Drains to Ocean" message, and inspected for legibility prior to the wet season (October-April) every year. Catch basins with illegible labels are recorded and re-stenciled or re-labeled within 180 days of inspection. In addition, signs referencing local code(s) that prohibit littering and illegal dumping are posted at designated public access points to open channels, creeks, urban lakes, and other relevant water bodies.

7.3 Trash Management

Permit §VI.D.9.h.iv-v & Permit §VI.D.9.h.vii (LA)/§VII.L.8.iv-v (LB)

The following Trash Management BMPs described below are employed to mitigate the impacts of anthropogenic trash on receiving waters.

7.3.1 Trash Management at Public Events

The following measures are implemented for any event in the public right of way or wherever it is foreseeable that substantial quantities of trash and litter may be generated, including events located in areas that are subject to a trash TMDL:

- Proper management of trash and litter generated; and
- Arrangement for temporary screens to be placed on catch basins; or
- Provide clean out of catch basins, trash receptacles, and grounds in the event area within one business day subsequent to the event.

7.3.2 Trash Receptacles

Covered trash receptacles are located in areas identified as high trash generation areas and maintained and cleaned out as necessary to prevent trash overflow. Examples of areas that may be considered high trash generating areas include:

- High vehicle or pedestrian traffic areas
- Commercial areas
- Industrial areas
- Construction areas
- High density residential areas
- Areas adjacent to vacant lots

7.3.3 Additional Trash Management Practices

In areas that are not subject to a trash TMDL, additional trash management practices will be employed no later than five years after the effective date of the LA MS4 Permit (4 years after the effective date of the LB MS4 Permit). Trash excluders or equivalent devices must be installed on or in catch basins or outfalls to prevent the discharge of trash to the MS4 or receiving waters, unless the installation of such BMP(s) alone will cause flooding (not due to lack of maintenance). Alternatively, additional trash BMPs

that provide substantially equivalent removal of trash may be implemented. Additional BMPs may include, but are not limited to:

- Increased street sweeping
- Adding trash cans near trash generation sites
- Prompt enforcement of trash accumulation
- Increased trash collection on public property
- Increased litter prevention messages or trash nets within the MS4

The BMPs chosen will provide equivalent trash removal performance as excluders, and will be demonstrated though the annual report. When outfall trash capture is provided, revision of the schedule for inspection and cleanout of catch basins will also be reported in the annual report.

The State Water Resources Control Board (State Water Board) is considering the adoption of amendments to the Water Quality Control Plans for Ocean Waters of California and for the Inland Surface Water, Enclosed Bays, and Estuaries of California for Trash (Trash Amendments) citing a strong need for statewide consistency in trash management. The proposed Trash Amendments will include five elements: (1) Water Quality Objective, (2) Prohibition of Discharge, (3) Implementation, (4) Compliance Schedule, and (5) Monitoring, which will outline NPDES Permittee requirements for trash management. The development of the Trash Amendments will continue to be monitored, and any additional required trash management practices in areas not subject to a trash TMDL will be implemented per the guidance provided by these amendments.

7.4 Storm Drain Maintenance

Permit §VI.D.9.h.viii (LA)/ §VII.L.8.viii (LB)

The following BMPs constitute the Storm Drain Maintenance Program:

- Municipally-owned open channels and drainage structures are visually inspected for debris at least annually.
- Trash and debris from is removed from open channel storm drains a minimum of once per year, before the storm season.
- The discharge of contaminants is minimized during MS4 maintenance and clean outs;
- Material removed is properly disposed of by containing and hauling away for legal disposal

7.5 Infiltration from Sanitary Sewer to MS4/Preventive Maintenance

Permit §VI.D.9.h.ix (LA)/§VII.L.8.ix (LB)

Thorough, routine, preventive surveys and maintenance of both municipally owned and operated Storm Drain Systems as well as Sanitary Sewer Systems infiltration and seepage of contaminants from the sanitary sewer system into the storm drain system is prevented. Sanitary Sewer System routine preventative maintenance is described in the Sewer System Management Plan (SSMP), which is a component of the Statewide General Waste Discharge Requirements (WDR) for Sanitary Sewer Systems.

Where necessary, controls implemented to limit infiltration of seepage from sanitary sewers to the MS4 include:

- Adequate plan checking for construction and new development;
- Incident response training for its municipal employees that identify sanitary sewer spills;
- Code enforcement inspections;
- MS4 maintenance and inspections;
- Interagency coordination with sewer agencies; and

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- Proper education of its municipal staff and contractors conducting field operations on the MS4 or its municipal sanitary sewer (if applicable).

7.6 Permittee Owned Treatment Control BMPs *Permit §VI.D.9.h.x (LA)/§VII.L.8.x (LB)*

All municipally owned treatment control BMPs, including post-construction BMPs, are regularly inspected and maintained to ensure their proper operation.
Any residual water generated during BMP maintenance is disposed of using one of the following procedures:

- Hauled away and legally disposed of; or
- Applied to the land without runoff; or
- Discharged to the sanitary sewer system; or
- Treated or filtered to remove bacteria, sediments, nutrients, and meet the limitations set in Table PA-6 below prior to discharge to the storm drain system.

Table PA-6: Discharge Limitations for Dewatering Treatment BMPs

Parameter	Units	Limitation
Total Suspended Solids	Mg/L	100
Turbidity	NTU	50
Oil and Grease	Mg/L	10

8. Streets, Roads, and Parking Facilities Maintenance

Permit §VI.D.9.i(LA)/§VII.L.9 (LB)

This section corresponds to multiple Activity Cut Sheets within the Flexible Pavement, Rigid Pavement, Litter/Debris/Graffiti, Traffic Guidance, and Management and Support Families.

Streets and roads may collect litter and debris from nearby activities, as well as from vehicular traffic. They also require routine maintenance that may generate waste materials. Table PA-7 shows potential pollutants generated from street, road, and parking facilities maintenance.

Table PA-7: Potential Pollutants Generated from Street, Road, and Parking Facility Maintenance

Activity	Potential Pollutants						
	Sediment	Trash	Metals	Bacteria	Oil & Grease	Organics	Oxygen Demanding Substances
Street and Road Maintenance	×	×	×		×	×	
Parking Facility Maintenance	×	×	×	×	×	×	×

8.1 Street Sweeping *Permit §VI.D.9.i.i-ii(LA)/§VII.L.9.i-ii (LB)*

Streets and/or street segments are swept according to the following designations:

- Priority A: Streets and/or street segments that are designated as consistently generating the highest volumes of trash and/or debris should be swept at least two times per month.
- Priority B: Streets and/or street segments that are designated as consistently generating moderate volumes of trash and/or debris should be swept at least once per month.
- Priority C: Streets and/or street segments that are designated as generating low volumes of trash and/or debris shall be swept as necessary but in no case less than once per year.

8.2 Road Reconstruction *Permit §VI.D.9.iii (LA)/§VII.L.9.iii (LB)*

Projects that include roadbed or street paving, repaving, patching, digouts, or resurfacing roadbed surfaces implement the following BMPS:

- Restricting paving and repaving activities to exclude periods of rainfall or predicted rainfall unless required by emergency conditions.
- Installing sand bags or gravel bags and filter fabric at all susceptible storm drain inlets and at manholes to prevent spills of paving products and tack coat;
- Preventing the discharge of release agents including soybean oil, other oils, or diesel into the MS4 or receiving waters.
- Preventing non-stormwater runoff from water use for the roller and for evaporative cooling of the asphalt.
- Cleaning equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage and dispose of properly.
- Collecting liquid waste in a container, with a secure lid, for transport to a maintenance facility to be reused, recycled or disposed of properly.
- Collecting solid waste by vacuuming or sweeping and securing in an appropriate container for transport to a maintenance facility to be reused, recycled or disposed of properly.
- Covering the “cold-mix” asphalt (i.e., pre-mixed aggregate and asphalt binder) with protective sheeting during a rainstorm.
- Covering loads with tarp before haul-off to a storage site, and not overloading trucks.
- Minimizing airborne dust by using water spray during grinding.
- Avoiding the stockpiling of soil, sand, sediment, asphalt material and asphalt grindings materials or rubble in or near MS4 or receiving waters.
- Protecting stockpiles with a cover or sediment barriers during a rain.

8.3 Parking Facilities Maintenance *Permit §VI.D.9.iv (LA)/ §VII.L.9.iv (LB)*

Municipally owned parking lots that are uncovered and exposed to stormwater are kept clear of debris and excessive oil buildup by inspecting lots at least 2 times per month and cleaning at least once per month.

9. Emergency Procedures *Permit §VI.D.9.j (LA)/ §VII.L.10 (LB)*

Participating Agencies may conduct repairs of essential public service systems and infrastructure in emergency situations with a self-waiver of the provisions of the MS4 Permit as follows:

- Cities will abide by all other regulatory requirements, including notification to other agencies as appropriate.
- Where the self-waiver has been invoked, Cities will submit to the Regional Water Board Executive Officer a statement of the occurrence of the emergency, an explanation of the

circumstances, and the measures that were implemented to reduce the threat to water quality, no later than 30 business days after the situation of emergency has passed.

Minor repairs of essential public service systems and infrastructure in emergency situations (that can be completed in less than one week) are not subject to the notification provisions. Appropriate BMPs to reduce the threat to water quality will be implemented.

10. Municipal Employee and Contractor Training *Permit §VI.D.9.k (LA)/Permit §VII.L.11 (LB)*

An annual training program on the requirements of the overall stormwater management program is implemented for all municipal field staff whose interactions, jobs, and activities affect stormwater quality prior to June 30 every year. The Cities also ensure that contractors performing privatized/contracted municipal services have appropriate training in the stormwater management program. The goals of the annual training are to:

- Promote a clear understanding of the potential for municipal activities to pollute stormwater
- Identify opportunities to require, implement, and maintain appropriate BMPs in their line of work

In addition to the annual stormwater program training, the Cities implement an annual training program to train all of their employees and contractors who use or have the potential to use pesticides or fertilizers (whether or not they normally apply these as part of their work). Training programs address:

- The potential for pesticide-related surface water toxicity
- Proper use, handling, and disposal of pesticides
- Least toxic methods of pest prevention and control, including IPM
- Reduction of pesticide use

Outside contractors can self-certify, providing they certify they have received all applicable training required in the MS4 Permit and have documentation to that effect.

Illicit Connections & Illicit Discharges Elimination Program

Each participating city is required to develop and implement an Illicit Connections & Illicit Discharge Elimination (IC/ID) Program that includes the requirements listed in Permit §VI.D.10.a (LB §VII.M). This document provides guidance to assist the Cities in implementing an IC/ID program in compliance with the Permit.

Introduction *Permit §VI.D.10.a (LA)/§VII.M.1 (LB)*

Illicit connections and illicit discharges (IC/IDs) as defined in Table ICID-1 are potential significant sources of pollutants into and from the MS4. The Illicit Connection and Illicit Discharge (IC/ID) Program provides a comprehensive process for detecting, investigating and eliminating IC/IDs in an efficient and timely manner. The program consists of the following components:

- Procedures for conducting source investigations for IC/IDs
- Procedures for eliminating the source of IC/IDs
- Procedures for public reporting of illicit discharges
- Spill response plan and
- IC/ID education and training for City staff.

The purpose of this program is to effectively prohibit illicit discharges into the MS4.

Table ICID-1: IC/IDs Defined

Prohibition	Definition	Examples
Illicit Connections	Any man-made conveyance that is connected to the MS4 without a permit, excluding roof drains and other similar type connections.	Unpermitted channels, pipelines, conduits, inlets or outlets that are connected directly to the MS4.
Illicit Discharges	Any discharge into the MS4 or from the MS4 into a receiving water that is prohibited under local, state, or federal statutes, ordinances, codes or regulations. This includes any non-stormwater discharge, except those authorized in MS4 Permit §III.A.10.2.	Sanitary wastewater, Vehicle wash water, wash-down from grease traps, motor oil, antifreeze and fuel spills into or from the MS4.

Legal Authority

Adequate Legal Authority is required to prohibit IC/IDs to the MS4 and enable enforcement capabilities to eliminate the sources of IC/IDs.

Illicit Discharge Source Investigation and Elimination *Permit §VI.D.10.b (LA)/ §VII.M.2 (LB)*

The purpose of the IC/ID Program is accomplished in part by developing clear, step-by-step written procedures for conducting investigations of illicit discharges.

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Investigation

Standardized procedures for conducting investigations to identify the source of all suspected illicit discharges are included in as an attachment (Illicit Discharge Investigation and Elimination Guidance). Procedures include the following:

- **Initiation** – Investigate the source of all observed discharges. After becoming aware of an illicit discharge, conduct an investigation to identify and locate the source within 72 hours.
- **Prioritization** – Investigate illicit discharges suspected of being sanitary sewage and/or significantly contaminated first.
- **Tracking** – Track all investigations and document the information listed in Table ICID-2.

Table ICID-2: Recorded Information for Illicit Discharge Investigations

Item	Information
1	Date(s) the illicit discharge was observed
2	Results of the investigation
3	Follow-up of the investigation
4	Date the investigation was closed

Elimination

Standardized procedures to eliminate illicit discharges once the sources are located are included as an attachment. Procedures include the following:

- **Notification** – Immediately notify the responsible party (RP)/parties of the problem and require the responsible party to initiate all necessary corrective actions to eliminate the illicit discharge.
    - If it is determined that an illicit discharge originates within an upstream jurisdiction, notify the upstream jurisdiction and the Regional Board. The Notification is conducted within 30 days of determination and information is collected regarding combined efforts to identify the source.
- **Spill response** – The Spill Response Plan is implemented when the source for illicit discharges cannot be traced to a suspected RP. Permanent solutions to such discharges are described in the following section (Flow Diversion).
- **Follow-up** – Conduct and document follow-up investigations upon notification that an illicit discharge has been eliminated to verify that it has been satisfactorily eliminated and cleaned-up.
- **Enforcement** – Enforcement procedures are included in the Progressive Enforcement Policy. The Progressive Enforcement Policy includes a list of enforcement actions.

Progressive Enforcement Policy

The Progressive Enforcement Policy is implemented to ensure that illicit discharges/ illicit connections are eliminated within a reasonable time period. The procedures are followed when the source of the nature of the discharges is known. Procedures typically include:

- Written warnings for minor violations
- Formal notice of violation with specific actions and time frames for compliance
- Compensation from the RP for any costs related to remediation, inspection, investigation, clean-up and oversight activities
- Cease and desist orders

- Civil penalties (infractions), or referral for criminal penalties or further legal action.

Flow Diversion

In the event that an ongoing illicit discharge cannot be eliminated (following the full execution of legal authority and in accordance with the Progressive Enforcement Policy) or the RPs cannot be identified, the discharge is either treated or diverted to the sanitary sewer. In either instance, the Regional Board is notified within 30 days of such determination. Notification includes the following information:

- Written plan that describes the efforts that have been undertaken to eliminate the discharge.
- Description of actions to be undertaken.
- Anticipated cost and
- Schedule for completion.

Identification and Response to Illicit Connections *Permit §VI.D.10.c (LA)/§VII.M.3 (LB)*

Illicit connections can be concentrated sources of pollutants either through direct discharge or infiltration of sewage or other prohibited discharges into the MS4. To reduce this source of pollutants, the following program is implemented for the identification of illicit connections. Key components of this program include investigating and responding in order to actively prevent and eliminate illicit connections.

Investigation

Standardized procedures for identifying illicit connections are included as an attachment (Illicit Connection Investigation Guidance). Procedures include the following:

- **Initiation** – Investigate within 21 days from the discovery or upon receiving a report of a suspected illicit connection. The elements of the investigation are listed in Table ICID-3.
- **Tracking** – Track all investigations and document the information listed in Table ICID-3.

Response

If the source investigation concludes that a connection to the MS4 is both 1) permitted or documented and 2) discharging only stormwater or nonstormwater allowed under WMP NSWD SECTION or other individual or general NPDES Permits/WDRs, then the investigation is closed and no further action is taken. Upon confirmation of a connection to the MS4 is illicit, one of two options is taken:

1. **Permit or document the connection.** The permitted or documented connection may only discharge stormwater and nonstormwater allowed under WMP NSWD SECTION or other individual or general NPDES Permits/WDRs. Retaining a record of the connection and its investigation qualifies as documentation.
2. **Eliminate the connection.** The connection is eliminated within 180 days of completion of the investigation, using formal enforcement authority if necessary.

Table ICID-3: Recorded Information for Illicit Connection Investigations

Item	Information
1	Any relevant illicit discharge information from Table ICID-2
2	Source of the connection
3	Nature and volume of the discharge through the connection
4	RP for the connection (if identified)
5	Response including any formal enforcement taken

Public Reporting of Non-Stormwater Discharges and Spills *Permit §VI.D.10.d (LA)/§VII.M.4 (LB)*

Central Point of Contact

Public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s through a central contact point are promoted, publicized, and facilitated. This includes phone numbers and an internet site for complaints and spill reporting. The reporting hotline is provided to staff to leverage the field staff that has direct contact with the MS4 in detecting and eliminating illicit discharges.

The LACFCD, in collaboration with the County, provides the central point of contact and through the 888-CLEAN-LA reporting hotline and internet site.

Open Channels

Signage is posted adjacent to open channels (see MS4 Permit IV.D.9.h.vi.(4)). The signage includes information regarding dumping prohibitions and public reporting of illicit discharges.

Complaints

Written procedures are maintained that document how complaint calls are received, and tracked to ensure that all complaints are adequately addressed in the attached form (Record Keeping & Documentation). Following the adaptive management process outlined in the MS4 Permit, the procedures are periodically evaluated to determine whether changes or updates are needed to ensure that the procedures accurately document the employed methods. After the evaluation, any identified changes will be made to the procedures.

Documentation is maintained for all complaint calls. This includes recording the location of the reported spill or IC/ ID and the actions undertaken in response the complaint, including referrals to other agencies.

Spill Response Plan *Permit §VI.D.10.e (LA)/§VII.M.5 (LB)*

A spill response plan (Attachment ICID-E) is implemented for all sewage and other spills that may discharge into its MS4. The spill response plan identifies agencies responsible for spill response and cleanup, telephone numbers and e-mail address for contacts, and contains the following:

- **Agency Coordination** – Coordinate with spill response teams throughout all appropriate departments, programs and agencies so that maximum water quality protection is provided.
- **Spill Response** – Respond to spills for containment within 4 hours of becoming aware of the

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spill, except where such spills occur on private property, in which case respond within 2 hours of gaining legal access to the property. Initiate investigation of all public and employee spill complaints within one business day of receiving the complaint to assess validity.

- **Reporting** – Spills that may endanger health or the environment are reported to appropriate public health agencies and the California Emergency Management Agency (Cal EMA).

Illicit Connection and Illicit Discharge Education and Training *Permit §VI.D.10.f (LA)/§VII.M.6 (LB)*

A training program regarding the identification of IC/IDs is implemented for all municipal field staff, who, as part of their normal job responsibilities (e.g., street sweeping, storm drain maintenance, collection system maintenance, road maintenance), may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. Contact information, including the procedure for reporting an illicit discharge, is readily available to field staff.

Applicable Staff

Table ICID-4 is a list of field programs where program staff may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. Appropriate field staff, supervising staff and contractors involved in these programs require training in IC/ID identification and reporting following the schedule provided in Table ICID-5.

Contracted Staff

Contractors that provide these municipal services may attend city training or certify to the participating city and retain documentation that staff has received applicable training. Otherwise this provision is accomplished through a contractual requirement for contracted staff to receive the training.

Table ICID-4: Municipal Field Programs

Main Field Program Types	Sub-Category Types/Activities
Lake Management	Fertilizer & Pesticide Management
	Mowing, Trimming/Weeding, Planting
	Managing Landscape Waste
	Controlling Litter
	Erosion Control
	Controlling Illegal Dumping
	Bacteria Control
	Monitoring
Landscape Maintenance	Mowing, Trimming/Weeding, Planting
	Irrigation
	Fertilizer & Pesticide
	Managing Landscape Waste
	Erosion Control
Roads, Streets, and Highways Operations and Maintenance	Sweeping & Cleaning
	Street Repair & Maintenance
	Bridge & Structure Maintenance
Fountains, Plazas, and Sidewalk Maintenance and Cleaning	Surface Cleaning
	Graffiti Cleaning
	Sidewalk Repair
	Controlling Litter
	Fountain Maintenance
Solid Waste Handling	Solid Waste Collection
	Waste Reduction & Recycling
	Hazardous Waste Collection
	Litter Control
Water and Sewer Utility O&M	Water Line Maintenance
	Sanitary Sewer Maintenance
	Spill/Leak/Overflow Control
Fire Department Activities	Emergency/Post-Emergency Fire Fighting Activities
	Fire Fighting Training
	Fire Station Activities

Training Schedule

The training schedule for all applicable staff is listed in Table ICID-5.

Table ICID-5: IC/ID Program Training Schedule

Category	Schedule
Current Staff	Twice during the term of the MS4 Permit
New Staff	Within 180 days of starting employment

Training Elements

The IC/ID elements addressed by the training program are listed in Table ICID-6.

Table ICID-6: Minimum IC/ID Training Program Elements

Item	Information
1	IC/ID identification, including definitions and examples
2	Investigation
3	Elimination
4	Clean-up
5	Reporting
6	Documentation

Documentation

Documentation of training program activities and training modules are retained and made available for review by the Regional Board.

PROGRESSIVE ENFORCEMENT POLICY

2014

Stormwater Enforcement Guide

Insert City Seal

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PROGRESSIVE ENFORCEMENT POLICY

STORMWATER ENFORCEMENT GUIDE

INTRODUCTION

This Stormwater Progressive Enforcement Policy (PEP) provides procedures to enforce provisions of the Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4 Order No. R4-2012-0175. Pursuant to Section VI.D.2.a of the Order, Permittees are required to develop and implement a PEP to ensure that (1) regulated Industrial/ Commercial facilities, (2) construction sites, (3) development and redevelopment sites with post-construction controls, and (4) illicit discharges are each brought into compliance with all storm water and non-storm water requirements. The PEP provides the City with a guidance for enforcing the MS4 Permit Provisions and identifies enforcement procedures designed to encourage a timely response.

PROGRESSIVE ENFORCEMENT

Progressive enforcement is an escalating series of actions that allows for the efficient and effective use of enforcement. In some situations, an informal response (written warning/inspection report) is sufficient to inform the responsible party that there is a deficiency and to require the responsible party to return to compliance. If violations continue, the enforcement response should be quickly escalated to increasingly more formal and serious actions until compliance is achieved. Progressive enforcement is not appropriate in all circumstances. For example, where there is a situation needing immediate response, immediate issuance of a cleanup and abatement order may be appropriate.

COMPLIANCE CRITERIA

The City conducts on-site compliance inspections and conducts investigations, in response to complaints, under their authority provided in their municipal code and ordinances to verify compliance. Typical noncompliance issues related to stormwater may include:

- Prohibited discharges to the storm drain system.
- Site's existing condition is likely to result in exposure of pollutants to stormwater contact and possible pollutant discharge to the storm drain system such as:
    - Poor housekeeping activities that results in pollutant exposure.
    - Unattended spills and leaks.
    - Uncovered or improperly stored wastes, materials, or other items of concern.
    - Open waste receptacles such as tallow bins, compactors, and trash bins.
    - Leaky or contaminated equipment stored or used outdoors.
    - Track-out of dirt and sediment or other materials to street or outdoor areas.
- Illicit connections to the storm drain system.
- Best Management Practices (BMPs) are not in place to address pollutant generating activities, which may include erosion and sediment controls and post construction controls.

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Complaint Response

The City may receive complaints regarding stormwater ordinance from their staff members, public, local agencies, or the Regional Water Board. The City initiates, within one business day,[1] investigation of complaints from facilities within its jurisdiction. The initial investigation includes, at minimum, a limited inspection of the facility to confirm validity of the complaint and to determine if the facility is in compliance with municipal storm water ordinance and, if necessary, to oversee corrective action. Emergency complaints are investigated immediately.

PROGRESSIVE ENFORCEMENT GUIDELINES

Informal Enforcement

The City implements professional judgment regarding the circumstances surrounding an enforcement action and chooses to resolve routine noncompliance quickly and efficiently through informal means that are not accompanied by sanctions (e.g., civil charges or penalties). When deemed appropriate, the City employs the procedures described below to correct noncompliance informally.

Written Warning/ Inspection Report

Under circumstances where an inspection reveals routine noncompliance that can be corrected within a reasonably short time, staff may choose to issue a written warning/inspection report that describes the minor deficiencies/violations and includes a schedule for correcting the noncompliance[2]. The purpose of the written warning is to give the responsible party an opportunity to comply voluntarily and thus avoid sanctions that might be imposed by an escalated enforcement response.

For residential zones, the City employs an informal enforcement process and escalates to formal enforcement actions for those residents that do not comply with stormwater regulations.

Formal Enforcement / Administrative Enforcement

In the event that the City determines, based on an inspection or illicit discharge investigation conducted, that a responsible party has failed to adequately comply with the informal enforcement process within the required timeframe, the City may initiate administrative enforcement actions or will implement enforcement actions as established through authority in its municipal code. The City's goal is to achieve compliance through an extensive inspection program, educational outreach efforts and, if necessary, the initiation of appropriate enforcement action(s). The goal of any enforcement action is to: (1) return the facility to compliance in a timely manner; (2) eliminate economic benefit realized by the noncompliant facility; and (3) punish violators and prevent future noncompliance.

Notice of Violations

Under circumstances where the responsible party has failed to comply with the informal enforcement process or where the violations are significant, the City may choose to issue a Notice of Violation (NOV). The purpose of an NOV is to inform the responsible party of the observed violations, the applicable stormwater municipal codes that the responsible party has failed to comply with and the

[1] The City may comply with the Permit by taking initial steps (such as logging, prioritizing, and tasking) to "initiate" the ingestigation within that one business day. However, the Regional Water Board would expect that the initial investigation, including a site visit, to occur within four business days (per MS4 Order No.R4-2012-0175 Section VI.D.2.b)
[2] The City may choose to issue/write inspection report on site or provide to the responsible party at a later time.

potential consequences of failing to correct the violations. The NOV also gives the responsible party an opportunity to correct the violations described in the NOV within a specified time. Under circumstances where the responsible party fails to adequately respond to the NOV by failing to address or correct the violations noted in the NOV, the severity of the enforcement response will continue to escalate as described below.

Failure to Return to Compliance/ Second Notice of Violation

The City's municipal code stormwater ordinance authorizes assessment of administrative penalties which can be carried out by issuing a Failure to Return to Compliance Notice or second NOV . The second NOV is a stronger enforcement option which may be used in circumstances where the responsible party has failed to comply with the requirements as indicated on the first NOV.

Cease and Desist Order

In the event the City's municipal code stormwater ordinance authorizes a Cease and Desist Order (CDO), the City may issue a CDO, as an alternative to the second NOV, when immediate action by the responsible party is necessary to eliminate a continuing or threatened serious violation of the stormwater ordinance.

Misdemeanors

The City's may escalate enforcement when evidence of noncompliance indicates that the violator of the stormwater ordinance has acted intentionally with intent to cause, allow to continue or conceal a discharge in violation of the ordinance.

Issuance of Citation/Infractions

At the discretion of the City's, and as established through authority in its municipal code, the City may issue citations and/or infractions.

Cost Recovery

In the event that a complaint response or violation requires clean-up and or extensive investigation, the City has the authority, as established in the municipal code, to require the responsible party to reimburse the city or County for all costs incurred by the related violation. Cost recovery fees that may be collected include, but are not limited to, investigation, enforcement, compliance assistance, damage, control, and clean-up.

Abatement

When a responsible party fails to cease or control a nuisance condition that results in or is likely to result in further or continuing violations, the City's may request abatement of conditions on private property if necessary, or in the event of imminent danger to public safely or the environment, the City itself may abate the nuisance condition.

Permit Revocation

Sites violating the stormwater permit may be subject to permit revocation procedures as authorized in the City's municipal code.

City's/District Attorney

Severe or continuing violations should be referred to the City's or District Attorney for consideration of criminal charges.

TIMEFRAMES FOR CORRECTING DEFICIENCIES/VIOLATIONS

Depending upon the nature of the deficiencies/violations observed, City's may specify compliance deadlines for the responsible party in the inspection report or NOV.

- Prohibited discharges: discharges are to be stopped immediately and up to two weeks. The City may require the responsible party to provide a written description of correction, long-term compliance plan.
- Illicit connection: discharge via the illicit connection are to be stopped immediately and up to two weeks. The City may require the responsible party to provide proof that connection was permanently terminated. Re-inspection typically is required.
- Pollutant exposure/prohibited conditions violations: Up to two weeks to correct violations. The City may require the responsible party to provide proof of compliance for the observed violations.

EXTENSIONS OF COMPLIANCE DEADLINES

There are instances when a responsible party is not able to comply with requirements within the time frame specified. The City may grant a reasonable extension to the responsible party if the City determines that an extension is warranted, as follows:

- A request for extension must be received in writing (mail, e-mail, fax, hand delivered, etc.) by the City no later than the last day of the initial specified compliance deadline date.
- The extension request must explain why the extension is needed and warranted, as well as include a summary of actions taken to date by the responsible party to comply with requirements of the NOV.
- No more time is provided than should reasonably be needed for the responsible party to competently correct the noted deficiencies/violations. The City grants shorter extensions during the wet season.

Appropriate reasons to grant an extension may include, but are not limited to:

- Confirmed delays due to contractor or other service provider outside of responsible party's control.
- Extensive corrections involving work that would conceivably take longer than the time frame provided.
- In general, extensions should not be granted to allow the continuation of unauthorized non-storwater discharges.

The City may require an action plan or statement to be submitted by the responsible party within the initial compliance time frame, as a condition of granting an extension. The action plan or statement should specify the corrections that are to be made and specify an anticipated time frame for completion. The action plan or statement should be signed and dated by the responsible party.

REFERRALS TO THE REGIONAL BOARD

The City may refer violations of its municipal storm water ordinance and/or California Water Code section 13260 by industrial and commercial facilities and construction site operators to the Regional Water Board provided that the City has made a good faith effort of applying enforcement procedures to achieve compliance with its own ordinance. At a minimum, the City's good faith effort must be documented with:

- Two follow-up inspections, and
- Two warning letters or notices of violation.

Referral of Violations of the General Industrial/Construction Permits

For those facilities or site operators in violation of municipal stormwater ordinances and subject to the Industrial and/or Construction General Permits (IGP/CGP), the City may escalate referral of such violations to the Regional Water Board (promptly via telephone or electronically) after one inspection and one written notice of violation (copied to the Regional Water Board) to the facility or site operator regarding the violation. In making such referrals, the City shall include, at a minimum, the following documentation:[3]

- Name of the facility or site,
- Operator of the facility or site,
- Owner of the facility or site,
- WDID Number (if applicable),
- Records of communication with the facility/site operator regarding the violation, which shall include at least one inspection report,
- The written notice of violation (copied to the Regional Water Board),
- For industrial sites, the industrial activity being conducted at the facility that is subject to the Industrial General Permit, and
- For construction sites, site acreage and Risk Factor rating.

RECORDS RETENTION

City shall maintain records, per their existing record retention policies, and make them available on request to the Regional Water Board, including inspection reports, warning letters, notices of violations, and other enforcement records, demonstrating a good faith effort to bring facilities into compliance.[4]

[3] Pursuant to Order No. R4-2012-0175 Section VI.D.2.a.v
[4] Pursuant to Order No. R4-2012-0175 Section VI.D.2.a.iii

RB-AR12559

Sources

Los Angeles County Stormwater Quality Management Program (2001)

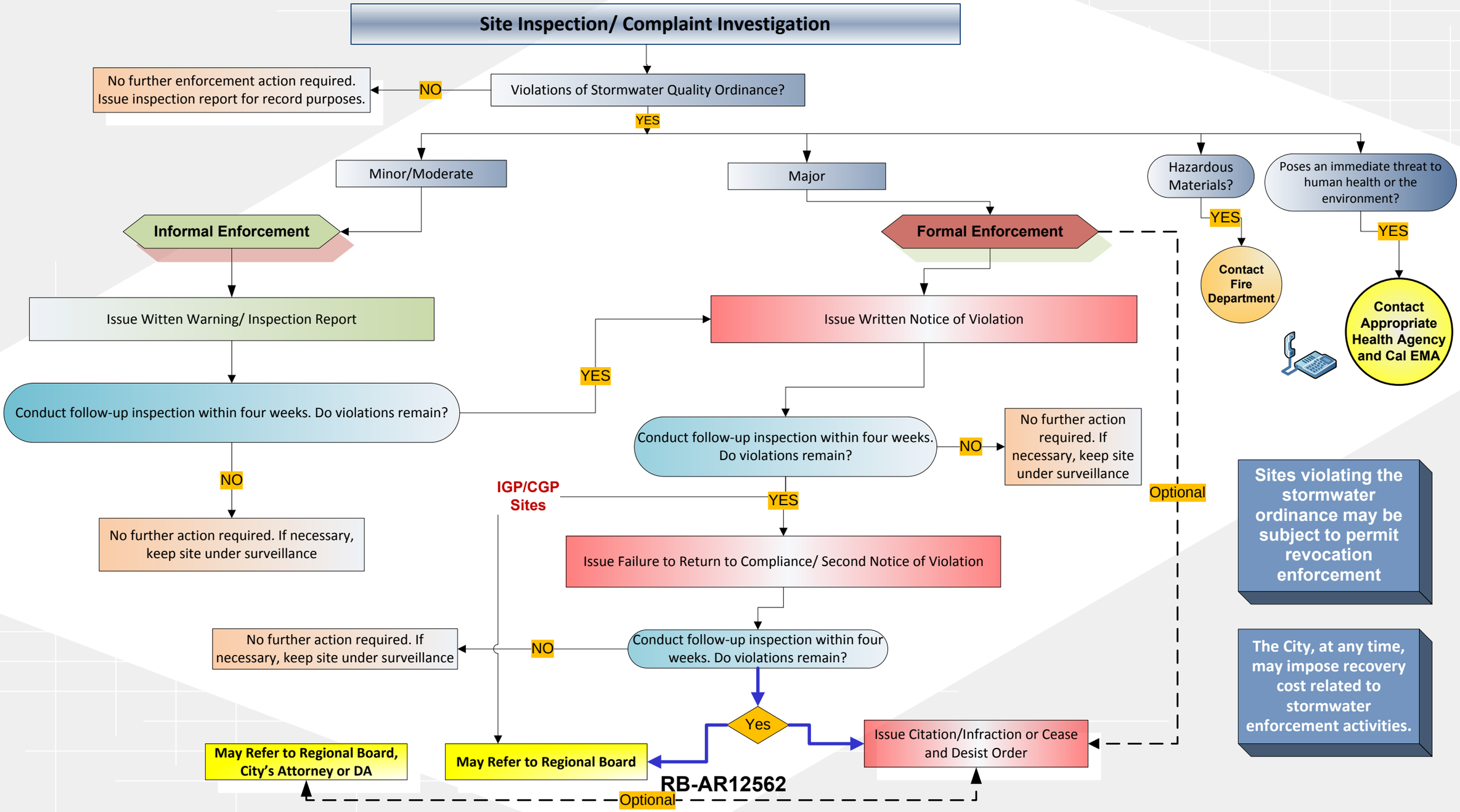
Orange County Municipal Storm Water Drainage Area Management Plan (2003)

Sacramento County Environmental Management Department. Inspection & Enforcement Policy - Commercial/Industrial Stormwater Compliance Program (2012).

Deficiencies/ Violation Degrees

Minor	Moderate	Major
Typically involves conditions that threaten to result in pollutant discharge to the storm system and/or waterways, if not corrected. The immediate threat to human health or the environment is low. **Examples:** **1.** Unattended automotive fluid drips and spills likely to result in moderate discharges to the storm drain system. **2.** Discharge of a moderate amount of car body wet sanding effluent from a single vehicle to outdoor pavement that has not yet impacted the storm drain system. **3.** Unattended spilled restaurant grease on outdoor pavement. Spill appears to be recent, is less than a quart, has not yet impacted the storm drain system and poor housekeeping do not appear to be habitual. **4.** Oily, uncovered engines, or other oily, possibly leaky items stored outside. **5.** Open and missing dumpster and tallow bin lids.	Typically involves less significant pollutant discharges to the storm system and/or receiving waters or conditions that threaten to result in minor to moderate pollutant discharges to the storm system and/or receiving waters. May include small or incidental discharges of hazardous or toxic substances. The violation does not present a major threat to human health and safety, but is likely to result in degradation of receiving water quality. **Examples:** **1.** Discharge of moderate amounts of automotive fluids to storm drain system results from neglected spills and poor housekeeping. **2.** Discharge of moderate amount (less than 20 gallons of diluted effluent) of auto body wet sanding effluent to storm drain system. **3.** More than a quart of spilled restaurant grease on outdoor pavement is neglected, possibly getting tracked out of trash enclosure. Neglect appears to be habitual but so far, impact to storm drain is moderate. **4.** Moderate amount of Oil/fluids leaking from improperly stored engines and parts discharge to storm drain system. **5.** Repeat minor violations may be considered moderate.	Includes significant pollutant discharges to the storm system and/or receiving waters as well as creation of conditions that threaten imminent discharge of significant pollutants to the storm system and/or receiving waters. This also includes, but is not limited to, significant discharges of hazardous or toxic substances. Major violations have the potential to present a major threat to human health or safety and/or the environment. The intent of the violator should be considered: Patterns of willful disregard for safety and the environment, recalcitrance, and repeat violations should contribute to designation of a violation as major, but are not necessary. **Examples:** **1.** Intentional discharge of waste oil to the storm drain. **2.** Discharge of significant volumes of auto body wet sanding effluent to storm drain from work on multiple vehicles, as practice. Especially where repeat violations or evidence of habitual discharge is evident. **3.** Significant amount of spilled restaurant grease is intentionally washed into storm drain, especially if hazardous degreasing agent is used. **4.** Significant amount of Oil/fluids leaking from improperly stored engines and parts discharge to storm drain system, especially if repeat violation. **5.** Repeat moderate violations may be considered major.

PROGRESSIVE ENFORCEMENT FLOW CHART



Watershed Management Program Appendix 3

Attachments to MCM Guidance

Insert City Seal

CITY STORMWATER PROGRAM INDUSTRIAL/COMMERCIAL FACILITY INSPECTION REPORT

Facility:	Address:
Contact:	Title:
Email:	Phone:
Inspector:	Date:
Inspection Type: ☐ Routine ☐ Follow-up ☐ Response to Complaint	BMP materials provided and explained: ☐ Yes ☐ No
SIC/NAICS code and/or business type:	

Industrial Facilities Only

(1) Covered under IGP (WDID is current) or other NPDES Permit: ☐ Yes ☐ No	(2) NEC filed: ☐ Yes ☐ No	SWPPP on-site: ☐ Yes ☐ No
If (1) and (2) above are "No", notified contact of need for IGP coverage and will refer facility to Regional Board: ☐ Yes ☐ No		

CHECKLIST FOR STORMWATER BMP (BEST MANAGEMENT PRACTICE) COMPLIANCE

	BMP	Yes	No	N/A
Vehicle & Equipment Maintenance	**Fueling** - Effective fueling source control devices & practices	☐	☐	☐
	Cleaning – Effective cleaning practices & wash water management practices	☐	☐	☐
	Repair – Effective repair practices & source control devices	☐	☐	☐
Equipment Operations	**Outdoor equipment operations** – Effective source control devices & practices	☐	☐	☐
Storage & Handling	**Outdoor liquids** – Effective source controls & practices	☐	☐	☐
	Outdoor raw materials – Effective source control practices & structural devices	☐	☐	☐
	Solid waste – Effective storage & handling practices & appropriate control measures	☐	☐	☐
Facility Maintenance	**Building & grounds maintenance** – Effective maintenance practices	☐	☐	☐
	Parking & storage area maintenance – Effective designs & housekeeping/maintenance practices	☐	☐	☐
	Stormwater conveyance system maintenance – Proper operation & maintenance protocols	☐	☐	☐
	Sidewalk washing – Remove debris & free standing oil/grease. Use high pressure/low volume spray washing with potable water, no cleaning agents & average rate of 0.006 gal/ft^2.	☐	☐	☐
Spills, Leaks & Discharges	**Accidental spills/leaks** – Effective spill/leak prevention & response procedures	☐	☐	☐
	Unauthorized nonstormwater discharges – Effective elimination	☐	☐	☐

COMMENTS AND CORRECTIVE ACTIONS (IF REQUIRED)
Include description of activities performed and/or principal products produced

ENFORCEMENT: ☐ **None required** ☐ **Corrective Action Notice (complete section below)** ☐ **Other (see comments)**

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If corrective actions have been noted above, then the responsible party (facility owner, occupant or person responsible) is in noncompliance with the City's Stormwater Quality Ordinance. The responsible party may be subject to enforcement actions under this ordinance if the corrective actions are not implemented by:

_____
Corrective Action Due Date

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____	_____	_____
Site Representative Signature	Printed Name	Date

Recording requested by and mail to:

Name: City of [Insert City]
Department of Public Works
ATTN: Director of Public Works

Address: [Insert City Address Line1]
[Insert City Address Line2]

Insert City Seal

********** Space Above This Line For Recorder's Use **********

MASTER COVENANT AND AGREEMENT

REGARDING ON-SITE BMP MAINTENANCE

The undersigned hereby certifies I am (we are) the owner(s) of the hereinafter legally described real property located in the City of [Insert City], County of Los Angeles, State of California (please give legal description: assessor's ID, tract no., lot no., etc.):

_____

Site Address _____

Owner(s) do hereby covenant and agree to and with the City of [Insert City]to maintain all on-site structural Best Management Practices (BMPs) in accordance with the Site Map and the Operations & Maintenance (O&M) Plan set forth in Attachment 1 hereto and incorporated herein by this reference. The specific structural BMPs are listed as follows:

_____

_____

Owner(s) shall maintain the listed drainage devices above on the property indicated and as shown on plans permitted by the City of [Insert City]in a good and functional condition to safeguard the property owners and adjoining properties from damage and pollution.

Owner(s) hereby consent to inspection of the Property by an inspector authorized by the City Manager, or his or her designee, for the purpose for verifying compliance with the provisions of this Agreement.

Owner(s) shall provide printed educational materials with any sale of the property which provide information on what stormwater management facilities are present, the type(s) and location(s) of maintenance signs that are required, and how the necessary maintenance can be performed.

Owner(s) shall provide actual notice of this Agreement and its terms to any respective successor(s) in interest to the Property prior to transfer of said interest to such successor(s) in interest. This covenant and agreement shall run with the land and shall be binding upon any future owners, encumbrances, their successors, heirs or assigns and shall continue in effect until the City of [Insert City] approves its termination.

_____ _____
(Print Name of Property Owner) (Print Name of Property Owner)

_____ _____
(Signature of Property Owner) (Signature of Property Owner)

Dated this _____ day of _____ 20 _____.

********** Space Below This Line For Notary's Use **********

ALL PURPOSE ACKNOWLEDGEMENT

State of _____ }
}
County of _____ }

On _____ before me, _____ personally appeared
(Insert Name of Notary Public and Title)
_____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf on which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

Recording requested by and mail to:

Name: City of [Insert City]
Public Works Department
ATTN: Director of Public Works

Address: [Insert City Address Line1]
[Insert City Address Line2]

Insert City Seal

********** Space Above This Line For Recorder's Use **********

MASTER TERMINATION OF COVENANT AND AGREEMENT

REGARDING ON-SITE BMP MAINTENANCE

The undersigned hereby certifies I am (we are) the owner(s) of the hereinafter legally described real property located in the City of [Insert City], County of Los Angeles, State of California (please give legal description: assessor's ID, tract no, lot not, etc.):

_____

Site Address _____

We do hereby, with approval of the City of [Insert City], Engineering Division, terminate the covenant and agreement entered into with the City of [Insert City]as recorded on the _____ day of _____20_____, as Document No.

_____

_____

This covenant and agreement is terminated for the reason that:

_____

_____

_____ _____
(Print Name of Property Owner) (Print Name of Property Owner)

_____ _____
(Signature of Property Owner) (Signature of Property Owner)

Dated this _____ day of _____ 20 _____.

Termination approved by: _____ Date: _____
(Authorized City Representative)

********** Space Below This Line For Notary's Use **********

ALL PURPOSE ACKNOWLEDGEMENT

State of _____ }
}
County of _____ }

On _____ before me, _____ personally appeared
(Insert Name of Notary Public and Title)
_____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf on which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

Insert City Seal

City of [Insert City]NPDES Program

POST-CONSTRUCTION BMP VERIFICATION & INSPECTION FORM

PROJECT INFORMATION	
Facility/Project Name:	Inspection Date:
Address:	Inspector:
Contact Name:	Contact Phone:

Project Category

☐ Priority Project ☐ Small Site LID Project ☐ Single Family Residence ☐ Green Street
☐ Public Project ☐ Private Project

Project Type:

☐ Commercial ☐ Industrial ☐ Residential ☐ Multi-Use
☐ Road/Street ☐ Parking Lot ☐ Automotive repair ☐ Restaurant ☐ Other:

Operation/Maintenance:

☐ Reviewed ☐ Not Reviewed ☐ Not Available
Preparer's Name: Preparer's Title:
Address: City: Zip: Phone:

Inspection Type

☐ Prior to Certificate of Occupancy ☐ Special Investigation ☐ Response to Complaint
☐ Routine Inspection (Annual) ☐ Follow-up Inspection

CHECKLIST FOR ROUTINE SOURCE CONTROL BMPs

Requirement	No. of BMPs (if Applicable)	BMP in place per approved LID Plan/SUSMP?	Corrective Action Required
Storm Drain System Stenciling/Signage		☐ Yes ☐ No	☐ Yes ☐ No
Outdoor Material Storage Areas		☐ Yes ☐ No	☐ Yes ☐ No
Trash Storage Areas		☐ Yes ☐ No	☐ Yes ☐ No
Efficient Irrigation Systems & Landscape Design		☐ Yes ☐ No	☐ Yes ☐ No
Protect Slopes & Channels		☐ Yes ☐ No	☐ Yes ☐ No
Loading Dock Areas		☐ Yes ☐ No	☐ Yes ☐ No
Maintenance Bays		☐ Yes ☐ No	☐ Yes ☐ No
Vehicle Wash Areas		☐ Yes ☐ No	☐ Yes ☐ No
Outdoor Process Areas		☐ Yes ☐ No	☐ Yes ☐ No
Equipment Wash Areas		☐ Yes ☐ No	☐ Yes ☐ No
Fueling Areas		☐ Yes ☐ No	☐ Yes ☐ No
Hillside Landscaping		☐ Yes ☐ No	☐ Yes ☐ No
Wash-water Controls for Food Prep Areas		☐ Yes ☐ No	☐ Yes ☐ No
Community Car Wash Racks		☐ Yes ☐ No	☐ Yes ☐ No

CHECKLIST FOR STRUCTURAL BMPs

Requirement	No. of BMPs (if Applicable)	BMP in place per approved LID Plan/SUSMP?	Corrective Action Required
Infiltration Trench/Basin		☐ Yes ☐ No	☐ Yes ☐ No
Infiltration Well/Dry Well		☐ Yes ☐ No	☐ Yes ☐ No
Detention Basin		☐ Yes ☐ No	☐ Yes ☐ No
Porous Pavement		☐ Yes ☐ No	☐ Yes ☐ No
Bio-infiltration		☐ Yes ☐ No	☐ Yes ☐ No
Vegetated Swale		☐ Yes ☐ No	☐ Yes ☐ No
Bio-filtration		☐ Yes ☐ No	☐ Yes ☐ No
Proprietary Control Measure (describe):		☐ Yes ☐ No	☐ Yes ☐ No
Media Filtration		☐ Yes ☐ No	☐ Yes ☐ No
Filter Insert		☐ Yes ☐ No	☐ Yes ☐ No
Regional or Watershed BMPs		☐ Yes ☐ No	☐ Yes ☐ No
Other (describe):		☐ Yes ☐ No	☐ Yes ☐ No

INSPECTION RESULTS:

- ☐ Visible / No Apparent Problems
- ☐ BMP Failure
- ☐ Significant Engineering / Design Flaws
- ☐ Unauthorized Modifications
- ☐ BMP Missing / Removed / Not Located
- ☐ Trash / Debris Exceeding Cap. (bypass)
- ☐ Evidence of Pollution / Dumping
- ☐ Vector Control Issues (Mosquitoes)
- ☐ Inadequate Maintenance

DESCRIPTION OF CORRECTIVE ACTION(S) REQUIRED:

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If any corrective actions have been noted above, then based on this verification inspection, you are in noncompliance with Municipal Code Chapter [-]. You must implement the required corrective action(s) by:

_____
Corrective Action Due Date

After this date, your facility will be re-inspected to verify that all necessary corrective measures have been taken. FAILURE TO IMPLEMENT THE CORRECTIVE ACTION(S) WILL SUBJECT YOU TO ELEVATED ENCORCEMENT, WHICH CAN INCLUDE INFRACTION OR MISDEMEANOR PENALTIES.

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____	_____	_____
Contact Signature	Printed Name	Date

Insert City Seal

STORMWATER PLANNING PROGRAM PRIORITY PROJECT CHECKLIST

FORM PC

Project Name	Owner Name	Developer Name
Project Address	Owner Address	Developer Address
Plan Check #	Owner Phone	Developer Phone

TYPE OF PROJECT

Does the proposed project fall into one of the following categories? Please check Yes/No	YES	NO
PRIORITY PROJECTS		
1. A new project equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious* surface area		
2. A new industrial park with 10,000 square feet or more of surface area		
3. A new commercial mall with 10,000 square feet or more surface area		
4. A new retail gasoline outlet with 5,000 square feet or more of surface area		
5. A new restaurant (SIC 5812) with 5,000 square feet or more of surface area		
6. A new parking lot with either 5,000 ft^2 or more of impervious* surface or with 25 or more parking spaces		
7. A new automotive service facility (SIC 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) with 5,000 square feet or more of surface area		
8. Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA)*, where the development will: a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and b. Create 2,500 square feet or more of impervious surface area		
9. Redevelopment*		
SPECIAL PROVISION PROJECTS		
10. Green street* project		
11. Single family hillside* home		

If checked YES, numerical criteria will apply to items 1,2,6-9 and items 3-5 (for project areas of 5,000 ft^2 or more of surface area.) If any of the boxes are checked YES, this project will require the preparation of a Low Impact Development (LID) Plan and a Maintenance Agreement Transfer*

* Defined on back.

Applicant Name

Applicant Signature

Applicant Title

Date

DEFINITIONS:

Impervious are those surfaces that do not allow stormwater runoff to percolate into the ground. Typical impervious surfaces include: concrete, asphalt, roofing materials, etc. However, some specially designed concrete/asphalt do allow water to percolate (pervious).

Hillside means property where the slope is 25% or greater and where grading contemplates cut or fill slopes. Single family hillside homes will require a less extensive plan. During the construction of a single-family hillside home, the following measures are implemented:

a. Conserve natural areas

b. Protect slopes and channels

c. Provide storm drain system stenciling and signage

d. Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability

e. Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

Green Streets means any street and road construction of 10,000 square feet or more of impervious surface area

a. These projects will follow an approved green streets manual to the maximum extent practicable. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects. Stormwater mitigation measures must be in compliance with the approved green streets manual requirements.

Redevelopment means land-disturbing activities that result in the creation, addition, or replacement of 5,000 ft^2 or more of impervious surface area on an already developed site.

Redevelopment does not include routine maintenance activities that are conducted to maintain the original line and grade, hydraulic capacity, or original purpose of facility, nor does it include modifications to existing single family structures, or emergency construction activities required to immediately protect public health and safety.

Significant Ecological Area means an area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and would be disturbed or degraded by human activities and developments. Also, an area designated by the City as approved by the Regional Water Quality Control Board.

Maintenance Agreement and Transfer: All developments subject to LID and site specific plan requirements provide verification of maintenance provisions for Structural and Treatment Control BMPs, including but not limited to legal agreements, covenants, CEQA mitigation requirements, and/or conditional use permits. Verification at a minimum shall include:

- The developer's and/or owner's signed statement accepting responsibility for maintenance until the responsibility is legally transferred; and
- A signed statement from the public entity assuming responsibility for Structural or Treatment Control BMP maintenance and conduct a maintenance inspection at least once a year; or
- Written conditions in the sales or lease agreement, which requires the recipient to assume responsibility for maintenance and conduct a maintenance inspection at least once a year; or
- Written text in project conditions, covenants and restrictions (CCRs) for residential properties assigning maintenance responsibilities to the Home Owners Association for maintenance of the Structural and Treatment Control BMPs; or
- Any other legally enforceable agreement that assigns responsibility for the maintenance of post-construction Structural or Treatment Control BMPs.

Insert City Seal

STORMWATER PLANNING PROGRAM
PRIORITY DEVELOPMENT & REDEVELOPMENT PROJECTS
PLAN CHECK # _____

FORM P1

Project Name _____ Project Location _____	**GENERAL PROJECT CERTIFICATION** A completed original of this form must accompany all LID Plan submittals.
Company Name _____ Address _____ Contact Name / Title _____ Phone / FAX / Email _____	

Best Management Practices (BMPs) have been incorporated into the design/maintenance/construction of this project to accomplish the following:

1. Minimize impacts from stormwater runoff on the biological integrity of Natural Drainage Systems and water bodies in accordance with requirements under CEQA (Cal. Pub. Resources Code § 21100), CWC § 13369, CWA § 319, CWA § 402(p), CWA § 404, CZARA § 6217(g), ESA § 7, and local government ordinances.
2. Maximize the percentage of pervious surfaces to allow more percolation of stormwater into the ground.
3. Minimize the amount of stormwater directed to impermeable surfaces and to the MS4.
4. Minimize pollution emanating from parking lots through the use of appropriate Treatment Control BMPs and good housekeeping practices.
5. Minimize breeding of Vectors
6. Reduce pollutant loads in stormwater from the development site.

I certify that this Low Impact Development Plan and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered/evaluated the information submitted.

Post Construction / Maintenance Certification

As the responsible party, I certify that the proposed BMPs will be implemented, monitored and maintained to ensure their continued effectiveness. In the event of a property transfer, the new owner/lessee will be notified of the BMPs in use at this site and I will include written conditions in the sales or lease agreement, which requires the new owner (or lessee) to assume responsibility for maintenance and conduct a maintenance inspection at least once a year. The information contained herein is, to the best of my knowledge and belief, true, accurate, and complete.

In consideration of the execution of City of [Insert City] approval of the proposed Low Impact Development (LID) Plan including any proposed treatment system, the applicant hereby agrees to indemnify, save and keep the City of [Insert City], its officers, agents and employees free and harmless from and against any and all claims for injury, damage, loss, liability, cost and expense of any nature whatsoever, which the City of [Insert City], its officers, agents, or employees may suffer, sustain, incur, pay out as a result of any and all actions, suits, proceedings, claims and demands which may be brought, made, or filed against the City of [Insert City], its officers, agents or employees by reason of or arising out of, or in any manner connected with any and all operations permitted by this approval. This indemnification extends to further agree that the City of [Insert City]is not responsible for any additional requirements or restrictions due to changes in regulations, policies or enforcement practices of the California Regional Water Quality Control Board, or any other applicable regulatory agencies.

Property Owner Name	Property Owner Signature
Applicant Title	Date

PLANNING BEST MANAGEMENT PRACTICES

BMP Name	BMP Identification Number and Name	✓ if to be used
Car Wash Facility	SC-21: Vehicle and Equipment Cleaning	
Constructed Wetlands	MP-20: Wetlands	
Control of Impervious Runoff	-N/A-	
Efficient Irrigation	-N/A-	
Energy Dissipaters	EC-10: Velocity Dissipation Devices	
Extended Detention Basins	TC-22: Extended Detention Basin	
Infiltration Basins	TC-11: Infiltration Basins	
Infiltration Trenches	TC-10: Infiltration Trenches	
Inlet Trash Racks	-N/A-	
Landscape Design	EC-2: Preservation of Existing Vegetation EC-4: Hydro seeding EC-6 & EC-8: Straw & Wood Mulching	
Linings for Urban Runoff Conveyance Channels	-N/A-	
Materials Management	SC-30: Outdoor Loading/Unloading	
Media Filtration	TC-40: Media Filter	
Motor Fuel Concrete Dispensing Areas	SC-20: Vehicle and Equipment Fueling	
Motor Fuel Dispensing Area Canopy	SC-20: Vehicle and Equipment Fueling	
Water Quality Inlets	TC-50: Water Quality Inlet	
Outdoor Storage	SC-31: Outdoor Liquid Container Storage SC-33: Outdoor Storage of Raw Materials	
Porous Pavement and/or Alternative Surfaces	-N/A-	
Protect Slopes and Channels	EC-11: Slope Drains EC-12: Streambank Stabilization	
Self-Contained Areas for Vehicle or Equipment Washing, Steam Cleaning, Maintenance, Repair, or Material Processing	SC-21: Vehicle and Equipment Cleaning SC-22: Vehicle and Equipment Repair SC-32: Outdoor Equipment Operations	
Storm Drain System Stenciling and Signage	SC-34: Waste Handling and Disposal (Signage Section)	
Trash Container Areas	SC-34: Waste Handling and Disposal	
Vegetated Swales and Strips	TC-32: Bioretention	
Wet Ponds	TC-20: Wet Ponds	
Other:	• • • • •	

Please refer to the California Storm Water Best Management Practice Handbooks for more information.

Insert City Seal

STORMWATER TREATMENT CERTIFICATION

FORM P2

SITE NAME and ADDRESS

_____

_____

_____

_____

_____

Plan Check #_____

Planning #_____

APPROXIMATE PROJECT CHARACTERISTICS

Roofed Area	_____	ft^2
Roadway/Parking Area (exposed)	_____	ft^2
Landscaped/Vegetation	_____	ft^2
Other Ground Level Impervious Areas (Ex: Outdoor work or storage areas)	_____	ft^2
Other: _____	_____	ft^2
TOTAL	_____	ft^2

STRUCTURAL/TREATMENT BMPs

(attach additional sheets as necessary) or see back

Area Designation (must correspond with plans)	**Tributary Area** (ft^2)	**Average Impervious Factor**	**Estimated Flow Rate or Volume***	**Anticipated Potential Pollutants**	**Type of BMP** (include size, make, and model, if any)	**BMP Location** (briefly describe)	**Design Treatment Flow Rate or Volume Capacity**

By stamping this form, I acknowledge that each treatment BMP is provided with adequate bypass or overflow so as not to contribute to localized flooding or soil instability.

*Flow rates and volumes based on the 0.75 inch, 24-hour rain event or the 85th percentile, 24-hour rain event, whichever is greater.

I certify that I am a Professional Civil Engineer registered in the State of California, and that the treatment methods and capacities herein comply with the requirements established by the California Regional Water Quality Control Board, Los Angeles Region, and the State Water Resources Control Board for Low Impact Development (LID) Plans.

Affix Registered Engineer Wet Ink Stamp Here:

Print Name _____ **Signature** _____ **Date** _____

STRUCTURAL/TREATMENT BMPs

(attach additional sheets as necessary)

Area Designation (must correspond with plans)	**Tributary Area** (ft^2)	**Average Impervious Factor**	**Estimated Flow Rate or Volume***	**Anticipated Potential Pollutants**	**Type of BMP** (include size, make, and model, if any)	**BMP Location** (briefly describe)	**Design Treatment Flow Rate or Volume Capacity**

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OWNER'S CERTIFICATION
MINIMUM BMPS FOR ALL CONSTRUCTION SITES

FORM OC1

PLAN CHECK #_____

Project Name	_____	BUILDING/GRADING PERMIT NUMBER	
Project Location	_____		
Owner Name	_____	Contractor Name	_____
Address	_____	Address	_____
Phone	_____	Phone	_____
FAX/Email	_____	FAX/Email	_____

The National Pollutant Discharge Elimination System (NPDES) is the portion of the Clean Water Act that applies to the protection of receiving waters. Under permits from the Los Angeles Regional Water Quality Control Board (RWQCB), certain activities are subject to RWQCB enforcement. To meet the requirements of the Los Angeles County Municipal Stormwater Permit (CAS004001), minimum requirements for sediment control, erosion control and construction activities must be implemented on each project site. Minimum requirements include:

- **EROSION CONTROL:** Erosion from slopes and channels shall be controlled by implementing an effective combination of BMPs, such as the limiting of grading activities during the wet season; inspecting graded areas during rain events; planting and maintenance of vegetation on slopes; and covering erosion susceptible slopes.
- **SEDIMENT CONTROL:** Eroded sediments from areas disturbed by construction and from stockpiles of soil shall be retained on site to minimize sediment transport from the site to streets, drainage facilities and/or adjacent properties via runoff, vehicle tracking or wind.
- **NON-STORMWATER MANAGEMENT:** Non-stormwater runoff from equipment and vehicle washing and any other activity shall be contained at the project site.
- **WASTE MANAGEMENT:** Construction related materials, wastes, spills or residues shall be retained on site to minimize transport from the site to streets, drainage facilities or adjoining properties by wind or runoff. Runoff from equipment and vehicle washing shall be contained at construction sites unless treated to remove sediment and pollutants.

Examples of Minimum BMPs include: (1) Soil piles must be covered with tarps or plastic, (2) leaking equipment must be repaired immediately, (3) refueling must be conducted away from catch basins, (4) catch basins must be protected when working nearby, (5) vacuum all concrete saw cutting, (6) never wash concrete waste into the street, (7) keep the site clean, sweep the gutters at the end of each working day and keep a trash receptacle on site.

As the architect/engineer of record, I have selected appropriate BMPs to effectively minimize the negative impacts of this project's construction activities on stormwater quality. The project owner and contractor are aware that the selected BMPs shall be installed, monitored, and maintained to ensure their effectiveness. The BMPs not selected for implementation are redundant or deemed not applicable to the proposed construction activity.

Architect/Engineer of Record Name	Architect/Engineer of Record Signature
Title	Date

I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law.

Landowner or Landowner's Agent Name	Landowner or Landowner's Agent Signature
Title	Date

Insert City Seal

EROSION AND SEDIMENT CONTROL PLAN (ESCP) REVIEW CHECKLIST

These requirements apply to all activities involving soil disturbance with the exception of agricultural activities. Applicable activities include but are not limited to grading, vegetation clearing, soil compaction, paving, re-paving and linear underground/overhead projects (LUPs).

Prior to issuing a grading or building permit, each operator of a construction activity within its jurisdiction must prepare and submit an ESCP prior to the disturbance of land.

Contact Name:	Tracking #:
Contact Title:	Site Name:
Company Name:	Site Address:
Mailing Address:	Type of Facility:
City, State, Zip:	Submittal Date:
Phone Number:	Plan Return Date:
Fax Number:	Disturbed Area:

First Review
ESCP Received on:

Review Completed on:

Second Review
ESCP Received on:

Review Completed on:

Third Review
ESCP Received on:

Review Completed on:

Fourth Review
ESCP Received on:

Review Completed on:

Fifth Review
ESCP Received on:

Review Completed on:

Sixth Review
ESCP Received on:

Review Completed on:

ESCP REQUIREMENT	SATISFACTION			COMMENTS
	YES	NO	N/A	
General Information				
Contact information (e.g., name, address, phone, email, etc.) provided for the owner and contractor.	☐	☐	☐	
Basic site information including location, status, size of the project and area of disturbance is provided.	☐	☐	☐	
Proof of existing coverage under applicable permits, including, but not limited to the State Water Board's Construction General Permit, and State Water Board 401 Water Quality Certification.	☐	☐	☐	
Meets the minimum requirements of the jurisdictional erosion and sediment control ordinance.	☐	☐	☐	
Includes the elements of a Storm Water Pollution Prevention Plan (SWPPP) prepared in accordance with the requirements of the Construction General Permit.	☐	☐	☐	
Developed and certified by a Qualified SWPPP Developer (QSD).	☐	☐	☐	
Identifies the proximity all water bodies, water bodies listed as impaired by sediment-related pollutants, and water bodies for which a sediment-related TMDL has been adopted and approved by the USEPA.	☐	☐	☐	
Identifies any significant threat to water quality status, based on consideration of factors listed in Appendix 1 to the Construction General Permit.	☐	☐	☐	
The project start date and anticipated completion date is provided.	☐	☐	☐	
Includes Identification of site Risk Level as identified per the requirements in Appendix 1 of the Construction General Permit.	☐	☐	☐	
Contains a language signed by the landowner or the landowner's agent stating as follows: *"I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law."*	☐	☐	☐	

ESCP REQUIREMENT	SATISFACTION			COMMENTS
	YES	NO	N/A	
Best Management Practices				
All structural BMPs are designed by a licensed California Engineer.	☐	☐	☐	
Includes Sediment/Erosion Control.	☐	☐	☐	
Includes controls to prevent tracking on and off the site.	☐	☐	☐	
Includes non-stormwater controls (e.g., vehicle washing, dewatering, etc.).	☐	☐	☐	
Includes Materials Management (delivery and storage).	☐	☐	☐	
Includes Spill Prevention and Control.	☐	☐	☐	
Includes Waste Management (e.g., concrete washout/waste management; sanitary waste management).	☐	☐	☐	
Includes methods to minimize the footprint of the disturbed area and to prevent soil compaction outside of the disturbed area.	☐	☐	☐	
Includes methods used to protect native vegetation and trees.	☐	☐	☐	
Includes the rationale for the selection and design of the proposed BMPs, including quantifying the expected soil loss from different BMPs.	☐	☐	☐	
Post-Construction Structural BMPs subject to Operation and Maintenance Requirements are identified.	☐	☐	☐	
Site Plan				
Full sized plans showing the site with all proposed BMPs and water quality notes have been signed and stamped with wet ink application by the appropriate individual.	☐	☐	☐	
Plan includes a title block containing at least the project name, address, and owner.	☐	☐	☐	
All figures, maps, plot plans, etc. have a legend, including a North arrow and scale.	☐	☐	☐	
All facilities are labeled for the intended function.	☐	☐	☐	
All areas of outdoor activity are labeled.	☐	☐	☐	
All structural BMPs are indicated.	☐	☐	☐	
Drainage flow information depicted.	☐	☐	☐	
Project location shown.	☐	☐	☐	
Site boundary indicated.	☐	☐	☐	

Agency Standard Operating Procedures

Each agency will use the suggested language below to develop, implement, and revise as necessary agency-specific Standard Operating Procedures (SOPs) that identify the procedures each agency will follow.

CGP Coverage Verification

- Verification of active coverage under the Construction General Permit for sites disturbing 1 acre or more, or that are part of a planned development that will disturb 1 acre or more and a process for referring non-filers to the Regional Water Board.

Prior to releasing any permits relating to and/or allowing for construction activities on a site resulting in one (1) acre or more of soil disturbance, a Notice of Intent (NOI), a Storm Water Pollution Prevention Plan (SWPPP), and all other Permit Registration Documents (PRDs) must be filed with the Regional Water Resources Control Board (Regional Board) through the State Water Board's Storm water Multi-Application and Report Tracking System (SMARTS) website and a Waste Discharge ID (WDID) number must be obtained from the Regional Board. This requirement will be included as a condition of approval. In cases where construction activities have commenced on a qualifying site and the project has not yet filed all PRDs (along with an explanation for filing late) with the Regional Board, a Notice of Violation (NOV) will be sent to the responsible person. Any work orders released will be stopped and fines may be enforced. The Regional Board will be notified of the discharger's non-compliance. Work will not be allowed to commence until the NOI has been accepted by the Regional Board and WDID number issued.

ESCP Review

- Review of the applicable ESCP and inspection of the construction site to determine whether all BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions.

Prior to issuing a grading or building permit, each operator of a construction activity within its jurisdiction must prepare and submit an Erosion and Sediment Control Plan (ESCP) prior to the disturbance of land. The ESCP Requirement Checklist will be used to ensure required information is submitted by the responsible person. These requirements apply to all activities involving soil disturbance with the exception of agricultural activities. Applicable activities include but are not limited to grading, vegetation clearing, soil compaction, paving, re-paving and linear underground/overhead projects (LUPs).

BMP Assessment

- Assessment of the appropriateness of the planned and installed BMPs and their effectiveness.

Prior to releasing any permits relating to and/or allowing for construction activities on a site resulting in one (1) acre or more of soil disturbance a Qualified SWPPP Practitioner (QSP) must be identified by the developer. Prior to beginning any construction activities, the QSP must review the ESCP and determine if the following requirements are being met:

1. Erosion and sediment controls are incorporated to provide effective reduction or elimination of sediment related pollutants in stormwater discharges and authorized non-stormwater discharges from the site.

2. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water.
3. Non-stormwater control BMPs are selected to control sediment on the construction site.
4. Materials and waste management pollution control BMPs are incorporated to minimize stormwater contact with construction materials, wastes and service areas; and to prevent materials and wastes from being discharged off-site.

If the QSP identifies potential problematic areas of the ESCP, a revision to the ESCP must be submitted for review and approval.

Once the BMPs are installed, inspections must be conducted at the frequency identified in the Watershed Management Program (WMP). All BMPs not functioning as intended must be repaired, replaced, or changed to a more effective BMP. Inspection and maintenance procedures must be in accordance with the CASQA handbook.

Discharge Reporting

- Visual observation and record keeping of non-stormwater discharges, potential illicit discharges and connections, and potential discharge of pollutants in stormwater runoff.

Any non-stormwater discharges, potential illicit discharges and connections, and potential discharge of pollutants in stormwater runoff will be tracked and kept on record.

Public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s within this jurisdiction will be conducted. Multiple modes of communication are in place to allow for complaints and spill reporting. When a complaint is received it will be documented and tracked to ensure that all complaints are adequately addressed.

A Spill Response Plan will be implemented for all sewage and other spills that may discharge into the MS4 within this jurisdiction. Coordination with spill response teams will be observed throughout all appropriate departments, programs, and agencies so that maximum water quality protection is provided. All spill complaints will be investigated within one business day of receiving the complaint and a response to spills for containment will be conducted within 4 hours of becoming aware of the spill, except where such spills occur on private property, in which case the response should be within 2 hours of gaining legal access to the property. Spills that may endanger health or the environment will be reported to appropriate public health agencies and the Office of Emergency Services (OES).

A training program regarding the identification of illicit connections/illicit discharges (IC/IDs) for all municipal field staff, who, as part of their normal job responsibilities (e.g., street sweeping, storm drain maintenance, collection system maintenance, road maintenance), may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4 will be provided.

Construction Inspection Reporting and Tracking

- Development of a written or electronic inspection report generated from an inspection checklist used in the field.
- Tracking of the number of inspections for the inventoried construction sites throughout the reporting period to verify that the sites are inspected at the minimum frequencies required.

Inspections will be conducted at a frequency listed in the Watershed Management Program (WMP). Inspection checklists and/or reports will be utilized to determine and keep record of whether or not all

BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions. These checklists/reports will be retained for at least three (3) years following NOT approval.

Insert City Seal

(CITY NAME) STORMWATER INSPECTION REPORT FOR CONSTRUCTION SITES

SITES ONE ACRE OR GREATER

Project Name:		Address:	
Area disturbed:		WDID:	SWPPP on-site: ☐ Yes ☐ No
Risk level: ☐ Low (Risk 1) ☐ Medium (Risk 2) ☐ High (Risk 3)		Erosion & Sediment Control Plan (ESCP) on-site: ☐ Yes ☐ No	
Phase: ☐ Prior to Land Disturbance ☐ Active construction ☐ Site stabilization			
Developer/Contractor:		Phone number:	
Contact:		Title:	
Inspector:		Date:	
Inspection: ☐ Routine (monthly and for each phase of construction) ☐ Follow-up ☐ Response to complaint		*For sites discharging to a waterbody impaired for sediment/turbidity*[i] ☐ *Routine biweekly* ☐ *Predicted rainfall* ☐ *Recent rainfall*	

CHECKLIST FOR STORMWATER BMP (BEST MANAGEMENT PRACTICE) COMPLIANCE

PHASE 1 AND 2: PRIOR TO LAND DISTURBANCE AND DURING ACTIVE CONSTRUCTION

	Comment	Yes	No	N/A
Erosion Control	1. Erosion controls are implemented in accordance with the ESCP	☐	☐	☐
	2. Erosion observed	☐	☐	☐
Sediment Control	3. Sediment controls are implemented in accordance with the ESCP	☐	☐	☐
	4. Sediment discharge observed	☐	☐	☐
Additional Controls	5. Tracking controls (tire washout, stabilized entrances, exits and roadways) are implemented in accordance with the ESCP	☐	☐	☐
	6. Sediment in roads observed	☐	☐	☐
	7. Wind erosion controls are implemented in accordance with the ESCP	☐	☐	☐
	8. Wind erosion observed	☐	☐	☐
Waste Management	9. Effective material delivery and storage practices are implemented	☐	☐	☐
	10. Spill prevention and control practices are implemented	☐	☐	☐
	11. Stockpile controls are implemented in accordance with the ESCP	☐	☐	☐
	12. Solid waste controls are implemented in accordance with the ESCP	☐	☐	☐
Nonstormwater Management	13. Vehicle and equipment washing, fueling and maintenance controls are implemented in accordance with the ESCP	☐	☐	☐
	14. Nonstormwater discharges observed	☐	☐	☐
	15. Dewatering operations covered under NPDES Permit CAG994004	☐	☐	☐
	16. Water conservation practices are implemented	☐	☐	☐

PHASE 3: FINAL LANDSCAPING/SITE STABILIZATION

Comment	Yes	No	N/A	Comment	Yes	No	N/A
1. Graded areas have reached final stabilization	☐	☐	☐	3. Temporary erosion and sediment BMPs are removed	☐	☐	☐
2. Trash, debris and construction materials are removed	☐	☐	☐	4. Post-construction BMPs are installed	☐	☐	☐

COMMENTS AND CORRECTIVE ACTIONS (IF REQUIRED):

ENFORCEMENT: ☐ **None required** ☐ **Corrective Action Notice (complete section below)** ☐ **Other (see comments)**

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If corrective actions have been noted above, then the responsible party (facility owner, occupant or person responsible) is in noncompliance with the City's Stormwater Quality Ordinance. The responsible party may be subject to enforcement actions under this program if the corrective actions are not implemented by:

_____
Corrective Action Due Date

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____ Site Representative Signature

_____ Printed Name

_____ Date

RB-AR12582

[i] For sites discharging to a tributary listed by the state as an impaired waterbody for sediment or turbidity under CWA § 303(d), or determined to be a threat to water quality, inspections must be conducted (1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA and (2) within 48 hours of a ½-inch rain event and (3) at least once every two weeks.

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CITY STORMWATER QUALITY PROGRAM
CONSTRUCTION SITE INSPECTION REPORT

FOR SITES LESS THAN ONE ACRE

Project:	Address:
Contact:	Title:
Contractor:	Phone:
Inspector:	Date:

CHECKLIST FOR STORMWATER BMP (BEST MANAGEMENT PRACTICE) COMPLIANCE

	Question	Yes	No	N/A
Erosion Control	1. Effective erosion controls implemented.	☐	☐	☐
	2. Erosion observed.	☐	☐	☐
Sediment Control	3. Effective sediment controls implemented.	☐	☐	☐
	4. Sediment discharge observed.	☐	☐	☐
Non-Stormwater Management	5. Water conservation practices are implemented.	☐	☐	☐
	6. Dewatering operations covered under NPDES Permit CAG994004	☐	☐	☐
Waste Management	7. Effective material delivery/storage practices and spill prevention/control practices are implemented.	☐	☐	☐
	8. Effective waste management controls are implemented.	☐	☐	☐

COMMENTS AND CORRECTIVE ACTIONS (IF REQUIRED):

ENFORCEMENT: ☐ **None required** ☐ **Corrective Action Notice (complete section below)** ☐ **Other (see comments)**

CORRECTIVE ACTION NOTICE (IF REQUIRED)

If corrective actions have been noted above, then the responsible party (facility owner, occupant or person responsible) is in noncompliance with the City's Stormwater Quality Ordinance. The responsible party may be subject to enforcement actions under this program if the corrective actions are not implemented by:

_____
Corrective Action Due Date

ACKNOWLEDGEMENT OF RECEIPT OF CORRECTIVE ACTION NOTICE

_____ Site Representative Signature

_____ Printed Name

_____ Date

RB-AR12584

Example Lease Language for Fixed Facilities

The following is example language that can be inserted into municipal leases:

The Los Angeles Regional Water Quality Control Board (RWQCB) has issued permits which govern stormwater and non-stormwater discharges resulting from municipal activities performed by or for the Coastal Watersheds of Los Angeles County, including the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the coastal watersheds of Los Angeles County with the exception of Long Beach (collectively referred to as Permittees). The RWQCB Permit is a National Pollutant Discharge Elimination System (NPDES) Permit No. R4-2023-0175. A Copy of the RWQCB Permit is available for review.

In order to comply with the Permit requirements, the Permittees have developed a Watershed Management Program (WMP) which contains Public Agency Facilities and Activities Maintenance Procedures (Maintenance Procedures) with Best Management Practices (BMPs) adopted from the Caltrans Storm Water Quality Handbook Maintenance Staff Guide (Caltrans Handbook) that parties leasing municipally owned properties must adhere to. These Maintenance Procedures contain pollution prevention and source control techniques to minimize the impact of those activities upon dry-weather urban runoff, stormwater runoff, and receiving water quality.

Activities performed at the facility leased under this agreement shall conform to the RWQCB NPDES Permit, the WMP, and the CalTrans Handbook, and must be performed as described within all applicable Maintenance Procedures. The holder of this agreement shall fully understand the Maintenance Procedures applicable to activities conducted at the facility leased under this agreement prior to conducting them and maintain copies of the Maintenance Procedures at the leased facility throughout the agreement duration. The applicable Maintenance Procedures are included as Exhibit ___ of this agreement.

Evaluation of activities subject to WMP requirements performed at the facility leased under this agreement will be conducted by the city to verify compliance with Maintenance Procedures, and may be required through lessor self-evaluation as determined by the city.

Example Contract Language for Field Programs

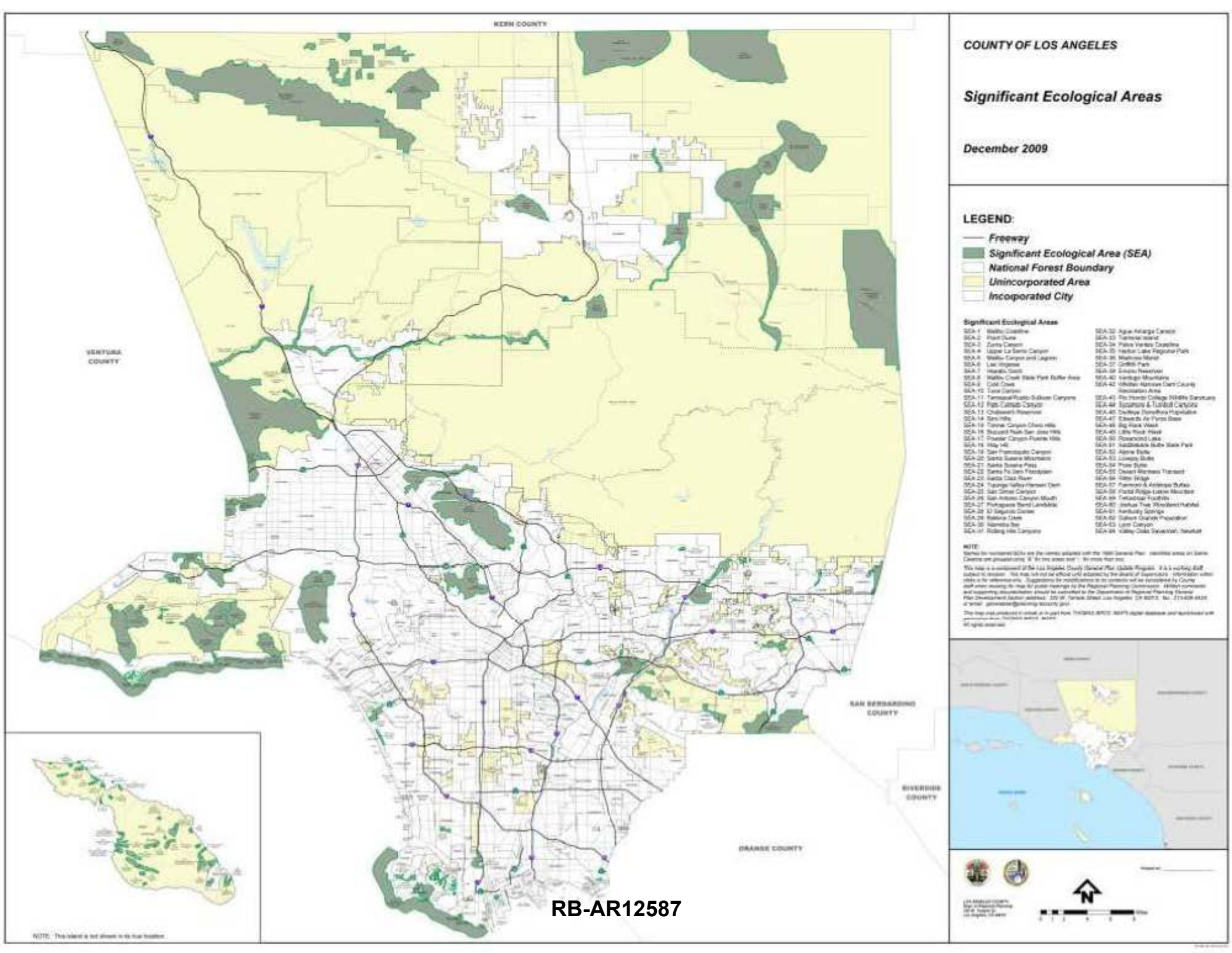
The following is example language that can be inserted into municipal field program contracts:

The Los Angeles Regional Water Quality Control Board (RWQCB) has issued permits which govern stormwater and non-stormwater discharges resulting from municipal activities performed by or for the Coastal Watersheds of Los Angeles County, including the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the coastal watersheds of Los Angeles County with the exception of Long Beach (collectively referred to as Permittees). The RWQCB Permit is a National Pollutant Discharge Elimination System (NPDES) Permit No. R4-2023-0175. A Copy of the RWQCB Permit is available for review.

In order to comply with the Permit requirements, the Permittees have developed a Watershed Management Program (WMP) which contains Public Agency Facilities and Activities Maintenance Procedures (Maintenance Procedures) with Best Management Practices (BMPs) adopted from the Caltrans Storm Water Quality Handbook Maintenance Staff Guide (Caltrans Handbook) that parties leasing municipally owned properties must adhere to. These Maintenance Procedures contain pollution prevention and source control techniques to minimize the impact of those activities upon dry-weather urban runoff, stormwater runoff, and receiving water quality.

Work performed under this CONTRACT shall conform to the RWQCB NPDES Permit, the WMP, and the CalTrans Handbook, and must be performed as described within all applicable Maintenance Procedures. The CONTRACTOR shall fully understand the Maintenance Procedures applicable to activities that are being conducted under this CONTRACT prior to conducting them and maintain copies of the Maintenance Procedures throughout the CONTRACT duration. The applicable Model Maintenance Procedures are included as Exhibit ___ of this CONTRACT.

Evaluation of activities subject to WMP requirements performed under this CONTRACT will be conducted to verify compliance with the Maintenance Procedures, and may be required through CONTRACTOR self-evaluation as determined by the city.



COUNTY OF LOS ANGELES

Significant Ecological Areas

December 2009

LEGEND:

- Freeway
- Significant Ecological Area (SEA)
- National Forest Boundary
- Unincorporated Area
- Incoporated City

Significant Ecological Areas

SEA-1 Malibu Coastline
SEA-2 Point Dume
SEA-3 Zuma Canyon
SEA-4 Upper La Sierra Canyon
SEA-5 Malibu Canyon and Lagoon
SEA-6 Las Virgenes
SEA-7 Hidden Valley
SEA-8 Malibu Creek State Park Buffer Area
SEA-9 Cold Creek
SEA-10 Liano Canyon
SEA-11 Tarmaxal/Portrero Solitario Canyons
SEA-12 Palo Comado Canyon
SEA-13 Chatsworth Reservoir
SEA-14 Simi Hills
SEA-15 Towsley Canyon-Oliveo Hills
SEA-16 Rolling Hills San Jose Hills
SEA-17 Powder Canyon-Puente Hills
SEA-18 Hillary Hill
SEA-19 San Francisquito Canyon
SEA-20 Santa Susana Mountains
SEA-21 Santa Susana Pass
SEA-22 Santa Fe Dam Floodplain
SEA-23 Santa Clara River
SEA-24 Tujunga Valley-Hansen Dam
SEA-25 San Gabriel Canyon
SEA-26 San Antonio Canyon Mouth
SEA-27 Portrero Ravine Landfills
SEA-28 El Segundo Dunes
SEA-29 Ballona Creek
SEA-30 Marsha Bay
SEA-31 Rolling Hills Canyons
SEA-32 Agua Amarga Canyon
SEA-33 Torrance Island
SEA-34 Palos Verdes Coastline
SEA-35 Harbor Lake Regional Park
SEA-36 Madrona Marsh
SEA-37 Griffith Park
SEA-38 Encino Reservoir
SEA-40 Verdugo Mountains
SEA-42 Whittier Narrows Dam County Recreation Area
SEA-43 Rio Hondo College Wildlife Sanctuary
SEA-44 Sycamore & Turnbull Canyons
SEA-45 Dalliege Donnelhora Hogsback
SEA-47 Edwards Air Force Base
SEA-48 Big Rock Wash
SEA-49 Little Rock Wash
SEA-50 Rosamond Lake
SEA-51 Saddleback Butte State Park
SEA-52 Alpine Butte
SEA-53 Lovejoy Buttes
SEA-54 Piute Buttes
SEA-55 Desert Wilderness Transect
SEA-56 Kiter Ridge
SEA-57 Fremont & Antelope Buttes
SEA-58 Portal Ridge-Liebre Mountain
SEA-59 Tehachapi Foothills
SEA-60 Joshua Tree Woodland Habitat
SEA-61 Kentucky Springs
SEA-62 Sullivan Grantite Precipition
SEA-63 Lyon Canyon
SEA-64 Valley-Oaks Savannah, Newhall

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RB-AR12587

2014

Integrated Pest Management Program



Developed for the City of

_____

RB-AR12588

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INTEGRATED PEST MANAGEMENT (IPM) PROGRAM IMPLEMENTATION GUIDELINES[1] FOR THE CITY OF _____

General IPM Policy

For the past few decades, the trend in pest management has been to increasingly rely on synthetic chemical pesticides. This management strategy results in the increased use of dangerous chemicals, an increase in the number of pests that can become resistant to the pesticides, as well as lead to new organisms becoming pests. Additionally, some pesticides used for terrestrial pest management have been found in waterways causing problems in the aquatic environment.

Pest control managers are now moving away from their reliance on pesticides and toward an integrated approach that combines limited pesticide use with more environmentally friendly pest control techniques. This system is known as integrated pest management (IPM), a strategy that focuses on the long-term prevention of pests through a combination of techniques, including preventative, cultural, mechanical, environmental, biological, and chemical control tactics (**Figure 1**). Multiple IPM techniques can be utilized simultaneously to control pest populations in the most effective manner possible.

A comprehensive IPM Program and Approach allows for primary focus on pollution prevention by monitoring and preventing pests as well as minimizing heavy pest infestations, which reduces the need for chemicals and/or multiple applications. The goal of the IPM Program is not to eliminate all pests, but to keep their populations at tolerable levels. In an IPM program, pesticides should be applied only when it is determined that pests are approaching damaging levels. Because this requires early detection of the pests, IPM programs utilize monitoring techniques and economic thresholds to determine when to implement control strategies. If possible, a person should be trained and assigned to scout the sites on a regular basis. Pesticides may be part of an IPM program, but they should preferably be used only after pests exceed established thresholds and applied only to the affected area (in the case of disease prevention, some modifications may be allowed). In general, all pest control strategies should be those that are least disruptive to biological control organisms (natural enemies), least hazardous to humans and the environment (including non-target organisms), and have the best likelihood of long-term effectiveness.

[1]Adapted from the Orange County Drainage Area Management Plan Integrated Pest Management Policy Developed by the University of California, Division of Agriculture and Natural Resources

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IPM practices are encouraged over the sole use of pesticides as the primary means of pest management (**Table 1**). As a part of their Municipal Activities Program, public agencies and their contractors evaluate the ability to use non-chemical IPM techniques before intensive use of pesticides. This IPM Program template outlines baseline IPM procedures that are required by the Los Angeles County Municipal Separate Storm System Permit (MS4 Permit)[2] along with additional optional IPM techniques that can be employed to implement an effective IPM program.

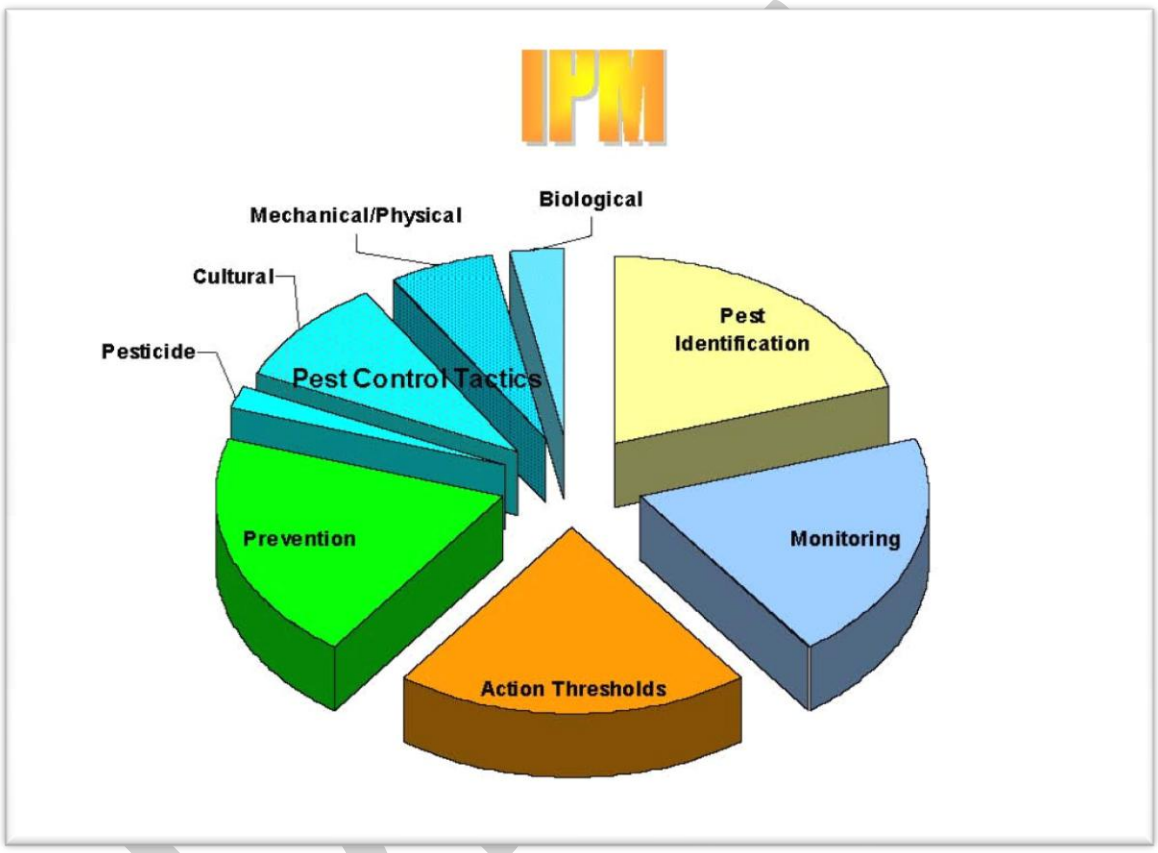


Figure 1 Components of an Integrated Pest Management Program

[2]California Regional Water Quality Control Board Los Angeles Region. 2012. Order No. R4-2012-0175 NPDES Permit No. CAS004001 Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4.

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Table 1 Advantages and Disadvantages of a Pesticide-Based Program Versus An IPM-Based Pest Control Program

Pesticide Based Pest Control		IPM Based Pest Control	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Quick suppression of pests	Not long-term	Long-term control	It may take longer to see results
	Pest control is reactive	Can be proactive in pest control actions.	Must establish thresholds
	Loss of natural controls. Often get outbreaks of other pests	Reduces disruption of natural enemies	
		Pesticides can be used (only used as a last resort)	Must have knowledge of pesticides and their effects on other organisms.
Labor is only for spraying	Extra work in cleanup	Staff becomes more knowledgeable of pests and injury symptoms	Labor is required for monitoring and regular scouting Training is required to identify pests and natural enemies
Not much preparation or follow-up needed	Need a PCA recommendation	Pest management is more organized	Must maintain a record-keeping system.
	Pesticide safety issues for applicators, public, animals More pesticides in environment Contamination of water bodies from runoff	Less exposure to pesticides Safer to the environment Reduces contamination from runoff	

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Implementation Guidelines

Enter Designated IPM Coordinator or IPM Contact Information in Box Below:

IPM Coordinator: Contact Info:

Personnel responsible for the care and maintenance of facilities under the City of _____ agree to implement a suite of basic integrated pest management procedures to meet MS4 Permit requirements[3]. The fundamental basis for the IPM program must include the following as outlined in Permit Part VI.D.9.g:

1. **Pesticides are to be used if monitoring indicates they are needed, and pesticides are applied according to applicable permits and established guidelines.**
2. **Treatments are made with the goal of removing only the target organism.**
3. **Pest controls are selected and applied in a manner that minimizes risks to human health, beneficial non-target organisms, and the environment.**
4. **The use of pesticides, including Organophosphates and Pyrethroids, does not threaten water quality.**
5. **Partnerships with other agencies and organizations are established to encourage the use of IPM.**
6. **A standardized protocol is to be used for the routine and non-routine application of pesticides (including pre-emergents), and fertilizers.**
7. **There is to be no application of pesticides or fertilizers (1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA34, (2) within 48 hours of a ½-inch rain event, or (3) when water is flowing off the area where the application is to occur. This requirement does not apply to the application of aquatic pesticides or pesticides which require water for activation.**
8. **No banned or unregistered pesticides are stored or applied.**
9. **All staff applying pesticides are certified in the appropriate category by the California Department of Pesticide Regulation, or are under the direct supervision of a pesticide applicator certified in the appropriate category.**
10. **Procedures to encourage the retention and planting of native vegetation to**

[3] In addition to MS4 Permit compliance, there are extensive federal and state laws and regulations that all public agencies must be in compliance with at all times, including the California Food and Agricultural Code (FAC) and the California Code of Regulations, Title 3 (3CCR).

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reduce water, pesticide and fertilizer needs are implemented; and

11. **Pesticides and fertilizers are stored indoors or under cover on paved surfaces, or use secondary containment.**
    a. **The use, storage, and handling of hazardous materials are reduced to decrease the potential for spills.**
    b. **Storage areas are regularly inspected.**

In order to implement the above required minimum practices, the following section describes components of an effective IPM Program that can be employed:

- Pest and Symptom Identification
- Prevention
- Monitoring
- Injury Levels and Action Thresholds
- Pest Control Tactics

A number of useful IPM techniques are outlined under each component and further described in Appendix A. These techniques are known to be effective and methods can be selected from each component as necessary to achieve the IPM goals and meet MS4 Permit requirements.

Additional information on the latest IPM techniques including management of new pests in the landscape can be obtained from local UC Cooperative Extension Advisors, UC IPM Regional Advisor, or the Statewide UC IPM Web Site at www.ipm.ucdavis.edu.

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Components of an Effective IPM Program

An IPM program is a long-term, multi-faceted system to manage pests (**Figure 1**). Use of pesticides is a short-term solution to pest problems, and should be used only when the other components fail to maintain the pests or their damage below an acceptable level. Successful IPM practitioners are knowledgeable about the biology of the plants and pests, and successful IPM programs primarily use combinations of cultural practices as well as a combination of physical, mechanical and biological controls.

Pest Identification

It is important to learn to identify all stages of common pests at each site. For example, if you can identify weed seedlings, you can control them before they become larger and more difficult to control and before they flower, disseminating seeds throughout the site. It is also important to be sure that a pest is actually causing the problem. Often damage such as wilting is attributed to root disease but may actually be caused by under watering or wind damage. Appendix A lists specific techniques that can be employed to identify pests.

Prevention

Good pest prevention practices are critical to any IPM program, and can be very effective in reducing pest incidence. Numerous practices can be used to prevent pest incidence and reduce pest population buildup such as the use of resistant varieties, good sanitary practices and proper plant culture. Examples of prevention include choosing an appropriate location for planting, making sure the root system is able to grow adequately and selecting plants that are compatible with the site's environment. Appendix A lists specific techniques that can be employed to achieve pest prevention.

Monitoring

The basis of an effective IPM Program is the development and use of a regular monitoring or scouting program. Monitoring involves examining plants and surrounding areas for pests, examining tools such as sticky traps for insect pests and quantitatively or qualitatively measuring the pest population size or injury. This information can be used to determine if pest populations are increasing, decreasing, or staying the same and to determine when to use a control tactic. Weather and other environmental conditions may also play a factor in whether a pest outbreak may occur so it is important to monitor temperature and soil moisture as well.

It is important to use a systematic approach when monitoring, for example you should examine leaves of a similar age each time you check for pests, rather than looking at the older leaves on some plants and younger ones on others. Randomly looking at a plant and its leaves does not allow you to track changes in pest population or damage over time.

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It is important to establish and maintain a record-keeping system to evaluate and improve your IPM program. Records should include information such as date of examination, pests found, size and extent of the infestation, location of the infestation, control options utilized, effectiveness of the control options, labor and material costs. Appendix A lists specific techniques that can be employed to in the monitoring of pests.

Injury Levels and Action Thresholds

In order to have a way to determine when a control measure should be taken, injury levels and action thresholds must be set for each pest. An injury level is the level of unacceptable damage. For example, the injury level for a leaf-feeding beetle may be set at 30% of the leaves being damaged. Action thresholds are the set of conditions required to trigger a control action. An example of this would be finding an average of 5 or more beetles on 10 shrubs in a location. Action thresholds are set from previous experience or published recommendations and based on expected injury levels. Injury levels are often set by the public's comments. Appendix A lists specific techniques that can be employed to determine injury levels and action thresholds.

Pest Control Tactics

Integrated pest management programs use a variety of pest control tactics in a compatible manner that minimizes adverse effects to the environment. A combination of several control tactics is usually more effective in minimizing pest damage than any single control method. The type of control that an agency selects will likely vary on a case-by-case basis due to the varying site conditions.

The primary pest control tactics to choose from include:

- Cultural
- Mechanical/Physical
- Biological
- Pesticide

Appendix A lists specific pest control techniques that can be employed.

Cultural Controls

Cultural controls are modifications of normal plant care activities that reduce or prevent pests. In addition to those methods used in the pest preventions, other cultural control methods include adjusting the frequency and amount of irrigation, fertilization, and mowing height. For example, spider mite infestations are worse on water-stressed plants, over-fertilization may cause succulent growth which then encourages aphids, too low of a mowing height may thin turf and allow weeds to become established.

Mechanical/Physical Controls

Mechanical control tactics involve the use of manual labor and machinery to reduce or

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eliminate pest problems using methods such as handpicking, physical barriers, or machinery to reduce pest abundance indirectly. Examples include hand-pulling or hoeing and applying mulch to control weeds, using trap boards for snails and slugs, and use of traps for gophers.

The use of physical manipulations that indirectly control or prevent pests by altering temperature, light, and humidity can be effective in controlling pests. Although in outdoor situations these tactics are difficult to use for most pests, they can be effective in controlling birds and mammals if their habitat can be modified such that they do not choose to live or roost in the area. Examples include removing garbage in a timely manner and using netting or wire to prevent bird from roosting.

Biological Controls

Biological control practices use living organisms to reduce pest populations. These organisms are often also referred to as beneficials, natural enemies or biocontrols. They act to keep pest populations low enough to prevent significant economic damage. Biocontrols include pathogens, parasites, predators, competitive species, and antagonistic organisms. Beneficial organisms can occur naturally or can be purchased and released.

The most common organisms used for biological control in landscapes are predators, parasites, pathogens and herbivores.

- Predators are organisms that eat their prey (e.g. Ladybugs).
- Parasites spend part or all of their life cycle associated with their host. Common parasites lay their eggs in or on their host and then the eggs hatch, the larvae feed on the host, killing it (e.g. Tiny stingless wasps for aphids and whiteflies).
- Pathogens are microscopic organisms, such as bacteria, viruses, and fungi that cause diseases in pest insects, mites, nematodes, or weeds (e.g. Bacillus thuringiensis or BT).
- Herbivores are insects or animals that feed on plants. These are effective for weed control. Biocontrols for weeds eat seeds, leaves, or tunnel into plant stems (e.g. goats and some seed and stem borers).

In order to conserve naturally occurring beneficials, broad-spectrum pesticides should be avoided since the use of these types of pesticides may result in secondary pest outbreak due to the mortality of natural enemies that may be keeping other pests under control (Figure 2).

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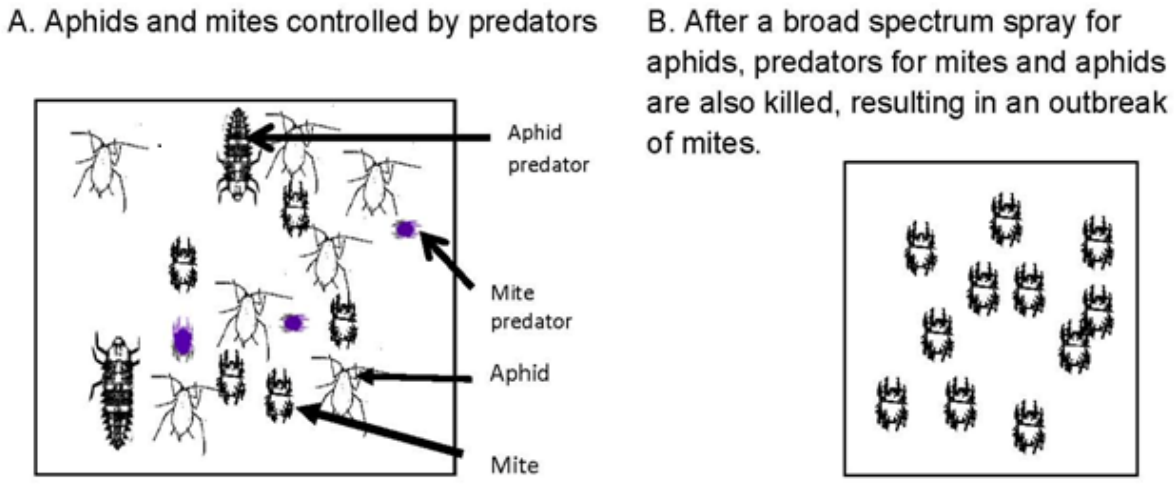


Figure 2 Example of Secondary Pest Outbreak Caused By Use of a Broad Spectrum Insecticide

Pesticide Controls

Any substance used for defoliating plants, regulating plant growth or preventing, destroying, repelling or mitigating any pest, is a pesticide. Insecticides, miticides, herbicides, fungicides, rodenticides and molluscides are all pesticides. Anything with an EPA or DPR registration number on the label is a non-exempt pesticide.

Pesticides should only be used when other methods fail to provide adequate control of pests and just before pest populations cause unacceptable damage. The overuse of pesticides can cause beneficial organisms to be killed and pest resistance to develop. When pesticides must be used, considerations should be made for how to use them most successfully. Avoid pesticides that are broad-spectrum and relatively persistent since these are the ones that can cause the most environmental damage and increase the likelihood of pesticide resistance. Always choose the most specific but least toxic to non-target organisms method.

In addition, considerations should be given to the proximity to water bodies, irrigation schedules, weather (rain or wind), etc. that are secondary factors that may result in the pesticide being moved off-site into the environment. Consideration should be made of the temporary loss of use of an area (application in a park may result in the area being sectioned off).

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Appendix A: Optional IPM Techniques to Integrate into IPM Program

The following practices are generally accepted to be effective IPM techniques. These procedures increase the long-term prevention and suppression of pest problems (insects, weeds, diseases, and vertebrates) with the minimum impact on human health, the environment, and non-target organisms. Emphasis is placed on improving cultural practices to prevent problems and utilize alternative control measures instead of broad spectrum pesticides. The following IPM techniques are divided into the following categories:

- General Pesticide Management Practices
- Pest and Symptom Identification
- Prevention
- Monitoring
- Injury Levels and Action Thresholds
- Pest Control Tactics

GENERAL PESTICIDE MANAGEMENT PRACTICES

- Maintain a complete inventory of all pesticides used and the use sites. This inventory should be updated annually.
- If pesticides are necessary, CAUTION-labeled pesticides should be considered before more toxic alternatives.
- Ensure that no banned or unregulated pesticides are stored or applied.
- Restricted use pesticides should only be used when no other alternatives are practical.
- Only small quantities of pesticides should be purchased eliminating the need for stockpiling.
- MSDSs should be regularly updated to reflect new pesticides or label changes to pesticides in storage.
- Pesticides should be used only according to label instructions.
- Weather conditions that could affect application should be considered. For example, wind conditions affect spray drift; rain may wash pesticide off of leaves.
- Pesticides should not be applied where there is a high chance of movement into water bodies; for example, they should not be applied near wetlands, streams, lakes, ponds or storm drains unless it is for an approved maintenance activity.
- In most cases, empty pesticide containers should be triple-rinsed before disposal. Particular information on the proper disposal of the pesticide and its container can be found on the label.

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- Pesticide equipment and containers should not be cleaned or rinsed in the vicinity of storm drains or other open water areas.
- Pesticides should be stored in covered areas with cement floors and in areas insulated from temperature extremes.
- Chemicals and equipment should be secured during transportation to prevent tipping or excess jarring.
- Pesticides should be transported completely isolated from people, food and clothing, for example, in the bed of the truck rather than in the passenger compartment.
- Pesticide equipment, storage containers and transportation vehicles should be inspected frequently.
- A plan for dealing with pesticide spills and accidents should be developed.
- Unless their safety is compromised, workers should immediately clean up any chemical spills according to label instructions and notify the appropriate supervisors and agencies.
- Pesticide applications on public property, which take place on school grounds, parks, or other public rights-of-way where public exposure is possible, should be posted with warning signs. The specific criteria for the signage can be found in FAC, section 12978. Pesticide applications by the Department of Transportation on public highway rights-of-way are exempt.

PEST AND SYMPTOM IDENTIFICATION

Insects, Mites, and Snails and Slugs

- Field personnel should be trained to recognize basic pests found in the landscape in the following groups: insects, mites, and mollusks.
- A licensed Pest Control Adviser can be on staff or hired to properly identify a pest and the symptoms caused by the pest.
- Field personnel can be trained to utilize disease life cycles to apply treatments when the organism can be controlled most effectively.
- Field personnel can be trained to distinguish between beneficial insects and actual pests found in the landscape (e.g. parasitizing wasps).
- Unknown samples can be submitted to the Orange County Agricultural Commissioner for identification by the county entomologist or plant pathologist.
- Abiotic or nonliving factors (wind, sunburn, air pollution, etc…) should be considered as possible causes of observed symptoms as well as biotic (living) factors.

Weeds

- Field personnel can be trained to identify common weeds in the landscape.
- Field personnel can be trained to utilize weed life cycles to properly control

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weeds such as controlling crabgrass utilizing a pre-emergent herbicide applied in mid-January.
- A licensed Pest Control Adviser can be on staff or contracted to properly identify the pest.

Diseases

- Field personnel can be trained to recognize common diseases or their signs/symptoms in the landscape.
- Field personnel can be trained to utilize disease life cycles to apply treatments when the organism can be controlled most effectively.
- Field personnel can be trained to recognize the difference between biotic and abiotic problems.
- Field personnel can be trained to understand how common diseases are spread throughout the landscape.
- Disease signs and symptoms can be sampled and submitted to the Orange County Agricultural Commissioner for identification by the county plant pathologist.
- A licensed Pest Control Adviser can be on staff or contracted to properly identify the pest.
- Photographs of disease signs and symptoms can be taken and compared to reference guides such as UC IPM's *Pests of Landscape Trees and Shrubs*.

Vertebrates

- Field personnel can be trained to recognize vertebrate pests and the damage they cause in the landscape.
- Field personnel can be trained to utilize vertebrate behavior to properly control the pest most effectively.
- Field personnel can be trained in vertebrate baiting and trapping.
- A licensed Pest Control Adviser can be on staff or contracted to properly identify vertebrate pest.

PREVENTION

Landscape Design Procedures

- Drainage, soil characteristics, water quality and availability should be considered during plant selection.
- Sun exposure, heat, and high temperature conditions should be considered during plant selection.
- Plant material should be selected based on adaptability to local climate conditions, such as those conditions common to a Mediterranean climate.
- Adequate space should be allowed for root growth, especially trees.

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- Nursery stock should be inspected and rejected if not healthy (injuries, diseased, circling roots/potbound, poor staking and/or pruning).
- Pest resistant species and cultivars should be selected.
- Plants with similar growth characteristics and irrigation requirements should be grouped together.
- Landscape design should match available irrigation technology to avoid excess water use and to minimize surface runoff.

Site Preparation and Planting Procedures

- Soil drainage properties can be assessed and compacted soils improved prior to planting.
- A soil analysis can be conducted to determine the chemical and physical properties of the existing soil and then appropriate amendments such as organic matter can be added.
- Irrigation should be installed as designed in order to avoid poor uniformity once plants are in place.
- Proper planting procedures should be followed for particular plant species to avoid planting too deeply or too shallow.
- Nursery tree stakes can be removed at planting and replaced with staking that allows trunk to flex; removing these stakes after 1 to 1.5 years.
- A soil probe or other soil moisture measurement device can be utilized to monitor soil moisture levels in existing root ball and surrounding soil during establishment period.

Water Management

- Plants should be examined weekly for symptoms of water stress and to assist in determining irrigation scheduling.
- Soil moisture can be monitored with a soil probe or soil moisture sensors to assist in scheduling irrigation.
- Evapotranspiration (ET) data or 'smart' clock technology can be utilized to schedule irrigation.
- Cyclic irrigation (short-multiple run times) can be employed to minimize surface runoff.
- Low precipitation sprinklers or low-volume systems can be utilized to reduce surface runoff.
- Systems should be inspected monthly to check for leaks, broken pipes, and clogged or broken sprinkler heads.
- Adjust sprinklers to avoid application of water directly to the trunk of trees (can promote disease) or on to concrete surfaces where it can enter storm drains.
- A hotline, email, or other dedicated method can be established for citizens to

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report leaks and broken sprinkler heads

Fertilizing Procedures

- To avoid nutrient losses below the root zone, fertilize only when plants are actively growing.
- Fertilizer should not be applied within 48 hours of a rain event to avoid losses below the root zone and in surface runoff.
- Soil analyses can be conducted in order to determine existing nutrient levels in the soil prior to fertilizing.
- Turf grass fertilizer maintenance schedules can be based on UC recommendations found online at UC Guide for Healthy Lawns: http://www.ipm.ucdavis.edu/TOOLS/TURF/MAINTAIN/fertilize.html
- Sports turf grass fertilizer maintenance guidelines can be based on UC recommendations found in *Establishing and Maintaining the Natural Turf Athletic Field (UCR ANR Publication Number: 21617)*.
- Overfertilization, especially of trees and shrubs, should be avoided to ensure plant growth is not excessively succulent making it more susceptible to pest infestations.
- Off-target fertilizer applications or spills should be cleaned up immediately by sweeping up and applying to landscape or turf or replacing in spreader or bag to ensure material does not enter storm drains.

Pruning Procedures

- Damaged or diseased wood should be regularly pruned from landscape plants.
- Trees should be pruned according to standards set forth by a professional tree care organization such as the International Society of Arboriculture.
- Plants too large for a space should be replaced instead of pruning them severely.
- Unnecessary pruning should be avoided as wounds are entry sites for decay and disease organisms.
- The age and species of the plant should be taken into account when determining the time of year to prune. For example, eucalyptus should be pruned in December and January when long-horned beetles are not active.
- Tree height reduction should be discouraged. When deemed necessary by a licensed arborist, the crown reduction method approved by a professional tree care organization should be utilized. Topping should not be done to reduce tree size.

MONITORING FOR PESTS AND PROBLEMS

Insect/Mollusk Monitoring Procedures

- Monthly visual inspections of plants for insects, mites, snail and slug damage,

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and recording results is an effective method for tracking changes and easy recall of data.

- Yellow sticky traps can be utilized to assess populations of insects.
- Insects can be dislodged from plants by shaking over a collection surface usually consisting of a clipboard with a white sheet of paper.
- If available for a particular insect, pheromone-baited traps can be utilized.
- Soil-dwelling turf insects can be brought to the surface for monitoring by flushing a specific area of soil (i.e. 2' x 2' grid) with plain water or a soapy water mixture.
- The amount of honeydew (aphids) and frass (caterpillars) present can be utilized as an indicator of population levels.

Weed Monitoring Procedures

- Landscapes can be inspected at least 4 times a year (early winter, early spring, summer and early fall) for weeds in order to determine if and when a weed problem exists.
- Site surveys can be utilized to record the location, date, and severity of weed problem for an effective method of tracking changes and easy recall of data.
    - The number of weeds encountered at periodic intervals (e.g. every 1 to 2 feet) can be counted and recorded along a straight line transecting a landscaped, area or within a selected area, for example 4 sq. ft. samples done in random places in a bed or turf area.

Disease Monitoring Procedures

- Landscapes should be regularly checked for conditions, such as overwatering and injuries, which promote disease.
- Landscapes should checked monthly for disease symptoms and signs. Disease prone plants should be checked more frequently.
- Landscape inspections should note date when disease signs and symptoms were first noticed and the current environmental conditions and soil moisture levels as an effective method of tracking changes and easy recall of data.

Vertebrate Monitoring Procedures

- Landscapes can be regularly inspected for vertebrate presence either by damage caused by animal, actual animal sightings, and/or droppings.
- Records can be kept of the absence or presence of actual vertebrates, the damage caused, and/or the presence or absence of droppings.
- Maps can be created and updated at least twice a year, recording areas of high vertebrate damage or signs (such as gopher mounds).

INJURY LEVELS AND ACTION THRESHOLDS

Insect/Mollusk Thresholds and Guidelines

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- Insect tolerance levels can be established based on the public's acceptance of damage to the landscape or a certain level of nuisance pests (i.e. ants), the actual plant species in the landscape, and long-term monitoring and knowledge of pests causing the damage.
- Thresholds can be based on levels where reasonable control of the pest can be achieved with minimum impact on the environment.
- Insect monitoring records can be utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of aphids on a rose garden at City Hall is low, while in a native shrub border it might be considerably higher.

Weed Thresholds and Guidelines

- Weed tolerance levels can be established based on public safety or the public's acceptance and the resources available to manage the landscape at that level.
- Weed monitoring records can be utilized to rank the percentage of the landscape area infested (none, light, moderate, heavy, or very heavy) with weeds.
- Public areas can be ranked according to high, medium, or low level of weed control and management conducted according to levels set for each rank (see Appendix B)

Disease Thresholds and Guidelines

- Disease tolerance levels can be established based on the public's acceptance and the resources available to manage the landscape at the level required.
- Disease monitoring records can be utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of powdery mildew on roses at City Hall is much lower than the threshold for its presence on Euonymus in a parking lot at a city sports park.

Vertebrate Thresholds and Guidelines

- Vertebrate tolerance levels can be established based on public safety, the public's acceptance and the resources available to manage the landscape at the level required.
- Vertebrate monitoring records can be utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of gopher mounds in a sport field is zero, while in a native shrub border it might be two before a trapping strategy is implemented.

PEST CONTROL TACTICS

Insect/Mollusk Management Methods

Cultural/Mechanical/Physical Control Methods

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- Sticky barriers can be applied to trunks of trees and large shrubs to prevent ants and other wingless invertebrates from plant canopies.
- Small insect infestations can be removed by pruning infested plant parts.
- Copper bands can be installed around base of trees or planting areas where snail and slug infestations are prevalent.
- Plant canopies can be thinned to increase light penetration to expose certain soft-bodied insects (soft-scale) as well as snails and slugs to heat.
- Strong streams of water can be used to dislodge insects such as aphids and whiteflies, from leaves.
- The use of plants that snails and slugs use for shelter should be avoided.
- Avoid irrigating between 5pm and 5am when moisture remains on plant material for several hours.

Biological Control Methods

- Persistent broad-spectrum pesticides should be avoided, especially if biological control of an insect has been established by UC researchers. Examples include parasitoid wasps controlling Eugenia Psyllids, Giant Whitefly, and Ash Whitefly.
- Natural predators (beneficial insects) can be augmented with purchases of additional predators from commercially available resources.

Pesticide Control Methods

- The most selective, rather than broad-spectrum, pesticide should be used.
- If available for controlling a particular insect, biological and botanical pesticides should be selected.
- Insecticidal soaps can be utilized to control infestations of soft-bodied insects such as aphids, thrips, and immature scales.
- Horticultural oils (neem oil and narrow-range refined oils) can be utilized to control infestations of soft-bodied immature and adult insects such as aphids, scales, and whiteflies.
- Pesticides should only utilized when the potential for impacts to the environment, especially water quality, are minimized.
- Equipment should be calibrated prior to the application of the insecticide to avoid excess material being applied to the landscape environment.
- Applicators should be trained to not apply pesticides to hard surfaces and to not allow any pesticide to enter the storm drain system.
- Spot treatments should be utilized rather than broadcast methods.
- Insecticide/fertilizer combinations should only used if it is appropriate timing for BOTH the insecticide application and the fertilizer application.

Weed Management Methods

Cultural, Mechanical, and Physical Control Methods

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- Timers can be set to avoid overwatering as weeds establish in areas where soil moisture is excessive.
- Drainage can be managed to avoid wet areas.
- Weeds can be removed from a site prior to planting.
- Mower height can be adjusted to turf species and time of year.
- Mower should be washed after mowing a weedy site.
- Hand-pulling, mowing, trimmers/brushcutters, flaming, hoeing, and rototilling around landscape plants should be the main methods utilized to control annual weeds and young perennial weeds.
- Soil solarization can be utilized to control some annual and perennial weed species.
- Bare soil areas can be covered with a thick layer of mulch to suppress weeds and conserve soil moisture.
- Soil, mulch, and plant material should be weed-free before it is introduced into the landscape.

Pesticide Control Methods

- Spot treatments can be utilized rather than broadcast methods.
- Herbicide/fertilizer combinations should only used if it is appropriate timing for BOTH the herbicide application and the fertilizer application.
- Herbicides should be utilized according to established thresholds (see Appendix B).
- Organically acceptable herbicides (shown to be effective through science-based research) should be used where appropriate.
- Herbicides can be applied to the stage of weed growth most susceptible to the chemical.
- Equipment should be calibrated prior to the application of the herbicide to avoid excess material being applied to the landscape environment.

Disease Management Methods

Cultural, Mechanical, and Physical Control Methods

- Localized areas of diseased plants should be pruned out and disposed of.
- Pathogen-infested plant parts can be removed from the soil surface area to reduce certain pathogens (e.g. Camellia Petal Blight).
- Pruning tools can be sterilized (e.g. a diluted bleach solution) between plants to prevent the spread of pathogen to other plants.
- Proper irrigation and fertilization can be maintained to prevent plant stress, waterlogging, and subsequent susceptibility to disease.
- Soil solarization can be utilized to control soil pathogens in annual beds where it

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is most effective.

- Mulch can be kept at least 6" from base of plants to avoid excessive moisture around crown possibly resulting in crown rots and is no deeper than 4"
- Disease-prone plants can be replaced with non-susceptible species.

Pesticide Control Methods

- Preventative fungicides and bactericides should only used where diseases can be predicted from environmental conditions and applied prior to infection or the appearance of symptoms.
- Synthetic fungicides should be used sparingly in the landscape and only in high visibility areas in order to minimize development of resistance.
- Organic fungicides and bactericides should be utilized in combination with cultural, mechanical, and physical control methods in order to improve their effectiveness.
- Copper-based fungicides should only be utilized in situations where its entry into surface runoff and storm drains is virtually impossible and after consultation with PCA and IPM coordinator.
- Mycopesticides, commercially available beneficial microorganisms, should be used where appropriate.
- Fungicides classes can be rotated to avoid resistance.

Vertebrate Management Methods

Cultural and Physical Control Methods

- Groundcovers can be maintained such that they do not harbor rats.
    - Shrubs pruned at least 1 foot from the ground (rats).
    - Sources of drinking water removed (leaky faucets, puddles).
    - Trash cans have lids and are emptied daily (rats).
    - Screens or other barriers installed under structures that have a space between soil and floor (rabbits).
- Habitat modification, based on pest biology can be used to reduce shelter. Trapping can be used for gophers when safe and practical.
- Kill traps used for ground squirrels and rabbits, should be checked daily, and put in places not accessible by children or non-target animals.
- Gas cartridges can be used for ground squirrels according to UC recommendations.

Pesticide Control Methods

- Anti-coagulant baits can be used and applied according to label and UC recommendations.
- Bait should be applied in a manner that non-target animals do not have access to

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it.

- Restricted use pesticides should only be applied by or under the direct supervision of an individual with a qualified applicators certificate (QAC). To receive a QAC, a person must take a test administered by Department of Pesticide Regulation (DPR). To obtain test materials, test schedules, and an application, see http://www.cdpr.ca.gov/docs/license/liccert.htm.

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Appendix B

Ranking public areas for weeds (or other pest) management:

Areas ranked as **HIGH** may include areas that the public sees and expects to be well-maintained. Examples are entrances to public buildings such as city hall and libraries.

These areas are allowed to use pesticides based on established thresholds.

Areas ranked as **MEDIUM** may include areas the public sees but does not expect a high level of maintenance. Examples are landscaped areas away from the entrance, recreational and picnic areas. These areas can tolerate a higher lever of weeds.

*These areas are allowed to use pesticides but the threshold is much higher and pesticides are used infrequently and only after consultation with IPM coordinato*r.

Areas ranked as **LOW** may include areas the public rarely sees or does not expect a high level of maintenance. Examples are medians, landscaped areas in parking lots, wildlands. These areas can tolerate a higher lever of weeds.

These areas are not allowed to use pesticides except in extreme cases and only after consultation with IPM coordinator.

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Example Catch Basin Cleaning Log

Catch Basin Cleaning Log			
Date	Location	Number of Catch Basins Cleaned	Total Amount Removed
Notes:			

Example of Completed Catch Basin Cleaning Log

Catch Basin Cleaning Log			
Date	Location	Number of Catch Basins Cleaned	Total Amount Removed
7/1/13	Street #1	20	55 cu. ft.
	Intersection #1	10	
	Street #2	5	
Notes:			

Drainage Inlet/Catch Basin Information		
Location		
Street:	Cross Street:	Side (N,S,E,W)
Distance:	Direction (N,S,E,W):	Inlet #:
Map #:	Grid:	
Condition		
Length of Opening:	Height of Opening:	Stencil Legible (Y/N):
Bicycle Bars (Y/N):	Grate Size:	Inlet Protection Bar (Y/N):
Treatment Control BMP (Y/N):	Type of BMP:	
Repairs Required:		

Illicit Connection Investigations Guidance

Field Screening Techniques

If evidence of an illicit discharge is detected, as described in Section 2, and the source does not appear to be evident or above ground, investigations will be conducted to determine if the discharge is being conveyed through an illicit connection. A good source of information includes *Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems* (EPA/600/R-92/238.1993, Pitt et al). General guidance follows below. These techniques can also be used if a Permittee elects to survey sections of their system for illicit connections.

Document Research

Maps of drainage facilities can be reviewed to locate upstream connections and drainage basins as an initial step to locate potential illicit connections. Other records, such as connection permits and discharge permits, can also be reviewed to determine if legal connections may be the source.

Physical Inspections

Catch basins, manholes and other facilities that can be safely investigated from the surface should be physically checked for evidence of connections. This may be a hard pipe connection, or could be a hose or other conveyance that directs a discharge into the storm drain facility. Identification of connections that exhibit evidence of suspected illicit discharges during routine site inspection (e.g., industrial, commercial or construction). Investigation is conducted to determine if the discharge is being conveyed through an illicit connection when evidence of illicit discharge is detected, and the source does not appear to be evident or above ground.

Facilities that are large enough for personnel to enter can also be physically inspected, however, entry into facilities requires strict adherence to health and safety procedures, including confined space entry procedures. In general, a space is “confined” if it is not intended for human occupancy, has limited openings for entry or exit, and has insufficient natural or mechanical ventilation. Information on safety procedures can be found in many documents, including the *Occupational Safety and Health Guidance Manual*, National Institute for Occupational Safety and Health; *OSHA Safety and Health Standards 29 CFR 1910 (General Industry)*, US Department of Labor, and *Title 8 of the California Code of Regulations, General Industry Safety Order*.

Dye Tests

Dye tests can reveal illicit connections in areas where storm drain flows are unexplained and the Permittee has access to suspect facilities. Typical dye tests consist of the addition of fluorescent dye to a floor drain or waste line from a domestic, commercial or industrial process, followed by monitoring for the dye in downstream storm drains. Permittees should conduct dye testing facility by facility (in each area where unexplained flow exists) until all facilities in the area are tested.

Smoke Tests

Smoke tests can reveal if illicit connections exist, and can reveal their source. Storm drains are sealed via sandbags or other sealing devices (plugs, etc.) and smoking incendiary devices are ignited upstream of the seal. Simultaneous inspections inside area facilities should reveal illicit connections even in the

absence of flow. As illicit discharges are intermittent, smoke tests offer real advantages over other types of illicit discharge source identification methods. However, as many legitimate connections to a storm drain may exist (roof drains, street drains, etc.) smoke may be observed extensively. This may cause some illicit connections to be missed, and create a problem with area businesses and residents as excessive smoke begins to enter private property.

T.V. Inspections

T.V. inspections can reveal if illicit connections exist, but cannot be used to view up the connection to determine the source. Robotized or otherwise mobile television cameras allow visual inspection of storm drains (pipes) too small or dangerous for personnel to enter. Although an excellent method of identifying and documenting illicit connections, T.V. inspections have high costs unless the equipment is already owned or can be borrowed from neighboring agencies.

Guidance Source

Los Angeles County Model Stormwater Quality Management Program, 2003.

Illicit Discharge Investigation and Elimination Guidance

Introduction

Once illicit discharges/disposal are detected and identified, they must be eliminated. Sometimes the source of the spill or discharge/disposal is apparent. The incident can be removed through voluntary cleanup/termination or enforcement procedures, and steps can be taken to prevent its recurrence. These prevention methods can include education and outreach materials for residents and businesses, preventive maintenance practices for infrastructure, vehicles and equipment or additional enforcement.

When the source of the discharge is not apparent, further investigation will be necessary to eliminate it and prevent it from recurring. The following discusses methods that can be used to document the incident, determine the nature of the material, and investigate the source.

Advance Planning

An effective investigation program requires good advance planning. Sufficient staff should be trained to conduct investigations so that qualified staff are available whenever investigations are necessary. Staff should become familiar with illicit discharge investigation and sampling procedures. General guidance follows below to assist with overall planning, but should not be considered complete for proper sampling quality assurance purposes.

Equipment

Appropriate equipment for field investigations may include:

Table 1: Typical Equipment for Investigations

Equipment Type	Equipment
General	Inspection checklist
	Field data log book
	Camera
	Tape measure
	Storm drain system map
	Flashlight
Flow measurement	Ping pong ball or other light floatable
	Stopwatch
Laboratory	Graduated container
	Temperature/pH/conductivity (EC) probe
	Field test kits (e.g., Lamotte test kit)
	12 1-liter amber glass sample bottles
	12 1-liter HDPE sample bottles
	Cooler with ice for sample preservation
	Gloves
	Splash goggles/safety glasses
	Deionized water in wash bottle
First Aid	First aid kit

Data Collection

Before entering the field, the inspection crew should locate information such as the following on a storm drain/street map for areas that will be investigated:

- All known or suspected pollutant generating activities
- Locations of NPDES dischargers
- All locations where storm drains enter open channels
- Catch basins and storm drain manholes

Visual Observation

Visual observation of the storm drain system and/or of activities on the surface can provide information on the source of illicit discharges. It is the simplest method to begin with and the least costly. Evidence of illicit discharges may only consist of visual observations because most illicit discharges are intermittent and will probably not be flowing when inspected. A field inspection crew should investigate the surface drainage system in the vicinity of suspected illicit discharges. This may include accessible areas in the public right-of-way adjacent to residences and businesses, catch basins, open channels near known points of discharge, and upstream manholes.

Photos of visual observations should be taken to aid subsequent data analysis and follow up planning. The following types of visual observations should be recorded on an investigation checklist, such as the one attached:

- Location
- General site description
- Amount, appearance of discharge/disposal
- Stains
- Structural cracking and corrosion
- Vegetative growth
- Nearby facilities with poor outside housekeeping practices
- Pipes/hoses connected to/directed toward drainage system

If the source of the discharge is determined, appropriate methods should be used to eliminate it through voluntary cleanup/termination or enforcement procedures, and steps should be taken to prevent its recurrence.

Sampling and Testing

If flow is observed, and the source of the discharge is not apparent, the crew should collect a sample and measure flow. Several tests should be conducted to determine the nature of the material. This can be compared to records of local facilities and possible pollutant generating activities as an aid in determining the possible sources of the flow.

The sample should be measured for pH, temperature and conductivity (EC). If any of these parameters are abnormal, or strong odors or flow discoloration are detected, the sample should be analyzed. This can be done with a field test kit, which will detect the presence of copper, phenols, detergents, and chlorine. Findings should be recorded on the inspection checklist.

If visual observations are abnormal and/or the field tests detect high concentrations of any constituent, the crew should consider collecting samples for laboratory analysis. The laboratory can usually supply properly cleaned sample bottles and specify either amber glass or plastic (HDPE) bottles depending on the analyses required. If there is enough flow, the field crew should fill several of each type of bottle to obtain enough sample volume for a range of analyses. If there is a limited quantity or sampling is difficult, the field crew should collect as much sample as possible so that the laboratory can run a limited set of analyses. The samples should be placed in a cooler filled with ice and transported to the lab(s) on the same day. Arrangements should be made prior to the field inspection with an analytical laboratory capable of performing the required analyses.

The laboratory analyses run on each sample should be carefully considered. Given the potential high cost for laboratory work, it is prudent to limit the number of analytical parameters (or analytes) tested for each sample. Tests may be selected based on the findings of indicator analyses, visual observations, field tests, and information collected about the types of materials processed, stored and/or spilled within each drainage area.

Guidance Source

Los Angeles County Model Stormwater Quality Management Program, 2003.

Insert City Seal

ILLICIT CONNECTION/ ILLICIT DISCHARGE INVESTIGATION REPORT

Response Time:
☐ 1-6 hrs. ☐ 13 hrs. ☐ 24 hrs. ☐ 48 hrs.

RESPONSE

Date:	Time:	Inspector:

INVESTIGATION

Location/ Address:

Reason for Investigation: ☐ Complaint ☐ Discharge/Spill Response ☐ Visual Monitoring
☐ Other: _____

Type of Material: ☐ Hazardous ☐ Wastewater ☐ Oil/Grease ☐ Soil/ Sediment ☐ Trash ☐ Sewage
☐ Fuel (Gas/Diesel) ☐ Chemicals ☐ Other _____

Estimated Quantity: ☐ Gallons ☐ Lbs.

Entered Storm Drain System: ☐ Yes ☐ No Storm Drain Location: _____	Entered Receiving Waters: ☐ Yes ☐ No Name of Receiving Water: _____

Observations

Field Testing: ☐ Yes ☐ No Details:	Sample Collected: ☐ Yes ☐ No Details:

Direct/ Constructed Connections Found: ☐ Yes ☐ No
Details:

RESPONSIBLE PARTY

Name:

Address:	Phone/ email:

Repeat Violation? ☐ Yes ☐ No

OUTREACH MATERIAL

Outreach Material Distributed: ☐ None ☐ General Information ☐ BMP Brochure ☐ Other _____

ENFORCEMENT

Enforcement: ☐ None ☐ Written Warning ☐ Notice of Violation ☐ Citation/Infraction ☐ Cease and Desist Order

Other Actions

FOLLOW-UP VISIT

Date:	Time:	Inspector:
Discharge Stopped? ☐ Yes ☐ No		Proper Clean-Up Action Taken: ☐ Yes ☐ No

Further Action Required: ☐ Yes ☐ No
Details:

Insert City Seal

ILLICIT CONNECTION/ ILLICIT DISCHARGE REPORTING & RESPONSE

Received by:	
Date:	Time Received:

REPORTING PARTY	
Name:	Anonymous: ☐ Yes ☐ No
Address:	Phone/email:

INCIDENT	
Date:	Time:
Location/ Address:	
Land Use: ☐ Residential ☐ Commercial ☐ Industrial ☐ Public	
Type of Material: ☐ Hazardous ☐ Wastewater ☐ Oil/Grease ☐ Sediment ☐ Trash ☐ Other _____ ☐ Unknown	
Estimated Quantity: ☐ Gallons ☐ Lbs.	
Entered Storm Drain System/ Receiving Waters? ☐ Yes ☐ No	
Description / Details	
Agencies Contacted: ☐ Office of Emergency Services ☐ HazMat Team ☐ LA County ☐ Regional Board ☐ Other	
Source Investigation Conducted? ☐ Yes ☐ No	Source Identified? ☐ Yes ☐ No
Direct/ Constructed Connections Found? ☐ Yes ☐ No	

ALLEGED RESPONSIBLE PARTY	
Name:	
Address:	Phone/ email:
Vehicle License No:	

ACTION & CLOSURE	
Referred to:	Date:
Department:	Phone/ email:
Actions Taken/ Details	

Date Closed:

Spill Prevention Coordination

Procedures

This attachment discusses spill prevention coordination procedures that identify:

- Divisions or sections responsible for responding to reports of spills
- General and specific spill response procedures including responsible division or section
- Spill response training activities
- Activities conducted to improve spill response procedures and equipment

Divisions or Sections Responsible for Responding to Reports of Spills

Identify the divisions or sections responsible for responding to reports of spills and note divisions or sections that respond to specific types of spills such as hazardous materials spills or sewage spills. Also indicate the specific field staff who respond to spills and the level of support they provide to lead emergency response agencies and source of spill investigations.

General and Specific Spill Response Procedures

Describe or reference general spill response procedures involved in responding to complaints and identifying spills through inspections. Include the spill response process from the spill identification stage through clean up and report preparation. Copies of the forms and reports prepared to document spills should also be included. Specific procedures for hazardous materials spills, floods, and sewage spills should be referenced. Contractor support for spill events, if applicable, should also be noted.

Spill Response Training Activities

Provide an overview of all spill response training that is conducted within the various divisions and sections of the agencies.

Activities to Improve Spill Response Procedures and Equipment

List all activities conducted within the implementing agency to improve spill response procedures and update equipment. Explain how improvements are identified, prioritized, and implemented. Include a schedule of how often spill response procedures and equipment are evaluate.

Spill Investigation, Containment and Cleanup

Investigation

Depending on the location of the spill and the type of material, the appropriate department/ agency should be notified. This may include:

- Storm drain maintenance, if the spill reaches the storm drain system
- Street and road maintenance, if the spill is in the public right-of-ways
- Sewer system maintenance, if the material is from the sewage system
- Industrial waste inspection, if the material is from industrial facilities
- Fire Departments/"first responders," if the material may be hazardous
- Contractors for hazardous materials, if the material is hazardous

These departments/agencies should determine the nature of the material and the extent of the spill. If any agency determines there is a chance that the spill involves hazardous materials, then the local Administering Agency will be notified. An example of spill investigation procedures is depicted in Figure D-1. Reporting procedures for hazardous substances are discussed further in Section 5 of this Illicit Connection/Illicit Discharge Elimination model program.

Containment and Cleanup

Once the nature and extent of the spill is determined, the appropriate departments and field superintendents will be notified to contain and clean up the spill. The three types of cleanup scenarios are (1) hazardous, (2) wastewater, and (3) other non-hazardous materials.

Hazardous

Handling procedures regarding releases of hazardous or potentially hazardous substances into the environment are covered in a number of federal and state regulations, including: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); Superfund Amendments and Reauthorization Act (SARA); Resource Conservation and Recovery Act (RCRA); and multiple bills codified under Division 20 of the California Health and Safety Code. These procedures are well established and are practiced by local hazardous materials response teams - generally a local Fire Department.

Material determined to be hazardous will be contained by the appropriate hazardous material response team. The team will contact an approved contractor for cleanup. Details are contained in the local *Emergency Response Procedures* manual.

Wastewater

Field crews responding to a sewage spill or overflow should contain the spill to prevent entry of the sewage into the storm drain system or natural watercourse. This will involve a coordinated effort between the sewer, street, and storm drain maintenance crews.

To the maximum extent possible, sewage should be prevented from entering the storm drain system by covering or blocking storm drain inlets and catch basins or by containing or diverting the overflow away from open channels and other storm drain fixtures (using sandbags, inflatable dams, etc.).

In the event that raw sewage enters a storm drain catch basin, where possible the sewage should be vacuumed or pumped out of the catch basin. If a sewage overflow enters a storm drain channel, where possible the downstream channel area should be blocked, flushed with potable water and the captured water pumped to a nearby sewer manhole. Any time a sewage spill enters the storm drain system and has the potential to reach coastal waterways, the local agency and L.A. County Dept. of Health Services, Bureau of Environmental Protection must be notified (323) 881-4147.

Once the spill is contained, it should be removed and the area disinfected. Every effort should be made to ensure that the disinfectant is not discharged to the storm drain system, using methods such as those described above.

Other Non-hazardous Materials

Non-hazardous materials should generally be removed by appropriate crews with knowledge of or jurisdiction over the location of the spill, as indicated in Section D.1. Because the situations and materials will vary widely, procedures will vary as well.

All materials should be prevented from entering waterways to the maximum extent possible. Many materials in sufficient quantities can deplete the oxygen level in receiving waters, or smother benthic communities. Typical examples of these materials include landscape waste, milk, flour, and many other organic liquids and solids or fine powders. These materials should generally be removed by first collecting and/or sweeping up all solids and disposing them in a landfill or other approved location. Liquids should be diverted to an area away from waterways where they may be removed with a vacuum truck or can soak into the ground.

Guidance Source

Los Angeles County Model Stormwater Quality Management Program, 2003.

Watershed Management Program Appendix 3

A-3-2 Example Vacant Lot Ordinance

For the TSS Reduction Strategy

EXAMPLE VACANT LOT ORDINANCE

For the TSS Reduction Strategy (City of Whittier Municipal Code § 8.08.026)

8.08.026 VACANT LOTS

For the purpose of this section, a vacant lot shall mean any property which is either undeveloped or has an existing on-site building/structure that is either abandoned, vacant and/or is un-leased by the property owner for more than thirty days.

All vacant lots within the city (except those that do not immediately front onto a public street, are less than five feet wide in width or depth, are identified on the city's zoning map as "open space," are used as designated habitat conservation or for active agricultural production) shall be maintained in accordance with the following provisions of this section within thirty days of becoming vacant:

A. Unimproved Vacant Lot Types. Lots that are unimproved due to never having been developed or having become vacant subsequent to the removal of any pre-existing buildings, structures or impervious surfaces shall be subject to the approval of a vacant lot landscape and irrigation plan by the director of parks, recreation and community services and shall be improved and maintained at all times in accordance with the following provisions:

1. Lots That Are Less Than One-Half Acre. For unimproved vacant lots that are less than one-half acre in size (21,780 square feet), the entire lot shall be improved and maintained in the following manner:

    a) The property owner shall landscape the entire lot using drought tolerate or xeriscape material that requires little to no water after the first three years of growth. Durable, high quality, synthetic turf may also be used as an alternative. The landscape material selected shall be reviewed and approved to the satisfaction of the director of parks, recreation and community services prior to installation, per Section 13.42.120 of the Whittier Municipal Code. The ground cover shall be maintained in good condition at all times.

    b) The lot shall be improved with an operable automatic irrigation system for the ground cover which shall be installed and maintained in good condition by the property owner at all times.

    c) The lot shall be maintained free of litter, weeds, graffiti, debris, including the stockpiling of any material, at all times. Any on-site litter, weeds, debris or stockpiling of material shall be immediately removed by the property owner, upon discovery. The property owner or their designated representative shall be responsible for inspecting the property at reasonable intervals or take other steps to reasonably ensure that no litter, weeds, graffiti, debris or material stockpiling collects or is maintained on the lot.

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d) Any dead or dying vegetation as well as any broken, malfunctioning or non-functioning irrigation components on the lot shall be replaced by the property owner within seventy-two hours of their discovery or notification. The property owner shall be responsible for inspecting the property at reasonable intervals, or take other steps to reasonably ensure that there is no dead or dying vegetation nor any broken, malfunctioning or non-functioning irrigation components on the lot.

e) At the discretion of the director of parks, recreation and community services the standards contained in Section 8.08.026(A)(2) (Lots that are one-half acre or greater) may be applied to vacant lots that are one-half acre or less if deemed appropriate to mitigate any one or more of the following circumstances:

i. To adequately secure the property from illegal dumping or other such illicit activities.

ii. Because of public safety concerns or hazards associated with the property.

iii. A declared state or regional drought.

2. Lots That Are One-Half Acre or Greater. For unimproved vacant lots that are one-half acre (21,780 square feet) or greater in size, the entire lot shall be improved and maintained in the following manner:

a) The property owner shall provide a minimum five-foot wide landscape planter adjacent to all public rights-of-way (except those property lines located immediately adjacent to an alley) that abut their vacant lot.

b) All landscape planters shall be improved with an operable automatic irrigation system. The landscape material selected shall consist of drought tolerate or xeriscape material that requires little to no water after the first three years of growth. Durable, high quality, synthetic turf may also be used as an alternative. The landscape material selected shall be reviewed and approved to the satisfaction of the director of parks, recreation and community services prior to installation, per Section 13.42.120 of the Whittier Municipal Code. The ground cover shall be maintained in good condition at all times.

c) All on-site landscaping and irrigation shall be maintained in good condition at all times by the property owner of the lot. Any dead or dying landscaping shall be replaced by the property owner within seventy-two hours of their discovery or notification, including any broken, malfunctioning or non-functioning irrigation components. The property owner shall be responsible for inspecting the property at reasonable intervals or take other steps to reasonably ensure that all of the landscaping and irrigation on the lot is maintained in good condition and there are no broken, malfunctioning or non-functioning irrigation components on the lot.

d) A six-foot high, view obscuring, decorative perimeter barrier shall be erected around the entire vacant lot, with a minimum five-foot wide perimeter

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landscape planter in front of the fencing. In circumstances where the director of parks, recreation and community services finds that a higher perimeter barrier is warranted for adequate security of the site and/or because of unusual topographical circumstances associated with the vacant lot, the perimeter barrier may be constructed up to a maximum of eight feet high. All perimeter barriers shall include a gravel pathway leading to a security gate to provide accessibility to the interior of the lot for the police department or other emergency personnel. A key or security code for the gate shall be provided to the Whittier Police Department by the property owner upon installation and shall be kept up-to-date at all times.

e) All decorative, view obscuring, perimeter barriers shall consist of either painted wood, redwood, woodcrete, green vinyl chain-link fencing with a green windscreen securely attached (along the interior of the fence), or any other durable, aesthetically attractive, material deemed acceptable to the director of parks, recreation and community services. On corner or reversed corner lots, all fencing shall comply with Section 18.64.050 for visual safety.

f) All perimeter barriers shall be maintained in good condition at all times by the property owner. Any on-site graffiti shall be removed by the property owner within seventy-two hours of its discovery or notification. The property owner shall be responsible for inspecting the property at reasonable intervals.

B. Improved Vacant Lots. Vacant lots improved with existing on-site buildings or structures that are vacant, abandoned, or un-leased for thirty days or more (as determined by the director of parks) shall be maintained by the property owner as follows:

1. All existing on-site landscaping and irrigation shall be maintained in good condition at all times and in accordance with the provisions contained in Chapters 8.08, 8.22 and8.24 of this code, including any conditions of approval applied to the site as part of the approved vacant lot landscape and irrigation plan under Section 8.08.026(C).
2. Any dead or dying vegetation as well as any broken, malfunctioning or non-functioning irrigation components for the lot shall be replaced by the property owner within seventy-two hours of their discovery or notification. The property owner or their designated representative shall be responsible for inspecting the property at reasonable intervals, or take other steps to reasonably ensure that there is no dead or dying vegetation nor any broken, malfunctioning or non-functioning irrigation components on the lot.
3. The lot shall be maintained free of litter, weeds, and debris, including the stockpiling of any material, at all times. Any on-site litter, debris or stockpiling of material shall be immediately removed by the property owner, upon discovery or notification. The property owner or their designated representative shall be responsible for inspecting the property at reasonable intervals, or take other steps to reasonably ensure that no litter, weeds, graffiti, debris or material stockpiling collects or is maintained on the lot.

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4. All on-site structures shall be maintained in good condition at all times. Damage to any on-site buildings or structures shall be abated within ten days by the property owner upon discovery. An alternative abatement period shall be required, if deemed necessary by the building official, to protect the public health, safety and welfare.
5. The lot shall be adequately secured at all times to prevent illegal dumping, criminal activity, vandalism, graffiti, on-site loitering by the homeless and any/all other attractive nuisances to the satisfaction of the director of parks, recreation and community services and the chief of police.

C. Vacant Lot Landscape and Irrigation Plan. Prior to the issuance of a demolition permit on any lot in which the construction of a new building, structure, parking lot, or impervious surface will not commence within thirty days after demolition, the property owner shall submit a vacant lot landscape and irrigation plan for review and approval of the director of parks, recreation and community services (with the appropriate plan check fees). The director of parks, recreation and community services may impose any reasonable conditions of approval on the vacant lot landscape and irrigation plan to ensure that the lot will be adequately maintained during the time that it is vacant. Upon approval of the plan, the landscape and irrigation improvements to the lot, as specified in the plan, shall be completed to the satisfaction of the director of parks, recreation and community services within thirty days after demolition. A reasonable extension of time may be granted by the director of parks, recreation and community services in those situations when the director, in his or her sole discretion, determines that a good faith effort is being made by the property owner to comply with the provisions of this section.

1. Appeal of Decision.
    a) The decision of the director of parks, recreation and community services to approve, conditionally approve or deny any vacant lot landscape and irrigation plan may be appealed in writing to the city manager within fifteen calendar days. The decision of the city manager shall be final, unless appealed in writing to the city council within fifteen calendar days of the city manager's decision. All decisions of the city council shall be final.
    b) At the sole discretion of the city council, the provisions contained within this ordinance may be made modified, as deemed appropriate, if a finding is made that the legal property owner has demonstrated an extreme financial hardship such as, but not limited to, the filing of bankruptcy, property tax default, their exists over six months of outstanding arrears to the monthly mortgage payment on the property, or any other extreme/unique hardship the city council believes is contrary to the purpose and intent of this ordinance.

D. View Obscuring Barriers and Fencing on Vacant Lots. There shall be no on-site fencing or view obscuring perimeter barriers that screen any vacant lot in any manner that obstructs vehicular and/or pedestrian visibility of the public right-of-way, or interferes with the public's use of the public right-of-way, as determined by the director of public works. The directors of public works and parks, recreation and community services shall approve the location and design of all vacant lot fencing and perimeter barriers prior to the construction of any such fencing or barriers on a vacant lot.

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E. The director of parks, recreation and community services shall implement all applicable sections of Chapter 13.42 (Water Conservation in Landscaping), regardless of the size of the vacant lot, to ensure that the approved vacant lot landscape and irrigation plan conserves water to greatest extent possible, while preserving the health of the landscaping approved on the vacant lot.

F. Where a recorded easement on vacant lot exists, the director of parks, recreation and community services may require and/or permit the property owner to use an appropriate ground cover over the easement (i.e., gravel, turf block, paving or some other acceptable material) that would enable a vehicle to drive over the easement. Any impervious surface approved over an easement shall be subject to the prior written approval of the easement holder.

G. Implementation. All vacant lots, regardless of how they became vacant, that are existing at the time of the adoption of the ordinance shall be brought into immediate compliance with all applicable provisions of this section, unless currently landscaped and irrigated under a previously approved vacant lot and landscape and irrigation plan approved by the director of community development or director of parks, recreation and community services prior to the adoption of this current ordinance. A reasonable extension of time may be granted by the director of parks, recreation and community services in those situations when the director, at his or her sole discretion, determines that a good faith effort is being made by the property owner to comply with this section.

H. Noncompliance Declared Nuisance. Failure to comply with any of the applicable requirements in this section shall constitute a public nuisance, as designated in Section 8.08.030, and the city attorney or the district attorney may commence an action or proceeding for civil abatement, removal and enjoinment thereof, in the manner proscribed by law; and shall take other steps and apply to such courts as may have jurisdiction to grant such relief as well as abate or remove the nuisance, including abatement in accordance with the provisions of this chapter.

(Ord. 2906 § 1, 2008)

(Ord. No. 2928, § 1, 6-23-09; Ord. No. 2958, § 3, 10-12-10)

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Watershed Management Program Appendix 3

A-3-3 Example Street Sweeping Municipal Code

For the TSS Reduction Strategy

EXAMPLE MUNICIPAL CODE LANGUAGE FOR PRIVATE PARKING LOT SWEEPING

For the TSS Reduction Program (City of Signal Hill Municipal Code § 12.16.060)

12.16.060 ILLICIT DISCHARGES

A. Except as otherwise permitted herein, all non-storm water discharges to the municipal storm drain system are prohibited.

B. No person shall cause, facilitate or permit any illicit discharge to the municipal storm drain system.

C. No person shall cause, facilitate or permit a discharge into an MS4 that causes or contributes to an exceedence of any water quality standard.

D. No person shall cause, facilitate or permit any discharge into an MS4 that causes or threatens to cause a condition of pollution, contamination, or nuisance (as defined in California Water Code § 13050).

E. No person shall cause, facilitate or permit any discharge into an MS4 containing pollutants which have not been reduced to the Maximum Extent Practicable.

Q. All owners and operators of industrial and/or commercial motor vehicle parking lots containing more than twenty-five parking spaces shall conduct regular sweeping and other similar measures to minimize the discharge of pollutants and other debris in the municipal storm drain system.

V. Any person who violates the terms of this section shall immediately commence all appropriate response action to investigate, assess, remove and/or remediate any pollutants discharged as a result of such violation, and shall reimburse the City or other appropriate governmental agency, for all costs incurred in investigating, assessing, monitoring and/or removing, cleaning up, treating or remediating any pollutants resulting from such violation, including all reasonable attorneys' fees and environmental and related consulting fees incurred in connection therewith.

(Ord. 2013-11-1462 § 1; Ord. 2003-02-1316 § 1; Ord. 2002-07-1304 § 2; Ord. 96-12-1215 § 1)

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Watershed Management Program Appendix 4

A-4-1 Reasonable Assurance Analysis

Reasonable Assurance Analysis for Lower Los Angeles River, Los Cerritos Creek, and Lower San Gabriel River

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

Paradigm Environmental
4797 Seminole Dr
San Diego, CA 92115

January 15, 2015

RB-AR12631

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1. Introduction

The Municipal Separate Storm Sewer System Permit (Permits) for Los Angeles County[1] and the City of Long Beach[2] includes optional provisions for a Watershed Management Program (WMP) that allows permittees the flexibility to customize their stormwater programs to achieve compliance with applicable receiving water limitations (RWLs) and water quality based effluent limitations (WQBELs) through implementation of control measures. A key element of each WMP is the Reasonable Assurance Analysis (RAA), which is used to demonstrate "that the activities and control measures…will achieve applicable WQBELs and/or RWLs with compliance deadlines during the Permit term" (NPDES Permit Order No. R4-2012-0175, Section C.5.b.iv.[5], page 64; NPDES Permit Order No. R4-2014-0024, Section C.5.h.vii.[2]). This report presents the Reasonable Assurance Analysis (RAA) for the Lower Los Angeles River (LLAR), Los Cerritos Channel (LCC), and Lower San Gabriel River (LSGR) WMPs.

While the Permits prescribe the RAA as a quantitative demonstration that control measures (best management practices [BMPs]) will be effective, the RAA also promotes a modeling process to identify and prioritize potential control measures to be implemented by the WMP. In other words, the RAA not only demonstrates the cumulative effectiveness of BMPs to be implemented, it also supports their *selection*. Furthermore, the RAA incorporates the applicable compliance dates and milestones for attainment of the WQBELs and RWLs, and therefore supports BMP scheduling.

On March 25, 2014, the Los Angeles Regional Water Quality Control Board (Regional Board) issued "RAA Guidelines" (LARWQCB 2014) to provide information and guidance to assist permittees in development of the RAA. The approach herein is consistent with the RAA Guidelines.

This report is organized in nine sections, as follows:

- Section 1: Introduction
- Section 2: Applicable Interim and Final Requirements
- Section 3: Modeling System to be used for the RAA
- Section 4: Current/Baseline Pollutant Loading
- Section 5: Estimated Required Pollutant Reductions
- Section 6: Determination of BMP Capacity for RAA
- Section 7: Cumulative Volume Reduction Goals to Achieve Required Reductions
- Section 8: Pollutant Reduction Plan
- Section 9: References

[1] National Pollutant Discharge Elimination System Permit Order No. R4-2012-0175

[2] National Pollutant Discharge Elimination System Permit Order No. R4-2014-0024

2. Applicable Interim and Final Requirements

The WMPs for LLAR, LCC, and LSGR follow the process in the Permits and identify the Water Quality Priorities (WQ Priorities) including the highest (Category 1) Water Quality Priorities which are subject to Total Maximum Daily Loads (TMDLs) and WQBELs. Practically all of these TMDLs include associated compliance schedules that are considered in this RAA. The TMDL and WMP milestones/compliance dates establish the pace at which BMPs must be implemented. Traditionally, the approach of TMDL implementation plans has been focused on *final* TMDL compliance, whereas the Permit compliance paths offered to WMPs increase emphasis on *milestones*. In line with the RAA Guidelines, for all final TMDL and TMDL/WMP milestones that occur in the next two Permit cycles, the combination of BMPs expected to result in attainment of the corresponding Permit limits are identified.

The TMDL milestones for the LLAR, LCC, and LSGR WMP areas are shown in Table 2-2 through Table 2-4. The Permits require each WMP to provide reasonable assurance for the TMDL milestones that occur in the current Permit term. If applicable TMDLs do not prescribe a milestone in the current Permits, a milestone must be established. The array of TMDLs creates a potentially complicated sequence based on multiple pollutants, and thus this RAA includes a limiting pollutant analysis. As described in Section 5, the identified limiting pollutant for wet weather is zinc for LLAR, LCC, and LSGR. As such, the wet weather milestones for the Los Angeles River, Los Cerritos Channel, and San Gabriel River Metals TMDLs establish the pace of stormwater BMP implementation. The wet weather milestones established for the current Permits include the following:

- **Lower Los Angeles River:** Achieve 31% of the required reduction by September 30, 2017. This milestone was created for the WMP, as the metals TMDL includes a 25% milestone in 2012 (prior to the current Permit term) and a 50% milestone in 2024 (beyond the current Permit term). Achievement of this milestone for zinc provides reasonable assurance of achieving a similar or greater reduction for other WQ Priorities.
- **Los Cerritos Channel:** Achieve 10% of the required reduction[3] by September 30, 2017. This milestone is directly from the metals TMDL. Achievement of this milestone for zinc provides reasonable assurance of achieving a similar or greater reduction for other WQ Priorities.
- **Lower San Gabriel River:** Achieve 10% of the required reduction by September 30, 2017. This milestone is directly from the metals TMDL. Achievement of this milestone for zinc provides reasonable assurance of achieving a similar or greater reduction for other WQ Priorities.

The pollutant reduction plan to achieve these milestones is described in Section 8, along with the plan to achieve the milestones for the next Permit term (achieve 35% of the required reduction in LCC and LSGR and achieve 50% of the required reduction in LLAR). A summary of the milestones within the current and next Permit terms and final milestone based on final TMDLs are summarized in Table 2-1. The required reductions that form the basis of the milestones are calculated in Section 5.

[3] The interim milestones are expressed in terms of the *required* reduction not total reduction (e.g., if the required reduction to attain final limits is 50%, then the 10% milestone equates to a 5% reduction). These reductions are calculated in Section 5.

Table 2-1. Summary of schedule for interim and final milestones

WMP Area	Milestone 1 (2017)	Milestone 2 (interim date of applicable metals TMDL)	Milestone 3 (final date of applicable metals TMDL)
LLAR	31%	50%	100%
LCC	10%	35%	100%
LSGR	10%	35%	100%

Table 2-2. Schedule of TMDL milestones for the Lower LA River

TMDL	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone (Bolded numbers indicated milestone deadlines within the current Permit term) [1]									
				2012	**2013**	**2014**	**2015**	**2016**	2020	2024	2028	2032	2037
LAR Nutrients	Ammonia-N, Nitrate-N, Nitrite-N, Nitrate-N+Nitrite-N	Meet WQBELs	All	Pre 2012									
				Final									
LAR Trash	Trash	% Reduction	All	9/30	9/30	9/30	9/30	9/30					
				70%	80%	**90%**	**96.70%**	**100%**					
LAR Metals	Copper, Lead	% of MS4 area Meets WQBELs	Dry	1/11					1/11	1/11			
				50%					75%	100%			
	Copper, Lead, Zinc, Cadmium	% of MS4 area Meets WQBELs	Wet	1/11						1/11	1/11		
				25%						50%	100%		
LA River Bacteria	*E. coli*	Meet WQBELs	Wet and Dry[2]										3/23
													Final
Dominguez Channel and LA/LB Harbors Toxics	Sediment: DDTs, PCBs, Copper, Lead, Zinc, PAHs	Meet WQBELs	All	12/28								3/23	
				Interim								Final	
Long Beach City Beaches and LAR Estuary Bacteria	Total Coliform, Fecal Coliform, Enterococcus	Meet WLAs	All	USEPA TMDLs, which do not contain interim milestones or implementation schedule. The Permits allow MS4 Permittees to propose a schedule in a WMP.									

[1] The Permit term is assumed to be five years from the Los Angeles County Permit effective date or December 27, 2017.

[2] The schedule for attaining the dry weather Bacteria TMDL is not shown in Table 3-2, which is stepwise by reach/segment and depends on whether a Load Reduction Strategy is developed for implementation.

Table 2-3. Schedule of TMDL milestones for Los Cerritos Channel WMP

TMDL	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone (Bolded numbers indicated milestone deadlines within the current Permit term) [1]									
				2012	**2013**	**2014**	**2015**	**2016**	2017	2020	2023	2026	2032
Los Cerritos Channel Metals	Copper	% Load Reduction or % of MS4 area Meets WQBELs	Dry						9/30	9/30			
									30%	70%	100%		
	Copper, Lead, Zinc	% Load Reduction or % of MS4 area Meets WQBELs	Wet						9/30	9/30			
									10%	35%	70%	100%	
Dominguez Channel and LA/LB Harbors Toxics	Sediment: DDTs, PCBs, Copper, Lead, Zinc, PAHs	Meet WQBELs	All	12/28									3/23
				Interim									Final

[1] The Permit term is assumed to be five years from the Los Angeles County Permit effective date or December 27, 2017.

Table 2-4. Schedule of TMDL milestones for the Lower San Gabriel River WMP

TMDL	Constituents	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone (Bolded numbers indicated milestone deadlines within the current Permit term) [1]									
				2012	**2013**	**2014**	**2015**	**2016**	2017	2020	2023	2026	2032
San Gabriel River Metals	Copper, Selenium	% Load Reduction or % of MS4 area Meets WQBELs	Dry						9/30	9/30			
									30%	70%	100%		
	Copper, Lead, Zinc	% Load Reduction or % of MS4 area Meets WQBELs	Wet						9/30	9/30			
									10%	35%	70%	100%	
Dominguez Channel and LA/LB Harbors Toxics	Sediment: DDTs, PCBs, Copper, Lead, Zinc, PAHs	Meet WQBELs	All	12/28									3/23
				Interim									Final

[1] The Permit term is assumed to be five years from the Los Angeles County Permit effective date or December 27, 2017.

3. Modeling System used for the RAA

The Watershed Management Modeling System (WMMS) was used to develop this RAA. WMMS is specified in the Permits as a potential tool to conduct the RAA. The Los Angeles County Flood Control District (LACFCD), through a joint effort with U.S. Environmental Protection Agency (USEPA), developed WMMS specifically to support informed decisions associated with managing stormwater. The ultimate goal of WMMS is to identify cost-effective water quality improvement projects through an integrated, watershed-based approach. The WMMS encompasses Los Angeles County's coastal watersheds of approximately 3,100 square miles, representing 2,566 subwatersheds (Figure 3-1). As described in the following subsections, WMMS is a modeling system that incorporates three tools: (1) the watershed model for prediction of long-term hydrology and pollutant loading, (2) a BMP model, and (3) a BMP optimization tool to support regional, cost-effective planning efforts. A version of WMMS is available for public download from LACFCD.

The version of WMMS to be used for the RAA in the LLAR, LLC, and LSGR WMPs is customized from the public download version, including the following modification/enhancements:

- Updates to meteorological records to represent the last 10 years (per the RAA Guidelines) and to allow for simulation of the design storm;
- Calibration adjustments to incorporate the most recent 10 years of water quality data collected at the nearby mass emission station;
- Application of a second-tier of BMP optimization using System for Urban Stormwater Treatment and Analysis INtegration (SUSTAIN), which replaces the Nonlinearity-Interval Mapping Scheme (NIMS) component of WMMS.
- Optimization of BMP effectiveness for removal of bacteria pollutants (rather than metals only); and
- Updates to Geographic Information System (GIS) layers, as available.

The subwatersheds in the LLAR, LLC, and LSGR WMP areas that are represented by WMMS are shown in Figure 3-2 through Figure 3-4, which include modifications to confine to jurisdictional boundaries included in these WMP areas. Also shown are the "RAA assessment points", which are used to calculate required load reductions (described in Section 5).

3.1. Watershed Model - LSPC

The watershed model included within WMMS is the Loading Simulation Program C++ (LSPC) (Shen et al. 2004; Tetra Tech and USEPA 2002; USEPA 2003). LSPC is a watershed modeling system for simulating watershed hydrology, erosion, and water quality processes, as well as in-stream transport processes. LSPC also integrates a geographic information system (GIS), comprehensive data storage and management capabilities, and a data analysis/post-processing system into a convenient PC-based Windows environment. The algorithms of LSPC are identical to a subset of those in the Hydrologic Simulation Program–FORTRAN (HSPF) model with selected additions, such as algorithms to dynamically address land use change over time. Another advantage of LSPC is that there is no inherent limit to the size and resolution of the model than can be developed, making it an attractive option for modeling the Los Angeles region watersheds. USEPA's Office of Research and Development (Athens, Georgia) first made LSPC available as a component of USEPA's National TMDL Toolbox (http://www.epa.gov/athens/wwqtsc/index.html). LSPC has been further enhanced with expanded capabilities since its original public release.

The WMMS development effort culminated in a comprehensive watershed model of the Los Angeles County Flood Control District that includes the unique hydrology and hydraulics of the system and characterization of water quality loading, fate, and transport for all the key TMDL constituents (LACDPW 2010a, 2010b). Since the original development of the WMMS LSPC model, Los Angeles County personnel have independently updated the model with meteorological data through April 2012.

To support the objectives of the WMPs, jurisdictional boundaries were also intersected with the WMMS LSPC model subwatersheds resulting in a finer resolution spatial unit for modeling. Model land use was then resampled using this subwatershed-jurisdiction intersect, properly distributing land use categories at the jurisdictional level for attributing sources, while maintaining hydrologic connectivity within the watershed model. This refinement introduced a new layer of resolution, facilitating the rollup of modeled results by jurisdiction to better support source attribution and implementation responsibilities among the participating entities.



Figure 3-1. WMMS model domain and represented land uses and slopes by subwatershed

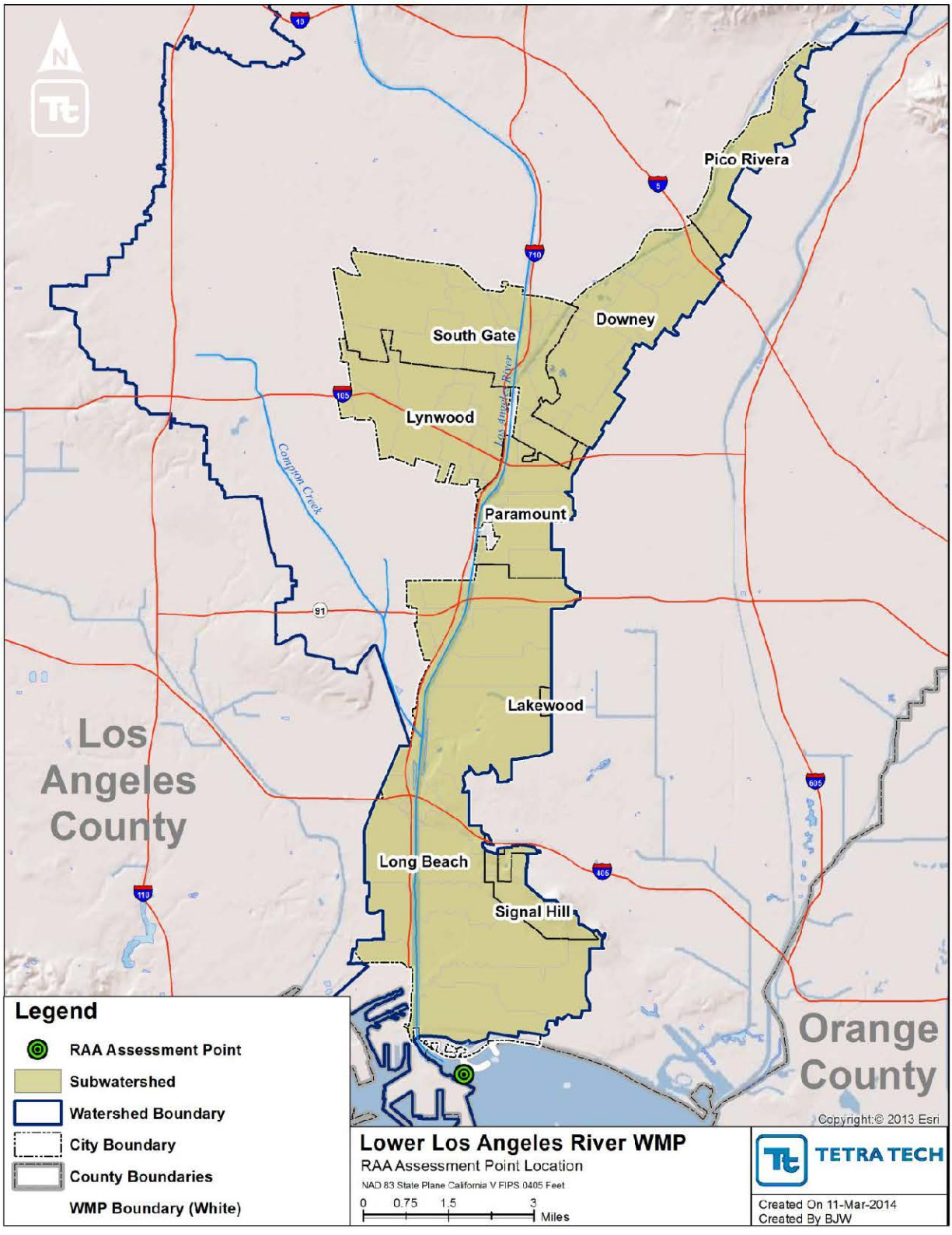


Figure 3-2. Lower LA River WMP Area subwatersheds represented by WMMS

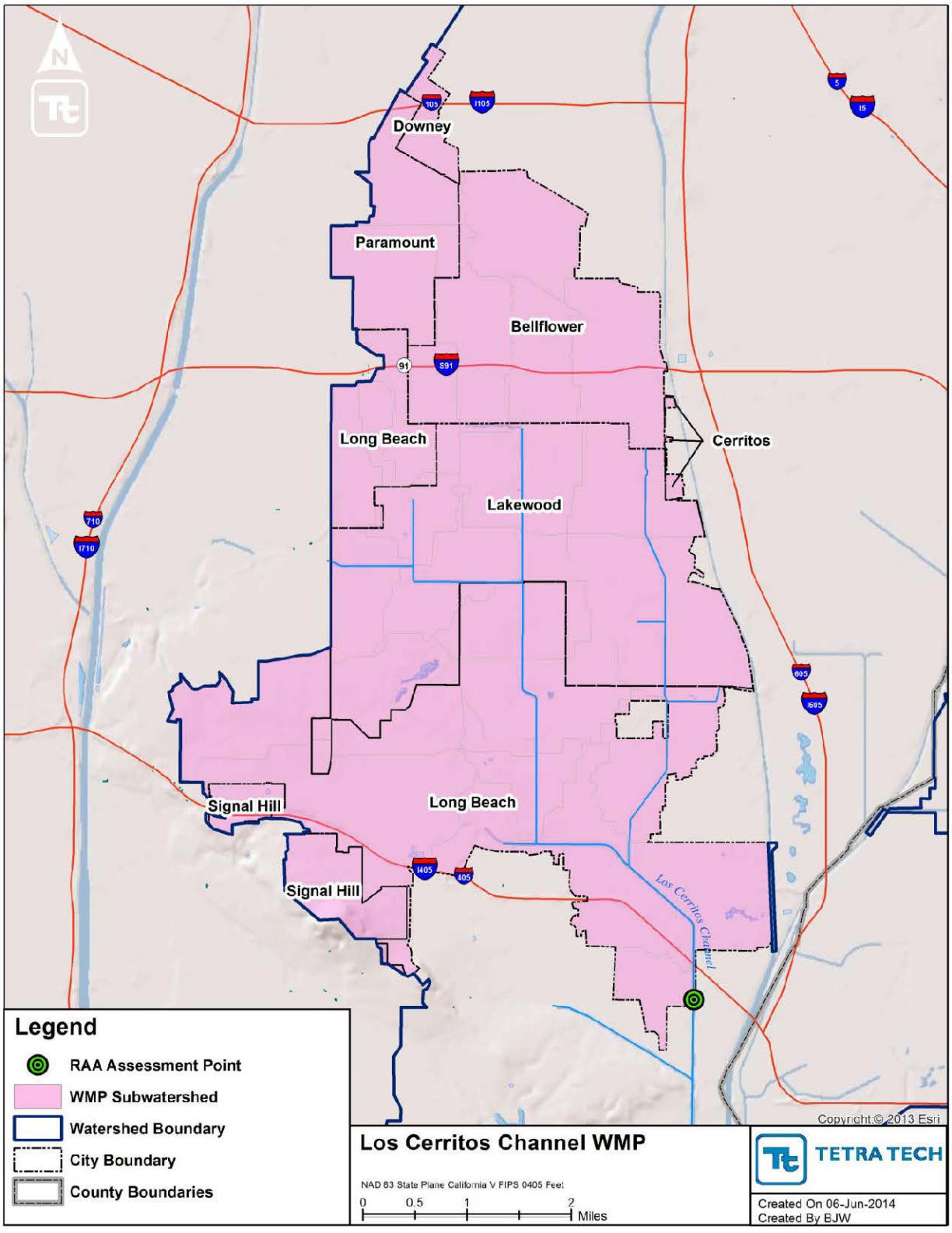


Figure 3-3. Los Cerritos WMP Area subwatersheds represented by WMMS

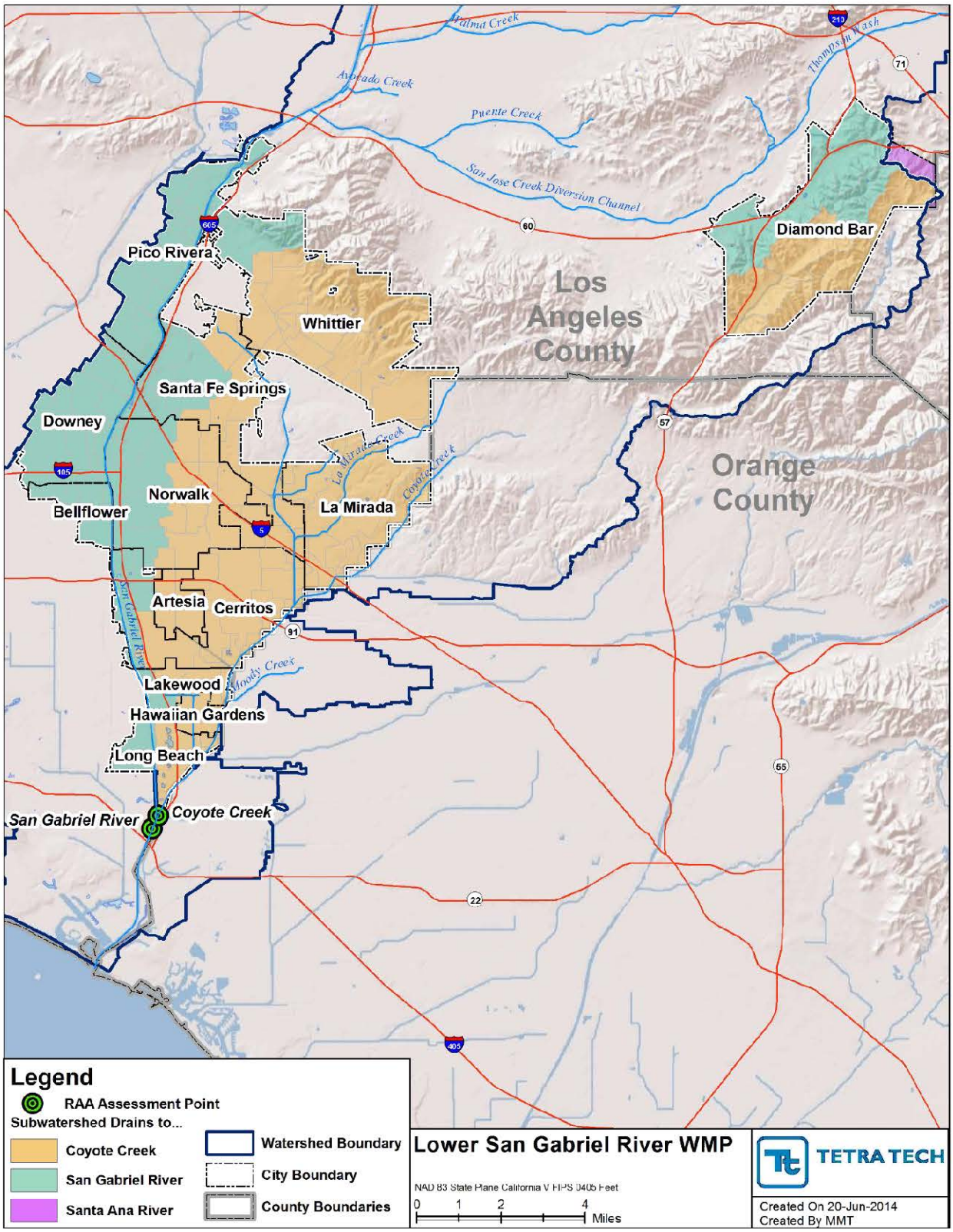


Figure 3-4. Lower San Gabriel River WMP Area subwatersheds represented by WMMS

3.2. Small-Scale BMP Model – SUSTAIN

The System for Urban Stormwater Treatment and Analysis INtegration (SUSTAIN) was developed by USEPA to support practitioners in developing cost-effective management plans for municipal storm water programs and evaluating and selecting BMPs to achieve water resource goals (USEPA, 2009). It was specifically developed as a decision-support system for selection and placement of BMPs at strategic locations in urban watersheds. It includes a process-based continuous simulation BMP module for representing flow and pollutant transport routing through various types of structural BMPs. Users are given the option to select from various algorithms for certain processes (e.g., flow routing, infiltration, etc.) depending on available data, consistency with coupled modeling assumptions, and the level of detail required. Figure 2-3 shows images from the SUSTAIN model user interface and documentation depicting some of the available BMP simulation options in a watershed context.

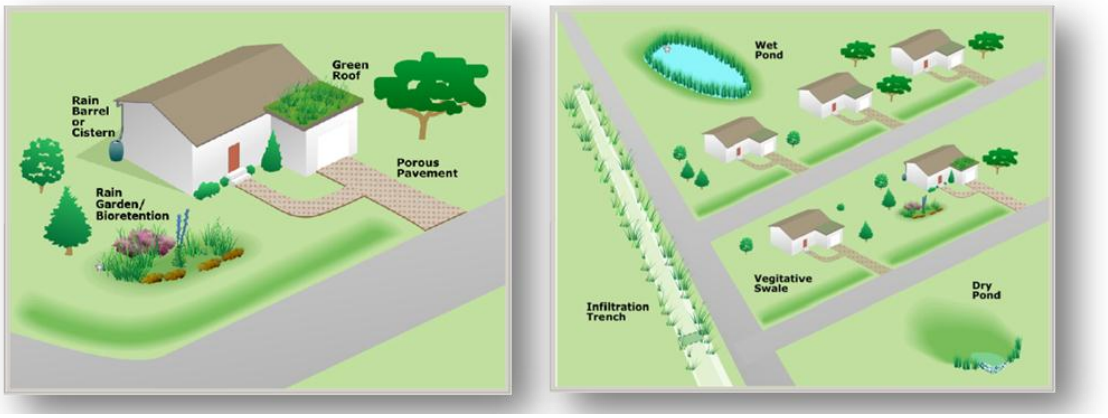


Figure 2-3. SUSTAIN model interface illustrating some available BMPs in watershed settings

SUSTAIN extends the capabilities and functionality of traditionally available models by providing integrated analysis of water quantity, quality, and *cost factors*. The SUSTAIN model in WMMS includes a cost database comprised of typical BMP component cost data from a number of published sources including BMPs constructed and maintained in Los Angeles County. SUSTAIN considers certain BMP properties as "decision variables," meaning that they are permitted to change within a given range during model simulation to support BMP selection and placement optimization. As BMP size changes, so do cost and performance. SUSTAIN runs iteratively to generate a cost-effectiveness curve comprised of optimized BMP combinations within the modeled study area (e.g., the model evaluates the optimal width and depth of certain BMPs to determine the most cost-effective configurations for planning purposes).

3.3. Large-Scale BMP Optimization Tool – NIMS/SUSTAIN

WMMS was specifically designed to dynamically evaluate effectiveness of BMPs implemented in subwatersheds for meeting downstream RWLs while maximizing cost-benefit. WMMS employs optimization based on an algorithm names Nonlinearity-Interval Mapping Scheme (NIMS) to navigate through the many potential scenarios of BMP strategies and identify the strategies that are the most cost effective (Zou et al. 2010). Given the relatively small spatial scale of the WMP area, NIMS was not applied for this study. Instead, a two-tiered approach was applied using the NSGA-II solution technique available in SUSTAIN. For Tier 1, treatment capacities were optimized for each contributing segment, which resulted in unique cost-effectiveness curves for each segment based on available opportunities therein. For Tier 2, the search space was composed of Tier 1 solutions, thereby streamlining the search process. The resulting Tier 2 curve represents the optimal large scale solution because it is comprised of optimized Tier 1 solutions. This approach is especially useful for prioritizing areas for management for scheduling implementation milestones as described in Section 8.

4. Current/Baseline Pollutant Loading

The LSPC model within WMMS was reconfigured and recalibrated specifically for the WMP areas to provide an estimate of current/existing pollutant loads from jurisdictions within the WMPs. Reconfiguration of model subwatersheds was performed to provide specific accounting of loadings from individual jurisdictions. Calibrations were performed to meet specifications of the RAA Guidelines (LARWQCB 2014).

4.1. Model Calibration to Existing Conditions

The LSPC watershed model was originally calibrated for hydrology using a regional approach relying on USGS observed daily streamflow datasets through Water Year (WY) 2006 (LACDPW 2010a). Water Quality was then calibrated using small-scale, land use level water quality monitoring data to develop representative event mean concentrations by land use (LACDPW 2010b). Model performance was also validated at the mass emissions monitoring stations in the context of a county-wide modeling effort. The calibration period for the original WMMS LSPC model began in 1996 and ended in 2006. For the RAA, an analysis was performed to evaluate performance of the LSPC model as it relates to the LLAR, LCC, and LSGR watersheds to understand and benchmark its applicability for use as a baseline condition. The evaluation of monitoring data was extended beyond the original WMMS-LSPC calibration to include the period from 10/1/2001 through 9/30/2011 incorporating both the average year (WY 2008) and 90th percentile (WY 2003) year.

Data available for the LACDPW water quality and hydrologic monitoring stations, S10 and F319 were used to reexamine simulated water quality and hydrology conditions in LA River. The two stations are co-located just south of the West Wardlow Road overpass and drain approximately 800 square miles, or nearly the entire LA River watershed. The monitoring stations were selected for comparison due to their location near the outlet of the LA River watershed, which encompasses the aggregate contributions of all upstream pollutant sources. The selected flow gage, F319, was also used to calibrate the WMMS LSPC model and, therefore, links the current and previous efforts. Water quality and hydrologic records for WYs 2003–2011 were compared to the simulated watershed model output to determine the necessary model parameter adjustments to establish an up-to-date model calibration. The locations of these two gages are presented in Figure 4-1. Statistical summaries and flow regime analysis of the water quality monitoring datasets from the Los Angeles River mass emission station S10 are presented in Attachment E.

Watershed model simulation of existing water quality conditions for the LCC watershed were evaluated for WYs 2003–2011 using data collected at the City of Long Beach Stearns Street monitoring location, just north of interstate 405. The water quality monitoring location is positioned at the WMP hydrologic outlet and captures the cumulative watershed loading effects impacting water quality conditions in this 27 square mile portion of the LCC watershed. No flow monitoring data are available in the watershed, thus simulated flow conditions could not be evaluated against observed data for LCC. The location of the water quality monitoring is presented in Figure 4-1 below and statistical summaries of the monitoring dataset are presented in Attachment E.

For the LSGR, hydrology was re-assessed at two monitoring locations using available data from WYs 2001-2011 The two monitoring locations selected include USGS 11087020 San Gabriel River at Whittier Narrows Dam CA and the LACDPW streamflow gage F354 located along Coyote Creek south of Spring Street (coincident with mass emission station S13). The USGS gage was selected for continuity with the development and calibration of the original WMMS LSPC modeling system. The primary monitoring location selected to calibrate water quality for LSGR was the LA County mass emission station S14. The San Gabriel River Monitoring Station is located below San Gabriel River Parkway in Pico Rivera. At this location the upstream tributary area is 450 square miles (LACDPW 2013). A second mass emission station, the Coyote Creek Monitoring Station (S13) located below Spring Street in the lower San Gabriel River watershed was also used to validate the water quality calibration. The locations of these two gages are presented below in Figure 4-1. Statistical summaries and flow regime analysis of the water quality monitoring datasets from the San Gabriel River and Coyote Creek mass emission stations S14 and S13 are presented in Attachment E.

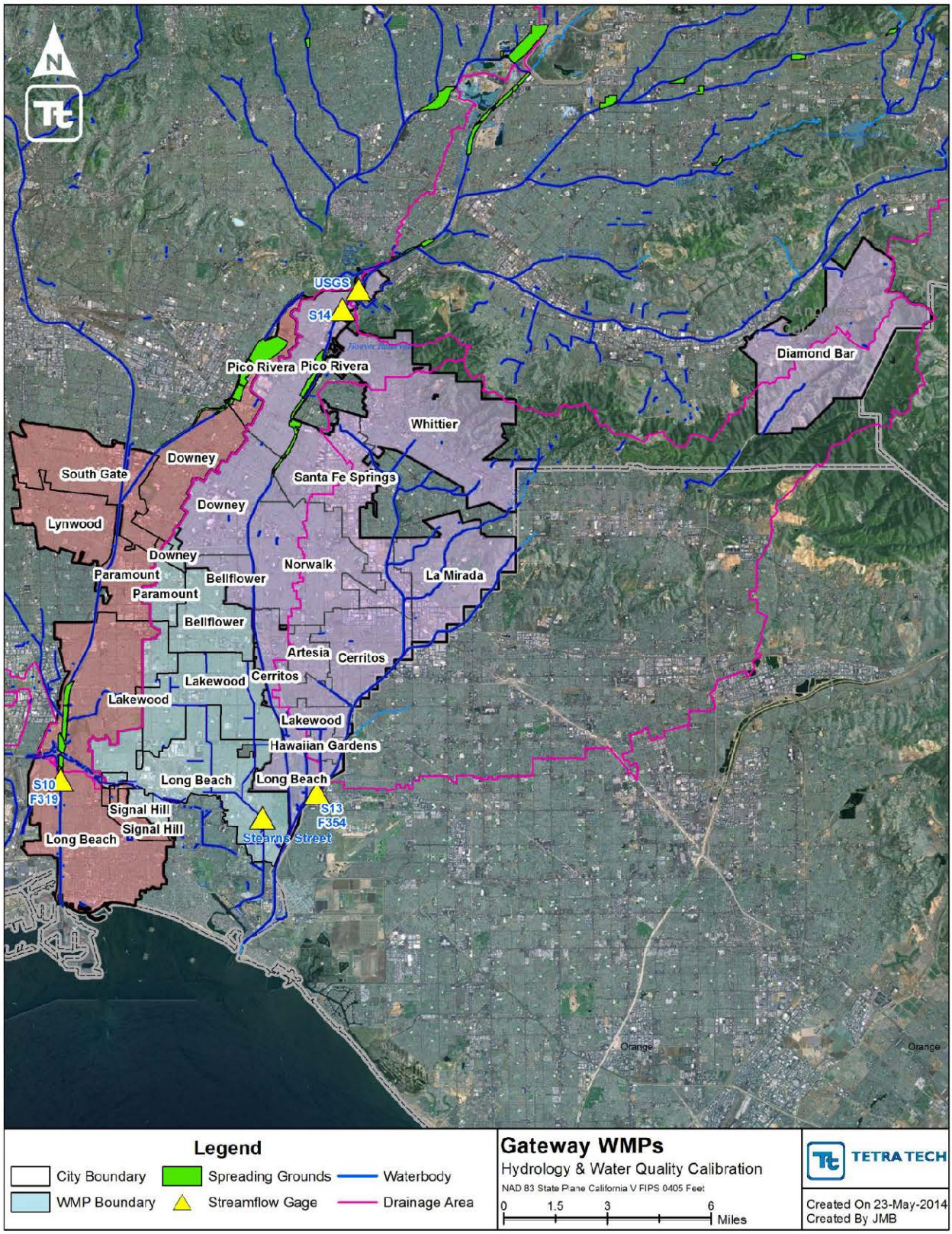


Figure 4-1. WMP groups hydrology and water quality calibration sites.

To demonstrate the ability to predict the effect of watershed processes and management actions, model calibration and validation are necessary and critical steps in any model application. Acceptable model calibration criteria for

benchmarking an RAA were developed by the Regional Board and are listed below in Table 4-1 (LARWQCB 2014). The objectives of establishing model assessment criteria are to ensure the calibrated model reflects all the model conditions and properly utilizes the available modeling parameters, thus yielding meaningful results. The lower bound of "Fair" level of agreement listed in Table 4-1 is considered a target tolerance for the model calibration process.

Table 4-1. Model assessment criteria from the RAA Guidelines

Constituent Group	Percent Difference Between Modeled and Observed		
	Very Good	Good	Fair
Hydrology / Flow	0 – 10	>10 – 15	>15 – 25
Sediment	0 – 20	>20 – 30	>30 – 40
Water Quality	0 – 15	>15 – 25	>25 – 35
Pesticides / Toxics	0 – 20	>20 – 30	>30 – 40

4.1.1. Hydrology Calibration

Table 4-2 and Table 4-3 present the hydrology calibration assessment for the Lower Los Angeles River and Lower San Gabriel River gages, respectively. Nash-Sutcliffle efficiency is a correlation coefficient commonly used in hydrological modeling to measure how well a model predicts temporal variation. A value of 1.0 means a perfect match between modeled and observed. A value of 0 means that the computed mean of observed data is as good a predictor as the model. A negative value means that the data-mean is a better predictor than the model. Because the Regional Board guidance only required annual average flow volume metric, evaluating Nash-Sutcliffe helped to demonstrate that the model also performed well at predicting *intra-annual* flow variablilty.

Table 4-2. Summary of model hydrology calibration performance for Lower Los Angeles River

Water Quality Parameter	Model Period	Hydrology Parameter	Modeled vs. Observed Volume (% Error)	Regional Board Guidance Assessment
In-stream flow at Los Angeles River below Wardlow Road (LA DPW F319)	10/1/2002 – 9/30/2011	Flow Volume	8.72	Very Good
		Nash-Sutcliffe	0.680	n/a

Table 4-3. Summary of model hydrology calibration performance for Lower San Gabriel River

Water Quality Parameter	Model Period	Hydrology Parameter	Modeled vs. Observed Volume (% Error)	Regional Board Guidance Assessment
In-stream flow at SAN GABRIEL R AB WHITTIER NARROWS DAM CA (USGS 1108702)	10/1/2001 – 9/30/2011	Flow Volume	-3.31	Very Good
		Nash-Sutcliffe	0.64	n/a
Coyote Creek near Spring Street (LA DPW F354)	10/1/2003 – 9/30/2011	Flow Volume	-6.17	Very Good
		Nash-Sutcliffe	0.62	n/a

4.1.2. Water Quality Calibration

Water quality calibration for the LLAR, LCC, and LSGR incorporated sampling from LA County mass emission stations at S10 (LA River), Streams Street (LCC), and S13 and S14 along Coyote Creek and the San Gabriel River, respectively. The updated observed concentration data collected at these sites were used to refine the calibration and benchmark model performance. Daily observed loads were calculated by multiplying observed concentration and daily observed flow. Daily loads were estimated for LCC using simulated flows due to the lack of observed data. The percent error between this daily observed load and the daily modeled load was then calculated for each constituent. The results of this evaluation at the two gages are presented in Table 4-4 through Table 4-7.

Table 4-4. Summary of model performance by constituent at the Los Angeles River (S10) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	91	-6.8	Very Good
Total Copper	58	-3.4	Very Good
Total Zinc	58	-18.1	Good
Total Lead	52	-0.1	Very Good
Fecal Coliform	57	-5.1	Very Good
Total Nitrogen	58	-4.0	Very Good
Total Phosphorous	57	6.9	Very Good

Table 4-5. Summary of model performance by constituent at Los Cerritos Channel (Stearns St.) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	85	2.7	Very Good
Total Copper	57	-2.1	Very Good
Total Zinc	56	1.5	Very Good
Total Lead	57	2.2	Very Good
Fecal Coliform	55	1.0	Very Good
Total Nitrogen	56	17.5	Good
Total Phosphorous	56	-0.4	Very Good

Table 4-6. Summary of model performance by constituent at the San Gabriel River (S14) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	45	8.57	Very Good
Total Copper	42	-9	Very Good
Total Zinc	44	16.1	Very Good
Total Lead	44	-3.97	Very Good
Fecal Coliform	43	1.85	Very Good
Total Nitrogen	*Not evaluated at this location*		
Total Phosphorous	44	-2.27	Very Good

Table 4-7. Summary of model performance by constituent at the Coyote Creek (S13) monitoring location

Water Quality Parameter	Sample Count	Modeled vs. Observed Load (% Error)	Regional Board Guidance Assessment
Total Sediment	42	1.28	Very Good
Total Copper	27	-28.9	Fair
Total Zinc	27	-32.44	Fair
Total Lead	25	-1.58	Very Good
Fecal Coliform	24	-34.48	Fair
Total Nitrogen	*Not evaluated at this location*		
Total Phosphorous			

Two fecal coliform samples were removed from the observed dataset at the San Gabriel River S14 mass emission station prior to performing the load calculation. These two samples appear to be outliers in the dataset with concentration values 10-100x greater than the remaining samples. These observations occurred on 10/17/2005 and 10/13/2009.

For pollutants not explicitly represented in the WMMS LSPC model, and for dry weather analysis, 90th percentile concentrations were calculated based on observed monitoring data at the LACDPW mass emission sites. The 90th percentile concentration was used for compliance with the Regional Board RAA guidelines (LARWQCB 2014). A summary of the 90th percentile concentrations for each constituent and waterbody are presented below in Table 4-8. For subsequent load reduction analyses, these concentrations were assumed for all wet or dry weather conditions they were assigned to represent existing conditions within their respective watersheds.

Table 4-8. 90th percentile concentrations assumed for non-modeled pollutants

Waterbody	Pollutant	Wet Weather	Dry Weather	90th Percentile Concentration	Units
Los Angeles River (S10)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Cadmium	●		4.8	ug/l
	Copper		●	25.68	ug/l
	Lead		●	3.43	ug/l
	E. coli		●	19,600	MPN/100 mL
Los Cerritos Channel (Stearns)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Copper		●	25.4	ug/l
	E. coli		●	14,200	MPN/100 mL
San Gabriel River (S14)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Copper		●	29.89	ug/l
	Selenium		●	4.77	ug/l
	E. coli		●	2,190	MPN/100 mL
Coyote Creek (S13)	DDT	●		0.005[1]	ug/L
	PCBs	●		0.0325[1]	ug/L
	PAHs	●		0.835[1]	ug/L
	Copper		●	28.54	ug/l
	E. coli		●	11,500	MPN/100 mL

[1] DDT, PCBs and PAHs were below MDL, so concentrations were assumed half MDL.

4.2. Current Best Management Practices/Minimum Control Measures

It is important to note the model calibration incorporates local stormwater BMPs implemented through late 2012 into the baseline condition. The only BMPs/control devices that were explicitly incorporated into the baseline model were the Dominguez Gap basins. All other BMPs, which individually were assumed to have a small effect on water quality at the watershed scale, are implicitly represented in the baseline condition. BMPs implemented in 2013 can be categorized as WMP implementation measures and their volume/load reductions are a component of the pollutant reduction plan for attaining interim and final milestones.

5. Estimated Required Pollutant Load Reductions

This section provides a description of the process for identifying critical conditions and calculating required load reductions to meet interim and final limitations.

5.1. Selected Average (Interim) and Critical (Final) Conditions

The RAA Guidelines specify that average conditions shall be used to establish load reductions for interim milestones and critical conditions shall be used to establish load reductions for final limits. In addition, the Permits provide two pathways for addressing WQ Priorities (see Figure 5-1):

- Volume-based: Retain the standard runoff volume from the 85th percentile, 24-hour storm
- Load-based: Achieve the necessary pollutant load reductions to attain Permit limits

Both types of numeric goals were evaluated as part of this RAA.

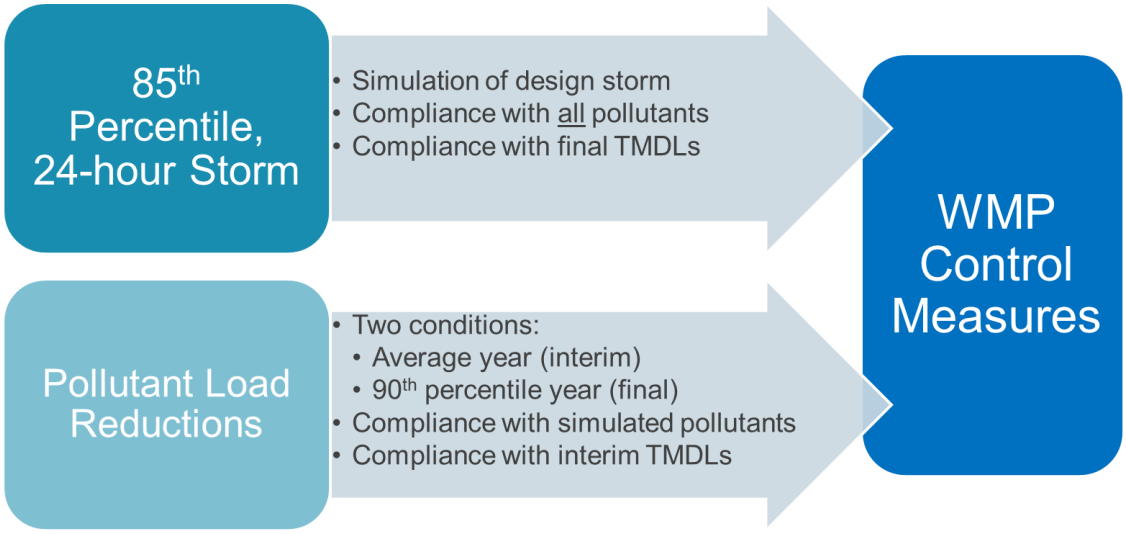


Figure 5-1. Two Types of Numeric Goals and WMP Compliance Paths according to the Permits

5.2. Representative Conditions for Wet Weather

Two approaches were considered and ultimately used in the RAA to represent wet weather critical conditions: the 90th percentile wet year and 85th percentile, 24-hour (design) storm, as described in the following subsections.

5.2.1. Average and 90th Percentile Wet Years

This RAA is based on continuous simulation, and a "representative" year-long time period was selected to represent average and critical conditions, which allows the modeling to capture the variability of rainfall and storm sizes/conditions. For LLAR, LCC, and LSGR, WY2008 was selected as the representative year for average conditions and WY2003 was selected as the representative year for the 90th percentile critical wet conditions.

To select these average and critical years for the RAA, the following steps were taken:

1. **Calculated key rainfall metrics for the last 25-years:** the average and critical years were identified by aggregating data from available rain gages across the entire Los Angeles River and San Gabriel River watersheds (LCC is in between, so the analysis for LLAR and LSGR also applies to LLC). For

comparison, other regional watersheds were also analyzed and presented. The two key metrics evaluated were: (1) total annual rainfall, and (2) average rainfall per wet day (with wet days defined as days with rainfall totals greater than 0.1 inches). The first is clearly an indicator of volume, while the second is an indicator of rainfall intensity. To evaluate long-term conditions, the analysis covered 25 water years (WY) from 1987 through 2011—the total rainfall for each precipitation gage was area-weighted and aggregated into annual totals by water year (i.e. previous October through current September).

2. **Selected years from the most recent 10-years that are most representative of average and 90th percentile**: per the RAA Guidelines, the most recent 10-year period represented in the available data were used to develop the RAA. Table 5-1 and Table 5-2 show average rainfall volumes and intensities (inches per wet day), respectively, for the most recent 10 years compared against the entire 25-years. Both the average and 90th percentile values were compared across the 10- and 25-year records. For the San Gabriel River, 2007-08 is a representative average year based on both the rainfall volume (Table 5-1) and intensity (Table 5-2) metrics. Because BMP performance is typically intensity-dependent, average rainfall per wet day (Table 5-2) was selected as a better metric for use in determining the 90th percentile than annual average rainfall (Table 5-1), which led to selection of 2002-03 as the critical year.

It should be noted that wet weather conditions were also reflective on the definition of dry/wet days. As described in Section 5, for analysis of non-bacteria pollutants (including the limiting pollutant zinc) days with greater than 90th percentile daily average flow were flagged as "wet," which aligns with the critical condition used for the LAR and LSGR metals TMDLs.

5.2.2. 85th Percentile, 24-hour Storm

The design storm is identified in the RAA Guidelines as an acceptable critical condition, and capture of design storm volumes by BMPs is a specified compliance metric in the Permits for TMDLs. The design storm was evaluated and used as a wet weather critical condition for the RAA. As described above, the design storm is a volume-based standard. Each subwatershed within each WMP area has a unique 85th percentile runoff volume, due to varying rainfall amounts and land characteristics (imperviousness, soils, slope, and the like). The rainfall depths associated with the 85th percentile, 24-hour storm are shown in Figure 5-2, based on rolling 24-hour intervals for the 25-year period between October 1, 1987 and September 30, 2011. Within the WMP area, the 85th percentile rainfall depth values range between 0.72 and 1.08 inches.

To determine the "standard volume" associated the design storm, initial conditions were set in LSPC to reflect representative conditions at the start of the simulation, along with regionally derived infiltration rates, and 85th percentile rainfall depths were used as rainfall boundary conditions. At each location the storm distribution presented in Figure 5-3 was used to temporally distribute the 24-hour rainfall volumes (LACDPW 2006). The model was then run to predict the associated runoff volumes for each subwatershed in the WMP area. Those runoff volumes represent the volumes that would need to be retained in order to attain the numeric goals associated with the 85th percentile, 24-hour storm.

Shown in Figure 5-4 are the rainfall depths and runoff depths (runoff volume divided by subwatershed area) associated with the design storm for each subwatershed in the WMP areas. About 50 percent of the subwatersheds in all three WMP areas experiences 0.4 inches or more of runoff under the 85th percentile, 24-hour storm, while about 10 percent of the area experiences about 0.55 inches or more of runoff. Figure 5-5 summarizes the total design storm volumes (in acre-feet) for each jurisdiction. The runoff depths for each subwatershed in the WMP area are graphically shown in Figure 5-6, Figure 5-7, and Figure 5-8.

Table 5-1. Average Rainfall Depths (Water Years 2002–2011 vs. 25-year Average and 90th Percentile)

Year	Average Rainfall Totals (in./year)				
	Ballona Creek	Dominguez Channel	Malibu Creek	San Gabriel River	Los Angeles River
2001-02	25.4	19.1	28.1	30.6	30.5
2002-03	17.1	13.9	20.8	23	20.4
2003-04	10.2	8.1	9.2	13.7	11.2
2004-05	39.3	28.4	42.6	49.6	46.7
2005-06	14.1	9.8	16.9	17.9	17.5
2006-07	4.3	3.1	6.8	6.4	5.8
2007-08	13.2	11.9	18.6	19.4	17.5
2008-09	9.6	8.5	12.3	14.6	12.5
2009-10	16.8	14.9	20.3	24.1	20.5
2010-11	21.2	18.5	25.3	28.5	25.7
Avg. (1987-2011)	15.9	12.5	18.4	20.7	19.2
90th %ile (1987-2011)	30.8	22.9	34.7	37.8	36.9

Red Box: WMP Watersheds. Blue highlighted cells are the two years in each basin with the smallest difference from the 25-year average. Orange cells have the smallest difference from the 90th percentile of the 25-year record.

Table 5-2. Average Rainfall Intensity (Water Years 2002–2011 vs. 25-year Average and 90th Percentile)

Year	Average Rainfall Per Wet Day (in./wet day)				
	Ballona Creek	Dominguez Channel	Malibu Creek	San Gabriel River	Los Angeles River
2001-02	0.36	0.32	0.41	0.42	0.36
2002-03	0.79	0.66	0.88	0.92	0.84
2003-04	0.61	0.48	0.61	0.66	0.58
2004-05	0.98	0.69	1.03	1.07	1.03
2005-06	0.53	0.41	0.61	0.64	0.61
2006-07	0.31	0.27	0.39	0.41	0.37
2007-08	0.56	0.52	0.68	0.76	0.71
2008-09	0.49	0.48	0.56	0.65	0.57
2009-10	0.64	0.6	0.71	0.82	0.72
2010-11	0.62	0.58	0.73	0.76	0.7
Avg. (1987-2011)	0.59	0.52	0.67	0.72	0.66
90th %ile (1987-2011)	0.78	0.66	0.91	0.97	0.89

Red Box: WMP Watersheds. Blue highlighted cells are the two years in each basin with the smallest difference from the 25-year average. Orange cells have the smallest difference from the 90th percentile of the 25-year record.

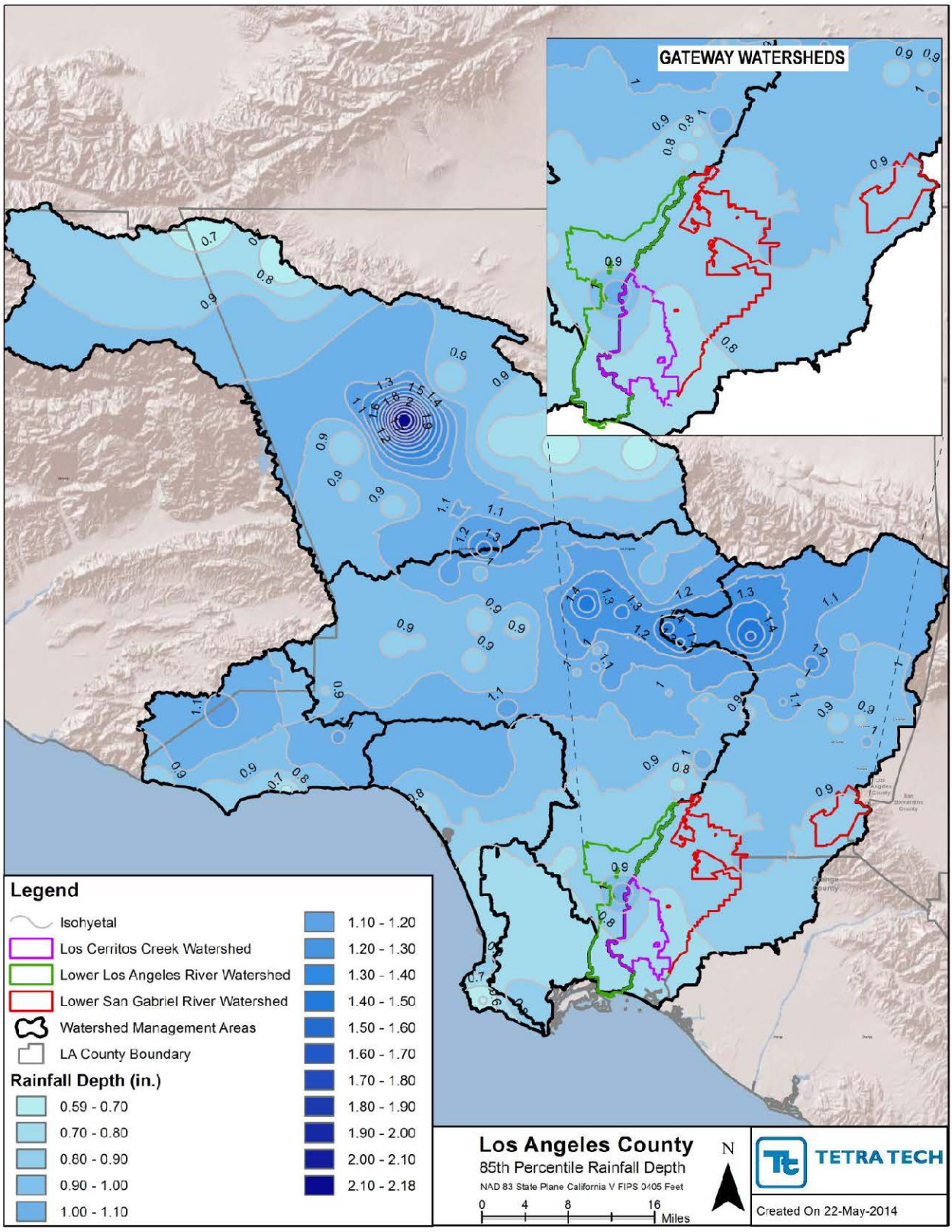


Figure 5-2. Rainfall depths associated with the 85th percentile, 24-hour storm.

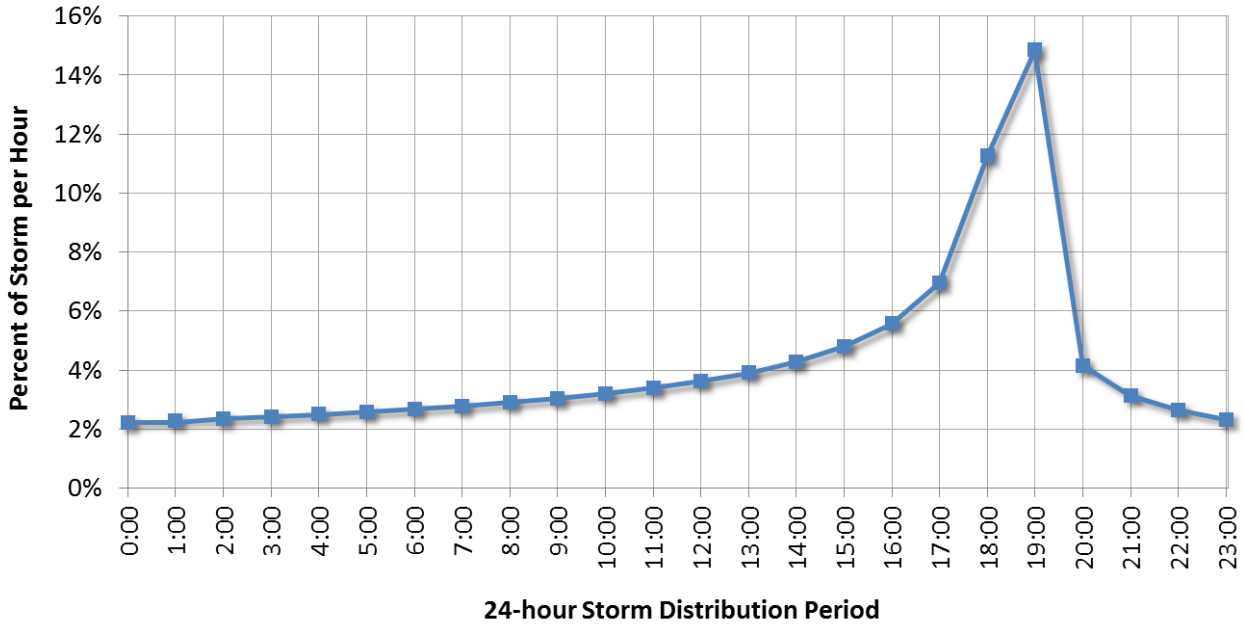


Figure 5-3. Temporal Distribution for 85th Percentile 24-hour Storm for LSPC Simulation.

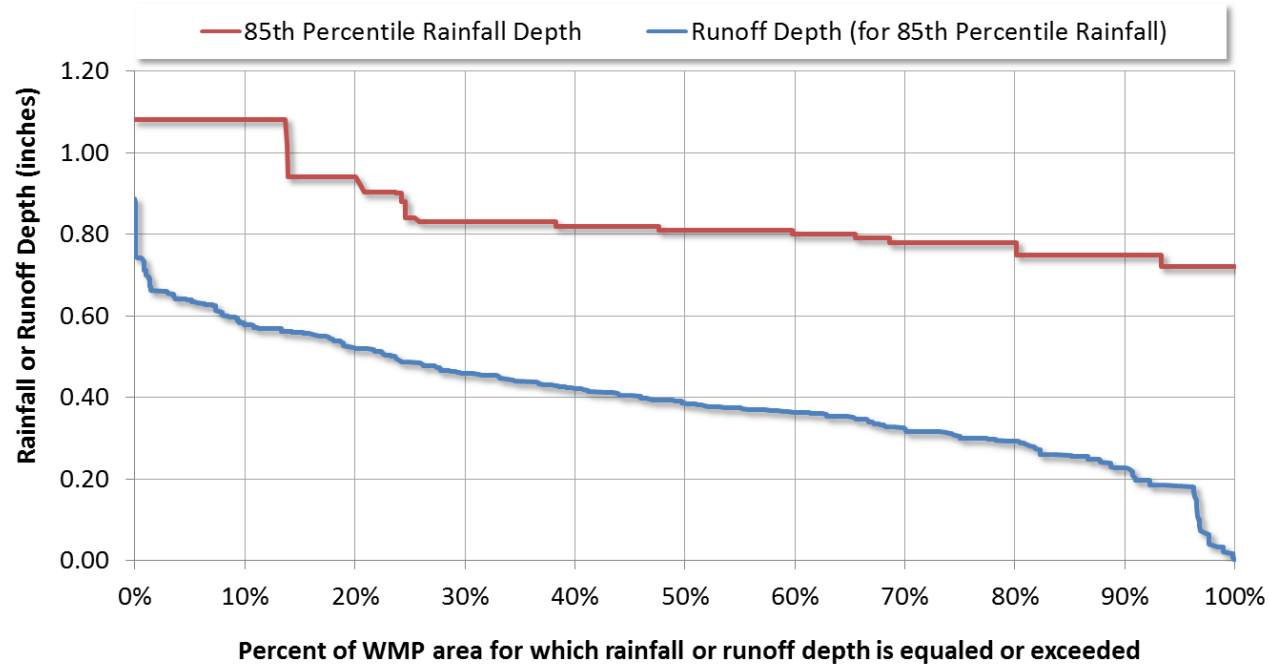


Figure 5-4. Rainfall and Runoff Depths Associated with 85th Percentile Rainfall in the WMP subwatersheds.

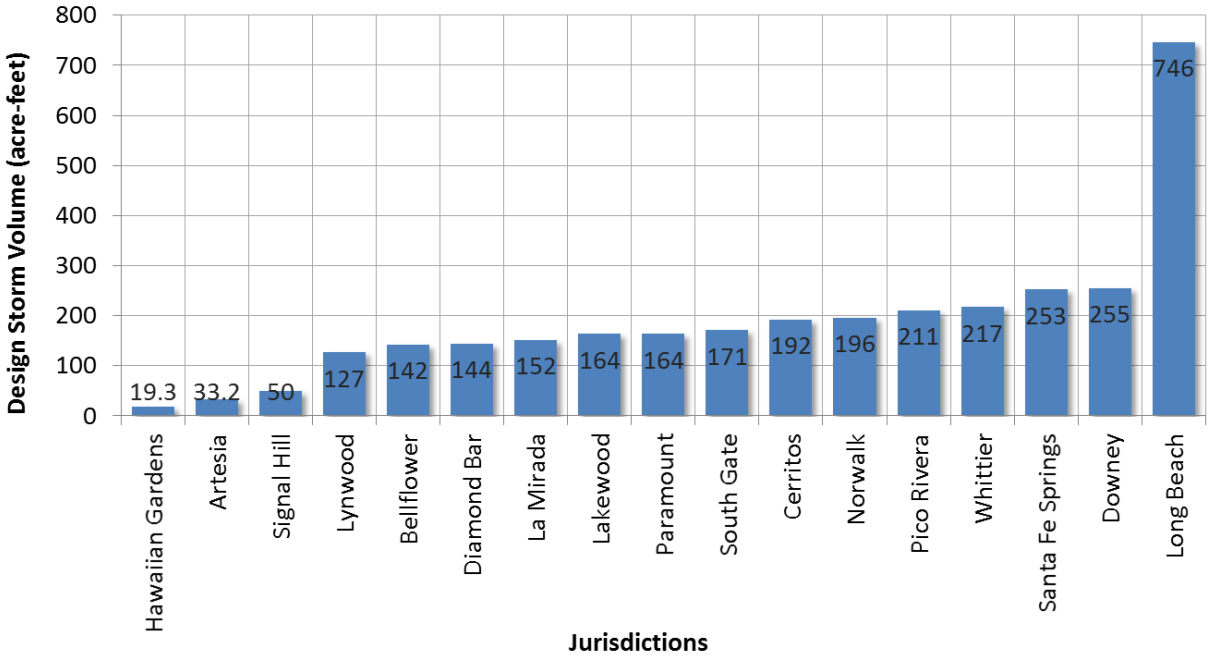


Figure 5-5. Runoff Volume Associated with the 85th Percentile, 24-hour Storm (by jurisdiction).

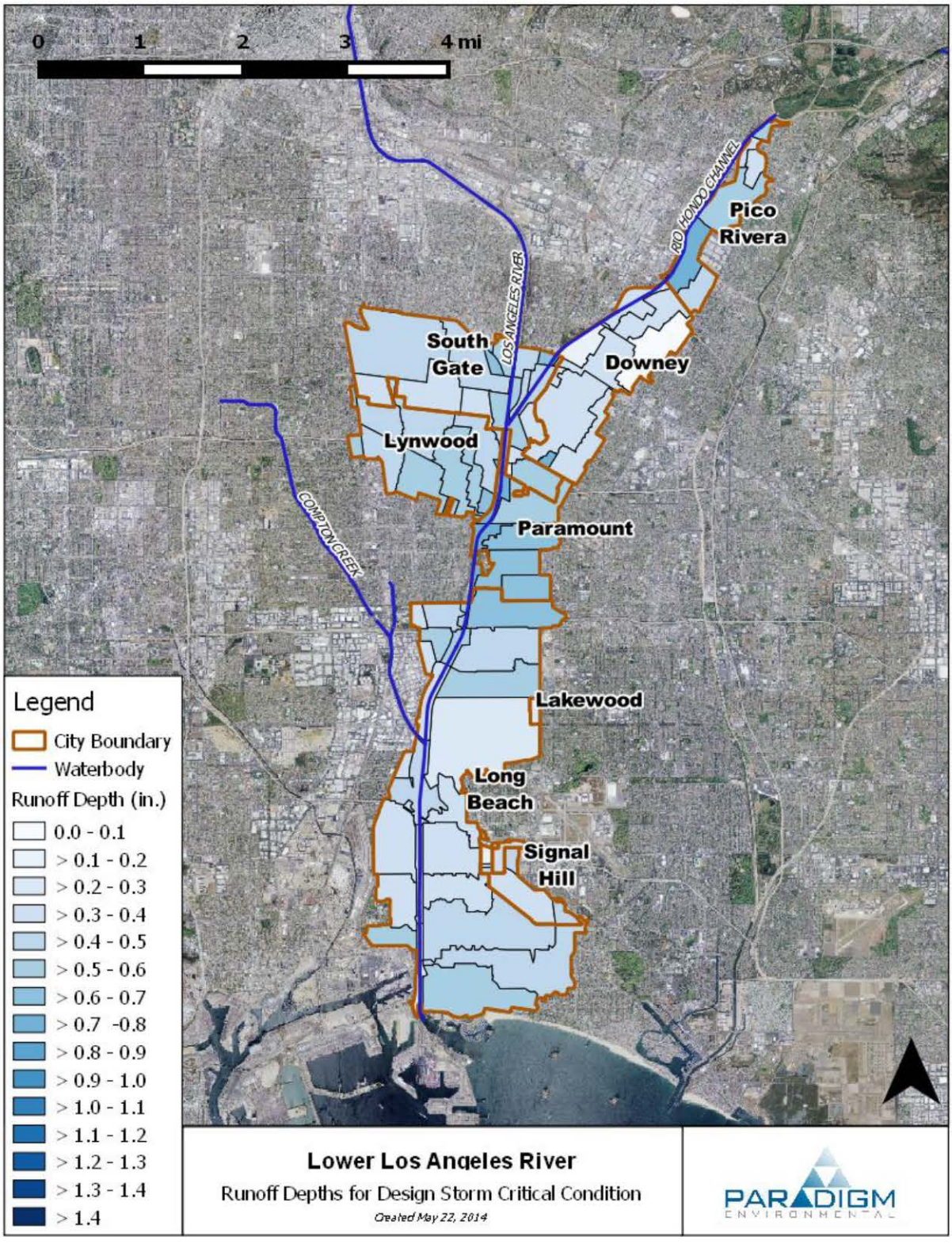


Figure 5-6. Runoff Associated with the 85th Percentile, 24-hour Storm for Lower Los Angeles River.

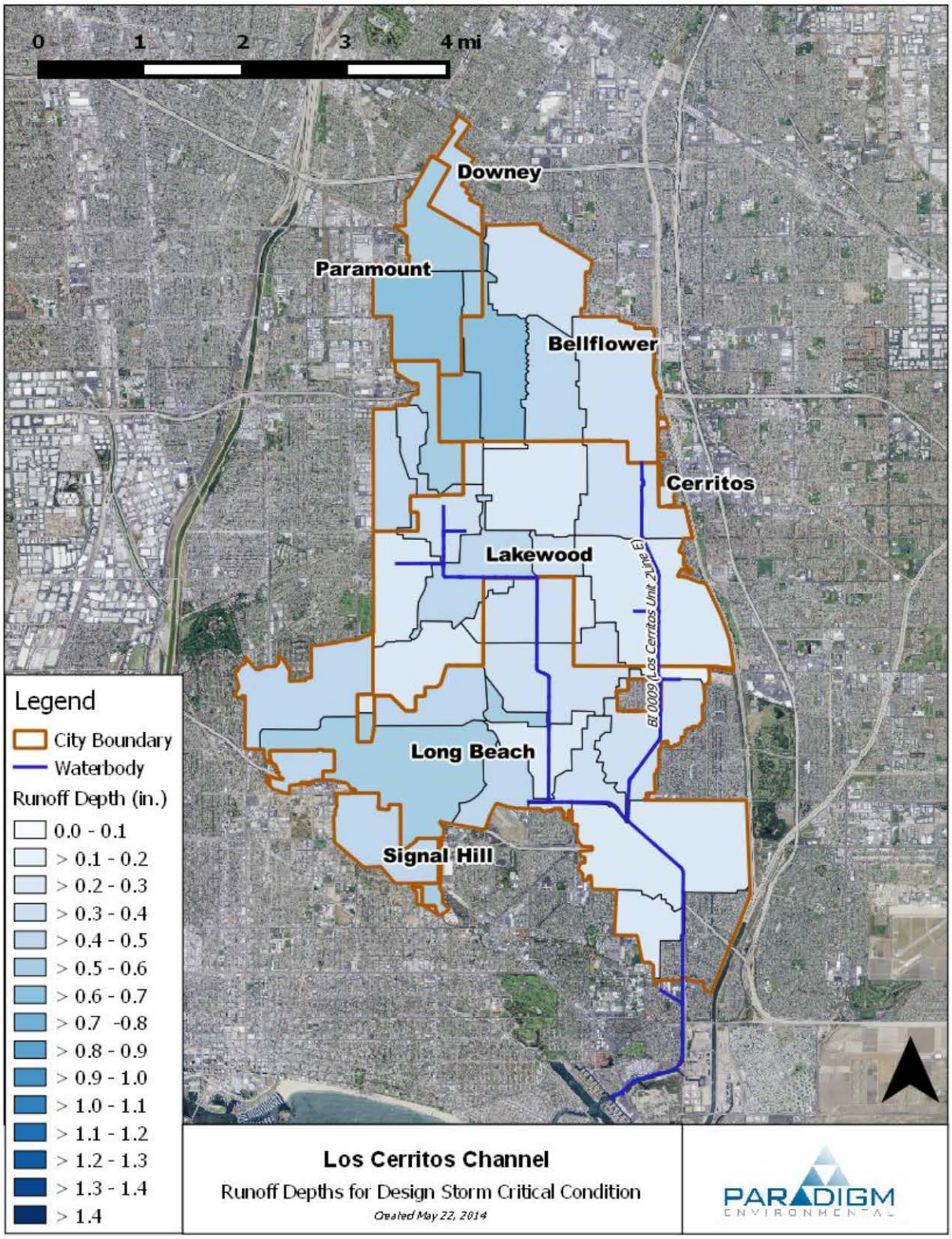


Figure 5-7. Runoff Associated with the 85th Percentile, 24-hour Storm for Los Cerritos Channel.

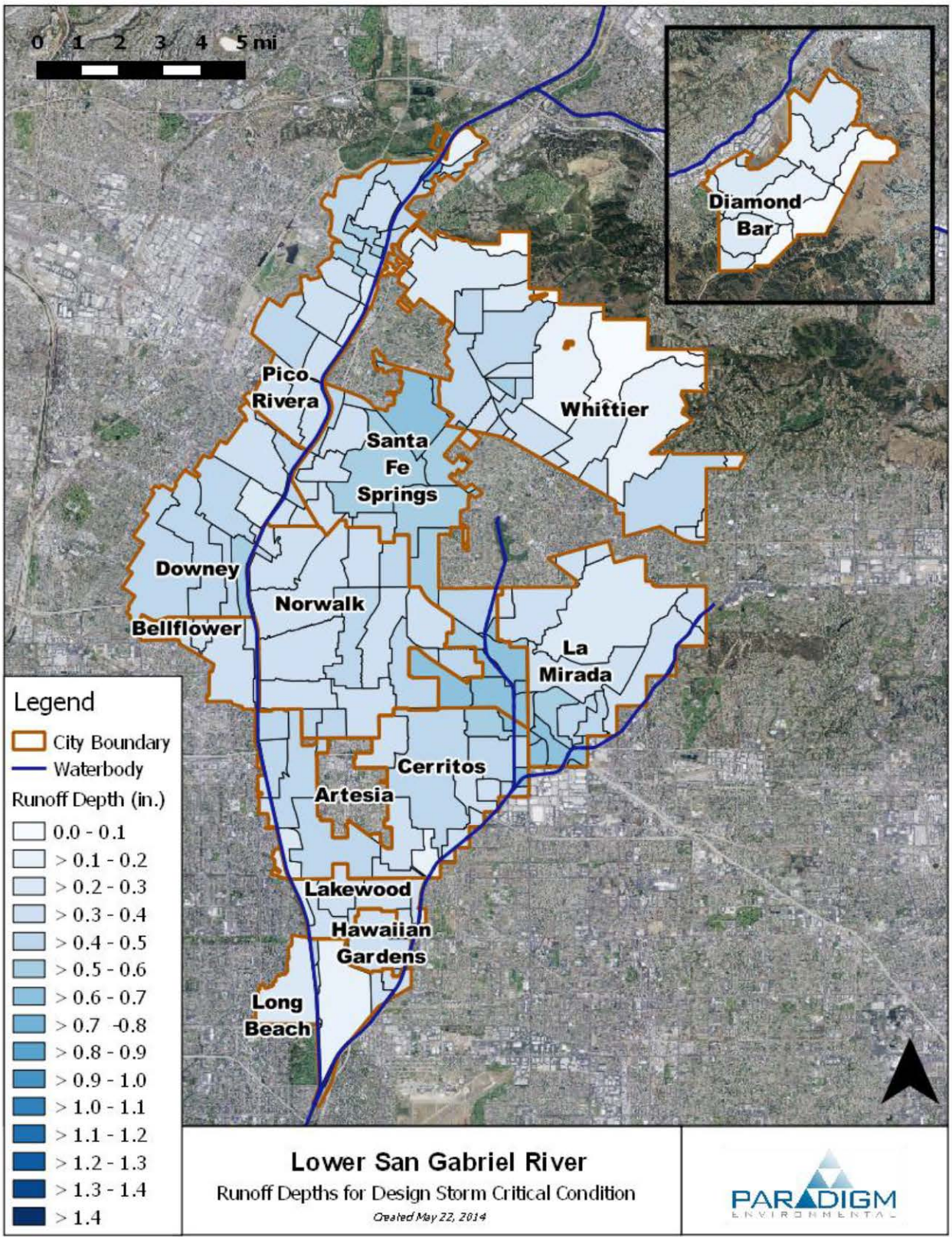


Figure 5-8. Runoff Associated with the 85th Percentile, 24-hour Storm for Lower San Gabriel River.

5.2.3. Representative Conditions for Dry Weather

Although clearly defined definitions exist for wet periods, definitions for dry periods are less clearly defined. Wet weather periods are either defined in terms of rainfall or instream flow. For bacteria, a wet day is one with a rainfall total greater than 0.1 inches plus the three subsequent days, while metals criteria define wet days as those with instream flow above the 90th percentile. One seemingly intuitive way of defining a dry period is simply to use the "non-wet" days represented as the inverse of wet days. However, summary of model results indicate some residual influence of wet weather among the "non-wet" days. This presents some challenges for estimating loads and evaluating dry weather compliance because BMP planning would be better served by choosing design conditions that are more influenced by natural background baseflow and/or anthropogenic activities such as point source discharges or dry weather runoff from irrigation (instead of post-rain event interflow).

The RAA Guidelines recommend using the most recent 10 years of data for modeling scenarios to ensure that the plans are based on a representative range of wet and dry conditions. Regional precipitation and instream flow patterns are highly variable; therefore, a representative dry period is one that consistently represents minimal influence to wet weather conditions. To identify a representative dry period, the analysis covered 25 WYs from 1987 through 2011. The following steps were taken:

1. The total rainfall for each precipitation gage in the study area was summarized and classified into wet and non-wet periods according to the bacteria criteria definition for wet weather (i.e. days with rainfall > 0.1 inches plus the three subsequent days).
2. Dry periods were evaluated on a monthly time scale. Table 5-3 shows the average number of consecutive 30-day dry periods, counted by month of the associated mid-interval date, for each of the rainfall gages within the three WMP areas over the 25 years of rainfall evaluated. The color-ramp indicates relative dryness, with red being driest. Table 5-3 indicates that on average, the months of June, July, and August are the driest months in the year, averaging 24-30 consecutive dry intervals. Note that because this table counts mid-interval dates by month, values approaching 30 actually indicate continuous dry intervals approaching 60 days (15 days on either side of the 30 day interval).
3. Select periods within the average and critical year were identified for dry weather simulations. The areal coverage or non-wet intervals in the two selected representative years (2008 and 2003) were compared against the 10-year period (2001-2011) and the long-term 25-year period (1998-2011). Figure 5-9, Figure 5-10, and Figure 5-11 show the selected representative dry period against summaries of non-wet weather conditions in the LLAR, LCC, and LSGR WMP areas, respectively. Within the two selected years, the 45-day period between 8/17 and 9/30 was found to be the most representative of dry weather conditions because (1) no rainfall occurred at any of the gages throughout all three WMP areas, (2) it was during a time of the year that was historically shown to experience the least amount of spatially-weighted rainfall in a year, and (3) it was late in the summer following an extended period of no rainfall for both 2003 and 2008.

The identified periods between 8/17 and 9/20 during the average and critical years were used for subsequent dry weather simulations for the dry weather component of the RAA.

Table 5-3. Consecutive 30-day Dry Periods per month by WMP and rainfall gage (10/1/1987 – 9/30/2011)

WMP	StaID	Average Number of Consecutive 30-Day Dry Intervals Per Month (10/1/1987 – 9/30/2011)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Los Cerritos Channel	D1254	2.2	1.9	6.2	11.9	22.3	25.2	28.9	28.9	21.4	12.7	7.8	4.4
	D1255	2.8	1.8	4.4	8.8	20.3	25.1	29.7	29.8	21.8	13.0	7.3	2.9
	D225	3.0	2.3	6.3	10.5	20.6	24.7	28.8	29.5	21.4	13.1	9.1	3.6
	D388	2.1	1.3	3.8	8.5	18.6	24.0	27.6	29.2	21.0	12.3	5.1	3.2
	D415	1.9	1.2	5.7	9.6	19.0	24.0	28.1	29.1	23.4	13.1	8.9	3.7
Lower Los Angeles River	D1113	4.2	2.5	8.3	9.8	19.5	24.4	28.1	27.8	23.6	13.7	8.8	4.5
	D1114	1.6	1.1	4.0	8.9	19.6	25.1	29.7	29.6	20.8	12.3	5.5	3.0
	D1256	2.1	1.4	4.8	10.4	20.5	24.6	28.8	29.8	23.5	14.2	6.2	3.1
	D291	3.3	1.1	5.0	8.8	19.4	24.4	28.7	28.4	21.9	11.6	4.6	3.5
	D388	2.1	1.3	3.8	8.5	18.6	24.0	27.6	29.2	21.0	12.3	5.1	3.2
	D415	1.9	1.2	5.7	9.6	19.0	24.0	28.1	29.1	23.4	13.1	8.9	3.7
Lower San Gabriel River	D106	4.2	0.6	6.0	10.9	19.7	24.6	28.6	29.0	23.9	14.0	8.2	4.0
	D1088	2.2	1.0	3.8	9.0	17.6	24.1	28.5	29.0	20.9	12.6	5.9	2.7
	D1095	2.4	0.5	4.4	10.0	19.2	24.6	28.6	29.1	21.2	14.2	7.1	4.2
	D1114	1.6	1.1	4.0	8.9	19.6	25.1	29.7	29.6	20.8	12.3	5.5	3.0
	D1254	2.2	1.9	6.2	11.9	22.3	25.2	28.9	28.9	21.4	12.7	7.8	4.4
	D1255	2.8	1.8	4.4	8.8	20.3	25.1	29.7	29.8	21.8	13.0	7.3	2.9
	D1256	2.1	1.4	4.8	10.4	20.5	24.6	28.8	29.8	23.5	14.2	6.2	3.1
	D1257	2.0	0.5	4.5	10.6	18.9	24.4	28.6	29.8	21.2	10.3	5.7	3.0
	D1271	1.8	1.6	3.9	9.4	18.1	24.4	28.6	29.7	21.6	11.7	7.3	3.4
	D156	3.0	1.5	5.2	10.1	19.2	24.6	28.5	29.3	21.0	13.4	7.2	5.0
	D17	1.7	1.2	5.2	9.1	17.5	22.4	28.6	29.0	22.6	11.3	5.2	3.7
	D225	3.0	2.3	6.3	10.5	20.6	24.7	28.8	29.5	21.4	13.1	9.1	3.6
	D269	1.8	0.5	4.2	8.1	18.0	24.2	28.6	29.1	22.2	13.0	6.7	3.2

Legend: Wet → Dry

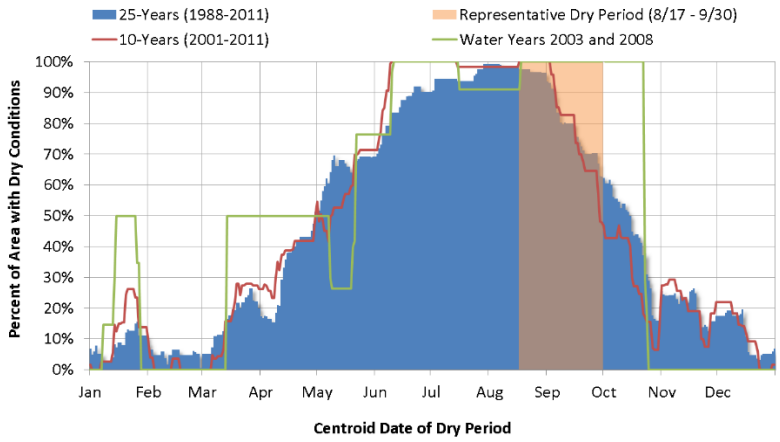


Figure 5-9. Spatiotemporal summary of non-wet weather conditions in the Lower Los Angeles River WMP area.

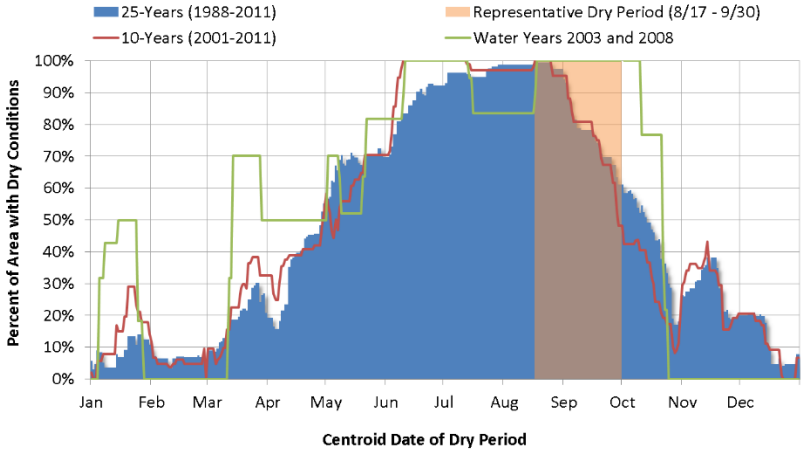


Figure 5-10. Analysis of summary of non-wet weather conditions in the Los Cerritos Channel WMP area.

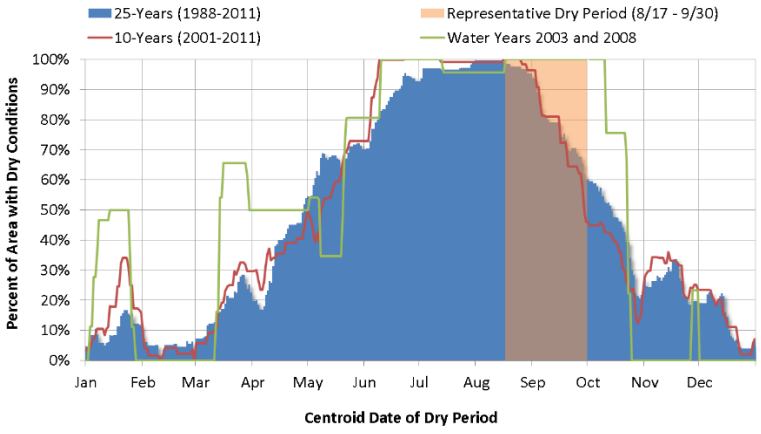


Figure 5-11. Spatiotemporal summary of non-wet weather conditions in the Lower San Gabriel River WMP area.

5.3. Calculated Required Pollutant Reductions to Achieve Final Limits

Using the average storm year (2007-08) and 90th percentile storm year (2002-03), required pollutant reductions were calculated for attainment of interim and final limitations, respectively, applicable to each WMP area. Per the RAA Guidelines, the percent reduction used to determine the control measures necessary to attain interim milestones shall be based on the average year, while the control measures for attainment of the final limits are based on the 90th percentile year.

Required load reductions were evaluated at RAA Assessment Points located at the bottom-most discharge from each WMP areas (shown in Figure 3-2 through Figure 3-4). The RAA Assessment Points represent locations where the collective discharge from each jurisdiction with each WMP area can be assessed to contribute to pollutant loads to the receiving waters. Pollutant loads outside of the WMP areas are not considered in this loading analysis at the RAA Assessment Points, although in reality other loads exist. However, transport of pollutant loads from individual jurisdictions within the WMP areas are considered, including the effect of LACFCD infrastructure and other hydraulic features that can impede flows and associated pollutant loads to the location of the RAA Assessment Points. The result is an accounting system that provides reasonable tracking and estimation of required load reductions throughout each individual WMP area so that meaningful goals can be set for BMP implementation planning.

Applicable targets for wet and dry conditions for Category 1 WQ Priorities (corresponding to the TMDLs within each watershed) are listed in Table 5-4 and Table 5-5, respectively. These targets were used to establish the daily "exceedance load" and daily "allowable load". The differences in these loads, as predicted by LSPC, were tracked across the average year and 90th percentile year and used to calculate the required pollutant reduction. While Category 1 WQ Priorities were emphasized, targets were also applied for Category 2 and Category 3 WQ Priorities. In particular, to provide a comprehensive WMP planning approach, copper, lead, zinc and *E. coli* were assessed for all RAA assessment points (even if a TMDL is not applicable).

For bacteria targets, it should be noted that Allowable Exceedance Days and high flow suspension (HFS) days were incorporated (if applicable) into the percent reduction calculation. The approach of the LA River Bacteria TMDL was used to align Exceedance Days and HFS days. The HFS applies to LLAR and LSGR but not LCC (and thus HFS days were not incorporated into the required reduction calculation for LCC). For LSGR and LCC, a bacteria TMDL has not been adopted but the RAA Guidelines state that targets and critical conditions from other TMDLs in the region should be utilized. If the Allowable Exceedance Days were removed from the percent reduction calculations for LSGR and LCC, the required reductions would increase.

Table 5-4. Applicable wet weather TMDL targets for Category 1 WQ Priorities

WMP Area	Waterbody	Pollutant	Target	Source
LLAR	LAR Reach 1 (freshwater)	Cd kg/d	$2.8x10^{-9}$ X daily storm volume (L) - 1.8	WQBEL
	LAR Reach 1 (freshwater)	Cu kg/d	$1.5x10^{-8}$ X daily storm volume (L) - 9.5	WQBEL
	LAR Reach 1 (freshwater)	Pb kg/d	$5.6x10^{-8}$ X daily storm volume (L) - 3.85	WQBEL
	LAR Reach 1 (freshwater)	Zn kg/d	$1.4x10^{-7}$ X daily storm volume (L) - 83	WQBEL
	All LLAR	DDT ug/kg TSS	1.58	Harbor Toxics TMDL
	All LLAR	PCBs ug/kg TSS	22.7	Harbor Toxics TMDL
	All LLAR	PAHs ug/kg TSS	4,022	Harbor Toxics TMDL
	LAR Reach 1 (freshwater)	*E-coli* MPN/100mL	235 (exceedances allowed during HFS days and 10 exceedance days)	WQBEL

WMP Area	Waterbody	Pollutant	Target	Source
LCC	All LCC	Cu g/d	$4.709X10^{-6}$ X daily storm volume (L)	WQBEL
	All LCC	Pb g/d	$26.852X10^{-6}$ X daily storm volume (L)	WQBEL
	All LCC	Zn g/d	$46.027X10^{-6}$ X daily storm volume (L)	WQBEL
	All LCC	DDT ug/kg TSS	1.58	Harbor Toxics TMDL
	All LCC	PCBs ug/kg TSS	22.7	Harbor Toxics TMDL
	All LCC	PAHs ug/kg TSS	4,022	Harbor Toxics TMDL
LSGR	SG Reach 2	Pb ug/L	81.34	WQBEL
	Coyote Cr.	Cu ug/L	24.71	WQBEL
	Coyote Cr.	Pb ug/L	96.99	WQBEL
	Coyote Cr.	Zn ug/L	144.57	WQBEL
	SG Reach 1 & Coyote Cr.	DDT ug/kg TSS	1.58	Harbor Toxics TMDL
	SG Reach 1 & Coyote Cr.	PCBs ug/kg TSS	22.7	Harbor Toxics TMDL
	SG Reach 1 & Coyote Cr.	PAHs ug/kg TSS	4,022	Harbor Toxics TMDL

Table 5-5. Applicable dry weather TMDL targets for Category 1 WQ Priorities

WMP Area	Waterbody	Pollutant	Target	Source
LLAR	LAR Reach 1 (freshwater)	Cu ug/L	23	WQBEL
	LAR Reach 1 (freshwater)	Pb ug/L	12	WQBEL
	LAR Reach 1 (freshwater)	*E-coli* MPN/100mL	126	WQBEL
LCC	All LCC	Cu g/d	67.2	WQBEL
	All LCC	*E-coli* MPN/100mL	126	WQBEL
LSGR	SG Reach 1	Cu ug/L	18	WQBEL
	SG Reach 1	*E-coli* MPN/100mL	126	WQBEL
	San Jose Cr. Reach 1&2	Se ug/L	5	WQBEL
	San Jose Cr. Reach 1&2	*E-coli* MPN/100mL	126	WQBEL
	Coyote Cr.	Cu kg/d	0.941	WQBEL
	Coyote Cr.	*E-coli* MPN/100mL	126	WQBEL

5.3.1. Wet-Weather Required Pollutant Reductions

The wet weather pollutant baseline loading and reduction targets for average and critical conditions are summarized in Table 5-6 and Table 5-7 respetively (all WMP areas) and shown graphically in Figure 5-12 through Figure 5-15 (individual WMP areas). These analyses were used to determine the limiting pollutant. The limiting pollutant is defined as the pollutant requiring the greatest load reduction, and BMPs implemented to achieve the limiting pollutant reductions are protective of other pollutant reductions (e.g., sediment or volume reductions). In Table 5-6. Wet-weather pollutant baseline loading by WMP area with analysis of limiting pollutants

WMP	Year[1]	Organics (kg)			Metals (kg)			Bacteria (Billion #)[1]
		DDT	PCB	PAH	TCu [2]	TPb	TZn [3]	E-Coli
Lower Los Angeles River (LLAR)	2003	0.12	0.77	19.80	2,437	2,464	11,153	2.78E+07
	2008	0.09	0.61	15.59	1,935	1,968	8,878	5.46E+07
Los Cerritos Channel (LCC)	2003	0.07	0.45	11.60	1,611	1,719	7,481	2.55E+08
	2008	0.05	0.35	9.13	505	386	2,607	2.40E+08
Lower San Gabriel River (LSGR)	2003	0.06	0.42	10.80	768	544	3,805	2.06E+06
	2008	0.05	0.33	8.50	393	337	2,512	1.98E+06
Coyote Creek (CC)	2003	0.11	0.71	18.20	1,640	1,197	8,373	6.57E+05
	2008	0.09	0.56	14.33	839	736	5,450	6.72E+06

Color ramps highlight potentially limiting (Red) vs. pollutants determined to be non-limiting for this analysis (Blue)

1. LLAR, LSGR, CC bacteria loads are for bacteria wet-days and exclude high flow suspension (HFS) days. LCC bacteria loads are for bacteria wet-days
2. Red box: Organics managed through sediment and associated metals reduction. Organic load reductions above influenced by assigned concentrations at half the MDLs (monitoring data below MDLs), and therefore are suspect and not considered limiting. Cu is not limiting after brake-pad reductions
3. Blue Box: Zinc is limiting pollutant for the 90th percentile year
4. Metals loads are for wet-weather days (90th percentile flow and greater)
5. Organics are summarized on an annual basis

Table 5-7, the red color gradient highlights limiting pollutants, with a deeper red generally indicating a more limiting pollutant. Zinc was identified as the limiting pollutant for each WMP area[4]. The determination of limiting pollutant considered implementation actions to control the pollutant – for example, Senate Bill 346 will result in significant reductions of copper loading from brake pads. Because total source control measures are not on the horizon for zinc, it becomes the limiting pollutant instead of copper. The evaluation of copper and organics as limiting pollutants and rationale for their exclusion is described below.

Although DDT and PCBs were estimated to have high load reduction requirements to meet WQBELs, they were not identified as limiting pollutants because the maximum detection limits (MDLs) used for the analysis heavily affected the calculated required reductions. Rather than use LSPC for reduction calculations, monitoring data were used directly and many reported concentrations for DDT, PCBs, and PAHs were below MDLs, so concentrations were assumed in the model to equal half the MDL. The MDL is above the target leading to non-detects requiring reductions. Of course, toxics will be addressed by control measures implemented for zinc. The Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL states that

[4] In LSGR, a higher percent reduction for bacteria was calculated for the average year than the 90th percentile (see Figure 5-14). Although total annual rainfall in 2008 and 2003 were virtually identical over the entire SGR watershed (20.5 and 20.4 inches/year, respectively), 2003 had fewer wet days than 2008, resulting in relatively more intense events on average (about 18 percent higher). As a result, 2003 had more HFS days than 2008—exceedances during HFS days are not considered when computing the required load reduction, lowering the required reduction.

"implementation of other TMDLs in the watershed may contribute to the implementation of this TMDL," and implementation of the effective TMDLs in Los Angeles River and San Gabriel River are integrated within Phase I of the implementation of the toxics TMDL (LARWQCB and USEPA 2011). As a result, DDT, PCBs, and PAHs were not represented in Figure 5-12 through Figure 5-15.

Although copper was calculated to have a higher required reduction than zinc, the effect of Senate Bill 346 is expected to reduce those reductions without any implementation of structural control measures. The Brake Pad Partnership was formed in 1999 as a collaboration of cities, industry, and other entities to address the lack of information and research regarding the impact of brake debris material in the environment. After its formation, the Brake Pad Partnership commissioned several technical studies to better quantify the fate and transport of copper to San Francisco Bay including a detailed source assessment. Overall findings of the study estimated that of the anthropogenic sources of copper, approximately 35 percent are attributed to brake pad releases (BPP 2010). Even if the reduction was only half of this amount, the adjustment to the required copper reduction would still result in zinc being the limiting pollutant in LLAR, LCC, and LSGR.

After excluding organics and total copper for the reasons described previously, total zinc becomes the limiting pollutant in each of the WMP areas during the 90th percentile year. In other words, reductions of zinc during WMP implementation will drive reduction of other pollutants, particularly because the pollutant reduction plan emphasizes sediment control (other pollutants are typically transported with sediment) and retention/infiltration rather than pollutant treatment.

Plots showing the differences between the baseline loads, allowable loads, and exceedance loads are shown in Attachment F.

Table 5-6. Wet-weather pollutant baseline loading by WMP area with analysis of limiting pollutants

WMP	Year[1]	Organics (kg)			Metals (kg)			Bacteria (Billion #)[1]
		DDT	PCB	PAH	TCu [2]	TPb	TZn [3]	E-Coli
Lower Los Angeles River (LLAR)	2003	0.12	0.77	19.80	2,437	2,464	11,153	2.78E+07
	2008	0.09	0.61	15.59	1,935	1,968	8,878	5.46E+07
Los Cerritos Channel (LCC)	2003	0.07	0.45	11.60	1,611	1,719	7,481	2.55E+08
	2008	0.05	0.35	9.13	505	386	2,607	2.40E+08
Lower San Gabriel River (LSGR)	2003	0.06	0.42	10.80	768	544	3,805	2.06E+06
	2008	0.05	0.33	8.50	393	337	2,512	1.98E+06
Coyote Creek (CC)	2003	0.11	0.71	18.20	1,640	1,197	8,373	6.57E+05
	2008	0.09	0.56	14.33	839	736	5,450	6.72E+06

Color ramps highlight potentially limiting (Red) vs. pollutants determined to be non-limiting for this analysis (Blue)

6. LLAR, LSGR, CC bacteria loads are for bacteria wet-days and exclude high flow suspension (HFS) days.
   LCC bacteria loads are for bacteria wet-days
7. Red box: Organics managed through sediment and associated metals reduction. Organic load reductions above influenced by assigned concentrations at half the MDLs (monitoring data below MDLs), and therefore are suspect and not considered limiting. Cu is not limiting after brake-pad reductions
8. Blue Box: Zinc is limiting pollutant for the 90th percentile year
9. Metals loads are for wet-weather days (90th percentile flow and greater)
10. Organics are summarized on an annual basis

Table 5-7. Wet-weather pollutant reduction targets by WMP area with analysis of limiting pollutants[5]

WMP	Year	Organics			Metals			Bacteria
		DDT	PCB	PAH	TCu [2]	TPb	TZn [3]	E-Coli
Lower Los Angeles River (LLAR)	2003	87.3%	72.0%	0.0%	84.1%	38.6%	67.4%	23.4%
	2008	90.0%	77.9%	0.0%	82.8%	32.9%	64.9%	45.1%
Los Cerritos Channel (LCC)	2003	86.6%	70.3%	0.0%	95.6%	76.7%	90.8%	40.4%
	2008	89.6%	77.1%	0.0%	87.1%	3.6%	75.6%	47.9%
Lower San Gabriel River (LSGR)	2003	79.5%	54.6%	0.0%	40.1%	0.0%	29.3%	22.9%
	2008	91.4%	80.7%	0.0%	18.0%	0.0%	25.0%[4]	53.0%
Coyote Creek (CC)	2003	75.9%	46.8%	0.0%	37.5%	0.0%	28.3%	19.1%
	2008	91.3%	76.8%	0.0%	22.7%	0.0%	30.4%[4]	59.2%

Color ramps highlight potentially limiting (Red) vs. pollutants determined to be non-limiting for this analysis (Blue)

1. Average year is 2008 and 90th percentile year is 2003
2. Red box: Organics managed through sediment and associated metals reduction. Organic load reductions above influenced by assigned concentrations at half the MDLs (monitoring data below MDLs), and therefore are suspect and not considered limiting. Cu is not limiting after brake-pad reductions
3. Blue Box: Zinc is limiting pollutant for the 90th percentile year
4. Bacteria reduction target is lower in 2003 than 2008 because more days were classified as HFS

[5] For the Diamond Bar jurisdiction of the San Gabriel River WMP area, a portion flows to the Santa Ana River. Since this area is open space and therefore not associated with MS4 runoff, no reductions were determined necessary. Loadings for the 90th percentile year from this area are 1.16 kg/year of total Cu, 0.87 kg/year of total Pb, 5.21 kg/year of total Zn, and 4.91x10^{12} #/year of E-coli.

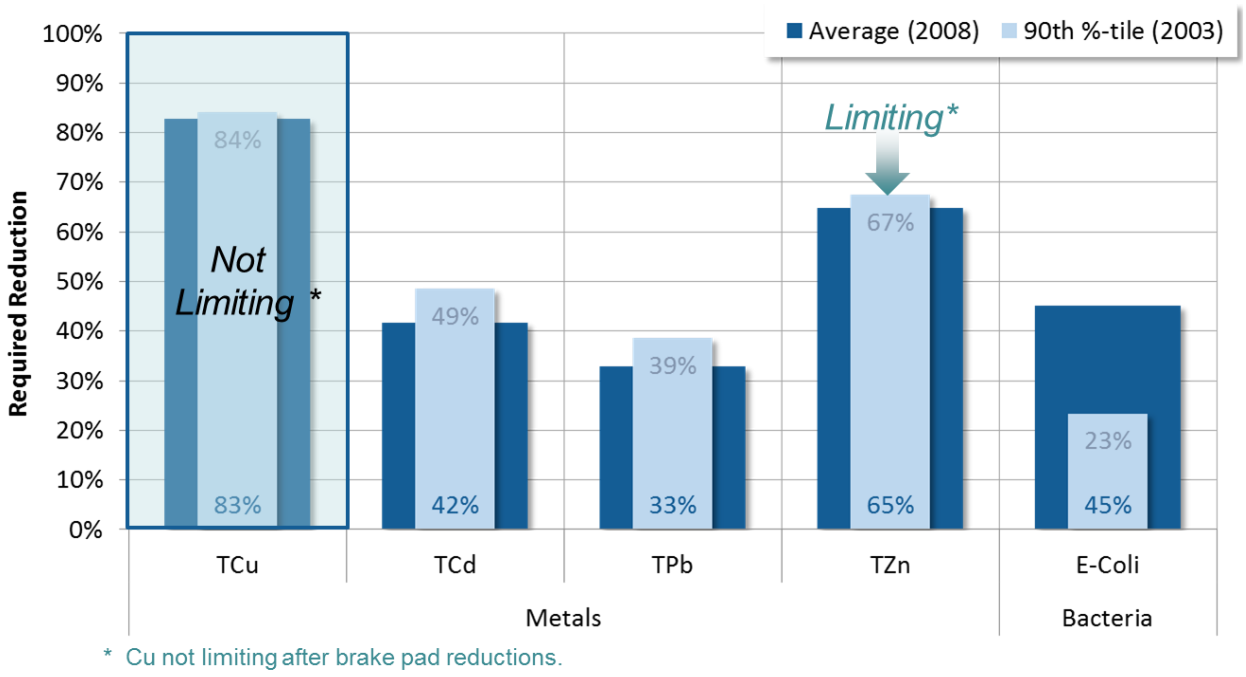


Figure 5-12. Wet-weather pollutant reduction targets and limiting pollutant for Lower Los Angeles River WMP.[6]

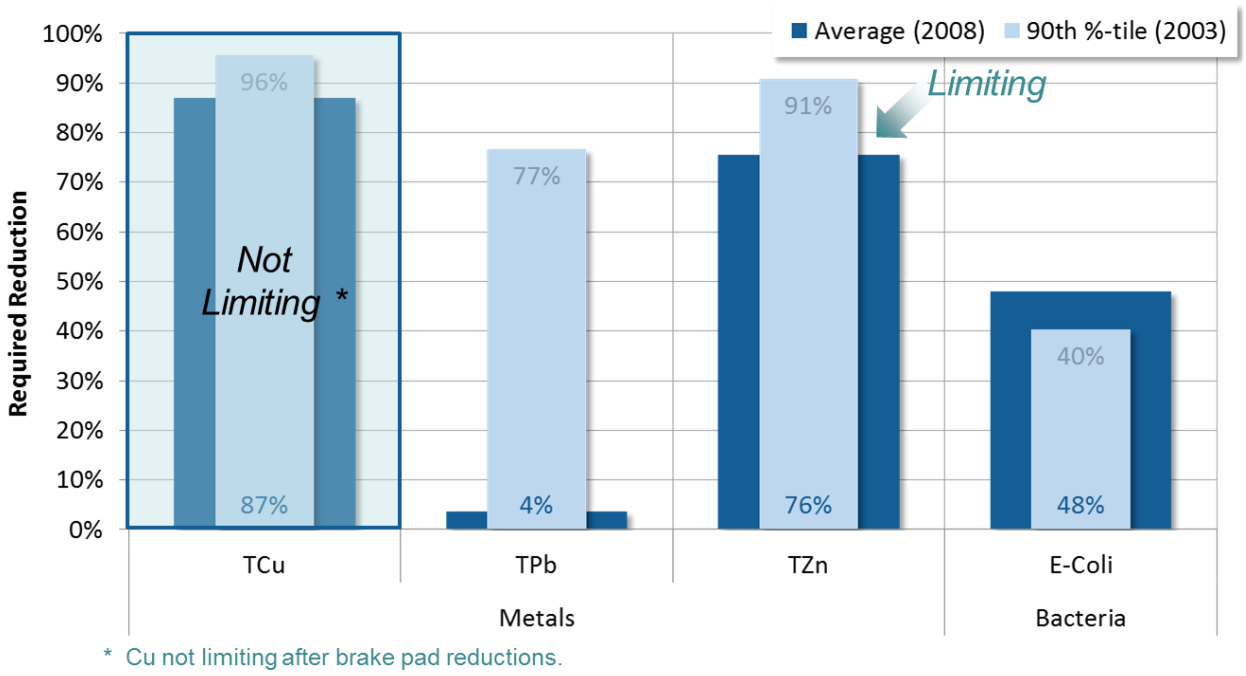


Figure 5-13. Wet-weather pollutant reduction targets and limiting pollutant for Los Cerritos Chanel WMP.

[6] Note that the Los Cerritos Channel TMDLs for Metals requires no reduction of Pb.

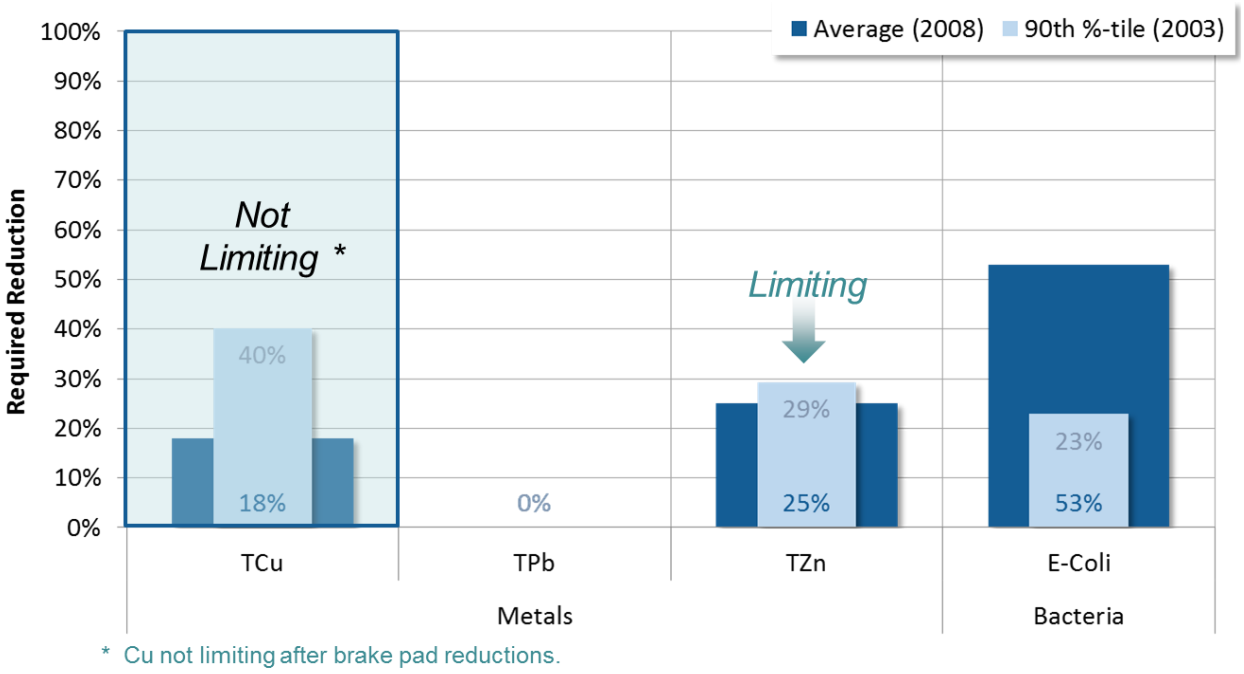


Figure 5-14. Wet-weather pollutant reduction targets and limiting pollutant for Lower San Gabriel River.

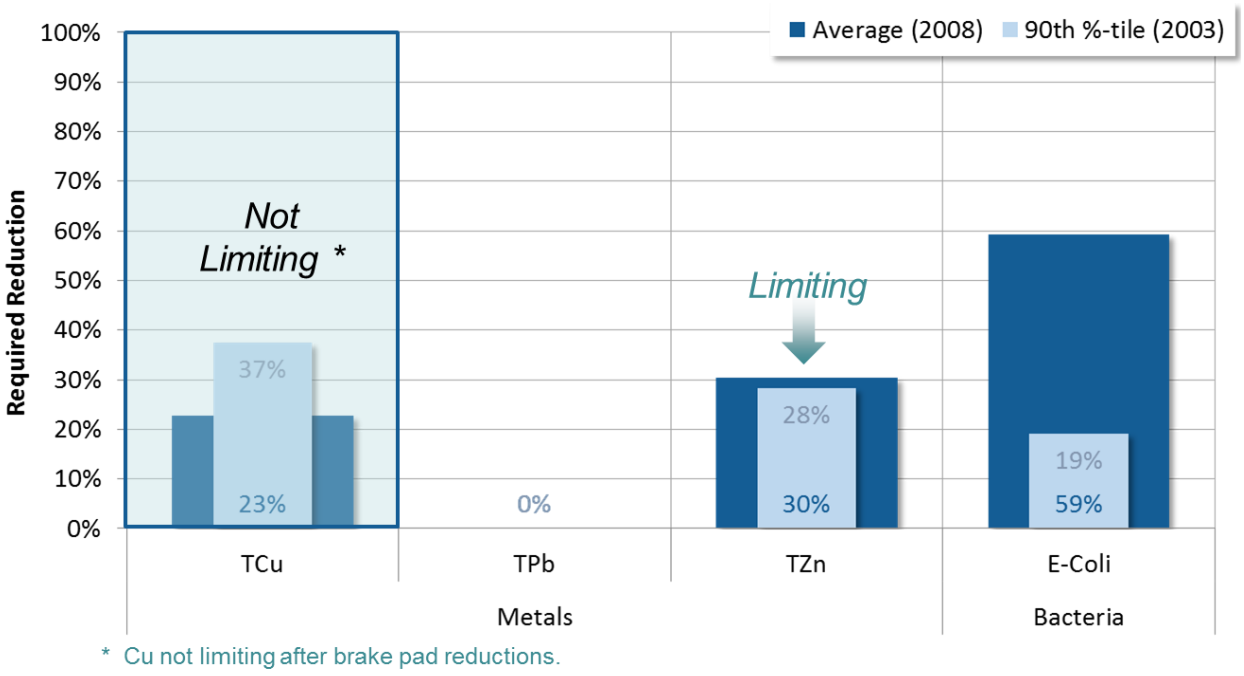


Figure 5-15. Wet-weather pollutant reduction targets and limiting pollutant for Coyote Creek.

5.3.2. Dry-Weather Pollutant Reduction Targets

Using the representative dry-weather period of August 17 through September 30, as defined in Section 5.2.3, modeled instream flow was multiplied by the observed dry weather concentrations to get existing conditions loads, which are shown in Table 5-8. Likewise, target concentrations were also multiplied by modeled instream flow to get allowable load for each waterbody, which is shown in Table 5-9. Finally, Table 5-10 summarizes dry-weather reduction targets for each listed segment for both the average year and the 90th percentile year.

For dry weather, bacteria is the limiting pollutant (not zinc) because the required reductions are much higher than other pollutants. Reductions of bacteria during WMP implementation will drive reductions of other pollutants.

Table 5-8. Modeled existing condition dry-weather loads by water body

Existing Condition		Dry Weather Flow (cfs)		Existing Load (kg/day or MPN/day)		
Waterbody	**Pollutant**	**2003**	**2008**	**2003**	**2008**	**Mean**
LAR Reach 1 (freshwater)	Cu ug/L	99.97	65.63	6.28	4.12	5.20
LAR Reach 1 (freshwater)	Pb ug/L	99.97	65.63	0.84	0.55	0.69
LAR Reach 1 (freshwater)	*E. coli* MPN/100ml	99.97	65.63	4.79E+13	3.15E+13	3.97E+13
LCC	Cu ug/L	4.65	2.20	0.29	0.14	0.21
LCC	*E. coli* MPN/100ml	4.65	2.20	1.62E+12	7.64E+11	1.19E+12
SG Reach 1	Cu ug/L	69.04	75.36	5.05	5.51	5.28
SG Reach 1	*E. coli* MPN/100ml	69.04	75.36	3.70E+12	4.04E+12	3.87E+12
San Jose Cr. Reach 1 & 2	Se ug/L	12.54	19.62	0.06	0.09	0.07
San Jose Cr. Reach 1 & 2	*E. coli* MPN/100ml	12.54	19.62	6.72E+11	1.05E+12	8.62E+11
Coyote Cr.	Cu ug/L	19.65	15.69	1.37	1.10	1.23
Coyote Cr.	*E. coli* MPN/100ml	19.65	15.69	5.53E+12	4.41E+12	4.97E+12

Table 5-9. Allowable TMDL dry-weather loads by water body

Existing Condition		Dry Weather Flow (cfs)		Allowable Load (kg/day or MPN/day)		
Waterbody	**Pollutant**	**2003**	**2008**	**2003**	**2008**	**Mean**
LAR Reach 1 (freshwater)	Cu ug/L	99.97	65.63	5.63	3.69	4.66
LAR Reach 1 (freshwater)	Pb ug/L	99.97	65.63	2.94*	1.93*	2.43*
LAR Reach 1 (freshwater)	*E. coli* MPN/100ml	99.97	65.63	3.08E+11	2.02E+11	2.55E+11
LCC	Cu ug/L	4.65	2.20	0.07	0.07	0.07
LCC	*E. coli* MPN/100ml	4.65	2.20	1.43E+10	6.78E+09	1.06E+10
SG Reach 1	Cu ug/L	69.04	75.36	3.04	3.32	3.18
SG Reach 1	*E. coli* MPN/100ml	69.04	75.36	2.13E+11	2.32E+11	2.23E+11
San Jose Cr. Reach 1 & 2	Se ug/L	12.54	19.62	0.15*	0.24*	0.20*
San Jose Cr. Reach 1 & 2	*E. coli* MPN/100ml	12.54	19.62	3.87E+10	6.05E+10	4.96E+10
Coyote Cr.	Cu ug/L	19.65	15.69	0.94	0.94	0.94
Coyote Cr.	*E. coli* MPN/100ml	19.65	15.69	6.06E+10	4.48E+10	5.45E+10

*Existing dry-weather loads are currently below the allowable loads thus showing compliance for this pollutant.

Table 5-10. Required dry-weather percent reductions by water body

WMP	Waterbody	Pollutant	Required Dry-Weather Percent Reductions		
			2003	**2008**	**Mean**
LLAR	LAR Reach 1 (freshwater)	Cu	10%	10%	10%
	LAR Reach 1 (freshwater)	Pb	0%	0%	0%
	LAR Reach 1 (freshwater)	*E. coli*	99.36%	99.36%	99.36%
LCC	LCC	Cu	76.74%	50.85%	68.43%
	LCC	*E. coli*	99.11%	99.11%	99.11%
LSGR	Coyote Cr.	Cu	31.42%	14.11%	23.73%
	Coyote Cr.	*E. coli*	98.90%	98.90%	98.90%
	SG Reach 1	Cu	39.78%	39.78%	39.78%
	SG Reach 1	*E. coli*	94.25%	94.25%	94.25%
	San Jose Cr. Reach 1 & 2	Se	0%	0%	0%
	San Jose Cr. Reach 1 & 2	*E. coli*	94.25%	94.25%	94.25%

Color Ramp shows relative magnitude of reductions—darker means higher reductions

6. Determination of Potential BMP Capacity for RAA

The process for determining the necessary cumulative BMP capacity depends on the type of numeric goal being addressed. As shown in Figure 6-1, the volume-based (design storm) approach, necessary BMP capacity was determined through a design storm analysis. For the load-based (pollutant reduction), the analysis leveraged the optimization routines in the customized WMMS. An initial step in the RAA was a comparison of the volume reductions required by the load-based and volume-based numeric goals, to support selection of the wet weather critical conditions.

For LLAR, LCC, and LSGR, the 90th percentile WY (2002-03) weather was selected as the critical condition for wet weather.

Details on the analyses performed to determine potential BMP treatment capacity are provided in Attachment A. The attachment describes the approach for incorporating nonstructural BMPs, accounting for the effect of LACFCD infrastructure, and separating the contribution from non-MS4 sources.

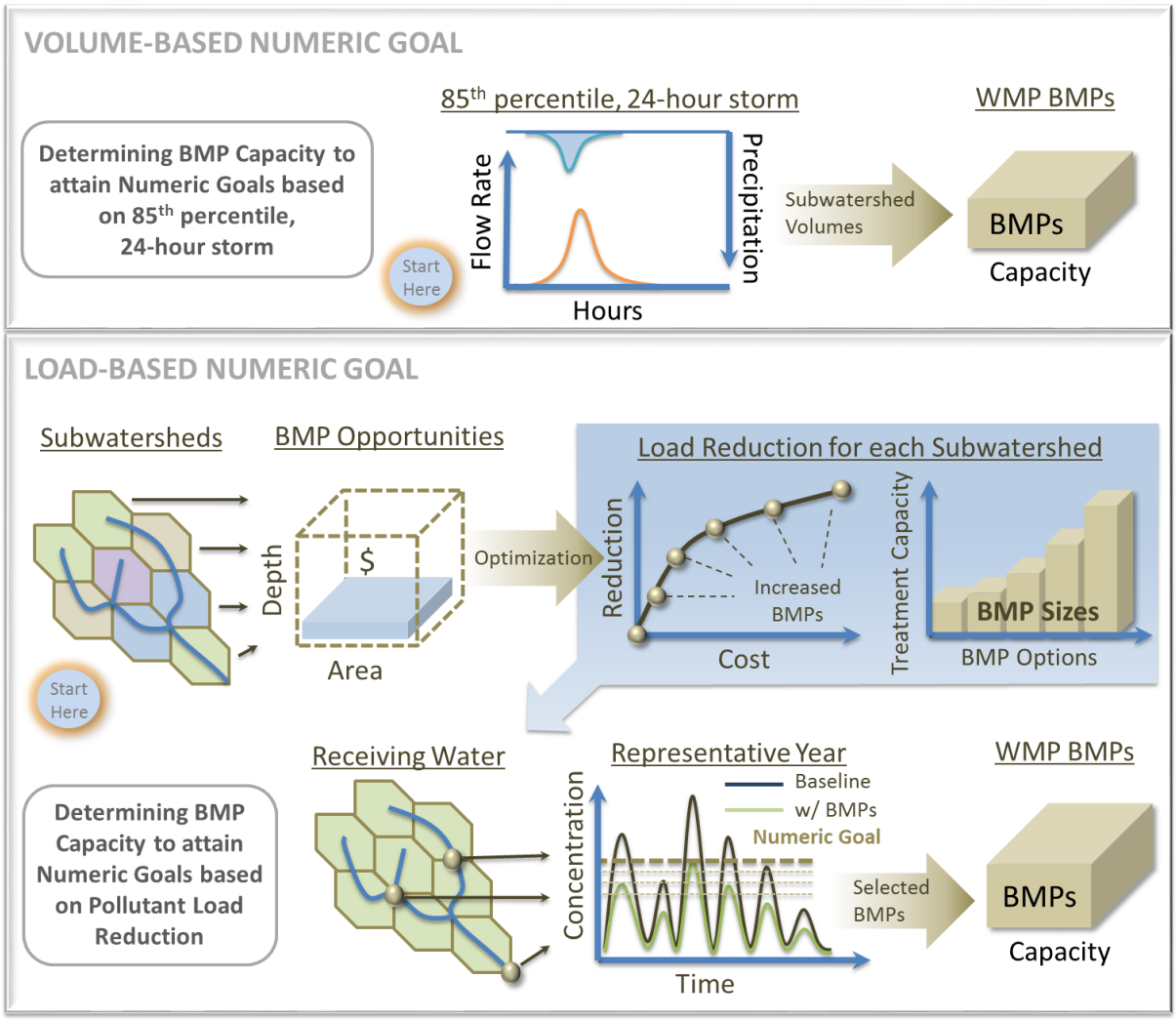


Figure 6-1. Illustration of Process for Determining Required BMP Capacities for the WMP using Volume-Based (top panel) and Load-Based (bottom panel) Numeric Goals.

7. Cumulative Volume Reduction Goals to Achieve Required Pollutant Reductions

The first output of the RAA is a series of "volume reduction goals" for each subwatershed and jurisdiction in the WMP area. WMMS was used to determine the stormwater retention volumes for each subwatershed that would achieve the required load reductions, as reported in this section. These calculated runoff reduction volumes for each subwatershed are a surrogate compliance metric for the responsible agencies. It should be noted that upon implementation, opportunities may arise where flow-through BMPs may provide similar ultimate pollutant load reduction, and may replace the need to implement volume-based reduction BMPs.

These volumes also form the basis for selection of BMPs to achieve those volume reductions, as described in Section 9 and Attachment A.

7.1. Volume Reductions for Structural BMPs

Structural BMPs were modeled using the assumptions outlined in Attachment A. BMP capacities were optimized across the entire study area to achieve the final milestone pollutant reduction requirements at each of the assessment points. Instead of summarizing optimization results in terms of BMP capacity, which is really specific to the network described in Attachment A, the results were summarized as required *annual* wet-weather retention volume (in acre-feet). This provides a volumetric basis that is (1) closely related to load reduction and (2) readily transferable as a control target for parallel BMP modeling at a finer resolution. Because the volumes were isolated to wet days, it is also not skewed by dry-weather runoff retention. The following subsections provide more details about the wet- and dry-weather analysis components.

7.1.1. Wet Weather

Using the structural BMP routing network in WMMS (described in Attachment A), the required *annual* wet-weather retention volume (in acre-feet) were calculated using the critical year time series. For milestones, the percent reduction was based on average year targets while final limits were based on critical year targets. The reported annual volumes are (1) based on required load reductions and (2) ready for BMP modeling at a finer resolution. A 10 percent load reduction was assumed to result from implementation of all nonstructural control measures outlined in the WMPs, setting the foundation of WMP implementation, and structural control measures provide additional load reduction.

Table 7-1 through Table 7-4 present incremental and cumulative retention volumes required to achieve each load reduction milestone by jurisdiction. The milestones are based on the metals TMDLs as described in Section 2. In order to calculate the incremental volume reductions for each milestone, optimization was performed for each jurisdiction to (1) emphasize BMP implementation in subwatersheds that volume reduction could most cost effectively reduce pollutants and (2) establish a cost-effective sequence of subwatersheds for each jurisdiction to achieve the milestones over time. In other words, WMMS was used to develop an implementation schedule that provides early gains in receiving water quality.

Table 7-1. Annual volume reduction goals to achieve interim and final milestones for Lower Los Angeles River WMP by jurisdiction

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Downey	31%	143.8	143.8
	50%	221.7	365.5
	Final	360.5	726.0
Lakewood	31%	14.3	14.3
	50%	0.0	14.3
	Final	0.0	14.3
Long Beach	31%	540.7	540.7
	50%	1090.8	1,631.5
	Final	2270.1	3,901.7
Lynwood	31%	303.3	303.3
	50%	185.2	488.6
	Final	619.6	1,108.1
Paramount	31%	181.8	181.8
	50%	227.8	409.6
	Final	579.2	988.8
Pico Rivera	31%	365.3	365.3
	50%	0.0	365.3
	Final	12.0	377.3
Signal Hill	31%	32.8	32.8
	50%	106.6	139.4
	Final	58.4	197.9
South Gate	31%	229.3	229.3
	50%	343.2	572.6
	Final	940.0	1,512.6

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
2: Includes full implementation of planned non-structural practices

Table 7-2. Annual volume reduction goals to achieve interim and final milestones for Los Cerritos Channel WMP by jurisdiction

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Bellflower	10%	NS	NS
	35%	336.1	336.1
	Final	801.3	1,137.4
Cerritos	10%	NS	NS
	35%	9.7	9.7
	Final	3.2	12.9
Downey	10%	NS	NS
	35%	77.0	77.0
	Final	35.8	112.8
Lakewood	10%	NS	NS
	35%	282.4	282.4
	Final	874.8	1,157.2
Long Beach	10%	NS	NS
	35%	560.9	560.9
	Final	2115.2	2,676.1
Paramount	10%	NS	NS
	35%	278.8	278.8
	Final	353.1	631.9
Signal Hill	10%	NS	NS
	35%	269.9	269.9
	Final	52.7	322.6

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
NS: Non-structural practices achieve 10% milestone

Table 7-3. Annual volume reduction goals to achieve interim and final milestones for Lower San Gabriel River WMP

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Artesia	10%	NS	NS
	35%	1.1	1.1
	Final	0.0	1.1
Bellflower	10%	NS	NS
	35%	1.3	1.3
	Final	61.5	62.8
Cerritos	10%	NS	NS
	35%	6.6	6.6
	Final	52.8	59.4
Diamond Bar	10%	NS	NS
	35%	0.3	0.3
	Final	32.8	33.0
Downey	10%	NS	NS
	35%	4.3	4.3
	Final	259.6	263.9
Lakewood	10%	NS	NS
	35%	7.4	7.4
	Final	2.2	9.6
Long Beach	10%	NS	NS
	35%	26.9	26.9
	Final	2.3	29.2
Norwalk	10%	NS	NS
	35%	0.8	0.8
	Final	136.1	136.9
Pico Rivera	10%	NS	NS
	35%	0.2	0.2
	Final	74.8	75.1
Santa Fe Springs	10%	NS	NS
	35%	0.0	0.0
	Final	106.0	106.0
Whittier	10%	NS	NS
	35%	0.0	0.0
	Final	7.5	7.5

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
NS: Non-structural practices achieve 10% milestone

Table 7-4. Annual volume reduction goals to achieve interim and final milestones for the Coyote Creek portion of Lower San Gabriel River WMP by jurisdiction

Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)		
	Milestone	Incremental	Cumulative[1]
Artesia	10%	NS	NS
	35%	47.9	47.9
	Final	0.0	47.9
Cerritos	10%	NS	NS
	35%	0.1	0.1
	Final	194.2	194.3
Diamond Bar	10%	NS	NS
	35%	1.0	1.0
	Final	73.0	74.0
Hawaiian Gardens	10%	NS	NS
	35%	27.0	27.0
	Final	3.4	30.4
La Mirada	10%	NS	NS
	35%	0.8	0.8
	Final	174.9	175.7
Lakewood	10%	NS	NS
	35%	17.5	17.5
	Final	8.2	25.7
Long Beach	10%	NS	NS
	35%	37.5	37.5
	Final	0.0	37.5
Norwalk	10%	NS	NS
	35%	3.0	3.0
	Final	149.5	152.5
Santa Fe Springs	10%	NS	NS
	35%	0.4	0.4
	Final	260.3	260.7
Whittier	10%	NS	NS
	35%	2.1	2.1
	Final	252.6	254.7

1: Color Ramp highlights relative amount of required retention volume for milestones: darker is more, lighter is less
NS: Non-structural practices achieve 10% milestone

7.1.2. Dry Weather

Dry-weather reductions from non-structural BMPs were calculated using flow from representative dry period (Section 5.2) of 8/17/2003 through 9/30/2003 and 90th percentile concentrations calculated from observed data (Section 5.2.1). Similar to wet weather, a 10% load reduction is assumed to result from the cumulative effect of nonstructural BMPs. Also, the effects of a 25% reduction in irrigation of urban grass was explicitly simulated in the model to estimate the resulting associated reduction of dry weather flows at the RAA Assessment Points. Irrigation was modeled as artificial rainfall within the LSPC model as a function of the potential evapotranspiration of urban grass. Once irrigation was reduced 25%, this directly impacted a large portion of the nonstormwater discharges drivin primarily from over irrigation and impacts on dry weather flows were significant. The projected effect of non-structural and irrigation controls on dry weather flow and loads is presented in Table 7-5. Since *E. Coli* is the limiting dry weather pollutant with required reductions in excess of 90%, the remaining volume reduction not controlled by non-structural measures will be treated by the structural BMPs described in the previous section.

Table 7-5. Projected dry weather reductions from non-structural control measures

Watershed	Constituent	Quantity (Volume or Mass)			Percent Reduction Achieved	
		Baseline	NM	NS	NM	NS
Lower Los Angeles River	Flow (M Gal.)	198.3	178.5	86.6	10.0%	56.4%
	Copper (kg)	19.28	17.35	8.42	10.0%	56.4%
	Lead (kg)	2.58	2.32	1.12	10.0%	56.4%
	E. Coli (Billion MPN)	147,166	132,449	64,230	10.0%	56.4%
Los Cerritos Channel	Flow (M Gal.)	133.6	120.2	56.3	10.0%	57.8%
	Copper (kg)	12.84	11.56	5.42	10.0%	57.8%
	E. Coli (Billion MPN)	71,808	64,627	30,277	10.0%	57.8%
Lower San Gabriel River	Flow (M Gal.)	163.3	147.0	71.2	10.0%	56.4%
	Copper (kg)	18.48	16.63	8.06	10.0%	56.4%
	Selenium (kg)	2.95	2.65	1.29	10.0%	56.4%
	E. Coli (Billion MPN)	13,540	12,186	5,903	10.0%	56.4%
Coyote Creek	Flow (M Gal.)	213.4	192.0	88.4	10.0%	58.6%
	Copper (kg)	23.05	20.75	9.55	10.0%	58.6%
	E. Coli (Billion MPN)	92,887	83,599	38,491	10.0%	58.6%

NM: Non-modeled non-structural practices achieve 10% reduction

NS: Non-structural 25% irrigation reduction practices achieve an additional approximately 60% reduction

8. MS4 Volume Reduction Goals to Achieve Required Pollutant Reductions

Each jurisdiction in the Group's WMP area is subject to stormwater runoff from non-MS4 facilities. In particular, Caltrans roads and facilities regulated by nontraditional or general industrial permits contribute to the runoff volume for each subwatershed. It will be important for these entities to retain their runoff and/or eliminate their cause/contribution to receiving water exceedances. The runoff from these non-MS4 facilities was therefore estimated and subtracted from the cumulative volume reduction goal (Section 7) to establish the MS4 responsible targets as described in Attachment A.

8.1. Summary of MS4 Responsible Reduction Goals

Runoff volumes estimated for non-MS4 permitted areas and Caltrans were subtracted from the reduction target to generate the required MS4 treatment capacity shown in Table 8-1 through Table 8-4.

Table 8-1. Lower Los Angeles River Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

	COMPLIANCE TARGET – FINAL MILESTONE		
Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Downey	726.0	654.7	71.2
Lakewood	14.3	14.3	-
Long Beach	3,901.7	3,039.6	862.1
Lynwood	1,108.1	667.9	440.2
Paramount	988.8	606.1	382.7
Pico Rivera	377.3	287.2	90.0
Signal Hill	197.9	188.9	9.0
South Gate	1,512.6	1,174.3	338.2
TOTAL	8,826.5	6,633.1	2,193.5

Table 8-2. Los Cerritos Channel Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

	COMPLIANCE TARGET – FINAL MILESTONE		
Jurisdiction	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Bellflower	1,137.4	990.4	147.0
Cerritos	12.9	12.9	0.0
Downey	112.8	93.0	19.8
Lakewood	1,157.2	1,152.1	5.1
Long Beach	2,676.1	1,629.8	1,046.2
Paramount	631.9	525.5	106.4
Signal Hill	322.6	284.3	38.3
TOTAL	6,050.9	4,688.0	1,364.8

Table 8-3. San Gabriel River Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Artesia	1.1	1.1	0.0
Bellflower	62.8	57.4	5.4
Cerritos	59.4	4.1	55.3
Diamond Bar	33.0	1.1	32.0
Downey	263.9	87.3	176.7
Lakewood	9.6	2.2	7.4
Long Beach	29.2	29.2	0.0
Norwalk	136.9	4.8	132.1
Pico Rivera	75.1	60.4	14.7
Santa Fe Springs	106.0	30.3	75.8
Whittier	7.5	7.1	0.4
TOTAL	784.6	284.9	499.7

Table 8-4. Coyote Creek Critical Year Runoff Volume from MS4 and Non-MS4 Facilities

Jurisdiction	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
Artesia	47.9	15.9	32.0
Cerritos	194.3	56.7	137.6
Diamond Bar	74.0	36.7	37.4
Hawaiian Gardens	30.4	27.1	3.4
La Mirada	175.7	124.9	50.8
Lakewood	25.7	19.7	6.0
Long Beach	37.5	0.0	37.5
Norwalk	152.5	52.5	99.9
Santa Fe Springs	260.7	12.6	248.1
Whittier	254.7	200.1	54.6
TOTAL	1,253.4	546.1	707.3

9. Pollutant Reduction Plan

The BMPs used to achieve the MS4 volume reduction goals in Section 8 are not, per se, a component of the Permit compliance determination. Instead, over time each agency will report and demonstrate that the *cumulative* effect of projects implemented over time add up to the required reductions for interim milestones and final targets (reported as "MS4 Compliance Target"). However, the initial scenario of BMPs for WMP implementation (referred to as a Pollutant Reduction Plan in the RAA Guidelines) and their costs may be the most beneficial outcome of the WMP. A detailed WMP implementation scenario is presented in Attachment B, broken down by jurisdiction and subwatershed. The volume reductions are separated among right-of-way (ROW) BMPs and Low Impact Development (LID) on public parcels (in combination with nonstructural BMPs).

The Pollutant Reduction Plan is considered an "initial" scenario because over time, through adaptive management, the responsible agencies will likely "shift" among different types of BMPs (e.g., increase implementation of green streets and reduce implementation of regional BMPs) or substitute alterative BMPs altogether (e.g., implement dry wells instead of green streets). These shifts will be supported by analyses to show the substituted BMPs provide an equivalent volume reduction as the replaced BMPs.

9.1. Existing/Planned Regional Control Measures

Existing regional BMPs play an integral part in measuring the current reductions and need for future control measures. The annual volume or load removed from the existing and planned regional control measures were subtracted from the MS4 responsible runoff to determine the remaining treatment volume required. Detailed information for the existing and planned regional control measures is found in Attachment A.

The existing and planned regional control measure information was provided for the Lower Los Angeles River and Lower San Gabriel River. The jurisdictions that were impacted are listed with the associated annual reduction provided by these facilities in Table 9-1 and Table 9-2.

Table 9-1. Lower Los Angeles River Critical Year Existing/Planned Regional BMP Runoff Volume Reductions

Jurisdiction	COMPLIANCE TARGET		
	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Existing/Planned Regional BMP Reductions (acre-ft/year)	Remaining MS4 Responsible Critical Year Storm Volume (acre-ft/year)
Lakewood	14.3	6.4	7.9
Long Beach	3,039.6	633.4	2,406.2
Signal Hill	188.9	22.7	166.2

Table 9-2. Lower San Gabriel River Critical Year Existing/Planned Regional BMP Runoff Volume Reductions

Jurisdiction	COMPLIANCE TARGET		
	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Existing/Planned Regional BMP Reductions (acre-ft/year)	Remaining MS4 Responsible Critical Year Storm Volume (acre-ft/year)
Downey	87.3	24.0	63.3

9.2. Future Control Measures for Attainment of Interim and Final Limits

The Pollutant Reduction Plans for wet and dry weather illustrate the sequencial BMP implementation strategy to attain all interim and final limits. Within each of the jurisdictions, the subwatershed subareas were individually prioritized and associated with milestones on the basis of cost-effectiveness for zinc removal. The optimization modeling results presented in Section 7 and Figure 9-1, Figure 9-2 and Figure 9-3 shown below identify the prioritization of subwatershed implementation based on the most effective combination of BMPs. The implementation schedule outlined in the Pollutant Reduction Plans for wet and dry weather are based upon this prioritization. The plans are presented in the following subsections.

9.2.1. Wet Weather

The interim and final targets are presented in total acre-feet per year that requires treatement through structural BMPs (less the non-MS4 and existing regional volumes as described in Sections 8 and 9.1). To properly capture the annual volume, BMPs are sized to the minimum volume needed to capture the target annual volume. Thus, the BMPs are presented as a volume (acre-feet) that has the ability to capture the required annual total to meet compliance.

An overall jurisdictional summary table is presented in Table 9-3 that outlines the required BMP volume to achieve compliance in the associated WMP group. The BMP volumes are the sum of existing distributed BMPs, potential green street BMPs, LID on public parcels, and remaining BMP volume that must be implemented as regional (or other) projects as necessary to meet the annual volume reduction target.

Table 9-4 through Table 9-7 outlines the jurisdiction-wide BMP volume targets necessary to meet the annual volume interim and final limits established in Section 8. Each distributed BMP was associated with a jurisdictional subwatershed and the associated implementation schedule, thus summing their impact across different interim goals. The remaining BMP volume after accounting for existing distributed BMPs is spread across right-of-way BMPs, LID on public parcels, and remaining BMP volume including potential regional projects. Priority was given to LID on public parcels, followed by right-of-way BMPs and finally other BMPs. The incremental column shows the total additional BMP volume required for each milestone while the cumulative measures the total BMP volume required by each milestone to hit the final compliance targets. Deatiled discussion on how the BMPs in the right-of-way and LID on public parcels were determined is found in Attachment A. Detailed tables are provided in Attachment B for each jurisdiction and associated subwatersheds. Detailed tables describing the existing distributed BMPs are found in Attachment D.

Table 9-3. Jurisdictional Final Target BMP Volumes by WMP Group

	LLAR	LCC	LSGR - SGR	LSGR - CC	
Jurisdiction	**Total BMP Volume to Achieve Compliance (acre-ft)**	**Total BMP Volume to Achieve Compliance (acre-ft)**	**Total BMP Volume to Achieve Compliance (acre-ft)**	**Total BMP Volume to Achieve Compliance (acre-ft)**	**TOTAL**
Artesia	-	-	0.1	1.1	**1.2**
Bellflower	-	118.2	5.5	-	**123.7**
Cerritos	-	1.6	0.6	6.4	**8.6**
Diamond Bar	-	-	0.2	8.9	**9.1**
Downey	83.4	10.2	17.5	-	**111.2**
Hawaiian Gardens	-	-	-	2.2	**2.2**
La Mirada	-	-	-	15.2	**15.2**
Lakewood	1.2	169.5	0.4	1.9	**173.0**
Long Beach	319.1	208.7	2.7	0.0	**530.5**
Lynwood	95.5	-	-	-	**95.5**
Norwalk	-	-	0.3	4.7	**5.0**
Paramount	76.6	55.1	-	-	**131.7**
Pico Rivera	41.2	-	10.8	-	**52.0**
Santa Fe Springs	-	-	4.9	2.1	**7.0**
Signal Hill	22.3	28.6	-	-	**50.9**
South Gate	173.0	-	-	-	**173.0**
Whittier	-	-	1.4	39.1	**40.5**
TOTAL	**812.3**	**591.9**	**44.4**	**81.6**	**1,530.2**

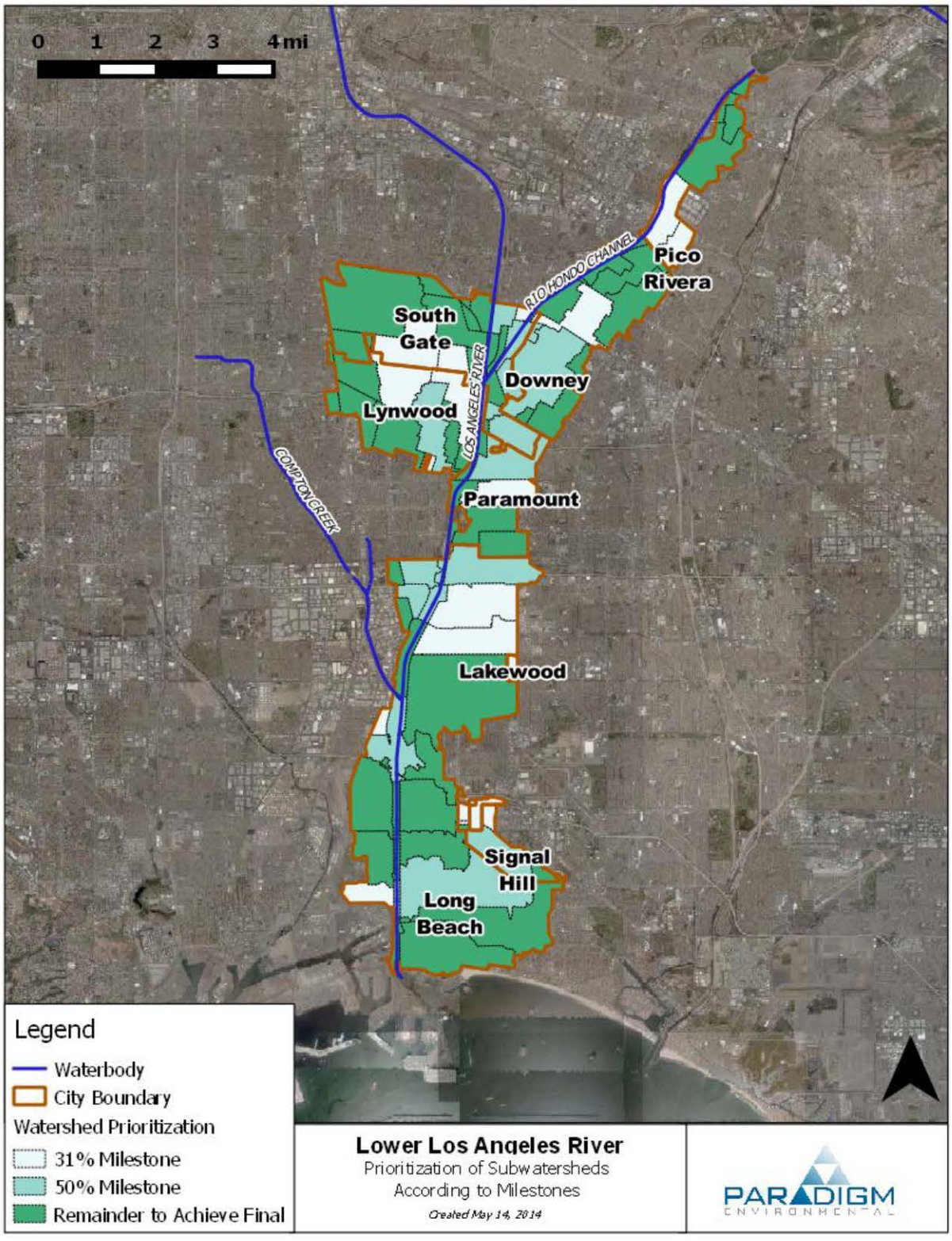


Figure 9-1. LLAR implementation areas associated with Interim and final milestones.

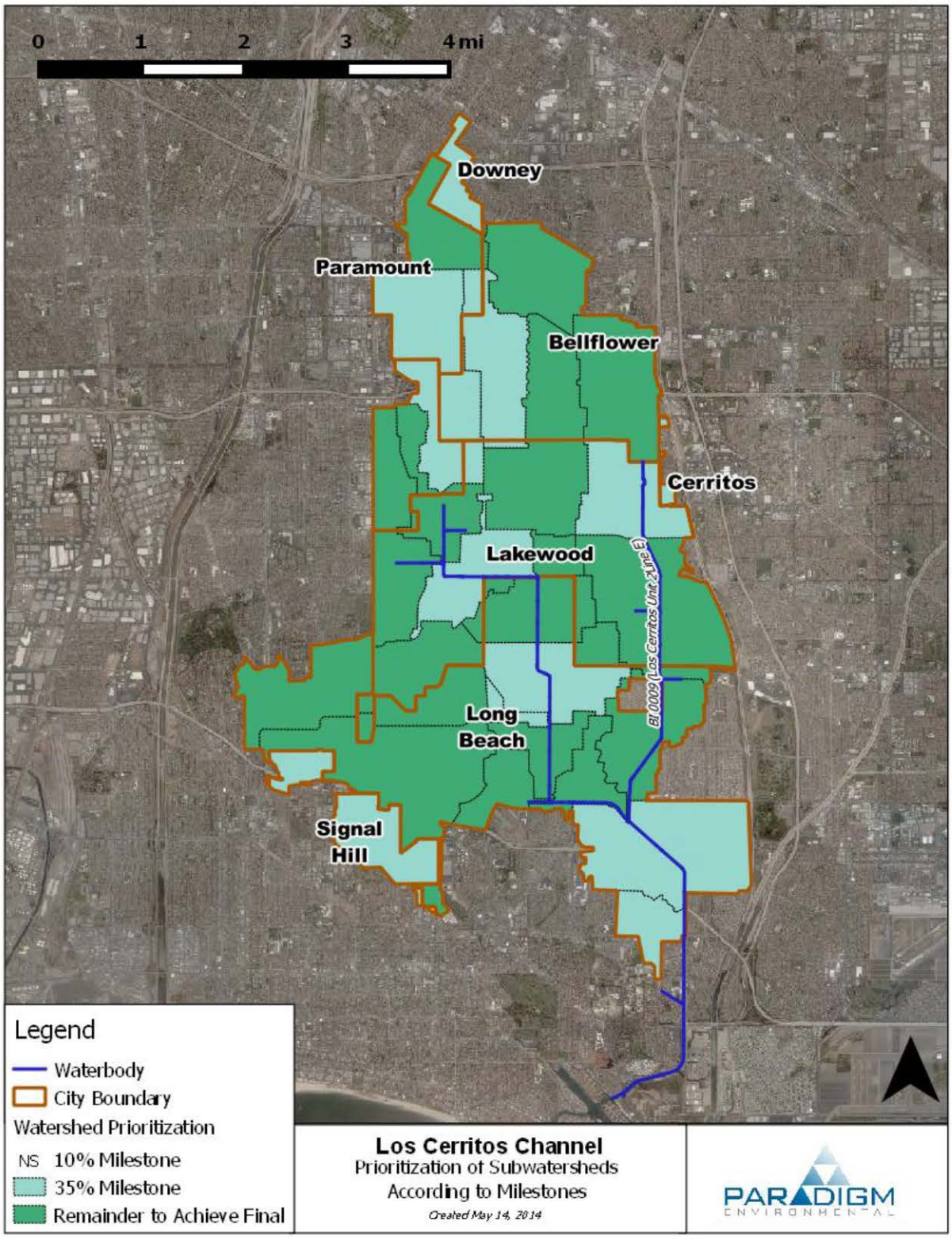


Figure 9-2. LCC implementation areas associated with Interim and final milestones.

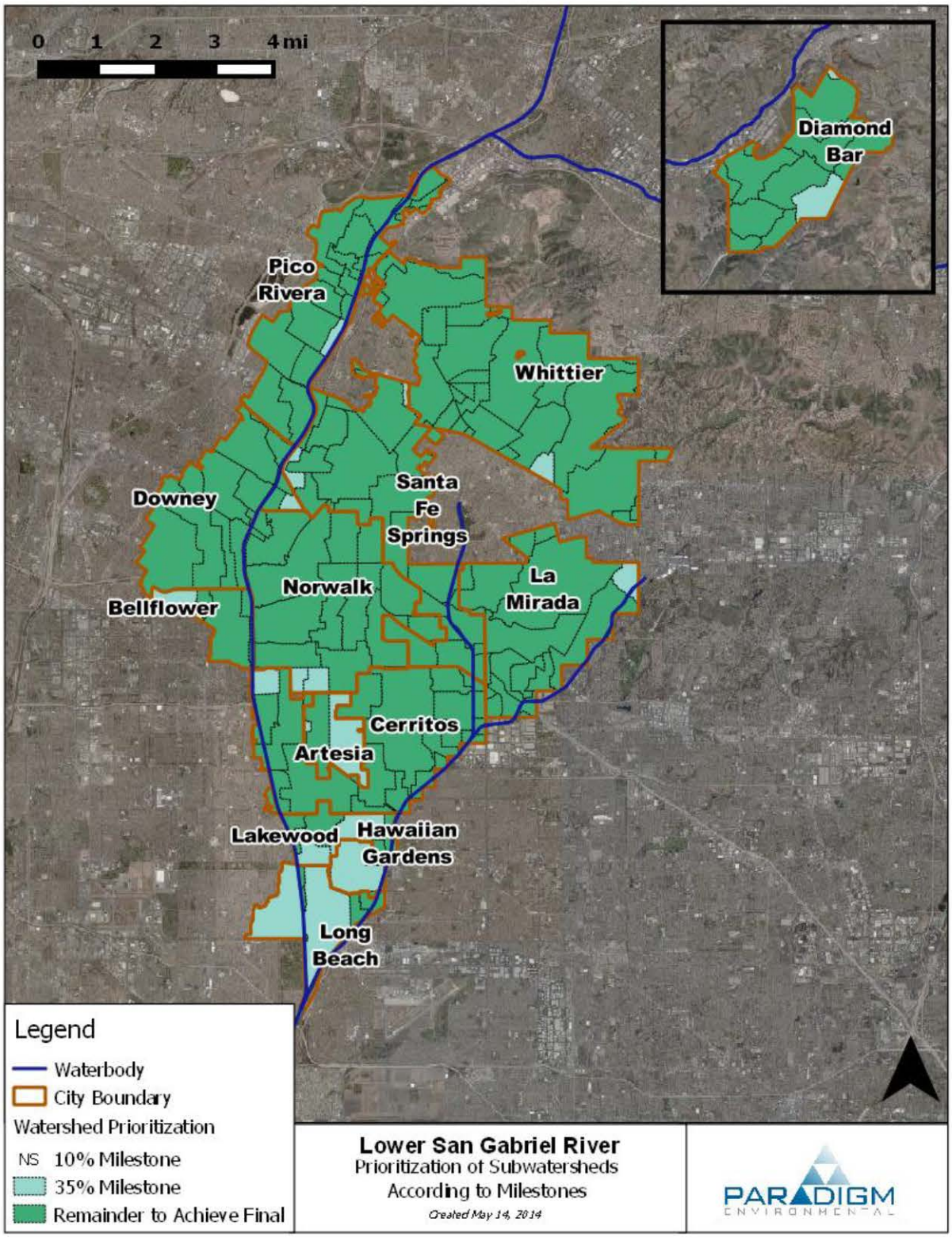


Figure 9-3. LSGR implementation areas associated with Interim and final milestones.

Table 9-4. Lower Los Angeles River Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Downey	31%	143.8	143.8	1.1	12.2	12.2	0.7	0.7	7.1	7.1
	50%	187.1	330.9	0.7	2.5	14.7	10.1	10.8	0.6	7.7
	Final	323.9	654.7	2.0	31.2	45.9	4.4	15.3	10.7	18.4
Lakewood	31%	7.9	7.9	NA	1.1	1.1	0.0	0.0	-	-
	50%	-	7.9		-	1.1	-	0.0	-	-
	Final	-	7.9		-	1.1	-	0.0	-	-
Long Beach	31%	6.5	6.5	NA	1.0	1.0	0.0	0.0	-	-
	50%	567.0	573.5		40.3	41.3	7.5	7.5	24.7	24.7
	Final	1,832.7	2,406.2		113.4	154.6	20.8	28.3	111.5	136.2
Lynwood	31%	235.9	235.9	NA	18.4	18.4	2.7	2.7	13.1	13.1
	50%	134.9	370.8		12.8	31.2	3.8	6.5	0.1	13.2
	Final	297.2	667.9		22.7	53.9	4.5	11.1	17.3	30.5
Paramount	31%	163.7	163.7	0.1	9.0	9.0	1.7	1.7	10.2	10.2
	50%	65.7	229.4		7.4	16.4	0.8	2.5	0.3	10.4
	Final	376.6	606.1		14.9	31.2	2.1	4.7	30.2	40.6
Pico Rivera	31%	275.3	275.2	NA	11.5	11.5	0.5	0.5	27.4	27.4
	50%	-	275.2		-	11.5	-	0.5	-	27.4
	Final	12.0	287.2		1.3	12.8	0.0	0.5	0.5	27.9
Signal Hill	31%	8.5	8.5	0.2	0.8	0.8	0.2	0.2	0.2	0.2
	50%	105.8	114.3		7.0	7.8	0.9	1.1	5.9	6.1
	Final	51.9	166.2		2.2	10.0	0.0	1.1	4.9	11.0
South Gate	31%	229.3	229.3	4.7	23.2	23.2	0.9	0.9	6.5	6.5
	50%	198.1	427.4		15.0	38.3	0.8	1.7	12.6	19.1
	Final	746.9	1,174.3		49.3	87.5	5.1	6.8	54.7	73.8

Table 9-5. Los Cerritos Channel Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Bellflower	10%	NS	NS		-	-	-	-	-	-
	35%	244.4	244.4	NA	15.1	15.1	1.2	1.2	16.2	16.2
	Final	746.0	990.4		43.0	58.1	3.2	4.5	39.4	55.6
Cerritos	10%	NS	NS		-	-	-	-	-	-
	35%	9.7	9.7	NA	1.0	1.0	0.0	0.0	0.5	0.5
	Final	3.2	12.9		-	1.0	-	0.0	0.1	0.6
Downey	10%	NS	NS		-	-	-	-	-	-
	35%	57.2	57.2	0.1	5.3	5.3	0.0	0.0	2.7	2.7
	Final	35.8	93.0		-	5.3	-	0.0	2.1	4.8
Lakewood	10%	NS	NS		-	-	-	-	-	-
	35%	282.4	282.4	NA	31.5	31.5	4.7	4.7	6.9	6.9
	Final	869.7	1,152.1		90.0	121.5	7.0	11.8	29.3	36.2
Long Beach	10%	NS	NS		-	-	-	-	-	-
	35%	473.5	473.5	NA	33.8	33.8	12.3	12.3	16.4	16.4
	Final	1,156.3	1,629.8		87.9	121.7	9.5	21.8	48.9	65.3
Paramount	10%	NS	NS		-	-	-	-	-	-
	35%	267.0	267.0	NA	14.3	14.3	3.0	3.0	17.1	17.1
	Final	258.5	525.5		8.5	22.8	3.5	6.4	8.7	25.8
Signal Hill	10%	NS	NS		-	-	-	-	-	-
	35%	231.6	231.6	0.0	11.2	11.2	1.2	1.2	14.2	14.2
	Final	52.7	284.3		-	11.2	-	1.2	2.0	16.2

NS: Non-structural practices achieve 10% milestone

NA: No information/not enough information provided

*Runoff from non-MS4 sources and reductions fro existing regional BMPs are excluded from compliance target (see Attachment A)

Table 9-6. San Gabriel River Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Artesia	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.1	1.1		-	-	0.1	0.1	-	-
	Final	-	1.1		-	-	-	0.1	-	-
Bellflower	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.3	1.3		0.2	0.2	0.0	0.0	-	-
	Final	56.1	57.4		1.5	1.8	3.7	3.7	0.0	0.0
Cerritos	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	4.1	4.1		0.6	0.6	0.0	0.0	-	-
Diamond Bar	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	1.1	1.1		0.2	0.2	-	-	-	-
Downey	10%	NS	NS		-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	63.3	63.3	7.1	10.0	10.0	0.4	0.4	-	-
Lakewood	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	2.2	2.2		0.2	0.2	0.0	0.0	0.1	0.1
Long Beach	10%	NS	NS	NA	-	-	-	-	-	-
	35%	26.9	26.9		1.1	1.1	1.3	1.3	-	-
	Final	2.3	29.2		0.3	1.4	-	1.3	0.0	0.0

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Norwalk	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.8	0.8		-	-	0.1	0.1	-	-
	Final	4.0	4.8		-	-	0.3	0.3	-	-
Pico Rivera	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.2	0.2		0.0	0.0	-	-	-	-
	Final	60.2	60.4		10.7	10.8	-	-	0.0	0.0
Santa Fe Springs	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	30.3	30.3		4.6	4.6	-	-	0.3	0.3
Whittier	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.0	0.0		-	-	-	-	0.0	0.0
	Final	7.1	7.1		1.4	1.4	-	-	-	0.0

NS: Non-structural practices achieve 10% milestone

NA: No information/not enough information provided

*Runoff from non-MS4 sources and reductions fro existing regional BMPs are excluded from compliance target (see Attachment A)

Table 9-7. Coyote Creek Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Artesia	10%	NS	NS	NA	-	-	-	-	-	-
	35%	15.9	15.9		-	-	1.1	1.1	-	-
	Final	-	15.9		-	-	-	1.1	-	-
Cerritos	10%	NS	NS	NA	-	-	-	-	-	-
	35%	0.1	0.1		0.0	0.0	-	-	-	-
	Final	56.6	56.7		3.0	3.1	3.4	3.4	-	-
Diamond Bar	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.0	1.0		0.3	0.3	-	-	-	-
	Final	35.6	36.7		8.0	8.2	-	-	0.7	0.7
Hawaiian Gardens	10%	NS	NS	NA	-	-	-	-	-	-
	35%	23.6	23.6		0.3	0.3	1.5	1.5	-	-
	Final	3.4	27.1		0.2	0.6	0.1	1.6	0.0	0.0
La Mirada	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	124.9	124.9		9.6	9.6	5.6	5.6	-	-
Lakewood	10%	NS	NS	NA	-	-	-	-	-	-
	35%	17.5	17.5		0.9	0.9	0.7	0.7	-	-
	Final	2.3	19.7		-	0.9	0.3	0.9	-	-
Long Beach	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	0.0	0.0		-	-	0.0	0.0	-	-

Jurisdiction	Milestone	COMPLIANCE TARGET		POLLUTANT REDUCTION PLAN						
		Remaining MS4 Responsible Critical Year Storm Volume* (acre-ft/year)		Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)		Estimated Potential LID on Public Parcels Volume (acre-ft)		Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	
		Incremental	Cumulative		Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
Norwalk	10%	NS	NS	NA	-	-	-	-	-	-
	35%	1.6	1.6		-	-	0.2	0.2	-	-
	Final	50.9	52.5		1.4	1.4	3.2	3.4	-	-
Santa Fe Springs	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	12.6	12.6		1.0	1.0	-	-	1.1	1.1
Whittier	10%	NS	NS	NA	-	-	-	-	-	-
	35%	-	-		-	-	-	-	-	-
	Final	200.1	200.1		39.0	39.0	-	-	0.0	0.0

NS: Non-structural practices achieve 10% milestone

NA: No information/not enough information provided

*Runoff from non-MS4 sources and reductions fro existing regional BMPs are excluded from compliance target (see Attachment A)

9.2.2. Dry Weather

Dry weather reductions are attained through a combination of non-structural practices and structural BMPs as they are implemented as part of the wet weather attainment of limits. As wet-weather BMPs are implemented, they serve to remove the dry-weather flows thus meeting the compliance set forth to achieve dry-weather reductions. As a summary of the dry weather analysis, Table 9-8 through Table 9-11 outline the jurisdiction-wide attainment of interim and final milestones for dry weather. The reduction from implemented BMPs compares the actual dry-weather reduction versus the compliance target.

Table 9-8. Lower Los Angeles River Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Downey	31%	30.8%	65.9%
	50%	49.7%	76.9%
	Final	99.4%	99.4%
Lakewood	31%	30.8%	99.4%
	50%	49.7%	99.4%
	Final	99.4%	99.4%
Long Beach	31%	30.8%	62.1%
	50%	49.7%	74.3%
	Final	99.4%	99.4%
Lynwood	31%	30.8%	71.8%
	50%	49.7%	80.2%
	Final	99.4%	99.4%
Paramount	31%	30.8%	51.0%
	50%	49.7%	72.4%
	Final	99.4%	99.4%
Pico Rivera	31%	30.8%	71.8%
	50%	49.7%	71.8%
	Final	99.4%	99.4%
Signal Hill	31%	30.8%	69.3%
	50%	49.7%	94.9%
	Final	99.4%	99.4%
South Gate	31%	30.8%	62.8%
	50%	49.7%	75.9%
	Final	99.4%	99.4%

Table 9-9. Los Cerritos Channel Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Bellflower	10%	9.9%	58.1%
	35%	34.7%	71.4%
	Final	99.1%	99.1%
Cerritos	10%	9.9%	56.4%
	35%	34.7%	99.1%
	Final	99.1%	99.1%
Downey	10%	9.9%	59.8%
	35%	34.7%	99.1%
	Final	99.1%	99.1%
Lakewood	10%	9.9%	55.6%
	35%	34.7%	69.6%
	Final	99.1%	99.1%
Long Beach	10%	9.9%	60.1%
	35%	34.7%	76.9%
	Fin al	99.1%	99.1%
Paramount	10%	9.9%	52.8%
	35%	34.7%	79.8%
	Final	99.1%	99.1%
Signal Hill	10%	9.9%	60.8%
	35%	34.7%	99.1%
	Final	99.1%	99.1%

Table 9-10. San Gabriel River Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Artesia	10%	9.4%	57.6%
	35%	33.0%	94.3%
	Final	94.25%	94.25%
Bellflower	10%	9.4%	49.9%
	35%	33.0%	57.6%
	Final	94.25%	94.25%
Cerritos	10%	9.4%	43.7%
	35%	33.0%	48.1%
	Final	94.25%	94.25%
Diamond Bar	10%	9.4%	58.2%
	35%	33.0%	58.8%
	Final	94.25%	94.25%
Downey	10%	9.4%	57.4%
	35%	33.0%	58.1%
	Final	94.25%	94.25%
Lakewood	10%	9.4%	43.1%
	35%	33.0%	73.7%
	Final	94.25%	94.25%
Long Beach	10%	9.4%	46.6%
	35%	33.0%	91.6%
	Final	94.25%	94.25%
Norwalk	10%	9.4%	54.8%
	35%	33.0%	55.7%
	Final	94.25%	94.25%
Pico Rivera	10%	9.4%	51.8%
	35%	33.0%	51.9%
	Final	94.25%	94.25%
Santa Fe Springs	10%	9.4%	54.4%
	35%	33.0%	57.9%
	Final	94.25%	94.25%
Whittier	10%	9.4%	57.9%
	35%	33.0%	58.0%
	Final	94.25%	94.25%

Table 9-11. Coyote Creek Dry Weather Pollutant Reduction Plan for Attainment of Interim and Final Limits

Jurisdiction	Milestone	Dry Weather *E. coli* Load Reduction	
		Compliance Target	Reduction from Implemented BMPs
Artesia	10%	9.9%	60.9%
	35%	34.6%	85.1%
	Final	98.9%	98.9%
Cerritos	10%	9.9%	56.3%
	35%	34.6%	56.3%
	Final	98.9%	98.9%
Diamond Bar	10%	9.9%	61.3%
	35%	34.6%	65.9%
	Final	98.9%	98.9%
Hawaiian Gardens	10%	9.9%	59.7%
	35%	34.6%	96.9%
	Final	98.9%	98.9%
La Mirada	10%	9.9%	57.4%
	35%	34.6%	58.7%
	Final	98.9%	98.9%
Lakewood	10%	9.9%	60.7%
	35%	34.6%	76.5%
	Final	98.9%	98.9%
Long Beach	10%	9.9%	54.5%
	35%	34.6%	91.9%
	Final	98.9%	98.9%
Norwalk	10%	9.9%	59.2%
	35%	34.6%	60.8%
	Final	98.9%	98.9%
Santa Fe Springs	10%	9.9%	51.7%
	35%	34.6%	52.0%
	Final	98.9%	98.9%
Whittier	10%	9.9%	60.7%
	35%	34.6%	61.4%
	Final	98.9%	98.9%

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Attachment A: DETERMINATION OF BMP TREATMENT CAPACITY

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

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1. Determination of BMP Treatment Capacity

The process for determining the necessary cumulative BMP capacity depends on the type of numeric goal being addressed. As shown in Figure 1-1, the volume-based (design storm) approach, necessary BMP capacity was determined through a design storm analysis. For the load-based (pollutant reduction), the analysis leveraged the optimization routines in the customized WMMS. An initial step in the RAA was a comparison of the volume reductions required by the load-based and volume-based numeric goals, to support selection of the wet weather critical conditions.

This appendix describes key analyses conducted to determine the potential capacity of different BMPs including non-structural BMPs. In addition, it describes the approach for non-MS4 sources.

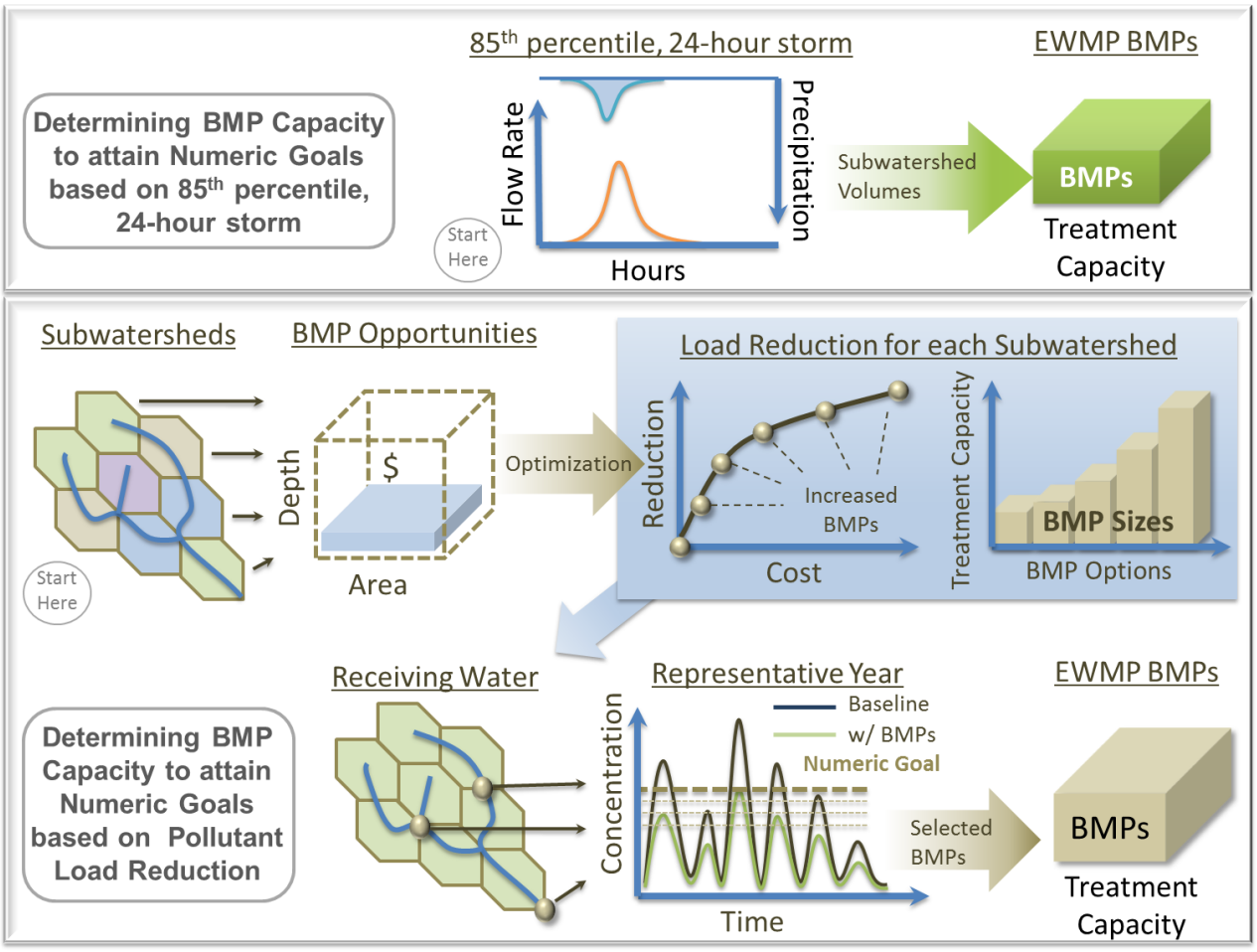


Figure 1-1. Illustration of Process for Determining Required BMP Capacities for the WMP using Volume-Based (top panel) and Load-Based (bottom panel) Numeric Goals.

1.1. Load Reduction Optimization Modeling Analysis

During development of WMMS, distributed BMPs were modeled at the subwatershed-scale using a generalized BMP treatment train. Depending on the land use type, different types of BMPs were applied. The three generalized BMP pathways were: (1) transportation, (2) residential, and (3) commercial/industrial/institutional. A conceptual schematic of the BMP network and pathways is presented in Figure 1-2 (LACDPW 2011).

For the RAA, subwatershed-scale SUSTAIN models were developed using the WMMS modeling assumptions. Each BMP from the treatment train described in Figure 1-2 was configured consistently with modeling performed during development of the WMMS system and followed the Regional Board RAA guidelines. A summary of key BMP parameters used for RAA modeling are presented in Table 1-1. Background infiltration rates were changed from those used during WMMS development (0.5 inches per hour) to site-specific infiltrations rates provided in the Los Angeles County Hydrology Manual and associated spatial datasets (LACDPW 2006). These rates also deviate somewhat from the values suggested in the RAA Guidelines (0.1 – 0.3 inches per hour); however, the data are locally-derived, published and reliable which provides adequate justification for their use.

First, SUSTAIN models were configured using the existing condition watershed model runoff timeseries and land use distributions as inputs, and benchmarked against the aggregated LSPC model results to establish baseline consistency. Second, using the SUSTAIN configuration with the respective BMP opportunities per pathway (as presented in Figure 1-2) in each subwatershed, optimization runs were formulated to maximize zinc reduction (i.e. the limiting target pollutant) while minimizing total estimated implementation cost. This resulted in a matrix of high-resolution cost-effectiveness curves for each subwatershed. Finally, a Tier-II optimization framework was configured to collectively optimize target load reductions at the downstream assessment point, with an added equitability constraint to ensure that each jurisdiction shared proportionally in the reduction effort. For the Tier-II optimization, instead of the decision variables being individual BMPs within a network like before, they were comprised of individual solutions taken off the cost-effectiveness curves at each subwatershed. The primary objective was to quantify the stormwater retention volume and load reductions provided by the collective actions occurring within each contributing jurisdiction tributary to the assessment point.

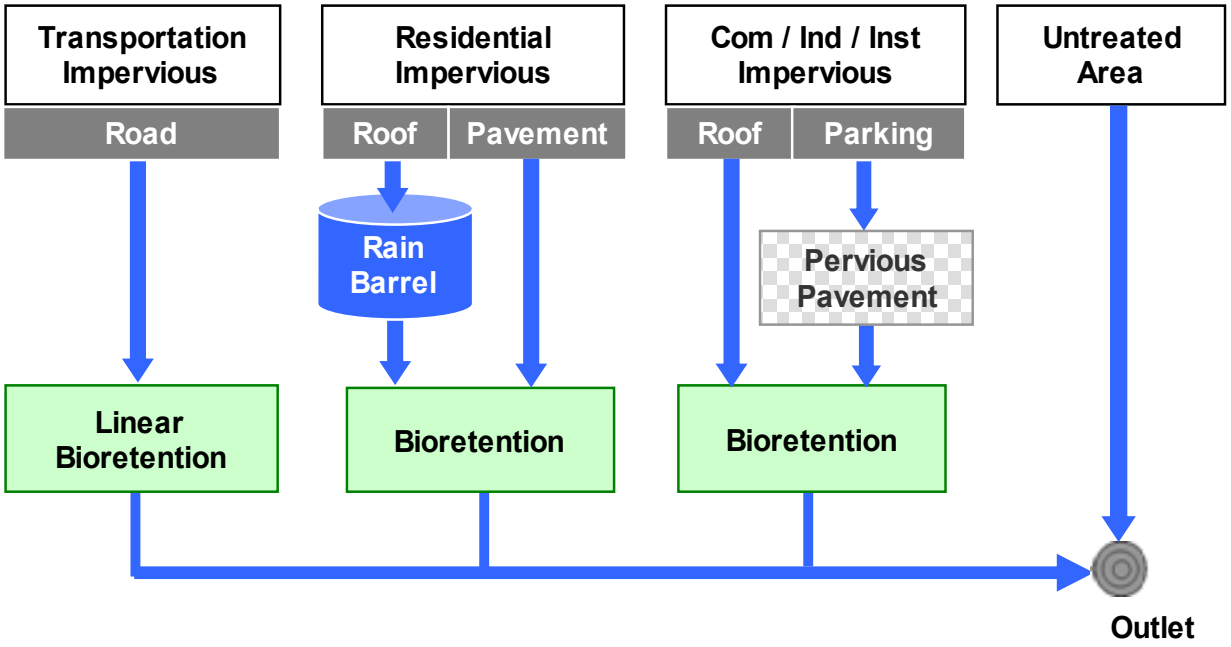


Figure 1-2. Conceptual schematic of the WMMS aggregate BMP treatment train (LACDPW 2011b).

Table 1-1. BMP parameters used in the load reduction modeling analysis

Constituent Group	Rain Barrel	Bioretention	Porous Pavement
Media Infiltration Rate (in/hr)	n/a	0.1 – 0.9	0.1 – 0.9
Substrate Layer Porosity (fraction)	n/a	0.4	0.4
Substrate Layer Field Capacity (fraction)	n/a	0.3	0.055
Substrate Layer Wilting Point (fraction)	n/a	0.1	0.05
Underdrain Gravel Porosity (fraction)	n/a	0.5	0.45
Vegetative Parameter, A (unitless)	n/a	0.6	1.0
Background Infiltration Rate (in/hr)	n/a	0.1 – 0.9	0.1 – 0.9
First Order Decay Rate (1/day)[1]	0.2 – 0.8	0.2 – 0.8	0.2 – 0.8
Underdrain Filtration Rate (%)[1]	n/a	0.5 – 0.9	0.5 – 0.9

1. Rates vary by pollutant and the type of BMP soil media

1.2. BMP Capacity Analysis for the Rights-of-Way

A key consideration for WMP implementation is the potential BMP capacity that could be provided by rights-of-way (ROW). In order to highlight the potential structural BMP implementation approaches to meet the volume targets, a BMP opportunity analysis was conducted. Two broad categories of BMPs – ROW BMPs and LID on public parcels – were used to describe the networks of BMPs needed to meet the target reductions.

This section describes how right-of-ways were evaluated for opportunities to locate BMPs and evaluate the key components that affect the ability of the ROW BMP networks to be effective: space available in the ROW, types of BMPs to site in the ROW, drainage areas that could potentially be treated by ROW BMPs, and estimated BMP infiltration rates.

Stormwater BMPs in the ROW are treatment systems arranged linearly within the street ROW and are designed to reduce runoff volumes and improve runoff water quality from the roadway and adjacent parcels. Implementing BMPs in the ROW provides an opportunity to meet water quality goals by locating BMPs in areas owned or controlled by a municipality to avoid the cost of land acquisition or establishing an easement. Implementing BMPs in the ROW allows for direct control of construction, maintenance, and monitoring activities by the responsible jurisdiction. Bioretention and permeable pavement are typically best suited for implementation in the ROW



Figure 1-3. Conceptual schematic of ROW BMPs with an underdrain (Arrows indicate water pathways).

Not all roads are suited for ROW BMP retrofits; therefore, screening is required to eliminate roads where ROW BMP retrofits are impractical or infeasible due to physical constraints. While ROW BMP retrofits can be implemented in a variety of settings, the physical characteristics of the road itself such as the road type, local topography, and depth to groundwater can significantly influence the practicality of designing and constructing these features. A screening protocol was established to identify realistic opportunities for retrofits based on the best available GIS data. The opportunities identified during this process provide the foundation for the engineering analysis to determine the volume of stormwater that can be treated by ROW BMP retrofits in the subject watersheds. This section describes the data and the screening process used to identify the best available roads for ROW BMP retrofits.

1.2.1. Data Used

To evaluate BMP opportunities and available implementation areas, several key data sets were processed and formatted. Table 1-2 outlines the data set names, formats, descriptions, and sources.

Table 1-2. Summary of Data

Data Set	Format	Description	Source
Parcels	GIS Shapefile	Outlines property boundaries and sizes	Los Angeles County (LAC) Assessor
Roads	GIS Shapefile	Shows street centerline network & classification by Topologically Integrated Geographic Encoding and Reference (TIGER)	LAC GIS Portal
Land Use	GIS Shapefile	Subdivides the region into predefined land use categories with similar runoff properties. Each individual land use feature identifies the associated percent impervious coverage.	LAC WMMS Model
Subwatersheds	GIS Shapefile	Defines drainage areas to selected outlet points	LAC WMMS Model
Slopes	GIS Shapefile	Classifies regions by the slope category	LAC WMMS Model
Soils	GIS Shapefile	Outlines spatial extents of dominant soil types	LAC GIS Portal
Jurisdictions	GIS Shapefile	Establishes city and county boundaries	LAC GIS Portal
Drainage Network	GIS Shapefile	Identifies stormwater structure layout and conveyance methods	LAC GIS Portal
Groundwater Contours	GIS Shapefile	Illustrates groundwater depth as measured from the surface	LAC BOS
Soil Runoff Coefficient Curves	PDF File	Curves characterize effect of rainfall intensity on runoff coefficient per soil type	Hydrology Manual Appendix C (LADPW 2006)
Aerial Imagery	Layer File	Orthoimage of entire region	ESRI Maps & Data Imagery
Runoff Rates	Time Series	Hourly runoff for land uses for the continuous simulation model	LAC WMMS Model

1.2.2. ROW BMP Screening

High traffic volumes, speed limits, slopes, and groundwater tables, impact the feasibility of ROW BMP implementation. Road classification data contains information typically useful for determining if the street is subject to high traffic volumes and speeds, and Census TIGER road data provides the best available road classification information for the study area. Table 1-3 shows the Master Address File (MAF)/TIGER Feature Classification Codes (MTFCC) deemed appropriate for ROW BMP retrofit opportunities. Only roads with the MTFCCs listed in Table 1-3 can be considered for ROW BMP retrofits in this screening analysis. All other roads are screened out.

Table 1-3. ROW BMP MTFCC

MTFCC	Description
S1400	Local neighborhood road, rural road, city street
S1730	Alley
S1780	Parking lot road

In addition to the screening of road types, opportunities were further screened to remove segments that have steep slopes. BMP implementation on streets with grades greater than 10 percent present engineering challenges that substantially reduce the cost effectiveness of the retrofit opportunity. From the available slope information, roads were considered as retrofit opportunities if the slope was less than 10 percent.

The final screen applied to the roads is the depth to groundwater. Implementing ROW BMPs in areas where the groundwater table is high is not recommended due to the fact that the BMPs are rendered ineffective due to their storage capacity being seriously diminished with groundwater inflow. From the groundwater contours provided, roads were eliminated as opportunities if the depth to groundwater was less than 10 feet. Attachment C highlights the areas identified with groundwater depths of 10 feet or less. The highlighted areas provide a starting point for elimination, however it should be noted that further evaluation may be necessary based on local knowledge of areas with high groundwater tables or daylighting of perched groundwater layers as identified by the jurisdictions.

The results of the ROW BMP screening are presented in Attachment C. Attachment C shows the roads available for retrofit (highlighted in green) versus all of the roads within the study area. An overall watershed map and individual jurisdictional maps for each watershed show all the identified retrofit opportunities. The maps indicate that a majority of the roads within each jurisdiction pass through the screening as potential retrofits. It should be noted that due to the coarse nature of the road classification data, only freeways, highways, and major roads were eliminated in the classification screening process. In practice, retrofitting every street that passed through the screening will likely not be feasible and adaptive management strategies will be necessary in the future to further refine the road classification data layer to more accurately identify road types suitable for ROW BMP retrofits.

The screened opportunities were used as the basis to evaluate the potential runoff volume reduction provided by ROW BMP implementations. In the following section, an engineering assessment is presented that determines the ROW BMP contributing drainage areas and the overall volume reductions achieved through ROW BMP implementation.

1.2.3. ROW BMP Configuration

The three most important assumptions necessary to evaluate BMP volume reduction performance are (1) the physical BMP configuration assumptions, (2) the contributing drainage area characteristics, and (3) the in-situ soil infiltration rates. By understanding the area draining to the BMPs and the volume capacity and function of the BMPs, an assessment can be performed to evaluate the potential of ROW retrofit BMPs to capture the required runoff volume in each subwatershed. This section summarizes the information and processes used to establish BMP configuration assumptions to be used for the runoff analysis presented in the following section.

1.2.4. BMP Assumptions Based on Green Streets

ROW BMPs consists of multiple types and combinations of stormwater treatment options. A well-established and often utilized ROW BMP is green streets. Green streets provide multiple benefits for pollutant and volume reduction and have been implemented in locations throughout the nation. In the future and as updates are made to the WMP, other ROW BMPs may be incorporated to achieve the required volume reductions.

Green streets typically consist of bioretention areas between the curb and sidewalk (herein referred to as the parkway) and/or permeable pavement within the parking lane. Prior to evaluating green street BMP treatment capacity, it is imperative to establish a configuration that can be assumed for typical implementation watershed-wide. This establishes the parkway space needed for the BMPs (plan view) and also determines the hydraulic function and storage capacity of the subsurface systems.

Bioretention systems are surface and subsurface water filtration systems, which use vegetation and underlying soils to store, filter, and reduce runoff volume while removing pollutants. Figure 1-4 represents a typical bioretention system incorporated into a green street design. Bioretention systems consist of a ponding depth and engineered soil media depth to treat runoff. Table 1-4 outlines typical widths, depths, and soil parameters associated with green street bioretention cells. Green streets were assumed to have no underdrains because the

WMP emphasizes low impact development and stormwater volume reduction to achieve pollutant load reductions.

Driveways and utilities limit the road length that can be converted into a green street. From past experience and aerial imagery review in the local watersheds, it was determined that 30 percent of the road length could be considered as the maximum possibility for conversion into bioretention area. This factor was used to limit the total length of potential green street bioretention areas. The parameters outlined above and in the table below were assumed to be the typical green street BMP implementation configuration for the screening analysis and the BMP treatment capacity evaluation described in the next section.

Table 1-4. BMP Design and Modeling Parameters for Subsequent Analyses

Component	Design Parameter	Value
Ponding Area	Depth	0.8 feet
	Width	4.0 feet
Media Layer	Depth	3.0 feet
	Porosity	0.4
Overall Profile	Effective Depth[1]	2.0 feet

[1] Effective depth is the maximum equivalent depth of water stored within the bioretention area less the depth displaced by soil media (vertical summation of surface ponding depth and void storage depth)

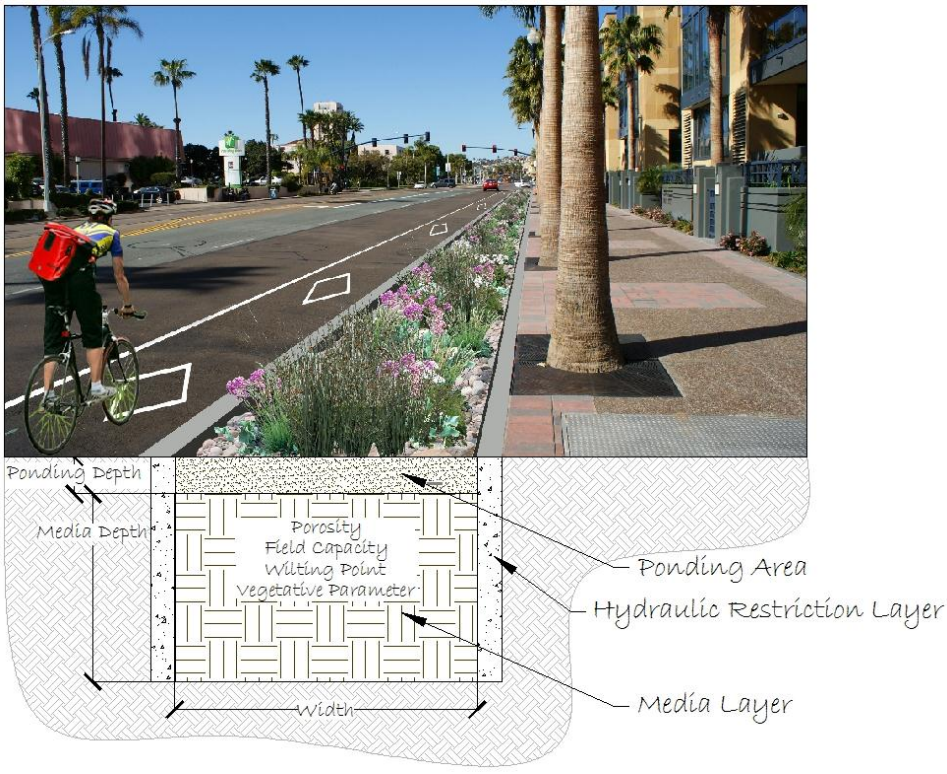


Figure 1-4. Typical bioretention section view (City of San Diego 2011).

Contributing Drainage Area Analysis

The purpose of this analysis was to realistically represent the area, type, and impervious coverage of land draining to potential green streets throughout the entire watershed. This is a critical step in WMP development because it predicts what volume of runoff can be assumed treated by green streets and what remaining (untreated) runoff must be routed to regional BMPs or addressed in other ways. The following engineering analyses were performed at a subwatershed-scale within the limits of available data and resources to estimate the maximum potential green street treatment capacity; given more detailed street-by-street drainage area data, the assumptions and results presented herein could be refined in future efforts to optimize green street treatment capacity. Figure 1-5 illustrates a simplified routing schematic used to represent the available runoff flow pathways to green street and regional BMPs throughout the watershed. The following subsections explain how each representative drainage area illustrated in Figure 1-5 was characterized.

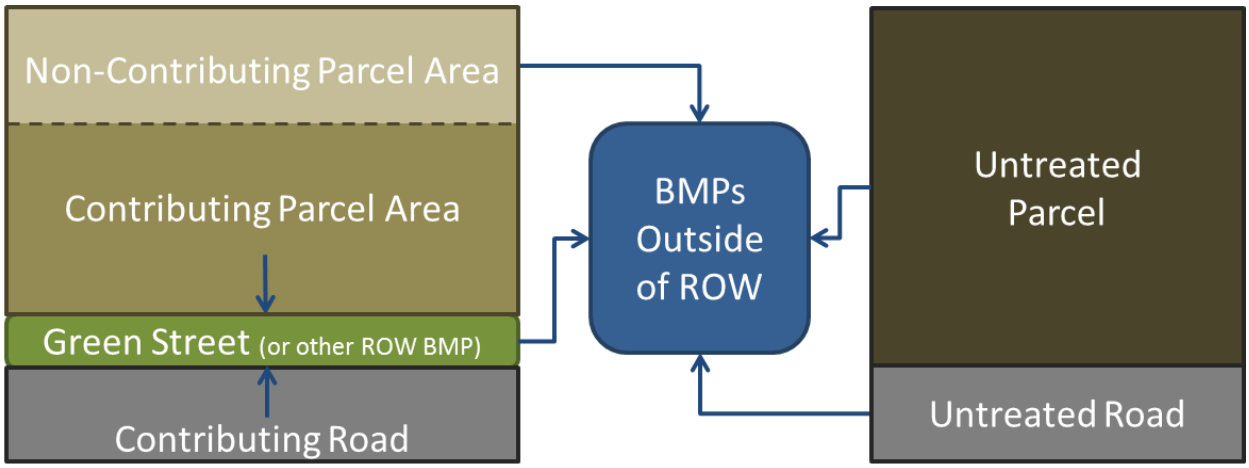


Figure 1-5. Green streets model schematic (arrows denote direction of runoff routing; figure not to scale).

Typical Parcel Size & Street Frontage Analysis

The nature of the green street analysis requires an understanding of typical parcel sizes and how much of the parcel drains to the ROW. Much of the runoff from parcels and the road drains to the ROW and is conveyed downstream through curb, gutter, and pipes. By identifying the typical parcel size, frontage length, and associated road area that drains to a candidate right-of-way area (Figure 1-6) the total area draining to potential green street retrofit opportunities was extrapolated throughout the watershed. For purposes of this study, only the high-density residential, multifamily residential, commercial, institutional, and industrial land uses were considered as contributing substantial runoff to the ROW (all other land uses contain minimal impervious area and thus contribute insubstantial runoff to the ROW).

The typical parcel size for each land use was determined by identifying all parcels for each land use. Once all the parcels were selected, the median parcel size for each land use was calculated and tabulated. This method evaluated thousands of parcels throughout the entire watershed and provided the most accurate depiction of the typical parcel size for each land use based on available data. Results are shown in Table 1-5.

Each parcel is adjacent to a portion of the ROW where the green street would be implemented. A subset of parcels approximate to the median parcel size for each land use was selected to determine the average frontage length. The portion of the selected parcels that was in contact with the ROW was measured using desktop analysis tools and averaged between all parcels of the same land use. Results are shown in Table 1-5.

Road area draining to green streets constitutes a substantial component of the total impervious drainage area. To establish road drainage areas, typical road widths were defined by sampling representative road segments located in each land use. Widths were measured from curb-to-curb using aerial orthoimagery and reported to the nearest even integer. The median sampled road width for each land use was calculated and compared with the City of Los Angeles Standard Street Dimensions (City of Los Angeles Bureau of Engineering 1999) for validation. To predict the resulting contributing road areas, the previously measured frontage length was multiplied by half the road width. Roads were assumed to be crowned; therefore, only half of the width would drain to one side of the road. Results are shown in Table 1-5.

As discussed in Section 1.2.4, only 30 percent of the frontage length could be converted into bioretention area. This factor was multiplied by the frontage length and used in limiting the total length of bioretention available within the model, as presented in Table 1-5.

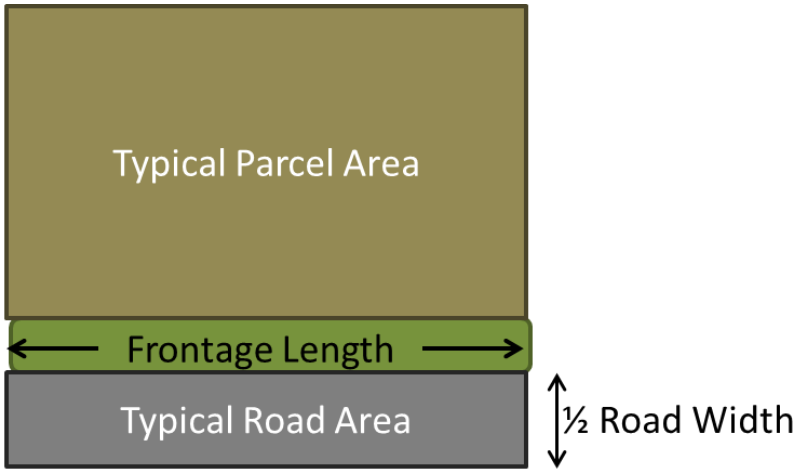


Figure 1-6. Typical parcel area, road width, road area, and frontage length schematic (figure not to scale)

Table 1-5. Typical parcel area, road area, and frontage length

Land Use	Typical Parcel Area (ft^2)	Frontage Length (ft)	Typical Road Width (ft)	Typical Road Area (ft^2)	BMP Length (ft)
High-density Residential	6,528	57	38	1,083	17
Multifamily Residential	13,526	60	30	900	18
Commercial	12,429	100	63	3,150	30
Institutional	38,215	143	37	2,646	43
Industrial	26,467	117	46	2,691	35
Other Land Use (Open Space, Vacant, etc.)	n/a[1]	100	40	2,000	30

[1] assumed not draining to ROW

Contributing Parcel Area Analysis

Many parcels will not always entirely drain to the ROW because portions can be retained on-site or flow onto an adjacent property. The actual volume of water that can be treated by a green street BMP was determined by identifying the typical proportion of the parcel that drains to the ROW (as shown in context of the model

schematic in Figure 1-7). This step also determines the area, and associated runoff, that is *not* expected to drain to green streets and is routed directly to downstream regional facilities or other practices (herein referred to as non-contributing parcel area).

The contributing areas to the green street BMPs were found using random sampling and identifying the surrounding parcel drainage patterns. Parcels were selected using a random number generator and drainage areas were determined on a desktop analysis using topography, aerial imagery, and drainage infrastructure features. The average contributing percentage was identified by evaluating multiple sites. Table 1-6 shows the percent contributing areas by land use that were determined from this analysis.

The impervious coverage of contributing parcel areas was also characterized during this step so that runoff could be simulated and routed to green streets in each land use. This was performed by tabulating the imperviousness data from the WMMS Model for each individual land use feature. The area-weighted mean impervious coverage was then calculated for each land use type. Results are tabulated for each land use in Table 1-6.

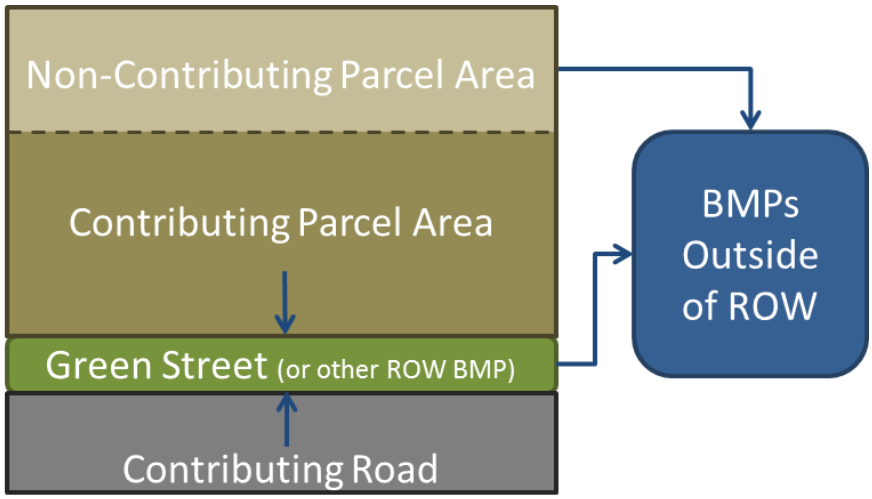


Figure 1-7. Parcel contributing area to ROW (impervious varies by land use; arrows denote direction of runoff routing; figure not to scale).

Table 1-6. Contributing area percentage by land use

Land Use	Contributing to ROW	Non-contributing to ROW	Percent Impervious
High-density Residential	80%	20%	36%
Multifamily Residential	80%	20%	60%
Commercial	80%	20%	90%
Institutional	80%	20%	72%
Industrial	35%	65%	66%
Other Land Use (Open Space, Vacant, etc.)	0%	100%	n/a

Untreated Roads Tabulation

Untreated roads consist of roadways with steep slopes, classifications not suited for green street implementation, or adjacent to open space or vacant parcels. Untreated road and associated adjacent parcel area that will ultimately drain to other BMPs was tabulated using available GIS data and screening results from Section 1.2.2 (conceptually illustrated in Figure 1-8).

Because green streets are implemented in the linear environment of the transportation corridor, it was assumed that the percentage of parcel area draining to green streets would be proportional to the percentage of suitable roads for green streets (as identified in Section 1.2.2) in each subwatershed. In other words, parcels associated with unsuitable roads were assumed to bypass green street treatment and routed directly to other facilities (these areas are defined herein as *untreated parcels*). The total treated and untreated parcel areas were reconciled with the total areas of each land use (per subwatershed) in the WMMS Model for validation and consistency.

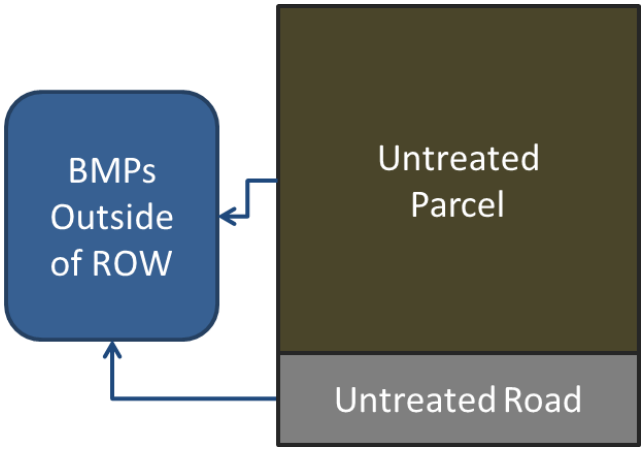


Figure 1-8. Schematic depicting untreated parcel and untreated road runoff routing (arrows denote direction of runoff routing; figure not to scale).

Summary of Contributing Drainage Areas

Results of the preceding analyses are presented in Figure 1-9. Areas that were assumed *un*treated by green streets include unsuitable roads and adjacent parcels, portions of suitable parcels that do not drain to the ROW, and predominantly pervious parcels (Open Space, Vacant, etc.), as discussed in preceding subsections; runoff from these untreated areas is assumed routed directly to regional facilities. Note that contributing areas are not necessarily proportional to contributing runoff due to variation in impervious coverage; runoff routing resulting from the preceding analyses is presented in the following section.

Given more detailed street-by-street engineering analyses, the potential area treated by green streets could be optimized, but the results below represent realistic estimates based on sound engineering judgment and currently available data and resources. Adaptive management strategies could target specific land uses that tend to bypass green street treatment (e.g. runoff, and associated treatment capacity, generated by industrial areas could be addressed through relevant industrial permits or onsite BMPs). Additional discussion on adaptive management strategies is provided in Section 8 of the main report.

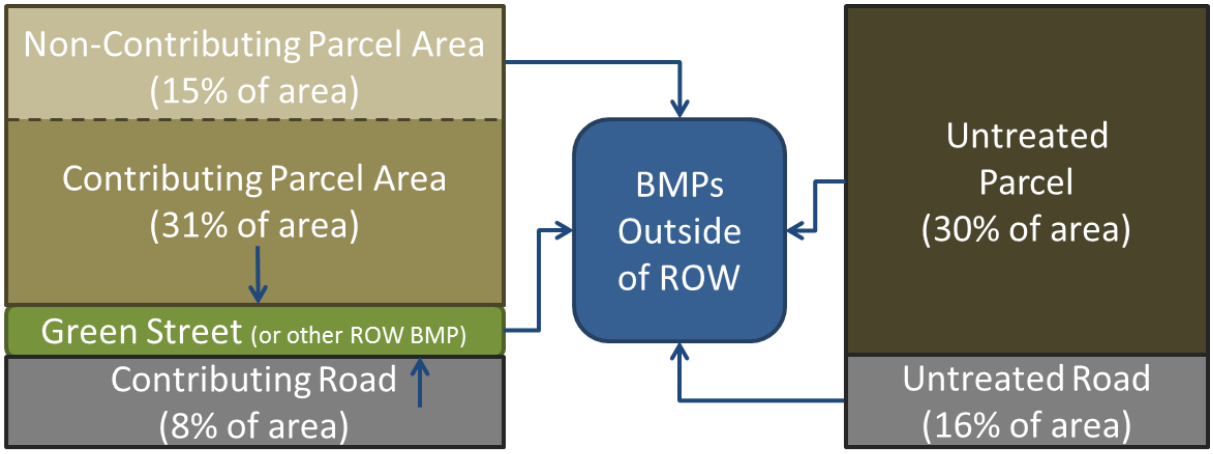


Figure 1-9. Schematic characterizing approximate distribution of routing to BMPs in the ROW for all WMP areas (arrows denote direction of runoff routing; figure not to scale).

BMP Infiltration Rates by Subwatershed

The purpose of performing the subwatershed infiltration rate analysis was to assign an average green street BMP infiltration rate to each subwatershed using soils data. Infiltration rates were assigned at the subwatershed level, which is the finest resolution at which the model performs hydrologic and water quality computations.

Soil data coverage provided through the LACDPW categorized soil unit areas into soil types. Runoff coefficient curves reported in the Hydrology Manual were developed by LACDPW for each soil type using double ring infiltrometer tests performed on areas of homogeneous runoff characteristics (LACDPW 2006). LADPW employed a sprinkling-type infiltrometer to perform the tests in each homogeneous area.

Runoff coefficient curves represent the response of the runoff coefficient (defined as the ratio of runoff to rainfall from a land area) to varying rainfall intensities. Each curve displays an inflection point representing the rainfall intensity at which substantial runoff initiates. According to LADPW (2006), each curve was assigned a minimum runoff coefficient of 0.1, "indicating that there is some runoff even at the smallest rainfall intensities." If it is assumed that substantial runoff initiates when the intensity of rainfall is greater than the soil's inherent infiltration rate, then the infiltration rate can be assumed equal to the rainfall intensity at the inflection point (less the assumed minimum runoff).

As demonstrated conceptually in Figure 1-10, the inflection point, and subsequently calculated infiltration rate, for each unique soil type in the WMP areas were identified using the runoff coefficient curves in Appendix C of the *Hydrology Manual* (LADPW 2006). Subwatershed areas were then intersected with the soil type coverage to calculate an area-weighted infiltration rate. Attachment C shows the distribution of the infiltration rates.

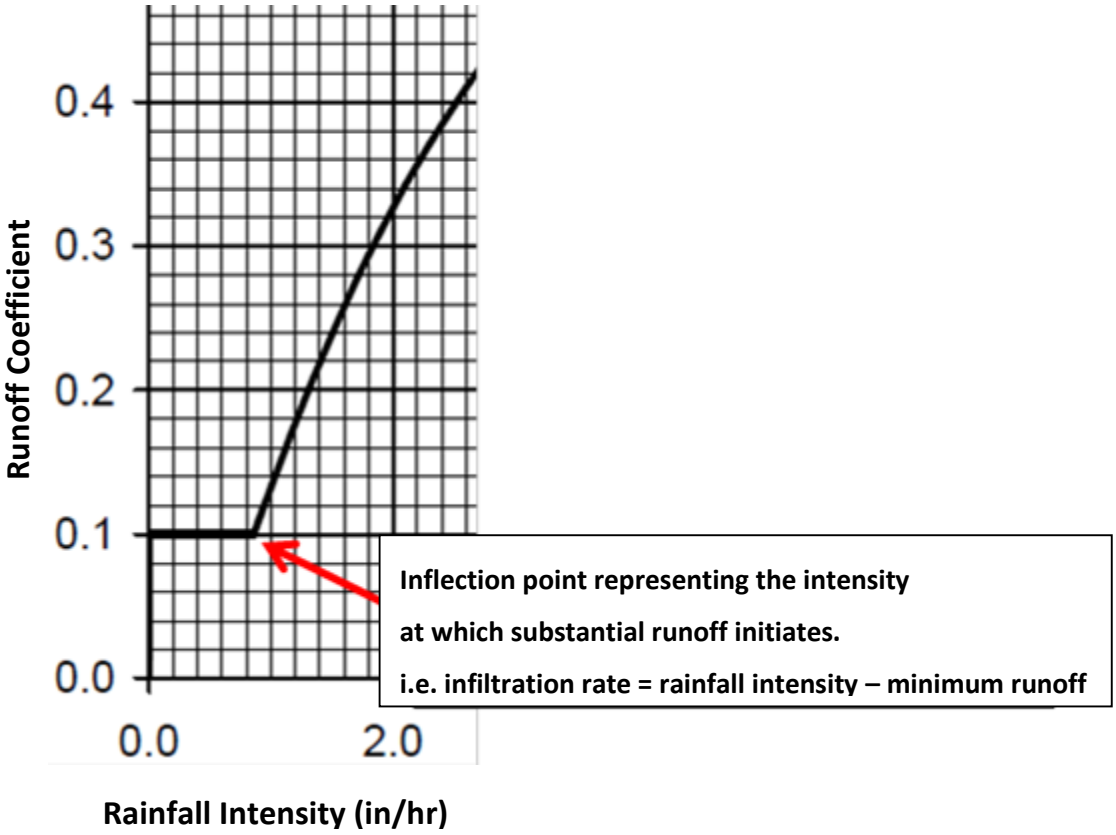


Figure 1-10. Example determination of runoff coefficient inflection point for an arbitrary soil type in Appendix C of LACDPW (2006).

1.3. LID on Public Parcels Assessment

Retrofitting public parcels with LID can be an efficient strategy for reducing stormwater runoff. This method allows municipalities the flexibility to prioritize and schedule stormwater projects to coincide with improvements that are already on the books (such as scheduled parking lot resurfacing, utility work, and public park improvements). Implementing LID on public parcels also allows municipalities the freedom to construct, inspect, and maintain BMPs without the need to purchase private property or to create stormwater easements.

The spatial extent of public parcels in each subwatershed was identified by selecting all parcels labeled as public by their assessors identification number (AIN). A total of 7,052 acres of public land was identified during this process (7% of the total WMP area). Each public parcel was assumed to implement BMPs that would treat the 85th percentile, 24-hour storm. The BMP volume was assumed to equal the 85th percentile, 24-hour storm depth times the impervious area.

LID retrofits are not feasible in all locations due to steep slopes, soil contamination hazards, and other constrains. The total runoff to be retained on public parcels was therefore discounted by 30% in order to provide a more realistic goal; this estimate was made in the lack of more detailed data, based on past LID screening exercises performed in Los Angeles County. The discount factor should be refined as actual public project sites are screened and prioritized.

1.4. Existing, Planned, and Potential BMPs

Existing and planned BMPs throughout the WMP areas were identified by the jurisdictions. These BMPs will provide capacity to reduce the annual storm runoff volume and demonstrate progress towards achieving the target runoff volume reduction.

1.4.1. Modeled Existing/Planned Subwatershed-Scale Regional BMPs

Regional BMPs that treat large portions of, or entire, subwatersheds (i.e. those with drainage areas larger than 50 acres) were modeled to quantify the impact to the upstream jurisdictions. The modeling approach and predicted performance for these specific sites is detailed in the following subsections. It is important to note that modeling was performed at a planning level coincident with the resolution of the subwatershed-scale WMMS model. Limited data were available to represent the sites, so conservative engineering assumptions were applied where appropriate. The calculated equivalent volume reductions from the BMPs can be refined during the adaptive management process once detailed design and monitoring data become available for the sites.

DeForest Wetlands Project

The DeForest Wetlands Project is located along the east bank of the Los Angeles River in the City of Long Beach and is comprised of approximately 34 acres of restored terrestrial and freshwater habitat and recreational amenities. The Project provides both groundwater recharge and surface water quality improvement. Site and modeling details are listed in Table 1-7.

Table 1-7. DeForest Wetlands Project details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	In Development		
Compliance Targets for Contributing Subwatersheds[1]	**248.7**	**ac-ft/yr**	Subwatershed 486066
	247.6	**ac-ft/yr**	Subwatershed 486068
Given Details			
Drainage Area	1490	ac	Delineated in GIS using WMMS subwatershed boundaries
Average Annual Infiltration Volume	15-35	ac-ft/yr	Per Section 3 of the WMP
Average Annual Treated Volume	800-1000	ac-ft/yr	Per Section 3 of the WMP; assumed volume is fully treated by wetland pollutant removal mechanisms prior to discharge; assumed treated volume is in addition to infiltration volume
Annual Runoff Volume Entering Wetland[1]	1589	ac-ft/yr	WMMS output
Annual Zinc Load Entering Wetland[1]	1808	lb Zn/yr	WMMS output
Wetland Zinc Effluent Concentration	20	µg/L	Upper limit of 95% confidence interval for wetland channels, per RAA Guidelines (LARWQCB 2014)
Modeling Results			
Estimated Annual Zinc Load Reduced by Infiltration[1]	17.1	lb Zn/yr	Assumed loading associated with minimum average infiltrated runoff; assumed load sequestered in sediments and/or sorbed to underlying soils
Estimated Annual Zinc Load Reduced by Wetland Functions[1]	535	lb Zn/yr	Reduction associated with treated volume; calculated by subtracting average effluent load associated with minimum treated volume from annual influent loading
Estimated Zinc Load Reduction	30.5%		

Relative to Annual Runoff[1]			
Estimated Zinc Load Reduction Relative to Compliance Target[1]	97.7%		
Estimated Equivalent Annual Volume Reduction[1]	**243.1**	**ac-ft/yr**	Subwatershed 486066
	242.0	**ac-ft/yr**	Subwatershed 486068

[1] Indicated annual volumes are referenced to the critical year

Dominguez Gap Wetlands Project

The Dominguez Gap Wetlands Project consists of two treatment wetlands situated on the east and west banks of the Los Angeles River that features habitat and recreational amenities. The East Basin is a 37-ac facility that is dewatered manually by a pump. The West Basin primarily functions as an infiltration basin and is approximately 15 acres. Table 1-8 and Table 1-10 characterize the site and modeling details of the East and West Basins, respectively.

Table 1-8. Dominguez Gap East Wetlands Project – East Basin details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	Complete		
Compliance Targets for Contributing Subwatersheds[1]	**346.9**	**ac-ft/yr**	Subwatershed 486014
	14.3	**ac-ft/yr**	Subwatershed 446014
Given Details			
Drainage Area	2075	ac	Delineated in GIS using WMMS subwatershed boundaries
Maximum Volume Treated per Storm Event	71	ac-ft	Per Section 3 of the WMP; assumed volume is fully treated by wetland pollutant removal mechanisms prior to discharge
Maximum Annual Volume Treated[1]	526	ac-ft/yr	Based on storm events recorded for critical year; assumed all storm event runoff volume treated up to 71 ac-ft
Annual Runoff Volume Entering Wetland[1]	913	ac-ft/yr	WMMS output
Annual Zinc Load Entering Wetland[1]	934	lb Zn/yr	WMMS output
Wetland Zinc Effluent Concentration	20	µg/L	Upper limit of 95% confidence interval for wetland channels, per RAA Guidelines (LARWQCB 2014)
Modeling Results			
Annual Zinc Load Reduced by Infiltration[1]	unknown	lb Zn/yr	Site soil information or monitored data required
Annual Zinc Load Reduced by Wetland Functions[1]	202	lb Zn/yr	Reduction associated with treated volume; calculated by subtracting average effluent load associated with minimum treated volume from annual influent loading
Zinc Load Reduction Relative to Annual Runoff[1]	22%		
Zinc Load Reduction Relative to Compliance Target[1]	55%		
Equivalent Annual Volume Reduction[1]	**191.7**	**ac-ft/yr**	Subwatershed 486014
	6.4	**ac-ft/yr**	Subwatershed 446014

[1] Indicated annual volumes are referenced to the critical year

Table 1-9. Dominguez Gap Wetlands Project – West Basin details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	Complete		
Compliance Targets for Contributing Subwatersheds[1]	**152.0**	**ac-ft/yr**	Subwatershed 486013 (41% contributes to West Basin)
	7.4	**ac-ft/yr**	Subwatershed 486015
Given Details			
Drainage Area	299	ac	Delineated in GIS using WMMS subwatershed boundaries
Annual Runoff Volume Infiltrated	All	ac-ft/yr	Per Section 3 of the WMP, no connection to Los Angeles River
Modeling Results			
Subwatershed 486013 Annual Runoff Volume Infiltrated[1]	47%		41% of subwatershed area contributes 47% of runoff volume to the basin
Subwatershed 446015Annual Runoff Volume Infiltrated	100%		100% of subwatershed area contributing
Equivalent Annual Volume Reduction[1]	**152.0**	**ac-ft/yr**	Subwatershed 486013 (compliance target is 43% annual reduction, so meets target)
	7.4	**ac-ft/yr**	Subwatershed 446015

[1] Indicated annual volumes are referenced to the critical year

Willow Springs Park

The Willow Springs Park project will convert a public parcel to a 47-acre park. The park will contain bioswales and a water feature integrated into a recreational spaces. Table 1-10 Characterizes the site and modeling details.

Table 1-10. Willow Springs Park details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower Los Angeles River		
Location	City of Long Beach		
Status	In Development		
Compliance Targets for Contributing Subwatersheds[1]	**26.5**	**ac-ft/yr**	Subwatershed 776012
	7.2	**ac-ft/yr**	Subwatershed 486012
Given Details			
Drainage Area	211	ac	Delineated in GIS using WMMS subwatershed boundaries
Total BMP Footprint	11	Ac	Per Section 3 of the WMP; natural channels/bioswales with very high infiltration rates
Underlying soil infiltration rates	0.9	In/hr	WMMS
Subwatershed area contributing	95%		
Modeling Results			
Maximum infiltration rate over footprint of BMP	0.83	ac-ft/hr	Assumed constant infiltration over entire footprint, applied to each time step of model runoff output draining to park – meets compliance target via infiltration
Equivalent Annual Volume Reduction[1]	**26.5**	**ac-ft/yr**	Subwatershed 776012
	7.2	**ac-ft/yr**	Subwatershed 446012

[1] Indicated annual volumes are referenced to the critical year

Discovery Park Infiltration Basin

An existing infiltration basin located at 12400 Columbia Way in the City of Downey treats runoff from approximately 51 acres (5% of the subwatershed in which the site is located). Field observations indicate that the facility has capacity to infiltration runoff at a rate of 2 in/hr (equivalent to approximately 4 ac-ft/day) in addition to detention storage. Table 1-11 reports the simplified modeling assumptions for this BMP – upon further evaluation of as-built conditions, the associated volume reduction can be refined during the adaptive management process.

Table 1-11. Discovery Park Infiltration Basin details

Parameter	Value	Unit	Notes, Assumptions
Site Overview			
WMP Area	Lower San Gabriel River		
Location	City of Downey		
Status	Complete		
Compliance Targets for Treated Subwatersheds[1]	**80.6**	**ac-ft/yr**	Subwatershed 245115
Given Details			
Drainage Area	51	ac	
Observed Infiltration Rate	4	ac-ft/day	Per Gerald Green, personal communication, 2014, February 2
Percentage of Subwatershed Contributing to BMP	5%		
Approximate Runoff Volume Draining to BMP[1]	44	ac-ft/yr	WMMS
Modeling Results			
Equivalent Annual Volume Reduction[1]	**24**	**ac-ft/yr**	Assumed constant infiltration over entire footprint, applied to each time step of model runoff output draining to park

[1] Indicated annual volumes are referenced to the critical year

Parque Dos Rios

Parque Dos Rios is located at the confluence of the Los Angeles River and Rio Hondo River. An approximately 30-ac area between the freeway and the Los Angeles River will be converted to an infiltration basin to treat additional upstream area. Currently, the site is self-retaining open space and is characterized in the baseline model as such. No further runoff volume reductions were calculated for this site; as design details are finalized for the infiltration basin improvements, associated volume reductions can be applied towards upstream jurisdictional compliance targets.

1.4.2. Identified Parcel-Scale Regional and Distributed BMPs

The jurisdictions within the WMP areas compiled detailed lists of BMPs intended to treat areas smaller than 50 acres. As with the preceding regional BMPs, these strategies represent progress towards achieving the compliance target in each respective jurisdiction. The distributed BMPs are listed in Attachment D and can be applied towards meeting the compliance targets in each jurisdiction.

The WMP groups have identified additional potential regional BMPs and these are listed in Section 3 for LCC and Section 4 for LLAR and LSGR of the respective WMP.

1.5. Non-MS4 Facility Runoff

Each jurisdiction is the Group's WMP area is subject to stormwater runoff from non-MS4 facilities. In particular, Caltrans roads and facilities regulated by nontraditional or general industrial permits contribute to the runoff volume for each subwatershed. It will be important for these entities to retain their runoff and/or eliminate their cause/contribution to receiving water exceedances. The runoff from these non-MS4 facilities was therefore estimated and subtracted from the treatment target as described below.

1.5.1. Non-MS4 Permitted Areas

Non-MS4 permitted areas were identified based on the address list of permittees on the State Water Resources Control Board (SWRCB) website. Using the address information, corresponding parcel areas were selected using the LA County Assessor Parcel Viewer and the associated GIS Shapefile. The percentage of permitted land use area relative to the total land use area was calculated and the associated non-MS4 permitted area runoff as extracted from the WMMS runoff response output.

1.5.2. Caltrans

The design storm runoff generated by Caltrans facilities was estimated using WMMS land use data. Areas labeled as Transportation consist of freeways and other extensive transportation facilities that tend to fall under Caltrans jurisdiction (versus areas labeled as Secondary Roads, which are managed by local transportation departments); these areas were assumed to be Caltrans facilities. Runoff from Transportation land uses, less runoff from any overlapping non-MS4 permitted areas identified above, was extracted from the WMMS model output for each subwatershed.

1.6. Institutional BMPs and Minimum Control Measures

It is challenging to accurately quantify most institutional BMP and minimum control measure (MCM) benefits in terms of pollutant load reductions because they generally require extensive survey and monitoring information to quantify. In addition, nonstructural BMPs may target pollutants, land uses, or populations, resulting in different load reductions depending on the implementation technique. A number of MCMs are outlined in each WMP, representing an array of practices to most effectively address pollutants at their source or affect their transport. For the purposes of the RAA, a 10% reduction was assumed to represent the cumulative impact of these practices during both wet and dry conditions. Another explicitly modeled nonstructural BMP was a goal to reduce 25% of irrigation of urban vegetation, a goal that can result from a myriad of practices ranging from public education, enforcement, incentive programs, creative water rate structures, etc. The 25% reduction in irrigation was modeled directly in LSPC and is the primary driver for dry weather flow reductions. Pollutant load reductions from these nonstructural BMPs were subtracted from loads simulated in the baseline model to quantify progress towards meeting the watershed numeric goals. Results of both the 10% reduction for collective MCMs, in addition to irrigation reduction, are presented in Section 7 of the main RAA report for both wet and dry conditions.

Attachment B: Detailed Jurisdictional Compliance Tables

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

January 15, 2015

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B1. Lower Los Angeles River WMP – MS4 vs Non-MS4

B1.1. City of Downey

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6076	17.1	17.0	0.1
6077	123.0	123.0	-
6079	210.3	176.4	33.9
6082	0.3	0.3	-
6100	11.4	10.7	0.7
6102	143.8	143.8	-
6103	0.0	-	0.0
6104	37.1	37.1	-
6106	100.2	76.4	23.9
6111	82.1	69.5	12.6
6113	0.6	0.6	0.0
Grand Total	726.0	654.7	71.2

B1.2. City of Lakewood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6014	14.3	14.3	-
Grand Total	14.3	14.3	-

B1.3. City of Long Beach

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6001	17.7	0.0	17.7
6002	387.5	378.7	8.8
6003	430.0	429.9	0.1
6004	3.4	2.4	1.0
6005	29.9	6.6	23.3
6006	55.9	35.9	20.0
6007	110.5	67.0	43.5
6008	172.5	144.0	28.5
6009	160.5	159.5	1.1
6010	128.3	100.8	27.5
6011	202.2	184.8	17.4
6012	7.2	0.0	7.2
6013	152.0	12.3	139.6
6014	346.9	346.9	-
6015	7.4	4.3	3.1
6016	3.0	0.0	3.0
6017	1.9	1.1	0.9
6018	49.3	45.8	3.5
6065	89.8	36.7	53.2
6066	248.7	202.6	46.1
6067	83.9	25.3	58.6
6068	247.6	222.5	25.1
6069	102.2	42.6	59.6
6070	83.4	22.2	61.2
6071	276.3	94.4	181.9
6072	0.3	0.3	-
7016	503.6	473.3	30.3
Grand Total	3,901.7	3,039.6	862.1

B1.4. City of Lynwood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6023	40.3	26.3	13.9
6024	16.1	10.6	5.4
6028	11.2	11.2	-
6030	168.8	45.2	123.6
6031	145.5	133.0	12.5
6032	115.7	60.5	55.2
6033	130.0	113.3	16.6
6074	185.2	134.9	50.4
6078	59.8	0.0	59.8
6080	146.6	91.7	54.9
6081	76.8	41.3	35.5
6082	12.2	0.0	12.2
Grand Total	1,108.1	667.9	440.2

B1.5. City of Paramount

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6069	0.0	0.0	-
6071	157.1	120.7	36.4
6072	183.8	172.9	10.9
6073	124.1	61.4	62.6
6075	181.8	163.7	18.1
6076	227.8	65.7	162.1
6078	112.3	21.7	90.6
6080	1.9	0.0	1.9
Grand Total	988.8	606.1	382.7

B1.6. City of Pico Rivera

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6106	86.5	44.3	42.2
6111	0.0	0.0	0.0
6112	5.9	1.4	4.5
6113	272.8	229.5	43.3
6114	0.0	0.0	-
6115	0.0	0.0	-
6116	0.0	0.0	-
6117	0.0	0.0	-
6126	12.0	12.0	-
6129	0.0	0.0	-
Grand Total	377.3	287.2	90.0

B1.7. City of Signal Hill

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6002	106.6	105.8	0.8
6003	43.7	43.7	-
6007	6.4	0.0	6.4
6009	8.3	8.2	0.1
6011	6.3	6.0	0.3
6012	26.6	25.2	1.4
Grand Total	197.9	188.9	9.0

B1.8. City of South Gate

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
6031	148.6	148.6	-
6033	70.0	61.9	8.1
6034	422.9	416.7	6.3
6076	125.9	92.5	33.4
6078	0.0	0.0	-
6079	68.9	54.4	14.6
6080	48.7	48.7	-
6082	137.6	82.8	54.7
6083	36.2	11.5	24.7
6084	159.7	137.8	21.9
6085	67.8	0.0	67.8
6089	35.7	18.3	17.4
6090	43.8	3.4	40.4
6096	0.6	0.6	-
6098	0.1	0.1	-
6100	80.6	51.2	29.4
6101	25.0	25.0	-
6102	6.3	6.3	-
6104	7.4	7.4	-
6350	18.6	0.0	18.6
6351	8.2	7.1	1.0
Grand Total	1,512.6	1,174.3	338.2

B2. Lower Los Angeles River WMP – Compliance Tables

B2.1. City of Downey

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6076	Final	17.0	-	-	1.2	-	1.2
6077	Final	123.0	0.3	11.8	1.2	6.4	19.6
6079	50%	176.4	0.7	1.7	10.1	-	12.5
6082	Final	0.3	-	-	0.0	0.0	0.0
6100	50%	10.7	0.0	0.8	0.0	0.6	1.4
6102	31%	143.8	1.1	12.2	0.7	7.1	21.1
6103	Final	-	0.7	-	-	-	0.7
6104	Final	37.1	0.3	3.2	0.0	0.9	4.5
6106	Final	76.4	0.4	9.1	1.6	-	11.1
6111	Final	69.5	0.3	7.1	0.5	3.3	11.2
6113	Final	0.6	-	0.0	-	0.1	0.1
Grand Total		654.7	3.8	45.9	15.3	18.4	83.4

B2.2. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6014	31%	7.9	-	1.1	0.0	-	1.2
Grand Total		7.9	-	1.1	0.0	-	1.2

B2.3. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6001	Final	-	-	-	-	-	-
6002	50%	378.7	-	23.8	5.2	19.3	48.3
6003	Final	429.9	-	22.4	1.4	32.8	56.5
6004	50%	2.4	-	0.1	-	0.3	0.3
6005	31%	6.6	-	1.0	0.0	-	1.0
6006	Final	35.9	-	0.3	0.1	4.1	4.5
6007	Final	67.0	-	6.4	0.1	4.0	10.6
6008	Final	144.0	-	13.9	2.0	3.5	19.4
6009	Final	159.5	-	11.5	0.7	9.2	21.4
6010	Final	100.8	-	8.2	0.9	4.8	13.9
6011	Final	184.8	-	14.4	0.9	9.6	24.9
6012	31%	-	-	-	-	-	-
6013	50%	-	-	-	-	-	-
6014	Final	155.2	-	15.0	7.9	-	22.9
6015	31%	-	-	-	-	-	-
6016	Final	-	-	-	-	-	-
6017	50%	1.1	-	-	-	0.1	0.1
6018	Final	45.8	-	4.3	-	2.6	6.9
6065	Final	36.7	-	0.4	0.0	4.6	5.0
6066	31%	-	-	-	-	-	-
6067	50%	25.3	-	2.6	0.3	0.5	3.3
6068	31%	-	-	-	-	-	-
6069	50%	42.6	-	0.6	0.0	3.5	4.1
6070	50%	22.2	-	2.7	0.4	-	3.1
6071	50%	94.4	-	10.5	1.6	1.0	13.1
6072	50%	0.3	-	0.0	-	0.0	0.0
7016	Final	473.3	-	16.5	6.9	36.3	59.7
Grand Total		2,406.2	-	154.6	28.3	136.2	319.1

B2.4. City of Lynwood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6023	Final	26.3	-	1.0	0.7	1.6	3.3
6024	Final	10.6	-	0.4	-	1.1	1.4
6028	31%	11.2	-	0.8	-	0.9	1.7
6030	Final	45.2	-	4.0	2.4	-	6.4
6031	31%	133.0	-	9.9	2.0	7.5	19.4
6032	Final	60.5	-	6.0	0.4	3.4	9.8
6033	Final	113.3	-	7.4	0.2	10.7	18.2
6074	50%	134.9	-	12.8	3.8	0.1	16.8
6078	Final	-	-	-	-	-	-
6080	31%	91.7	-	7.7	0.7	4.7	13.2
6081	Final	41.3	-	4.0	0.8	0.5	5.3
6082	Final	-	-	-	-	-	-
Grand Total		667.9	-	53.9	11.1	30.5	95.5

B2.5. City of Paramount

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6069	31%	0.0	-	-	-	-	-
6071	Final	120.7	0.0	4.9	0.9	9.9	15.6
6072	Final	172.9	0.0	7.6	1.1	13.9	22.6
6073	Final	61.4	-	1.9	0.2	4.6	6.6
6075	31%	163.7	-	9.0	1.7	10.2	20.9
6076	50%	65.7	-	7.4	0.8	0.3	8.6
6078	Final	21.7	-	0.5	0.0	1.8	2.3
6080	Final	-	-	-	-	-	-
Grand Total		606.1	0.1	31.2	4.7	40.6	76.6

B2.6. City of Pico Rivera

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6106	31%	44.3	-	5.9	0.5	0.2	6.5
6111	Final	-	-	-	-	-	-
6112	31%	1.4	-	0.0	-	0.1	0.2
6113	31%	229.5	-	5.6	0.0	27.0	32.7
6114	Final	-	-	-	-	-	-
6115	Final	0.0	-	-	-	0.0	0.0
6116	Final	-	-	-	-	-	-
6117	Final	-	-	-	-	-	-
6126	Final	12.0	-	1.3	0.0	0.5	1.8
6129	Final	-	-	-	-	-	-
Grand Total		287.2	-	12.8	0.5	27.9	41.2

B2.7. City of Signal Hill

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6002	50%	105.8	-	7.0	0.9	5.9	13.9
6003	Final	43.7	-	1.9	0.0	4.2	6.0
6007	Final	-	-	-	-	-	-
6009	Final	8.2	0.1	0.3	-	0.7	1.1
6011	31%	6.0	0.1	0.8	-	0.2	1.1
6012	31%	2.5	-	0.0	0.2	-	0.2
Grand Total		166.2	0.2	10.0	1.1	11.0	22.3

B2.8. City of South Gate

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
6031	31%	148.6	-	16.9	0.8	5.3	22.9
6033	Final	61.9	-	4.5	0.3	4.8	9.5
6034	Final	416.7	-	30.0	3.8	25.3	59.0
6076	50%	92.5	-	7.5	0.7	5.1	13.2
6078	Final	-	-	-	-	-	-
6079	50%	54.4	-	4.9	0.1	3.4	8.4
6080	31%	48.7	-	5.8	-	2.5	8.3
6082	Final	82.8	0.0	4.3	0.1	9.4	13.8
6083	Final	11.5	-	0.7	-	0.9	1.6
6084	Final	137.8	4.7	8.3	0.8	5.9	19.8
6085	50%	-	-	-	-	-	-
6089	Final	18.3	-	0.8	0.2	1.8	2.7
6090	Final	3.4	-	0.6	-	-	0.6
6096	31%	0.6	-	0.0	0.0	0.0	0.1
6098	31%	0.1	-	-	0.0	-	0.0
6100	50%	51.2	-	2.6	0.0	4.2	6.8
6101	31%	25.0	-	0.5	0.1	2.6	3.3
6102	31%	6.3	-	-	-	0.8	0.8
6104	Final	7.4	-	0.0	0.0	0.9	1.0
6350	Final	-	-	-	-	-	-
6351	Final	7.1	-	0.0	0.0	1.1	1.1
Grand Total		1,174.3	4.7	87.5	6.8	73.8	173.0

B3. Los Cerritos Channel WMP – MS4 vs Non-MS4

B3.1. City of Bellflower

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5507	305.0	268.1	36.9
5517	154.4	137.7	16.7
5518	235.2	233.5	1.7
5519	289.1	235.8	53.2
5523	138.8	100.4	38.5
5524	14.8	14.8	-
Grand Total	1,137.4	990.4	147.0

B3.2. City of Cerritos

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5506	0.0	0.0	-
5507	12.9	12.9	0.0
Grand Total	12.9	12.9	0.0

B3.3. City of Downey

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5524	112.8	93.0	19.8
Grand Total	112.8	93.0	19.8

B3.4. City of Lakewood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5506	226.6	226.5	0.0
5507	176.3	176.3	-
5510	20.7	19.9	0.8
5512	143.1	138.8	4.3
5514	35.3	35.3	-
5515	26.6	26.6	-
5516	31.9	31.9	-
5517	134.4	134.4	-
5519	9.5	9.5	-
5520	164.5	164.5	-
5521	95.2	95.2	-
5522	71.9	71.9	-
5523	21.4	21.4	-
Grand Total	1,157.2	1,152.1	5.1

B3.5. City of Long Beach

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5501	0.3	0.3	0.0
5502	0.5	0.2	0.2
5503	78.2	77.8	0.4
5504	349.2	300.9	48.2
5505	133.3	130.5	2.8
5506	8.6	8.6	0.0
5508	74.6	65.6	9.0
5509	129.3	25.6	103.7
5510	807.6	152.2	655.3
5511	50.5	48.5	2.0
5512	454.0	329.5	124.5
5513	32.5	30.5	2.0
5514	153.5	152.8	0.7
5515	91.0	91.0	-
5520	7.4	7.4	-
5521	108.7	49.2	59.5
5522	50.8	48.6	2.2
5523	146.4	110.7	35.7
Grand Total	2,676.1	1,629.8	1,046.2

B3.6. City of Paramount

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5519	36.5	35.4	1.2
5523	343.3	332.6	10.7
5524	252.1	157.5	94.6
Grand Total	631.9	525.5	106.4

B3.7. City of Signal Hill

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5510	322.6	284.3	38.3
Grand Total	322.6	284.3	38.3

B4. Los Cerritos Channel WMP - Compliance Tables

B4.1. City of Bellflower

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5507	Final	268.1	-	16.7	1.2	13.2	31.1
5517	Final	137.7	-	9.3	0.8	9.3	19.4
5518	Final	233.5	-	16.8	1.2	10.2	28.2
5519	35%	176.3	-	11.4	0.9	12.1	24.4
	Final	59.5	-	-	-	3.6	3.6
5523	35%	68.0	-	3.7	0.4	4.1	8.2
	Final	32.3	-	-	-	2.0	2.0
5524	Final	14.8	-	0.2	-	1.2	1.4
Grand Total		990.4	-	58.1	4.5	55.6	118.2

B4.2. City of Cerritos

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5506	Final	0.0	-	-	-	0.0	0.0
5507	35%	9.7	-	1.0	0.0	0.5	1.4
	Final	3.2	-	-	-	0.1	0.1
Grand Total		12.9	-	1.0	0.0	0.6	1.6

B4.3. City of Downey

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5524	35%	57.2	0.1	5.3	0.0	2.7	8.1
	Final	35.8	-	-	-	2.1	2.1
Grand Total		93.0	0.1	5.3	0.0	4.8	10.2

B4.4. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5506	Final	226.5	-	31.4	2.1	5.1	38.5
5507	35%	131.0	-	15.4	2.6	1.5	19.5
	Final	45.2	-	-	-	3.6	3.6
5510	Final	19.9	-	0.4	-	1.5	1.9
5512	Final	138.8	-	7.7	0.2	7.0	14.9
5514	Final	35.3	-	3.7	1.3	0.4	5.4
5515	Final	26.6	-	3.9	0.2	0.5	4.6
5516	Final	31.9	-	4.0	0.4	0.8	5.3
5517	Final	134.4	-	18.6	1.4	2.8	22.9
5519	35%	3.1	-	0.2	-	0.2	0.4
	Final	6.4	-	-	-	0.1	0.1
5520	35%	130.9	-	14.0	2.1	4.4	20.6
	Final	33.5	-	-	-	3.3	3.3
5521	Final	95.2	-	11.6	0.6	2.2	14.3
5522	Final	71.9	-	8.7	0.8	1.6	11.1
5523	35%	17.4	-	1.9	-	0.7	2.6
	Final	4.0	-	-	-	0.3	0.3
Grand Total		1,152.1	-	121.5	11.8	36.2	169.5

B4.5. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5501	35%	0.1	-	0.0	0.0	0.0	0.0
	Final	0.1	-	-	-	0.0	0.0
5502	35%	0.1	-	0.0	0.0	0.0	0.0
	Final	0.2	-	-	-	0.0	0.0
5503	35%	57.7	-	4.2	2.3	2.0	8.5
	Final	20.1	-	-	-	1.7	1.7
5504	35%	196.6	-	10.2	3.3	8.7	22.2
	Final	104.4	-	-	-	5.5	5.5
5505	Final	130.5	-	15.9	1.6	3.2	20.7
5506	Final	8.6	-	0.1	0.2	0.4	0.7
5508	Final	65.6	-	7.7	0.9	1.7	10.3
5509	Final	25.6	-	-	2.2	-	2.2
5510	Final	152.2	-	9.8	0.9	6.1	16.8
5511	Final	48.5	-	6.7	0.2	1.3	8.1
5512	Final	329.5	-	22.2	1.7	16.8	40.7
5513	35%	23.9	-	1.5	0.1	2.1	3.7
	Final	6.6	-	-	-	0.4	0.4
5514	35%	106.0	-	10.9	5.9	-	16.7
	Final	46.8	-	3.7	-	2.8	6.5
5515	Final	91.0	-	10.8	1.7	2.3	14.9
5520	Final	7.4	-	0.8	-	0.3	1.2
5521	Final	49.2	-	6.0	0.1	1.8	7.9
5522	Final	48.6	-	4.2	0.0	3.1	7.3
5523	35%	89.3	-	7.0	0.8	3.5	11.3
	Final	21.4	-	-	-	1.6	1.6
Grand Total		1,629.8	-	121.7	21.8	65.3	208.7

B4.6. City of Paramount

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5519	35%	24.0	-	1.9	0.2	1.4	3.5
	Final	11.4	-	-	-	0.6	0.6
5523	35%	243.0	-	12.4	2.8	15.7	30.9
	Final	89.6	-	-	-	4.1	4.1
5524	Final	157.5	-	8.5	3.5	4.0	16.0
Grand Total		525.5	-	22.8	6.4	25.9	55.1

B4.7. City of Signal Hill

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5510	35%	231.6	0.0	11.2	1.2	14.2	26.6
	Final	52.7	-	-	-	2.0	2.0
Grand Total		284.3	0.0	11.2	1.2	16.2	28.6

B5. Lower San Gabriel River (San Gabriel River) WMP – MS4 vs Non-MS4

B5.1. City of Artesia

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5109	1.1	1.1	-
Grand Total	1.1	1.1	-

B5.2. City of Bellflower

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5110	0.0	0.0	-
5112	0.7	0.6	0.2
5113	56.8	51.5	5.3
5114	0.0	0.0	-
5115	1.3	1.3	-
5116	0.1	0.1	-
5118	3.9	3.9	-
Grand Total	62.8	57.4	5.4

B5.3. City of Cerritos

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5107	0.0	0.0	-
5108	0.0	0.0	-
5109	40.7	0.0	40.7
5110	2.9	2.9	-
5111	6.8	0.0	6.8
5112	2.3	1.2	1.2
5113	0.0	0.0	-
5516	6.6	0.0	6.6
Grand Total	59.4	4.1	55.3

B5.4. City of Diamond Bar

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5197	0.0	0.0	-
5198	0.0	0.0	-
5203	12.6	0.0	12.6
5204	3.8	0.0	3.8
5205	1.0	1.0	-
5212	15.3	0.0	15.3
5213	0.3	0.0	0.3
Grand Total	33.0	1.1	32.0

B5.5. City of Downey

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5113	0.0	0.0	-
5114	78.3	22.4	55.9
5115	80.6	0.0	80.6
5118	0.0	0.0	0.0
5119	52.5	52.5	-
5122	4.3	0.0	4.3
5124	0.0	0.0	0.0
5125	38.4	2.5	35.8
5126	9.8	9.8	-
5127	0.0	0.0	-
5128	0.0	0.0	-
Grand Total	263.9	87.3	176.7

B5.6. City of Lakewood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5105	0.8	0.8	-
5106	7.4	0.0	7.4
5107	0.0	0.0	-
5108	1.4	1.4	-
5110	0.0	0.0	-
Grand Total	9.6	2.2	7.4

B5.7. City of Long Beach

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5102	0.0	0.0	-
5103	26.9	26.9	-
5104	2.3	2.3	-
5105	0.0	0.0	-
5106	0.0	0.0	-
Grand Total	29.2	29.2	-

B5.8. City of Norwalk

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5109	0.8	0.8	-
5116	0.5	0.0	0.5
5117	14.5	0.0	14.5
5118	3.7	0.1	3.5
5120	39.1	0.0	39.1
5121	41.5	3.9	37.6
5122	34.7	0.0	34.7
5124	2.2	0.0	2.2
Grand Total	136.9	4.8	132.1

B5.9. City of Pico Rivera

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5127	0.0	0.0	-
5128	10.9	6.4	4.5
5130	6.2	6.1	0.1
5131	17.2	11.7	5.5
5132	0.0	0.0	-
5135	4.3	4.3	-
5136	7.2	7.2	-
5137	0.2	0.2	-
5139	7.8	7.8	-
5140	0.0	0.0	-
5141	4.9	4.9	-
5142	0.0	0.0	-
5143	8.9	8.9	-
5144	3.8	0.0	3.8
5145	1.7	1.7	-
5147	0.0	0.0	-
5148	0.2	0.2	0.0
5149	0.0	0.0	-
5150	0.3	0.0	0.3
5151	0.3	0.0	0.3
5153	1.0	1.0	-
5154	0.0	0.0	-
Grand Total	75.1	60.4	14.7

B5.10. City of Santa Fe Springs

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5120	3.1	3.1	0.0
5122	11.0	0.0	11.0
5123	80.0	23.9	56.2
5127	0.0	0.0	0.0
5129	4.5	0.0	4.5
5130	1.7	0.0	1.7
5132	0.0	0.0	-
5133	0.1	0.0	0.1
5134	5.6	3.3	2.3
5135	0.0	0.0	-
Grand Total	106.0	30.3	75.8

B5.11. City of Whittier

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5138	7.1	7.1	-
5142	0.0	0.0	0.0
5146	0.4	0.0	0.4
5147	0.0	0.0	-
5148	0.0	0.0	-
5153	0.0	0.0	-
5173	0.0	0.0	-
Grand Total	7.5	7.1	0.4

B6. Lower San Gabriel River (San Gabriel River) WMP – Compliance Tables

B6.1. City of Artesia

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5109	35%	1.1	-	-	0.1	-	0.1
Grand Total		1.1	-	-	0.1	-	0.1

B6.2. City of Bellflower

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5110	Final	0.0	-	-	-	0.0	0.0
5112	Final	0.6	-	0.1	0.0	-	0.1
5113	Final	51.5	-	0.9	3.4	-	4.3
5114	Final	-	-	-	-	-	-
5115	35%	1.3	-	0.2	0.0	-	0.2
5116	Final	0.1	-	-	-	0.0	0.0
5118	Final	3.9	-	0.6	0.3	-	0.9
Grand Total		57.4	-	1.8	3.7	0.0	5.5

B6.3. City of Cerritos

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5107	Final	-	-	-	-	-	-
5108	Final	-	-	-	-	-	-
5109	Final	-	-	-	-	-	-
5110	Final	2.9	-	0.4	0.0	-	0.4
5111	Final	-	-	-	-	-	-
5112	Final	1.2	-	0.2	0.0	-	0.2
5113	Final	-	-	-	-	-	-
5116	35%	-	-	-	-	-	-
Grand Total		4.1	-	0.6	0.0	-	0.6

B6.4. City of Diamond Bar

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5197	Final	0.0	-	0.0	-	-	0.0
5198	Final	-	-	-	-	-	-
5203	Final	-	-	-	-	-	-
5204	Final	-	-	-	-	-	-
5205	Final	1.0	-	0.2	-	-	0.2
5212	Final	-	-	-	-	-	-
5213	35%	-	-	-	-	-	-
Grand Total		1.1	-	0.2	-	-	0.2

B6.5. City of Downey

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5113	Final	-	1.0	-	-	-	1.0
5114	Final	22.4	0.8	2.1	0.4	-	3.3
5115	Final	-	0.6	-	-	-	0.6
5118	Final	-	0.6	-	-	-	0.6
5119	Final	52.5	3.3	6.4	-	-	9.7
5122	35%	-	0.0	-	-	-	0.0
5124	Final	-	0.0	-	-	-	0.0
5125	Final	2.5	0.4	0.1	-	-	0.5
5126	Final	9.8	0.3	1.4	-	-	1.7
5127	Final	-	0.1	-	-	-	0.1
5128	Final	-	0.0	-	-	-	0.0
Grand Total		87.3	7.1	10.0	0.4	-	17.5

B6.6. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5105	Final	0.8	-	-	0.0	0.1	0.1
5106	35%	-	-	-	-	-	-
5107	Final	-	-	-	-	-	-
5108	Final	1.4	-	0.2	0.0	-	0.2
5110	Final	-	-	-	-	-	-
Grand Total		2.2	-	0.2	0.0	0.1	0.4

B6.7. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5102	Final	-	-	-	-	-	-
5103	35%	26.9	-	1.1	1.3	-	2.4
5104	Final	2.3	-	0.3	-	-	0.3
5105	Final	-	-	-	-	-	-
5106	Final	0.0	-	-	-	0.0	0.0
Grand Total		29.2	-	1.4	1.3	0.0	2.7

B6.8. City of Norwalk

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5109	35%	0.8	-	-	0.1	-	0.1
5116	Final	-	-	-	-	-	-
5117	Final	-	-	-	-	-	-
5118	Final	0.1	-	-	0.0	-	0.0
5120	Final	-	-	-	-	-	-
5121	Final	3.9	-	-	0.3	-	0.3
5122	Final	-	-	-	-	-	-
5124	Final	-	-	-	-	-	-
Grand Total		4.8	-	-	0.3	-	0.3

B6.9. City of Pico Rivera

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5127	Final	0.0	-	-	-	0.0	0.0
5128	Final	6.4	-	1.2	-	-	1.2
5130	Final	6.1	-	1.1	-	-	1.1
5131	Final	11.7	-	2.0	-	-	2.0
5132	Final	0.0	-	-	-	0.0	0.0
5135	Final	4.3	-	0.8	-	-	0.8
5136	Final	7.2	-	1.3	-	-	1.3
5137	35%	0.2	-	0.0	-	-	0.0
5139	Final	7.8	-	1.4	-	-	1.4
5140	Final	-	-	-	-	-	-
5141	Final	4.9	-	0.8	-	-	0.8
5142	Final	-	-	-	-	-	-
5143	Final	8.9	-	1.6	-	-	1.6
5144	Final	-	-	-	-	-	-
5145	Final	1.7	-	0.3	-	-	0.3
5147	Final	-	-	-	-	-	-
5148	Final	0.2	-	0.0	-	-	0.0
5149	Final	0.0	-	-	-	-	-
5150	Final	-	-	-	-	-	-
5151	Final	-	-	-	-	-	-
5153	Final	1.0	-	0.2	-	-	0.2
5154	Final	-	-	-	-	-	-
Grand Total		60.4	-	10.8	-	0.0	10.8

B6.10. City of Santa Fe Springs

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5120	Final	3.1	-	0.2	-	0.3	0.5
5122	Final	-	-	-	-	-	-
5123	Final	23.9	-	3.8	-	-	3.8
5127	35%	-	-	-	-	-	-
5129	Final	-	-	-	-	-	-
5130	Final	-	-	-	-	-	-
5132	Final	-	-	-	-	-	-
5133	Final	-	-	-	-	-	-
5134	Final	3.3	-	0.6	-	-	0.6
5135	Final	0.0	-	0.0	-	0.0	0.0
Grand Total		30.3	-	4.6	-	0.3	4.9

B6.11. City of Whittier

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5138	Final	7.1	-	1.4	-	-	1.4
5142	Final	-	-	-	-	-	-
5146	Final	-	-	-	-	-	-
5147	Final	-	-	-	-	-	-
5148	Final	-	-	-	-	-	-
5153	35%	0.0	-	-	-	0.0	0.0
5173	Final	-	-	-	-	-	-
Grand Total		7.1	-	1.4	-	0.0	1.4

B7. Lower San Gabriel River WMP (Coyote Creek) – MS4 vs Non-MS4

B7.1. City of Artesia

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5008	0.0	0.0	-
5018	47.9	15.9	32.0
Grand Total	47.9	15.9	32.0

B7.2. City of Cerritos

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5008	41.7	7.7	34.0
5016	0.0	0.0	-
5017	4.3	4.3	-
5018	49.7	14.9	34.8
5023	0.0	0.0	-
5024	48.7	0.0	48.7
5026	5.8	5.8	0.1
5028	12.2	0.0	12.2
5029	4.9	4.9	-
5030	0.1	0.1	0.0
5035	3.8	0.0	3.8
5036	2.2	1.2	1.0
5038	0.0	0.0	-
5059	16.0	15.1	0.8
5060	0.0	0.0	-
5061	4.9	2.6	2.3
Grand Total	194.3	56.7	137.6

B7.3. City of Diamond Bar

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5053	0.0	0.0	-
5054	1.0	1.0	-
5055	8.4	8.4	-
5056	10.6	0.0	10.6
5057	26.8	0.0	26.8
5058	27.2	27.2	-
Grand Total	74.0	36.7	37.4

B7.4. City of Hawaiian Gardens

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5004	0.0	0.0	-
5007	27.0	23.6	3.4
5009	0.1	0.1	-
5013	1.3	1.3	-
5014	2.1	2.1	-
Grand Total	30.4	27.1	3.4

B7.5. City of La Mirada

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5037	0.0	0.0	-
5038	1.1	0.0	1.1
5039	7.5	0.0	7.5
5040	2.1	0.0	2.1
5041	2.0	0.0	2.0
5042	0.0	0.0	0.0
5043	34.8	19.1	15.7
5044	0.8	0.0	0.8
5045	0.8	0.0	0.8
5059	1.4	1.4	-
5060	0.9	0.0	0.9
5062	40.4	20.5	19.9
5063	37.0	37.0	-
5064	0.0	0.0	-
5067	0.0	0.0	-
5069	40.3	40.3	-
5070	0.0	0.0	-
5073	5.7	5.7	-
5074	0.8	0.8	-
5080	0.0	0.0	-
Grand Total	175.7	124.9	50.8

B7.6. City of Lakewood

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5004	0.0	0.0	-
5007	17.5	17.5	0.0
5008	8.2	2.3	5.9
5014	0.0	0.0	-
5015	0.0	0.0	-
5016	0.0	0.0	-
5017	0.0	0.0	-
Grand Total	25.7	19.7	6.0

B7.7. City of Long Beach

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5003	0.0	0.0	0.0
5004	37.5	0.0	37.5
5005	0.0	0.0	-
5007	0.0	0.0	-
5009	0.0	0.0	-
5013	0.0	0.0	-
Grand Total	37.5	0.0	37.5

B7.8. City of Norwalk

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5008	3.0	1.6	1.3
5018	36.0	2.0	34.0
5019	41.5	24.3	17.2
5020	0.0	0.0	-
5021	43.4	16.9	26.5
5022	28.7	7.7	21.0
5024	0.0	0.0	-
5025	0.0	0.0	-
5060	0.0	0.0	-
5068	0.0	0.0	-
5071	0.0	0.0	-
5073	0.0	0.0	-
Grand Total	152.5	52.5	99.9

B7.9. City of Santa Fe Springs

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5019	0.0	0.0	-
5020	27.7	0.0	27.7
5022	13.5	0.0	13.5
5024	0.0	0.0	-
5025	31.2	0.0	31.2
5060	28.9	0.0	28.9
5061	0.0	0.0	-
5062	2.6	0.0	2.6
5067	19.4	0.0	19.4
5068	6.1	0.0	6.1
5069	2.3	0.0	2.3
5071	50.5	0.0	50.5
5072	2.6	2.6	-
5073	23.5	0.0	23.5
5084	1.4	1.4	-
5089	19.8	0.0	19.8
5092	1.1	1.1	-
5093	22.1	0.0	22.1
5094	7.4	7.4	-
5095	0.4	0.0	0.4
Grand Total	260.7	12.6	248.1

B7.10. City of Whittier

Subwatershed	COMPLIANCE TARGET – FINAL MILESTONE		
	Total Critical Year Storm Volume Target (acre-ft/year)	MS4 Responsible Critical Year Storm Volume Runoff (acre-ft/year)	Non-MS4 Runoff – Industrial Permitted & Caltrans (acre-ft/year)
5045	0.0	0.0	-
5064	0.0	0.0	-
5065	3.7	3.7	-
5070	0.0	0.0	-
5079	18.5	11.7	6.8
5080	52.6	26.0	26.5
5081	2.1	0.0	2.1
5082	6.8	0.2	6.6
5083	0.0	0.0	-
5086	1.7	0.0	1.7
5087	21.0	20.8	0.2
5088	25.0	24.7	0.3
5089	0.6	0.5	0.1
5090	0.8	0.8	-
5091	6.6	5.7	0.9
5092	13.8	8.9	4.9
5093	0.0	0.0	-
5094	0.6	0.6	-
5095	24.2	21.1	3.1
5096	3.8	3.8	-
5097	5.2	5.2	-
5098	48.7	47.9	0.7
5099	11.3	10.6	0.7
5100	7.3	7.3	-
5101	0.6	0.6	-
Grand Total	254.7	200.1	54.6

B8. Lower San Gabriel River WMP (Coyote Creek) – Compliance Tables

B8.1. City of Artesia

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5008	Final	-	-	-	-	-	-
5018	35%	15.9	-	-	1.1	-	1.1
Grand Total		15.9	-	-	1.1	-	1.1

B8.2. City of Cerritos

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5008	Final	7.7	-	-	0.9	-	0.9
5016	Final	-	-	-	-	-	-
5017	Final	4.3	-	-	0.5	-	0.5
5018	Final	14.9	-	-	1.1	-	1.1
5023	Final	-	-	-	-	-	-
5024	Final	-	-	-	-	-	-
5026	Final	5.8	-	1.0	0.0	-	1.0
5028	Final	-	-	-	-	-	-
5029	Final	4.9	-	0.3	0.2	-	0.6
5030	35%	0.1	-	0.0	-	-	0.0
5035	Final	-	-	-	-	-	-
5036	Final	1.2	-	0.2	0.0	-	0.2
5038	Final	-	-	-	-	-	-
5059	Final	15.1	-	1.6	0.5	-	2.0
5060	Final	-	-	-	-	-	-
5061	Final	2.6	-	-	0.2	-	0.2
Grand Total		56.7	-	3.1	3.4	-	6.4

B8.3. City of Diamond Bar

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5053	Final	-	-	-	-	-	-
5054	35%	1.0	-	0.3	-	-	0.3
5055	Final	8.4	-	1.2	-	0.7	1.9
5056	Final	-	-	-	-	-	-
5057	Final	-	-	-	-	-	-
5058	Final	27.2	-	6.7	-	-	6.7
Grand Total		36.7	-	8.2	-	0.7	8.9

B8.4. City of Hawaiian Gardens

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5004	Final	-	-	-	-	-	-
5007	35%	23.6	-	0.3	1.5	-	1.8
5009	Final	0.1	-	-	-	0.0	0.0
5013	Final	1.3	-	-	0.1	-	0.1
5014	Final	2.1	-	0.2	0.0	-	0.3
Grand Total		27.1	-	0.6	1.6	0.0	2.2

B8.5. City of La Mirada

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5037	Final	-	-	-	-	-	-
5038	Final	-	-	-	-	-	-
5039	Final	-	-	-	-	-	-
5040	Final	-	-	-	-	-	-
5041	Final	-	-	-	-	-	-
5042	Final	-	-	-	-	-	-
5043	Final	19.1	-	1.9	0.6	-	2.5
5044	Final	-	-	-	-	-	-
5045	35%	-	-	-	-	-	-
5059	Final	1.4	-	0.3	-	-	0.3
5060	Final	-	-	-	-	-	-
5062	Final	20.5	-	1.0	1.1	-	2.1
5063	Final	37.0	-	-	3.0	-	3.0
5064	Final	-	-	-	-	-	-
5067	Final	-	-	-	-	-	-
5069	Final	40.3	-	5.3	0.9	-	6.2
5070	Final	-	-	-	-	-	-
5073	Final	5.7	-	1.0	-	-	1.0
5074	Final	0.8	-	0.1	-	-	0.1
5080	Final	-	-	-	-	-	-
Grand Total		124.9	-	9.6	5.6	-	15.2

B8.6. City of Lakewood

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5004	Final	-	-	-	-	-	-
5007	35%	17.5	-	0.9	0.7	-	1.6
5008	Final	2.3	-	-	0.3	-	0.3
5014	Final	-	-	-	-	-	-
5015	Final	-	-	-	-	-	-
5016	Final	-	-	-	-	-	-
5017	Final	-	-	-	-	-	-
Grand Total		19.7	-	0.9	0.9	-	1.9

B8.7. City of Long Beach

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5003	Final	-	-	-	-	-	-
5004	35%	-	-	-	-	-	-
5005	Final	-	-	-	-	-	-
5007	Final	-	-	-	-	-	-
5009	Final	-	-	-	-	-	-
5013	Final	0.0	-	-	0.0	-	0.0
Grand Total		0.0	-	-	0.0	-	0.0

B8.8. City of Norwalk

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5008	35%	1.6	-	-	0.2	-	0.2
5018	Final	2.0	-	-	0.2	-	0.2
5019	Final	24.3	-	-	1.8	-	1.8
5020	Final	-	-	-	-	-	-
5021	Final	16.9	-	-	1.3	-	1.3
5022	Final	7.7	-	1.4	-	-	1.4
5024	Final	-	-	-	-	-	-
5025	Final	-	-	-	-	-	-
5060	Final	-	-	-	-	-	-
5068	Final	-	-	-	-	-	-
5071	Final	-	-	-	-	-	-
5073	Final	-	-	-	-	-	-
Grand Total		52.5	-	1.4	3.4	-	4.7

B8.9. City of Santa Fe Springs

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5019	Final	0.0	-	-	-	0.0	0.0
5020	Final	-	-	-	-	-	-
5022	Final	-	-	-	-	-	-
5024	Final	-	-	-	-	-	-
5025	Final	-	-	-	-	-	-
5060	Final	-	-	-	-	-	-
5061	Final	-	-	-	-	-	-
5062	Final	-	-	-	-	-	-
5067	Final	-	-	-	-	-	-
5068	Final	-	-	-	-	-	-
5069	Final	-	-	-	-	-	-
5071	Final	-	-	-	-	-	-
5072	Final	2.6	-	0.3	-	0.1	0.4
5073	Final	-	-	-	-	-	-
5084	Final	1.4	-	0.2	-	-	0.2
5089	Final	-	-	-	-	-	-
5092	Final	1.1	-	0.1	-	0.2	0.2
5093	Final	-	-	-	-	-	-
5094	Final	7.4	-	0.4	-	0.9	1.2
5095	35%	-	-	-	-	-	-
Grand Total		12.6	-	1.0	-	1.1	2.1

B8.10. City of Whittier

Subwatershed	Milestone	COMPLIANCE TARGET	POLLUTANT REDUCTION PLAN				
		Remaining MS4 Responsible Critical Year Volume (acre-ft/year)	Existing Distributed BMP Volume (acre-ft)	Total Estimated Right-of-Way BMP Volume (acre-ft)	Estimated Potential LID on Public Parcels Volume (acre-ft)	Remaining BMP Volume (Potentially Regional BMPs) (acre-ft)	Total BMP Volume to Achieve Compliance (acre-ft)
5045	Final	0.0	-	-	-	0.0	0.0
5064	Final	-	-	-	-	-	-
5065	Final	3.7	-	0.8	-	-	0.8
5070	Final	0.0	-	-	-	0.0	0.0
5079	Final	11.7	-	2.5	-	-	2.5
5080	Final	26.0	-	5.5	-	-	5.5
5081	35%	-	-	-	-	-	-
5082	Final	0.2	-	0.0	-	-	0.0
5083	Final	-	-	-	-	-	-
5086	Final	-	-	-	-	-	-
5087	Final	20.8	-	4.1	-	-	4.1
5088	Final	24.7	-	5.4	-	-	5.4
5089	Final	0.5	-	0.1	-	-	0.1
5090	Final	0.8	-	0.2	-	-	0.2
5091	Final	5.7	-	1.1	-	-	1.1
5092	Final	8.9	-	1.7	-	-	1.7
5093	Final	0.0	-	-	-	0.0	0.0
5094	Final	0.6	-	0.1	-	0.0	0.1
5095	Final	21.1	-	3.9	-	-	3.9
5096	Final	3.8	-	0.7	-	-	0.7
5097	Final	5.2	-	1.0	-	-	1.0
5098	Final	47.9	-	8.7	-	-	8.7
5099	Final	10.6	-	1.9	-	-	1.9
5100	Final	7.3	-	1.4	-	-	1.4
5101	Final	0.6	-	0.1	-	-	0.1
Grand Total		200.1	-	39.0	-	0.0	39.1

Attachment C: Supporting Figures for Watershed Control Measures

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

June 6, 2014



Figure 1. LLAR Downey Subwatershed IDs

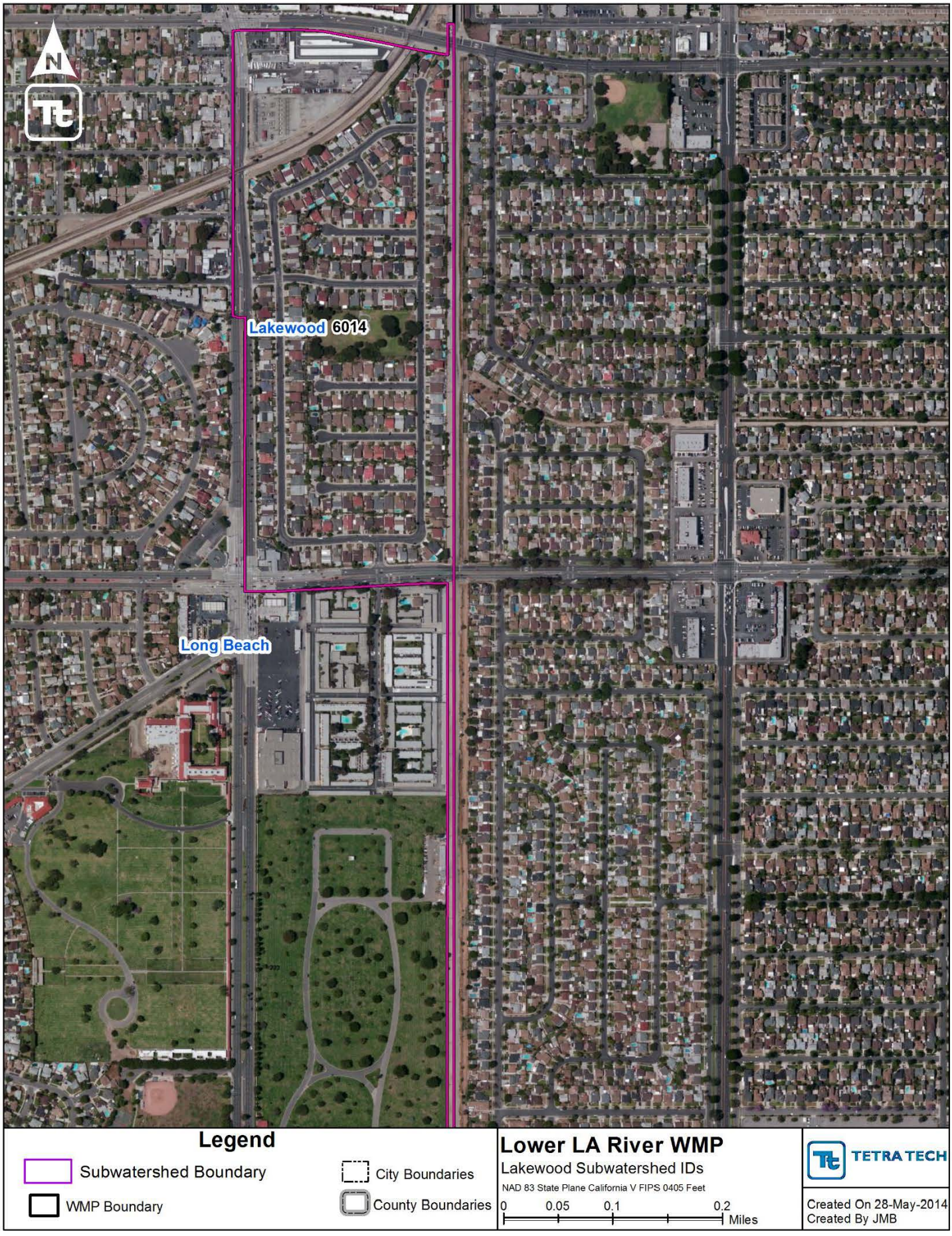


Figure 2. LLAR Lakewood Subwatershed IDs

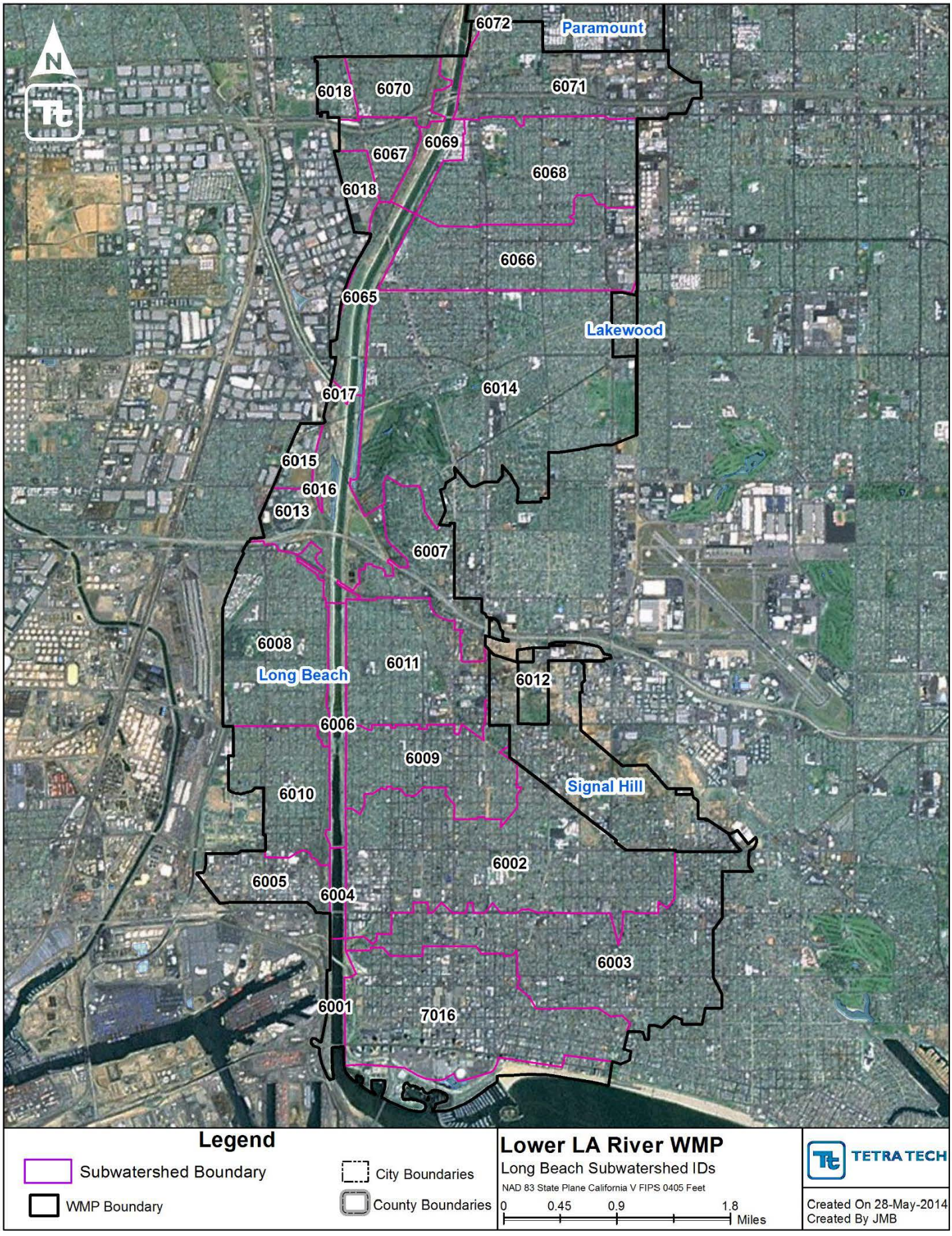


Figure 3. LLAR Long Beach Subwatershed IDs



Figure 4. LLAR Lynwood Subwatershed IDs



Figure 5. LLAR Paramount Subwatershed IDs



Figure 6. LLAR Pico Rivera Subwatershed IDs

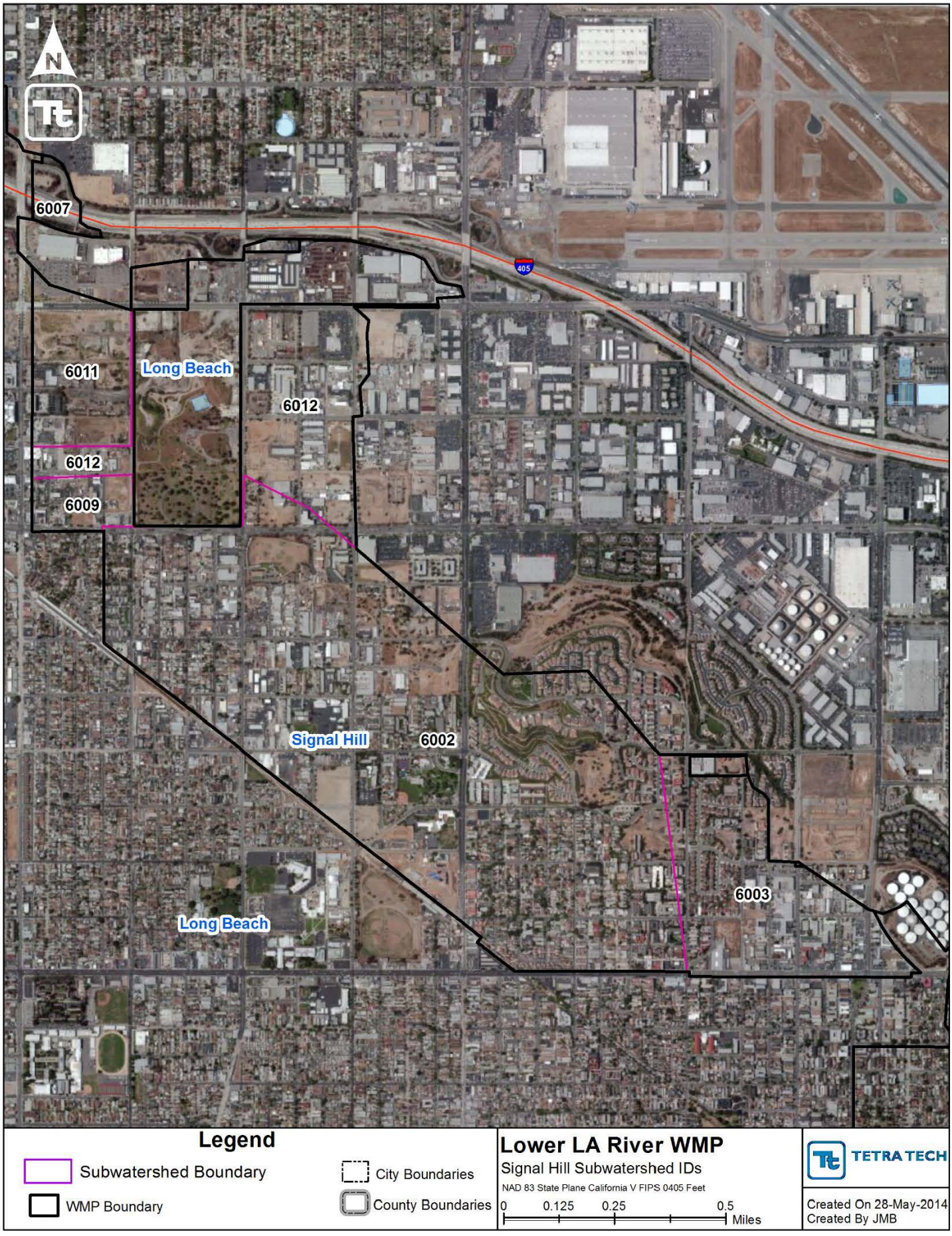


Figure 7. LLAR Signal Hill Subwatershed IDs



Figure 8. LLAR South Gate Subwatershed IDs

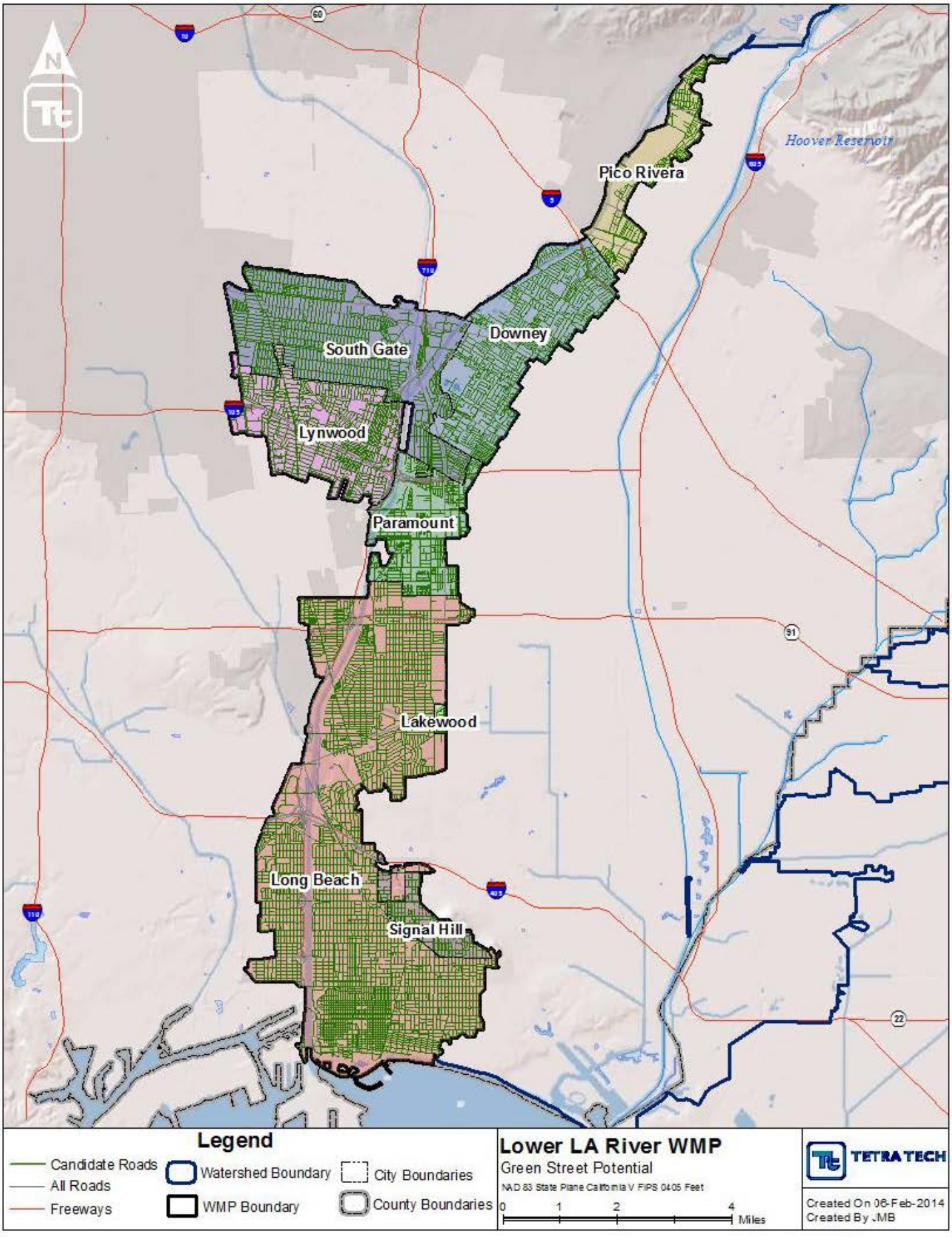


Figure 9. LLAR ROW BMP Potential Opportunities

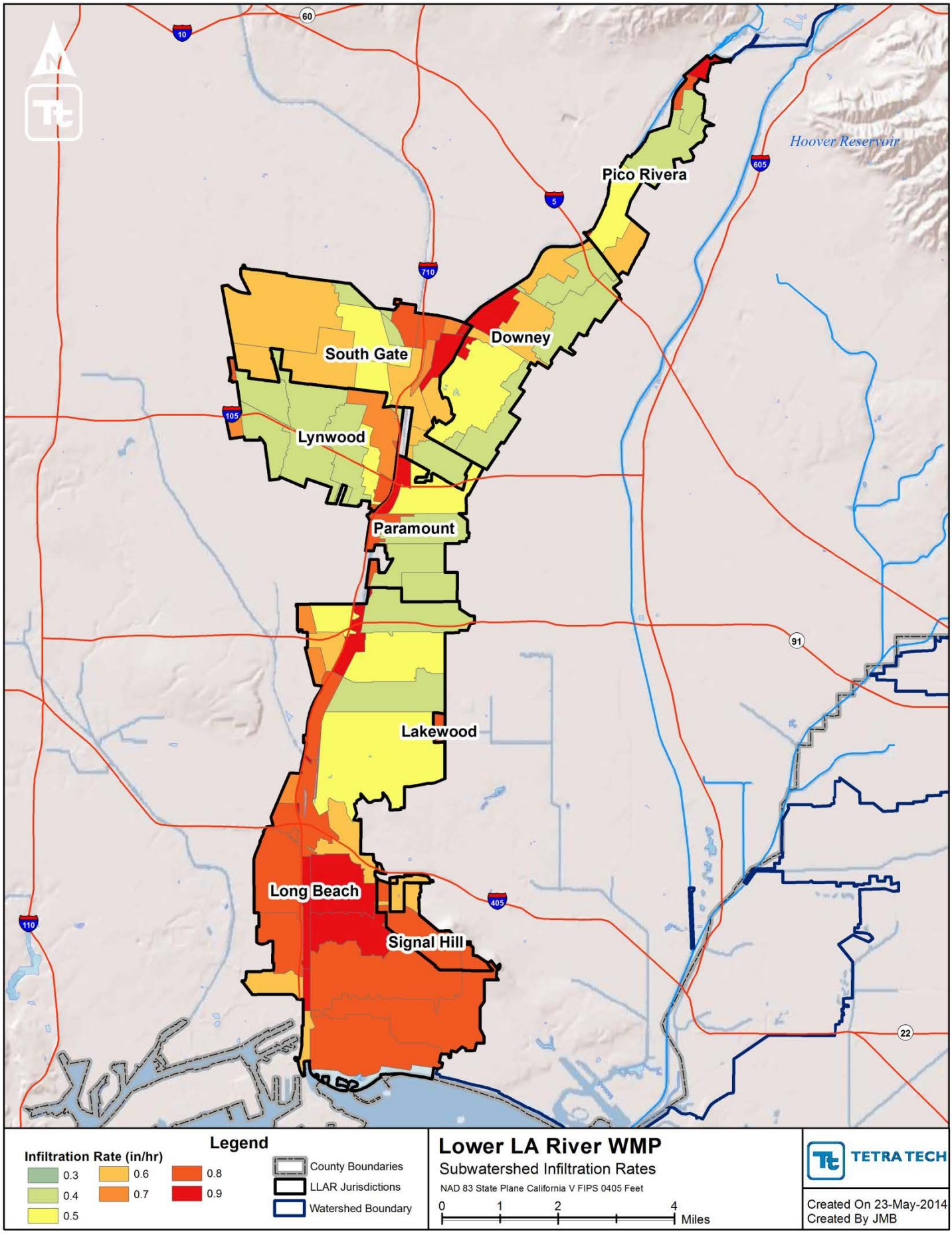


Figure 10. LLAR Subwatershed Infiltration Rates

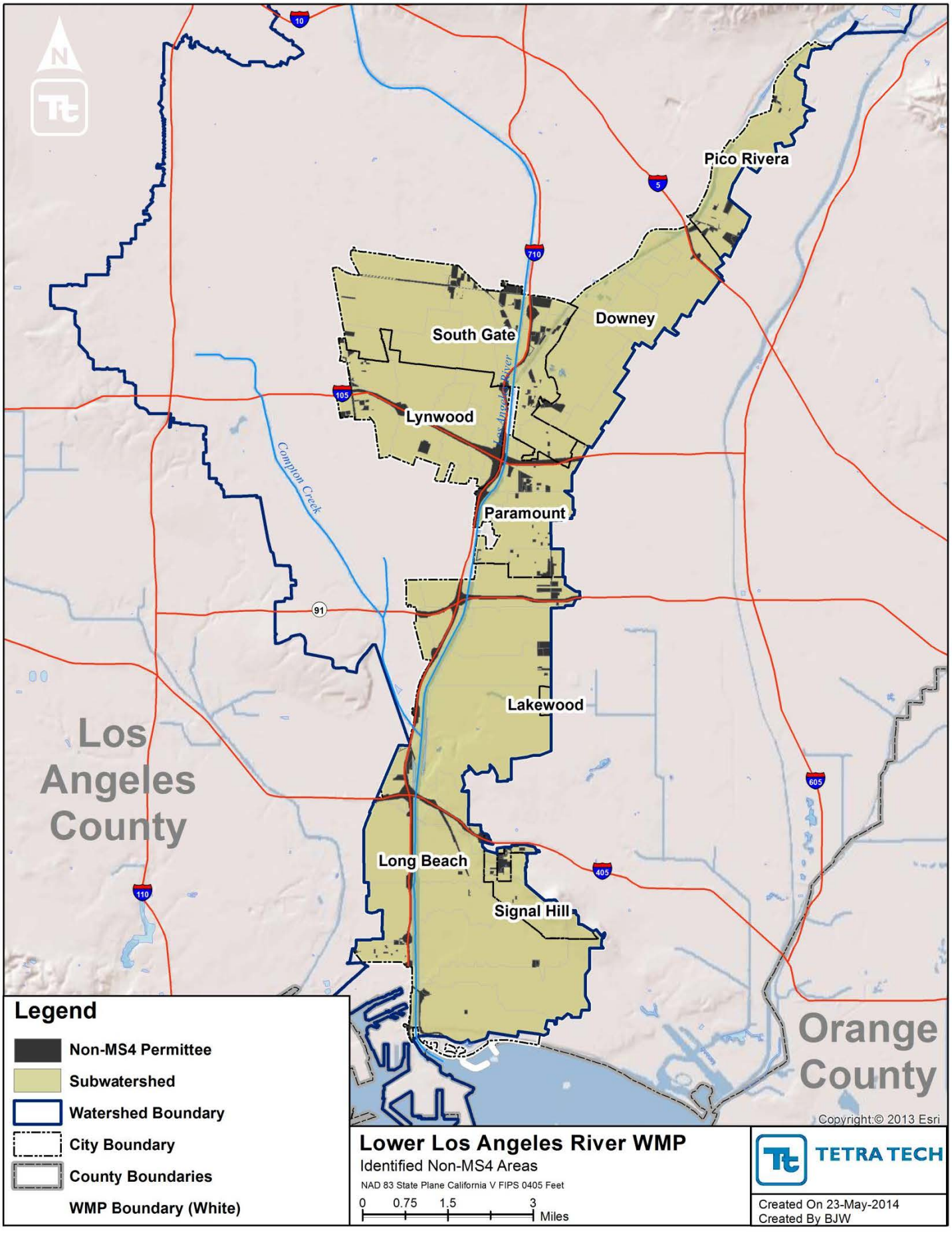


Figure 11. LLAR Non-MS4 Permittees

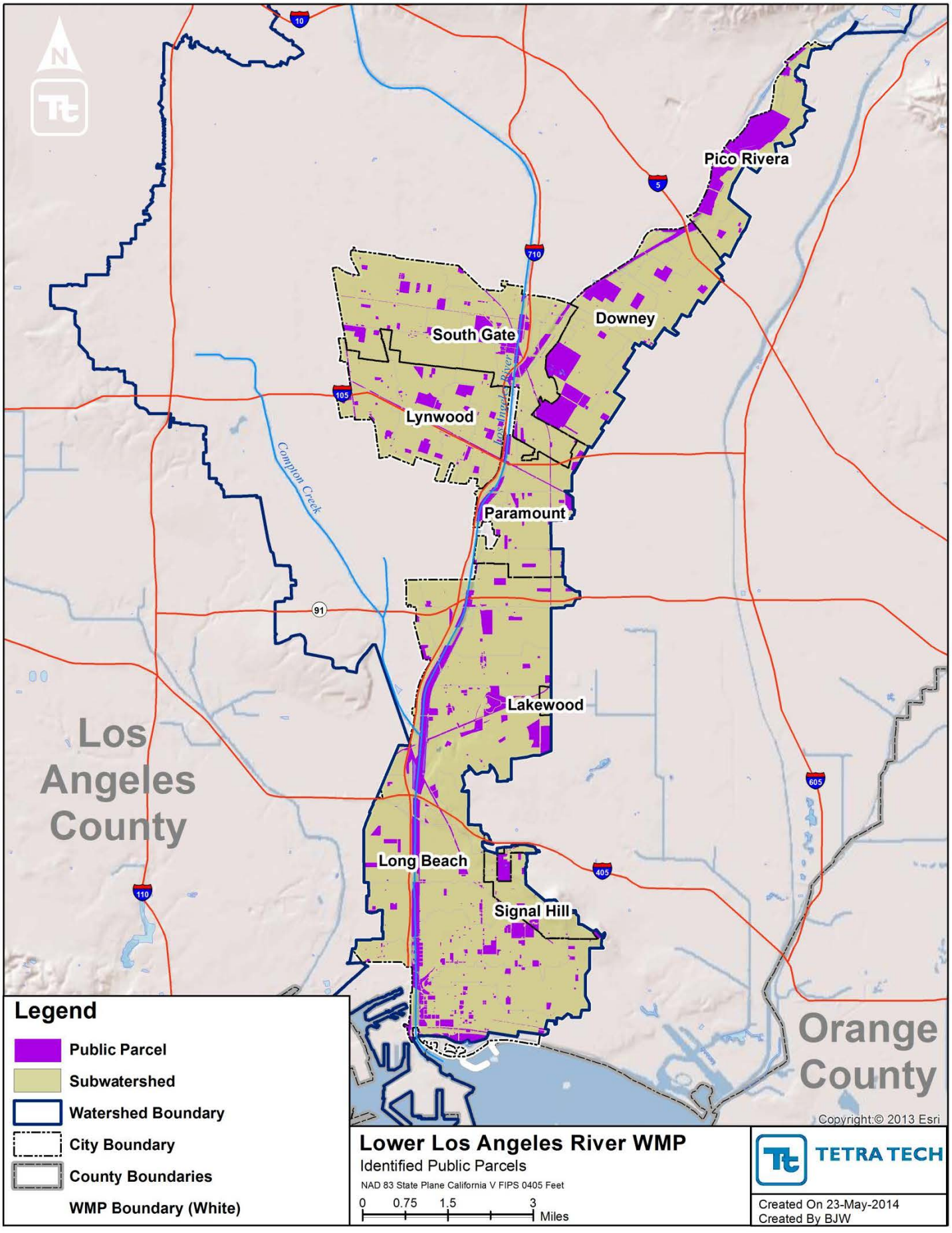


Figure 12. LLAR identified public parcels

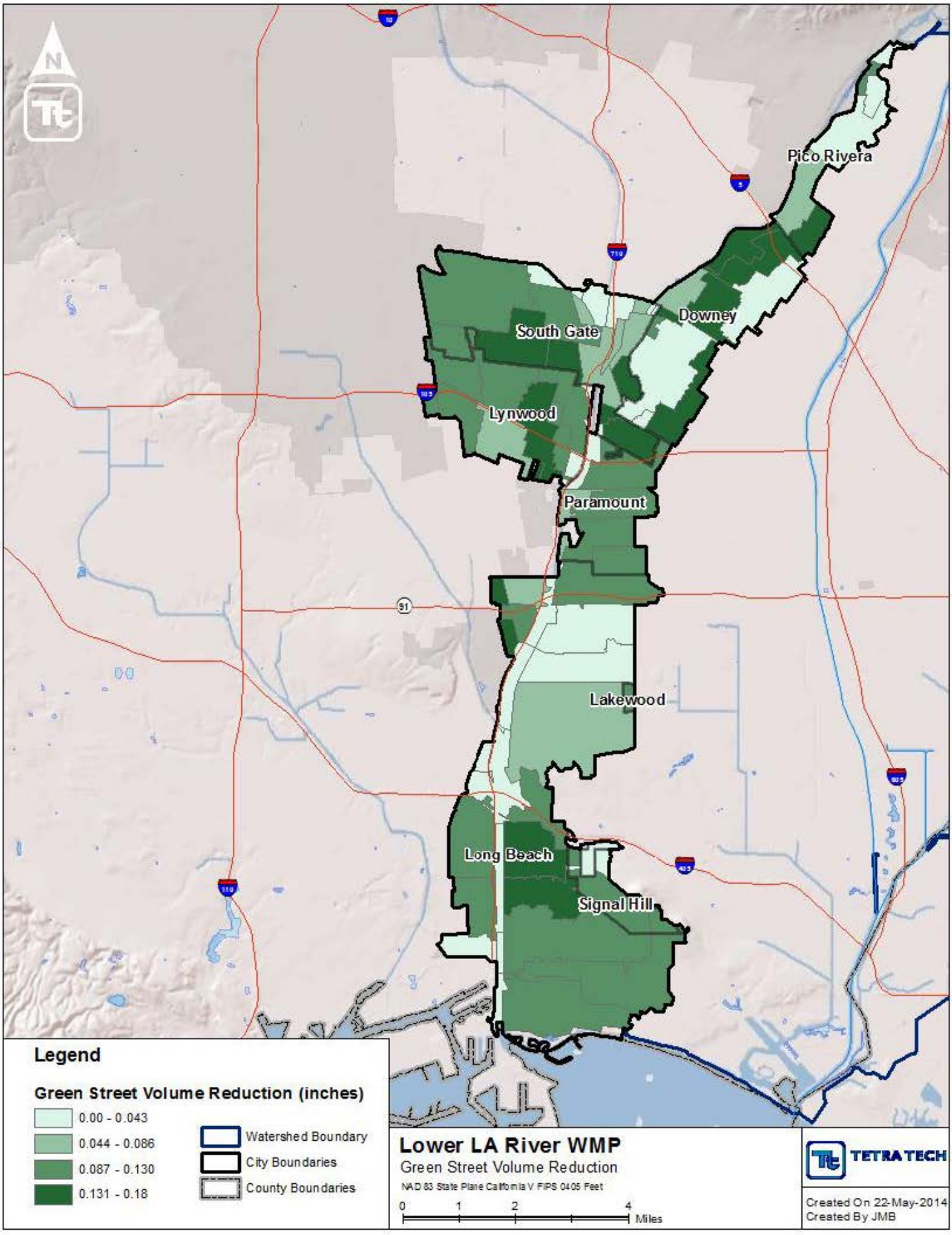


Figure 13. LLAR ROW BMP Volume Reduction

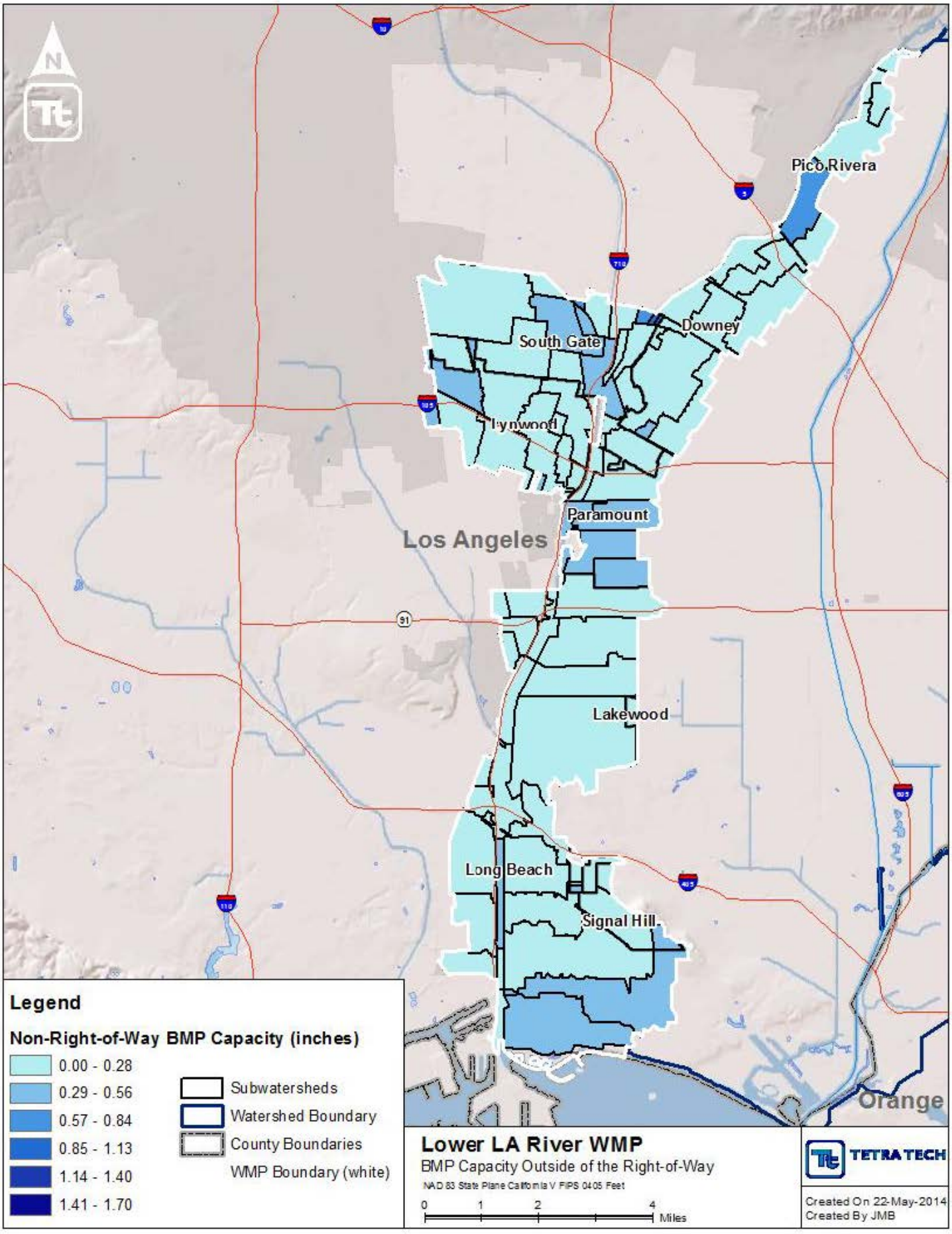


Figure 14. LLAR BMP capacity outside of the right-of-way

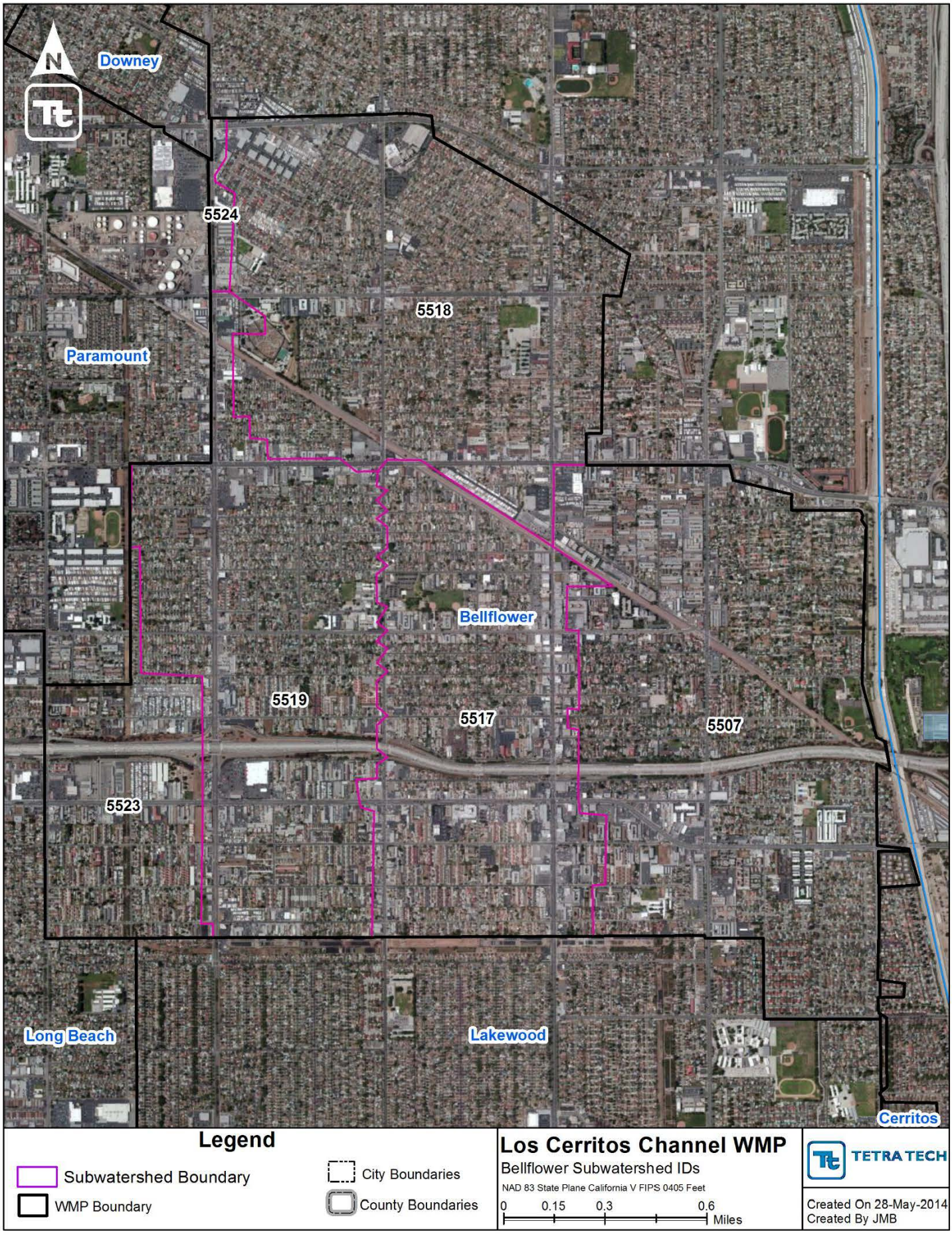


Figure 15. LCC Bellflower Subwatershed IDs



Figure 16. LCC Cerritos Subwatershed IDs

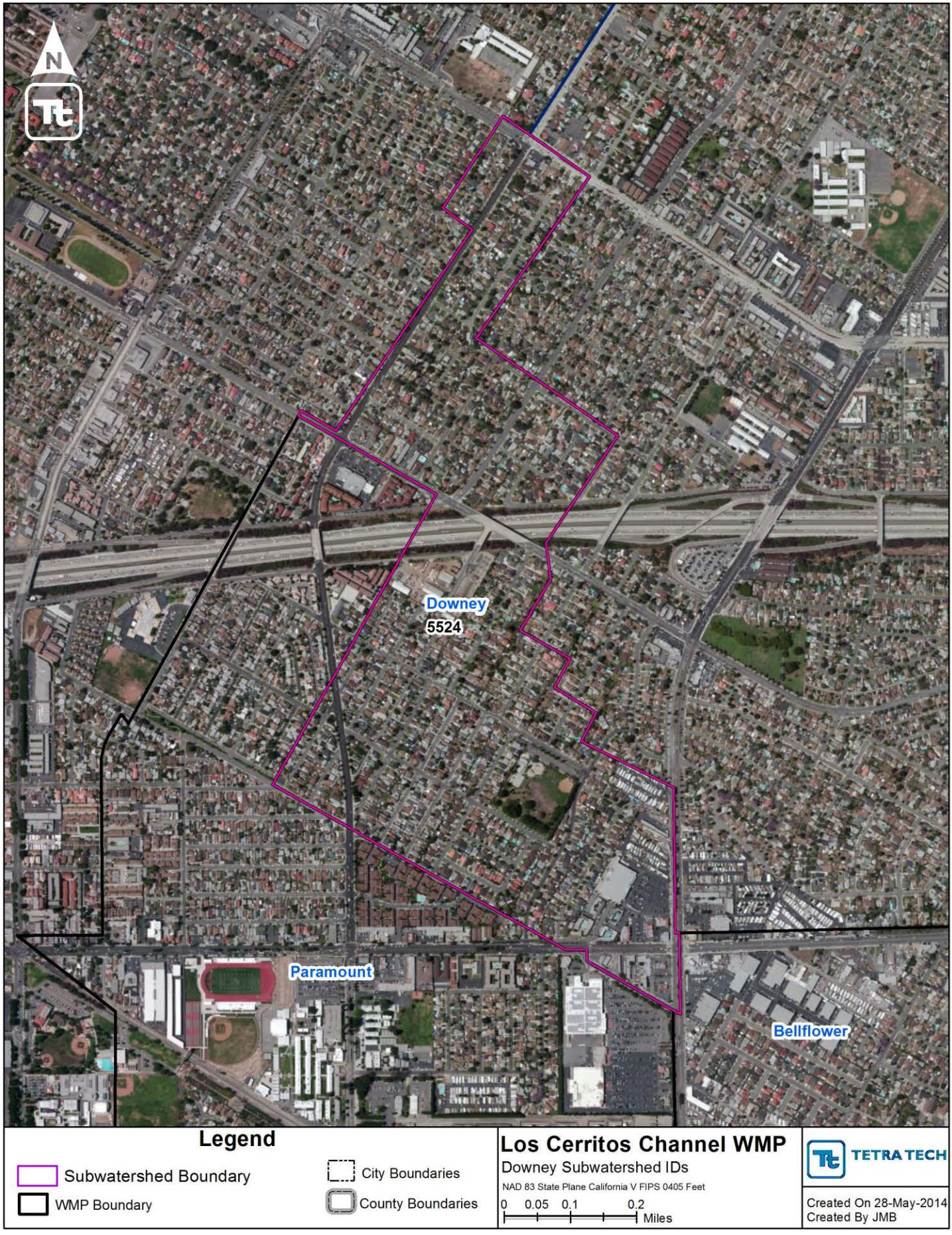


Figure 17. LCC Downey Subwatershed IDs

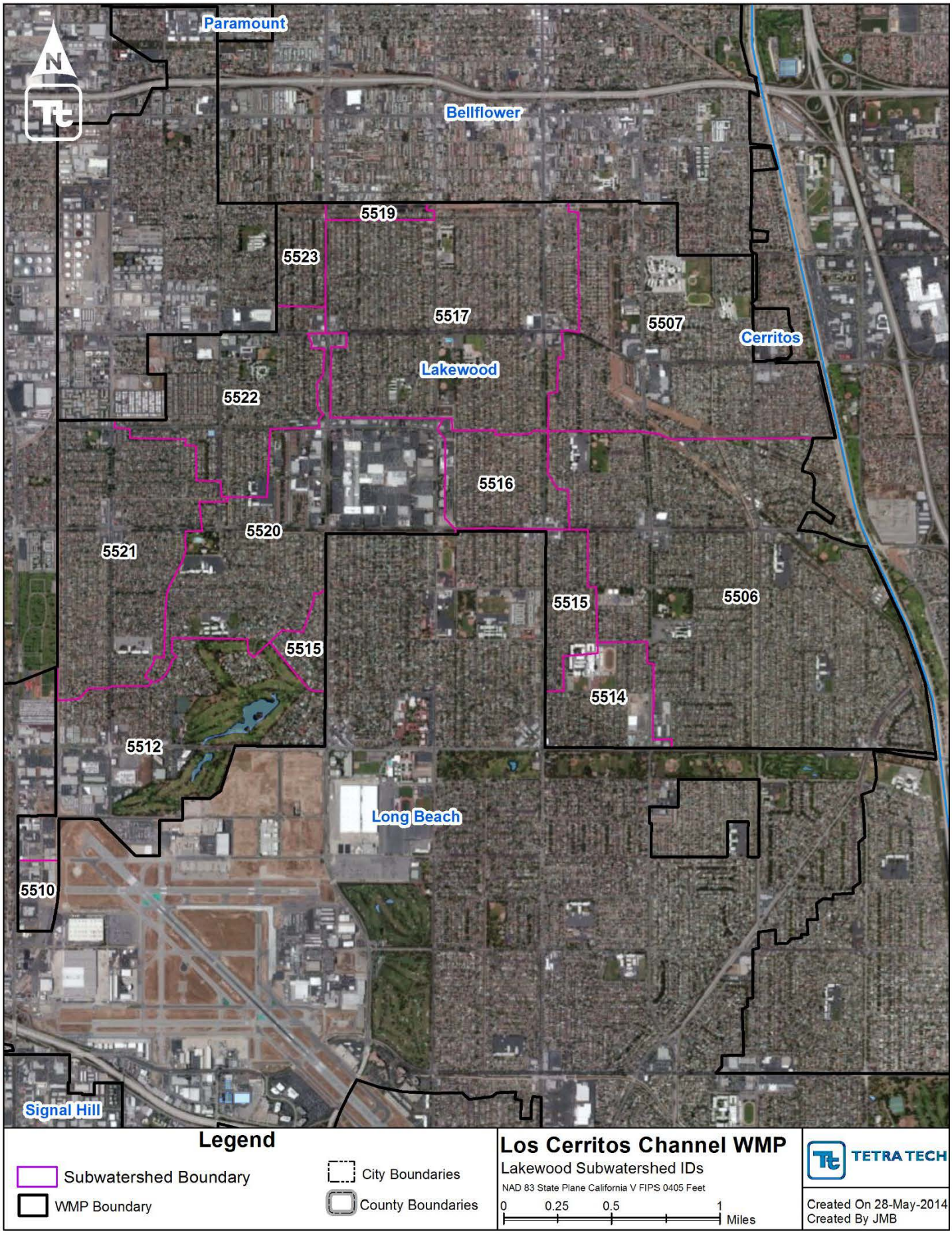


Figure 18. LCC Lakewood Subwatershed IDs

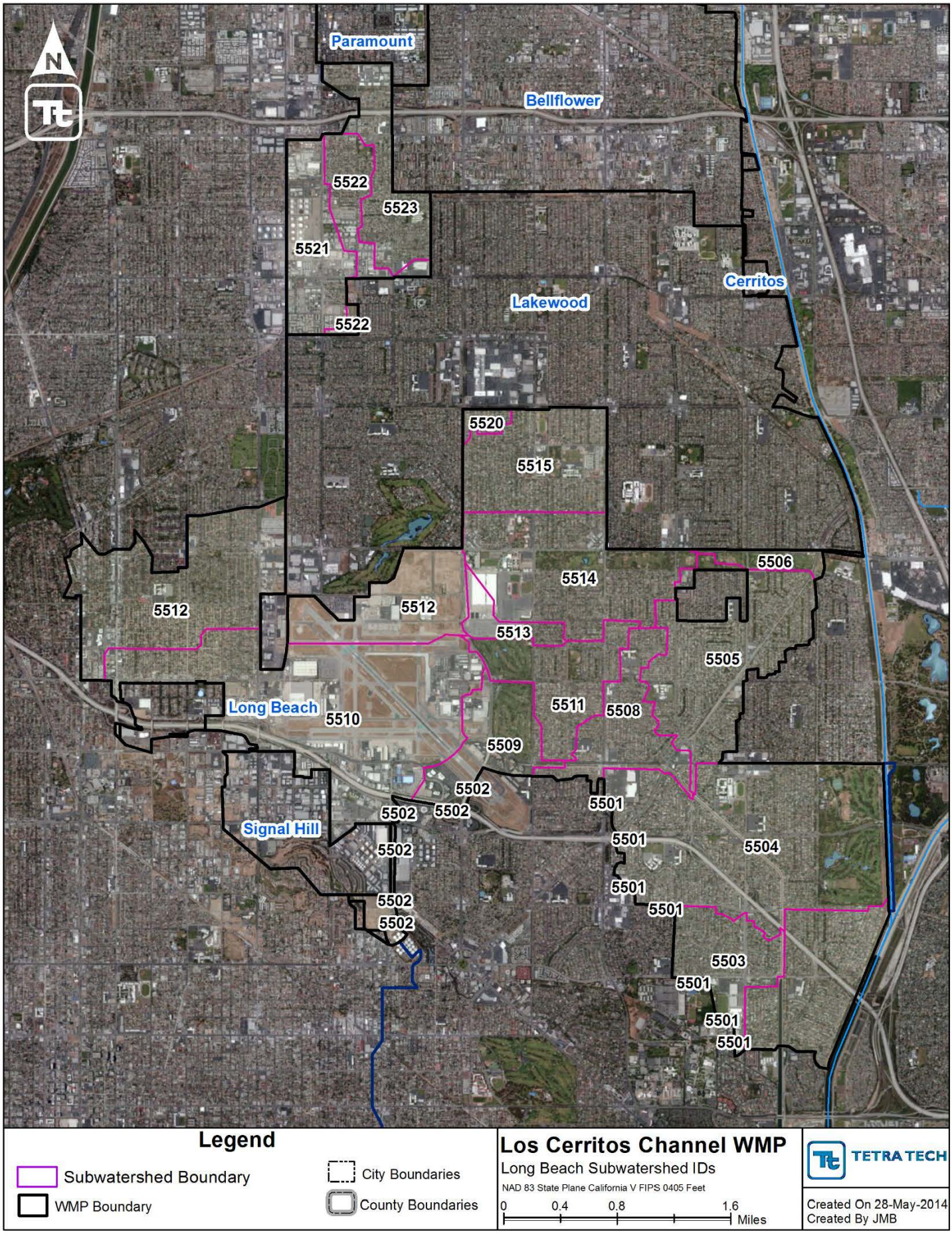


Figure 19. LCC Long Beach Subwatershed IDs



Figure 20. LCC Paramount Subwatershed IDs



Figure 21. LCC Signal Hill Subwatershed IDs

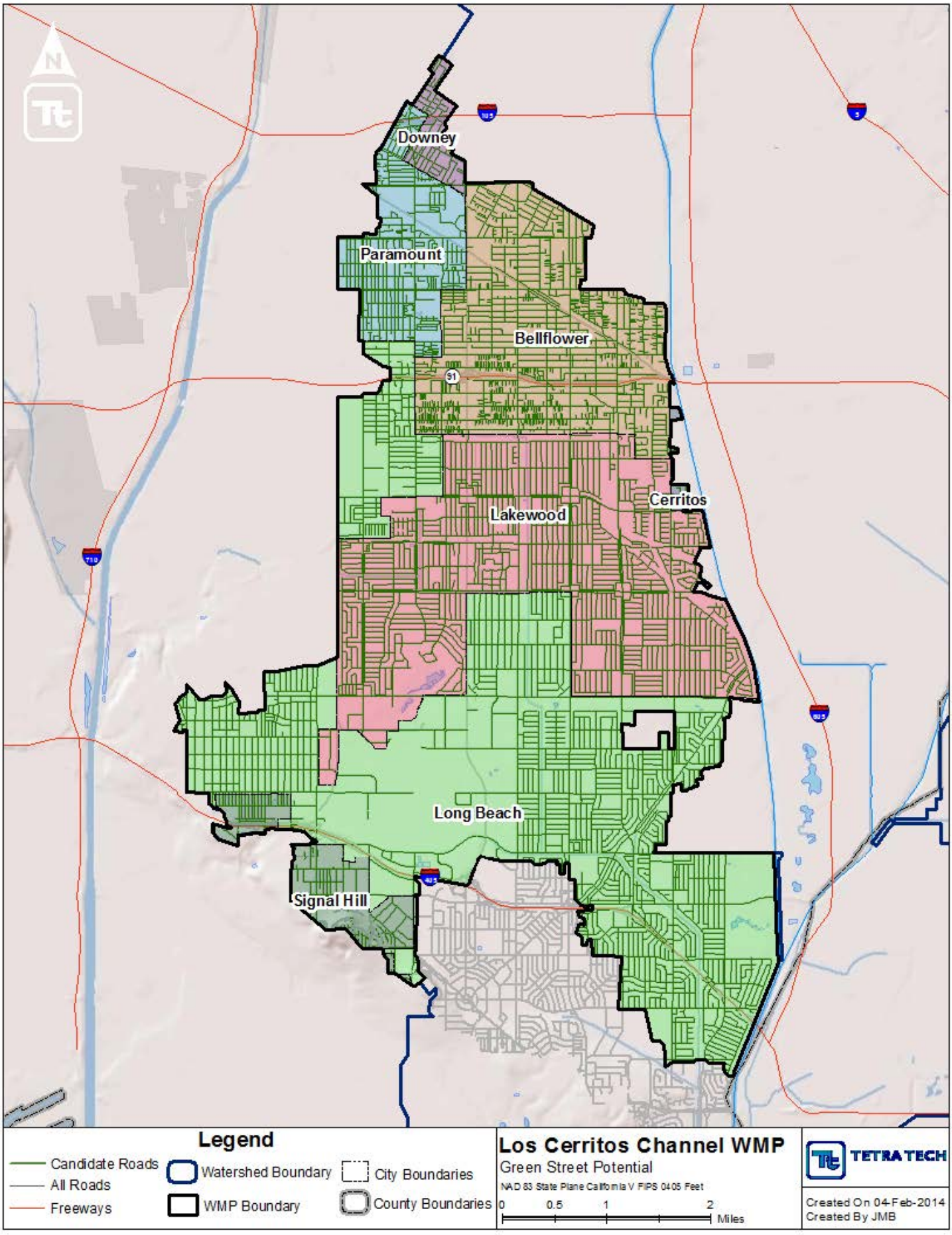


Figure 22. LCC ROW BMP Potential Opportunities

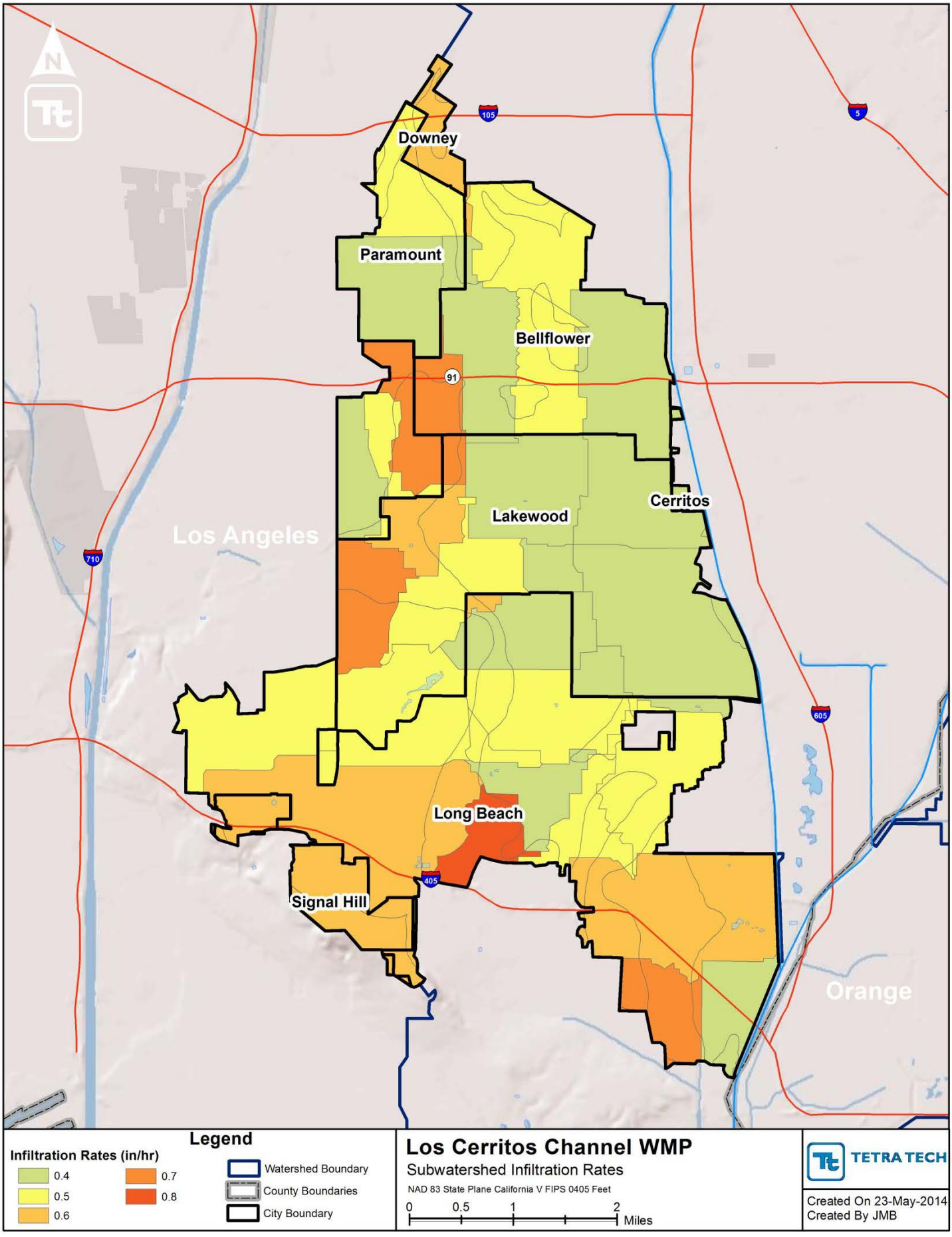


Figure 23. LCC Subwatershed Infiltration Rates

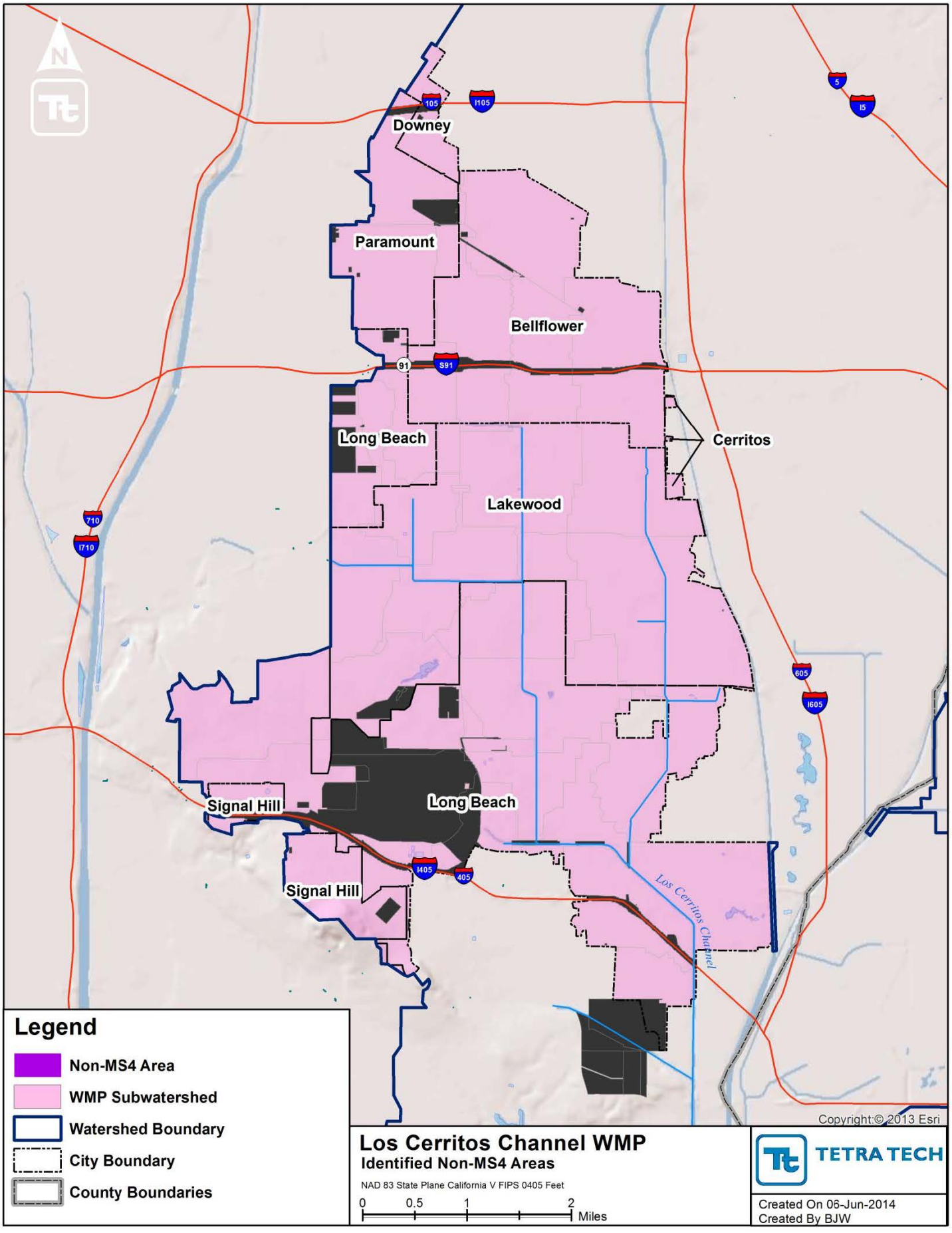


Figure 24. LCC Non-MS4 Permittees

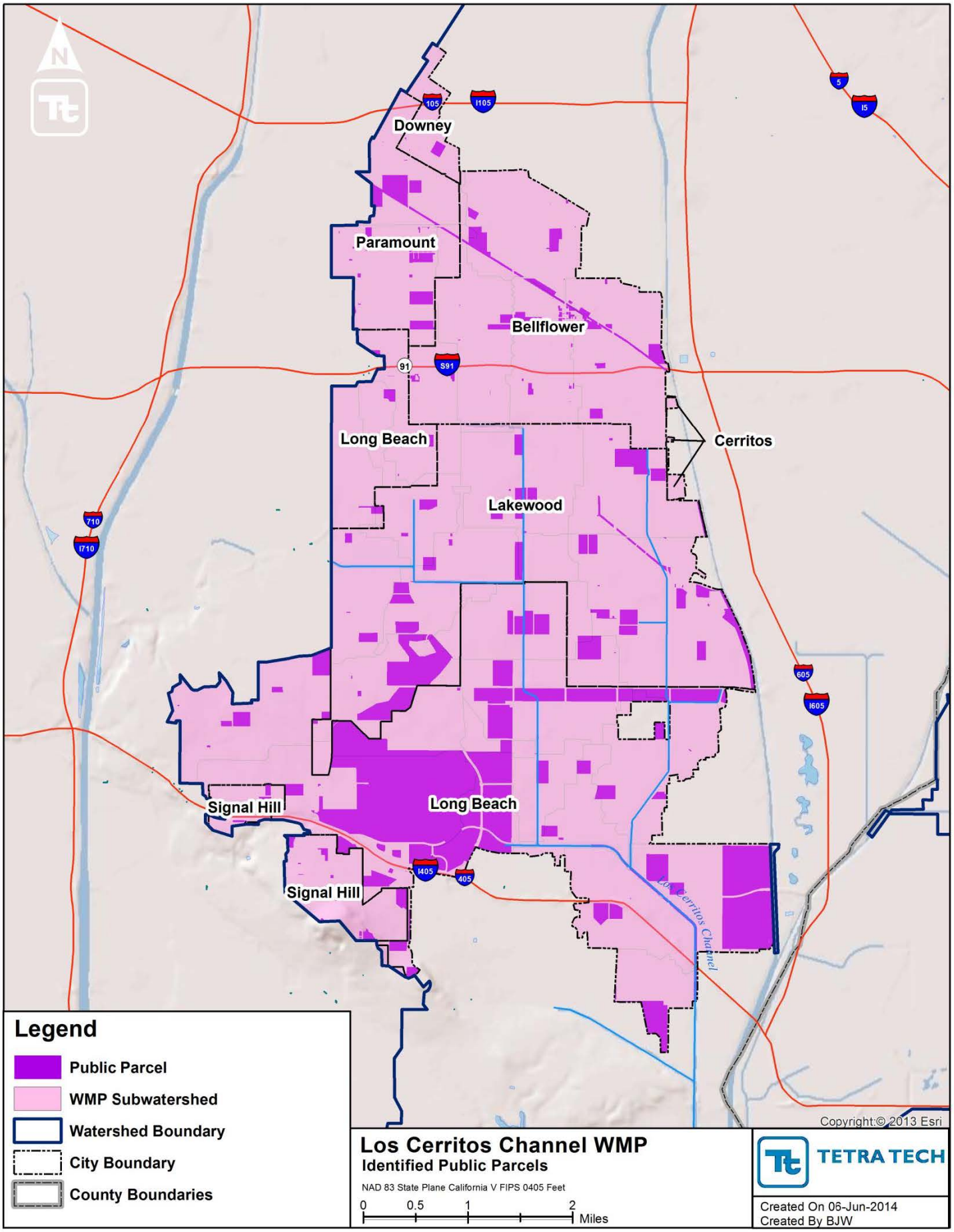


Figure 25. LCC identified public parcels

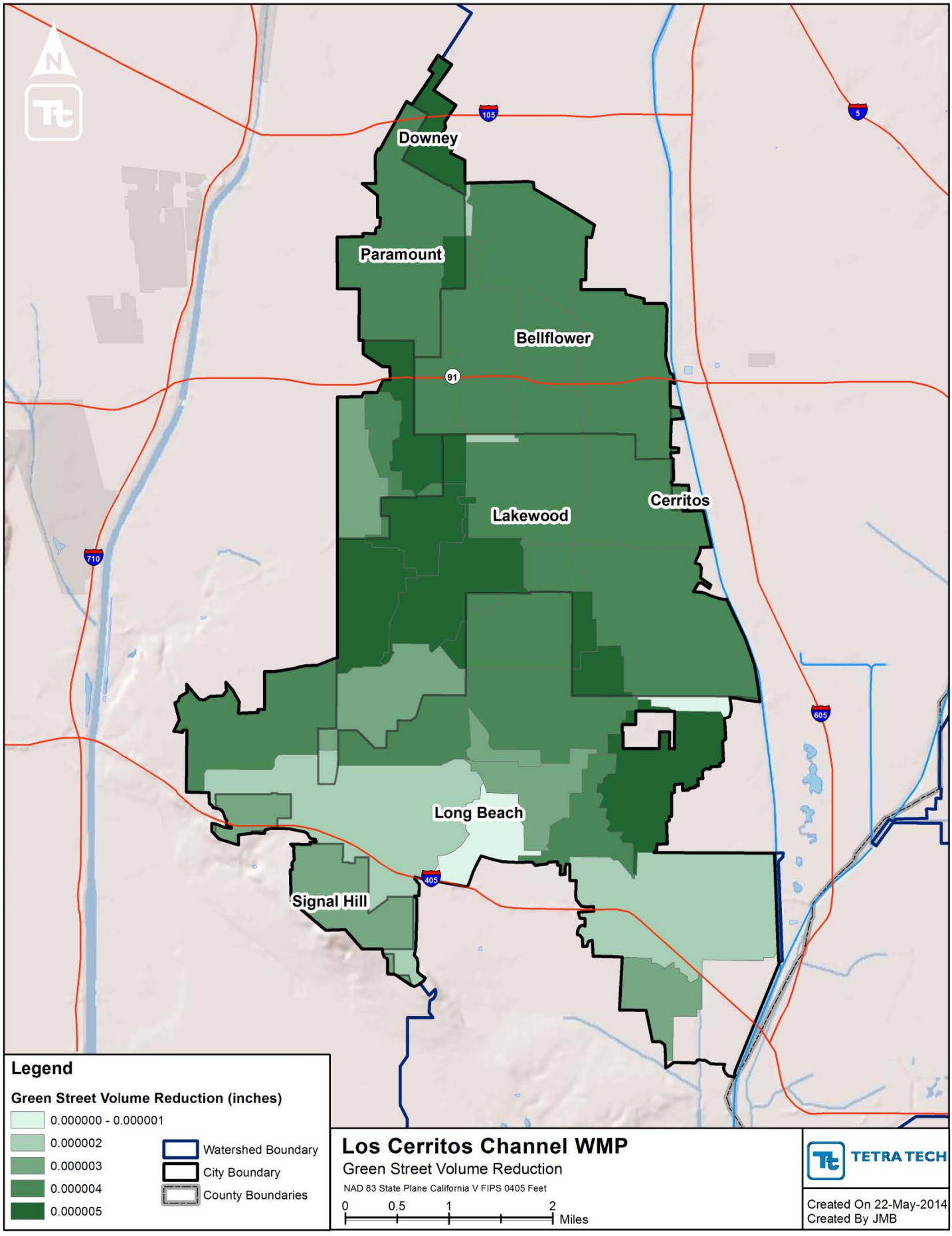


Figure 26. LCC ROW BMP Volume Reduction

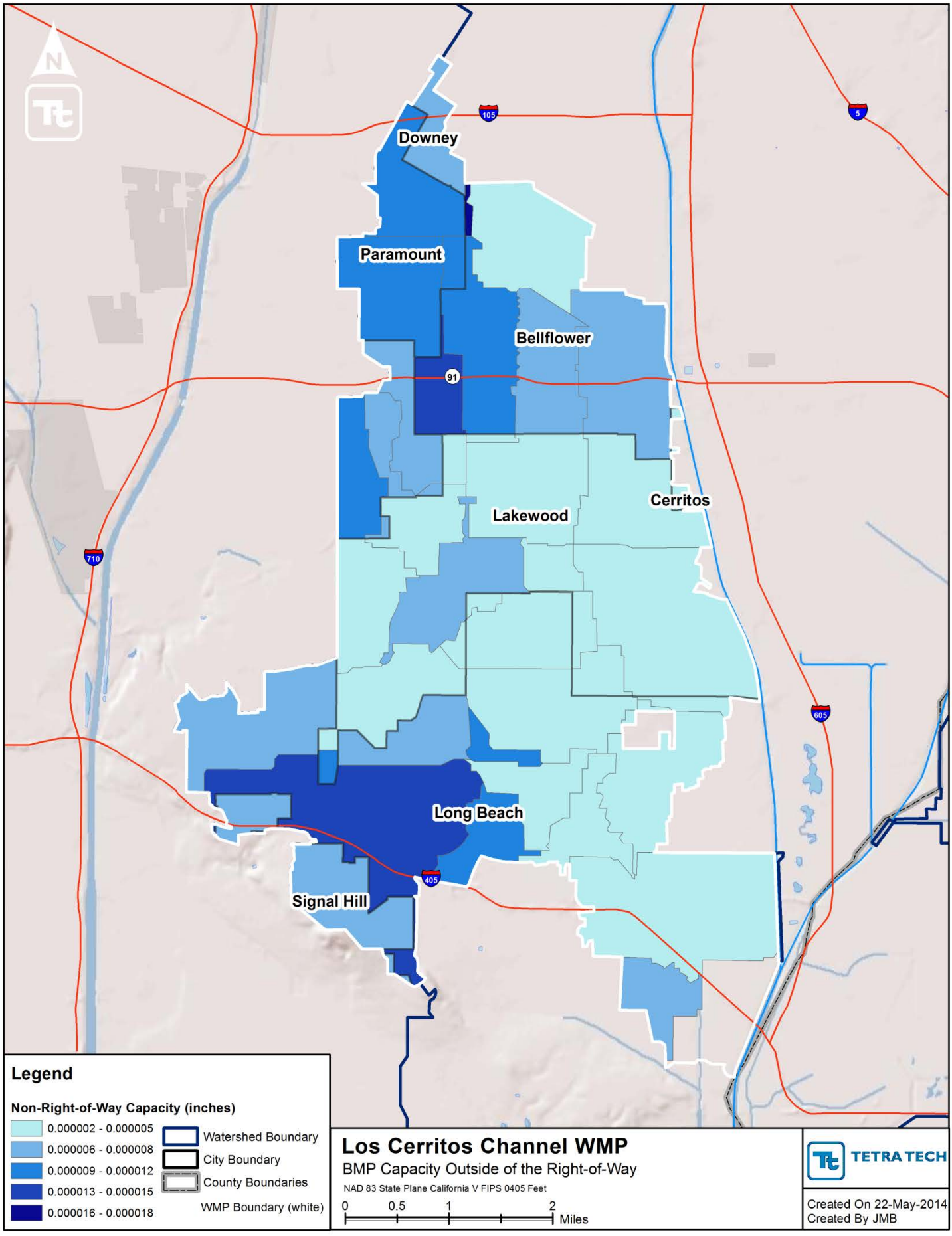


Figure 27. LCC BMP capacity outside of the right-of-way



Figure 28. LSGR (SGR) Artesia Subwatershed IDs

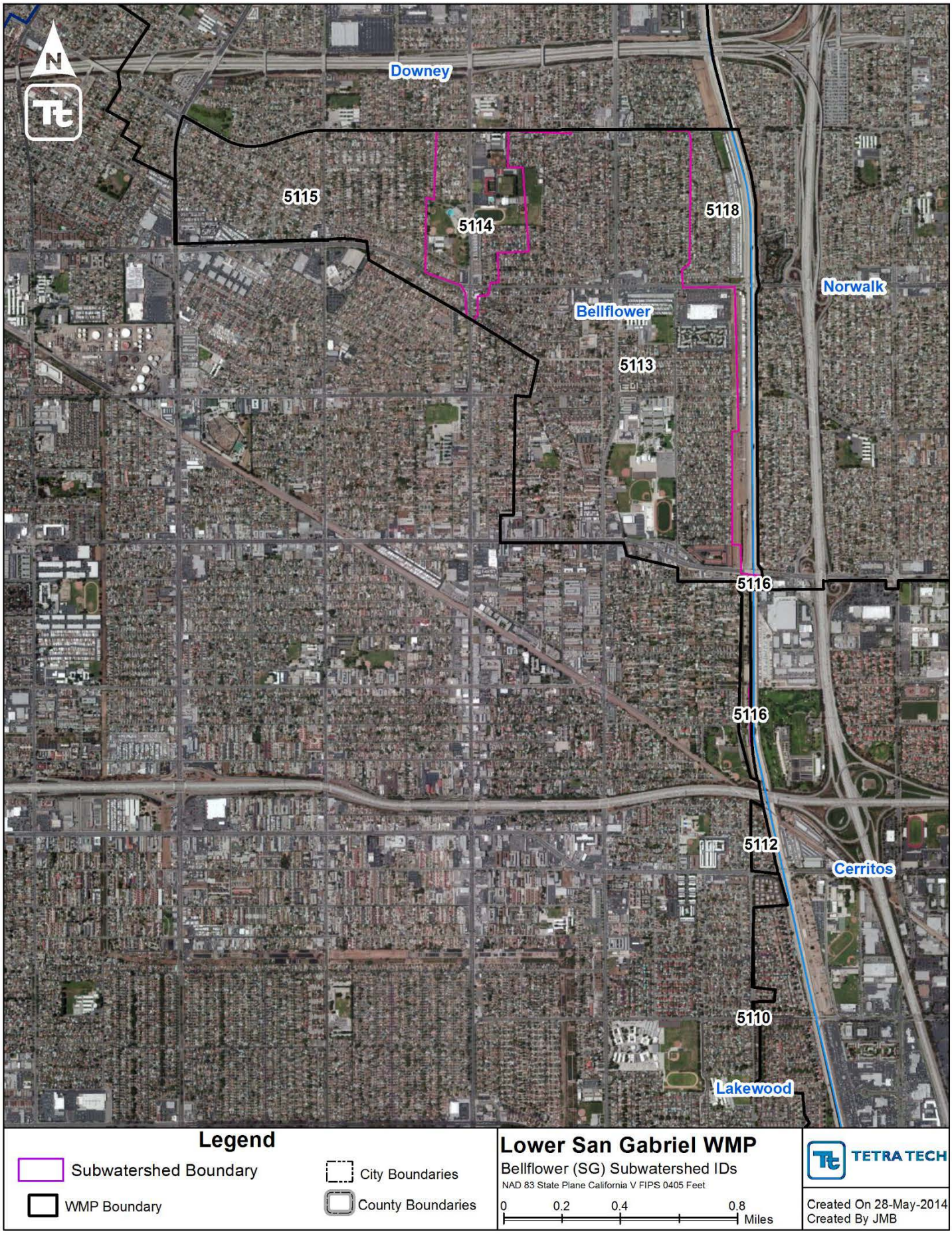


Figure 29. LSGR (SGR) Bellflower Subwatershed IDs

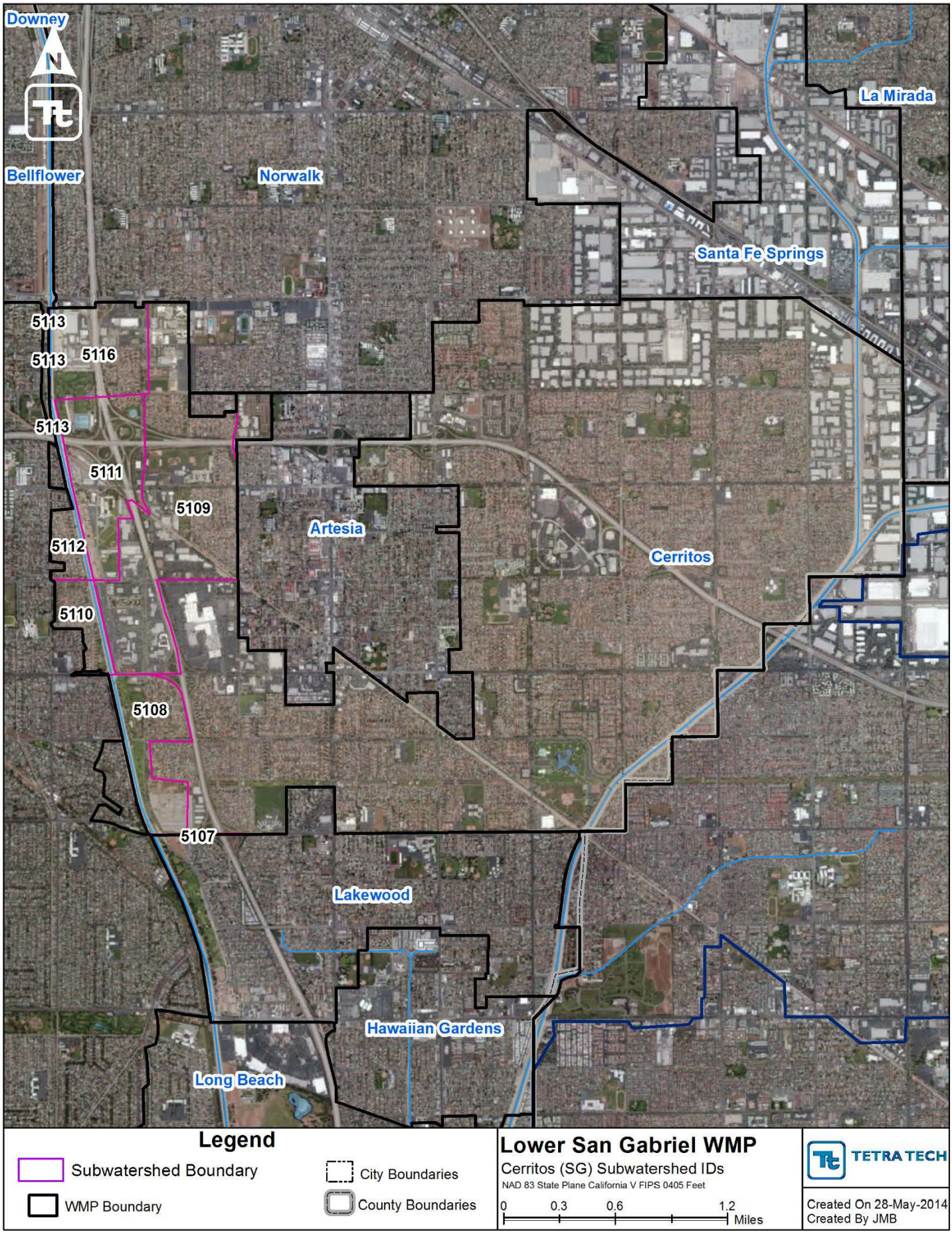


Figure 30. LSGR (SGR) Cerritos Subwatershed IDs

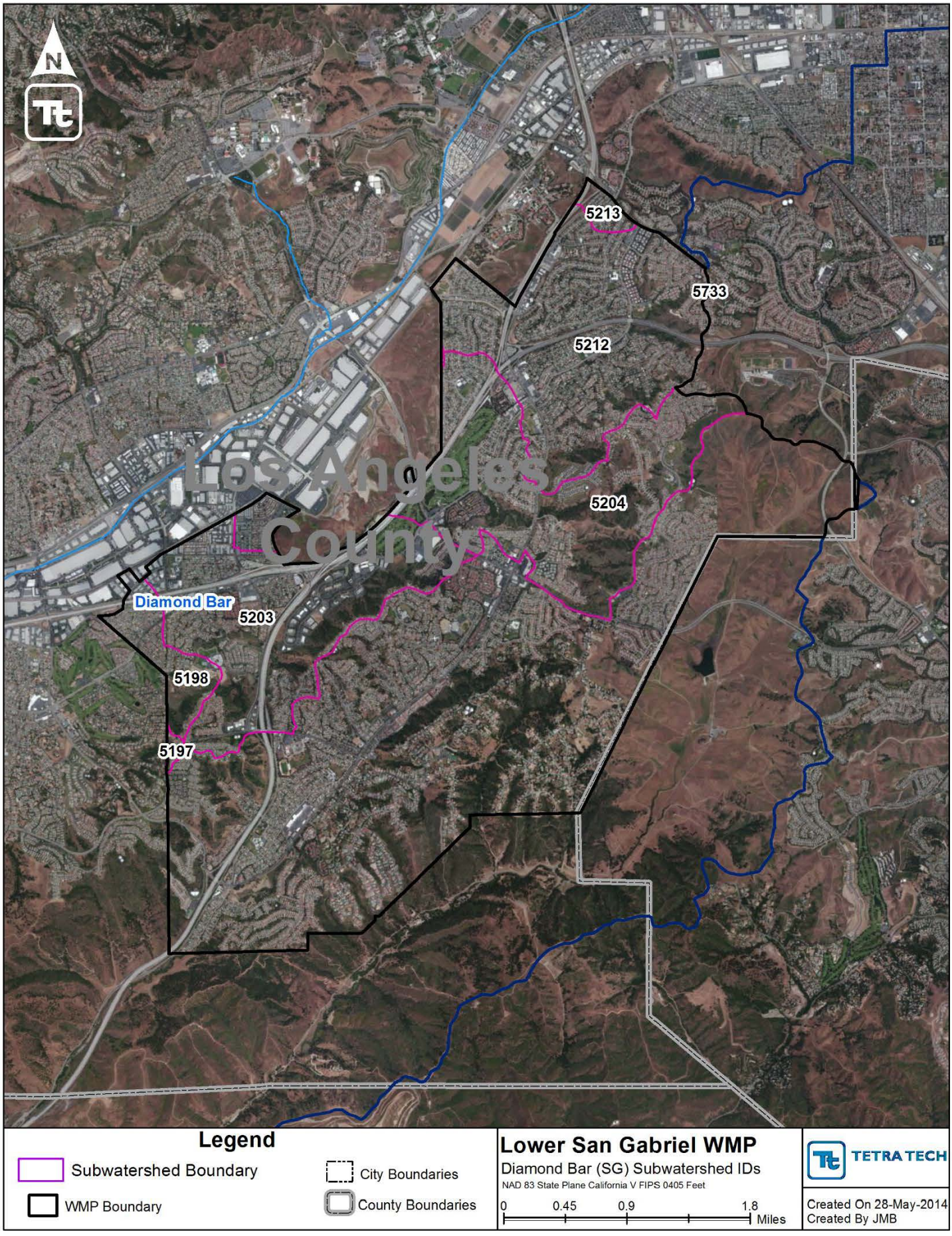


Figure 31. LSGR (SGR) Diamond Bar Subwatershed IDs

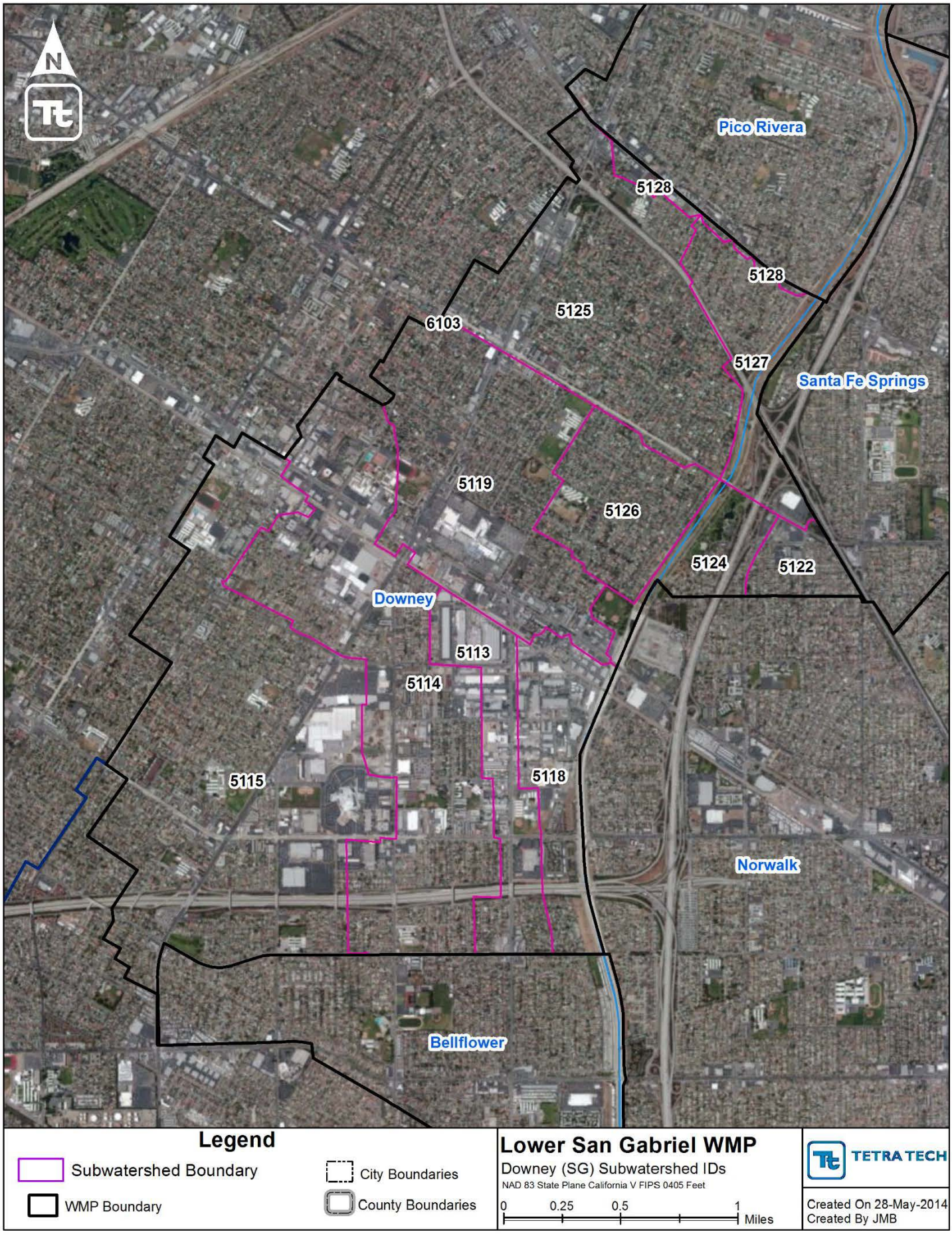


Figure 32. LSGR (SGR) Downey Subwatershed IDs

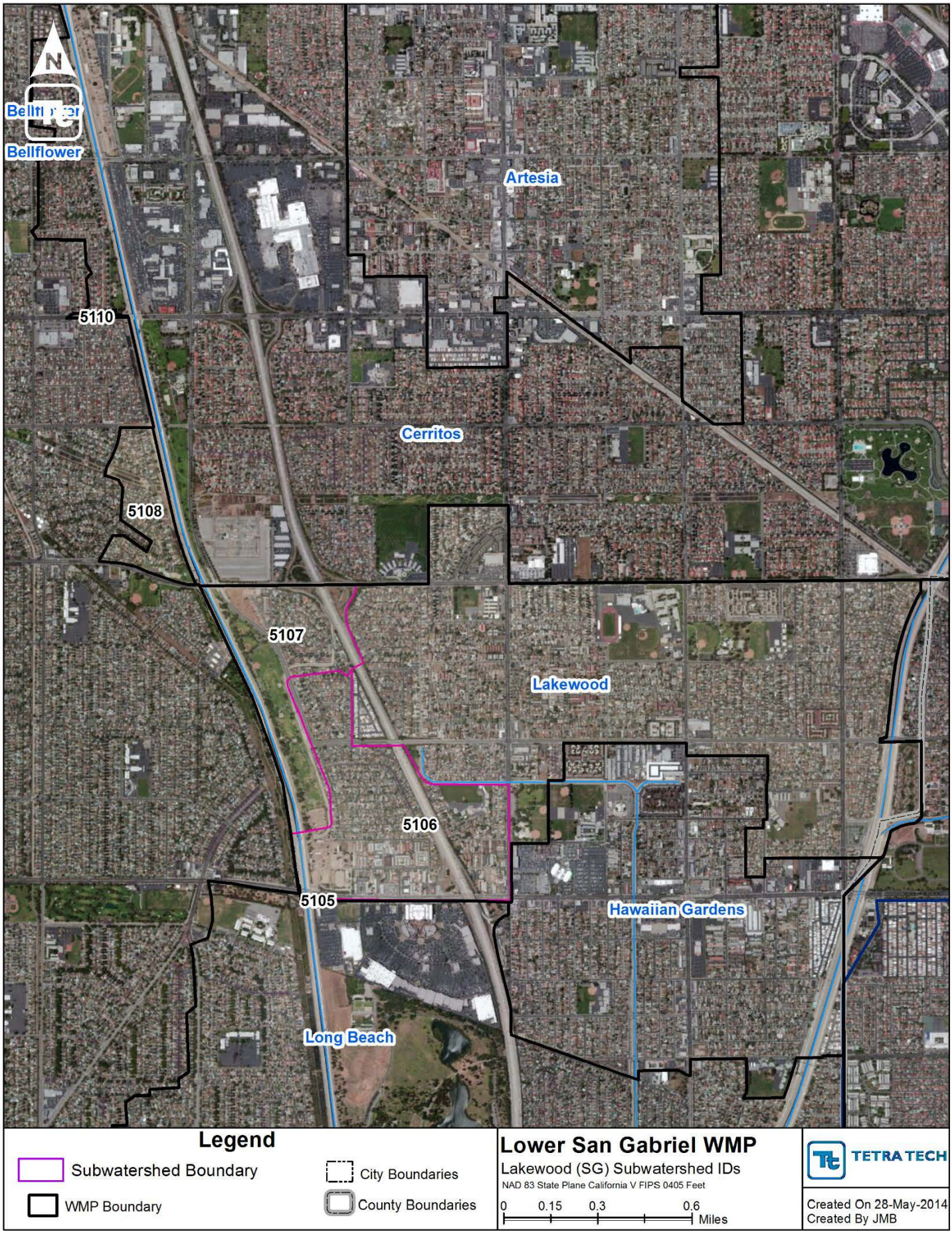


Figure 33. LSGR (SGR) Lakewood Subwatershed IDs

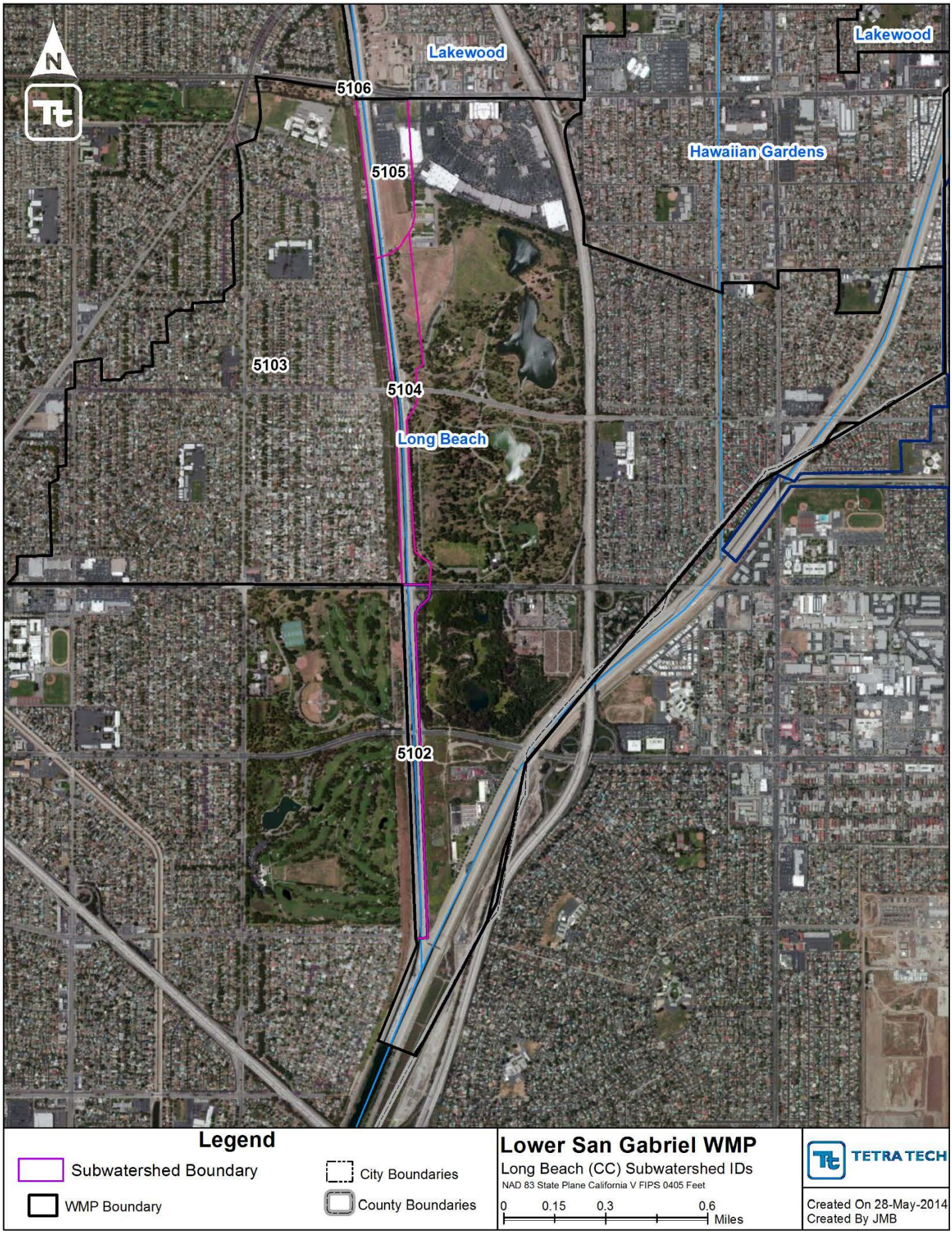


Figure 34. LSGR (SGR) Long Beach Subwatershed IDs

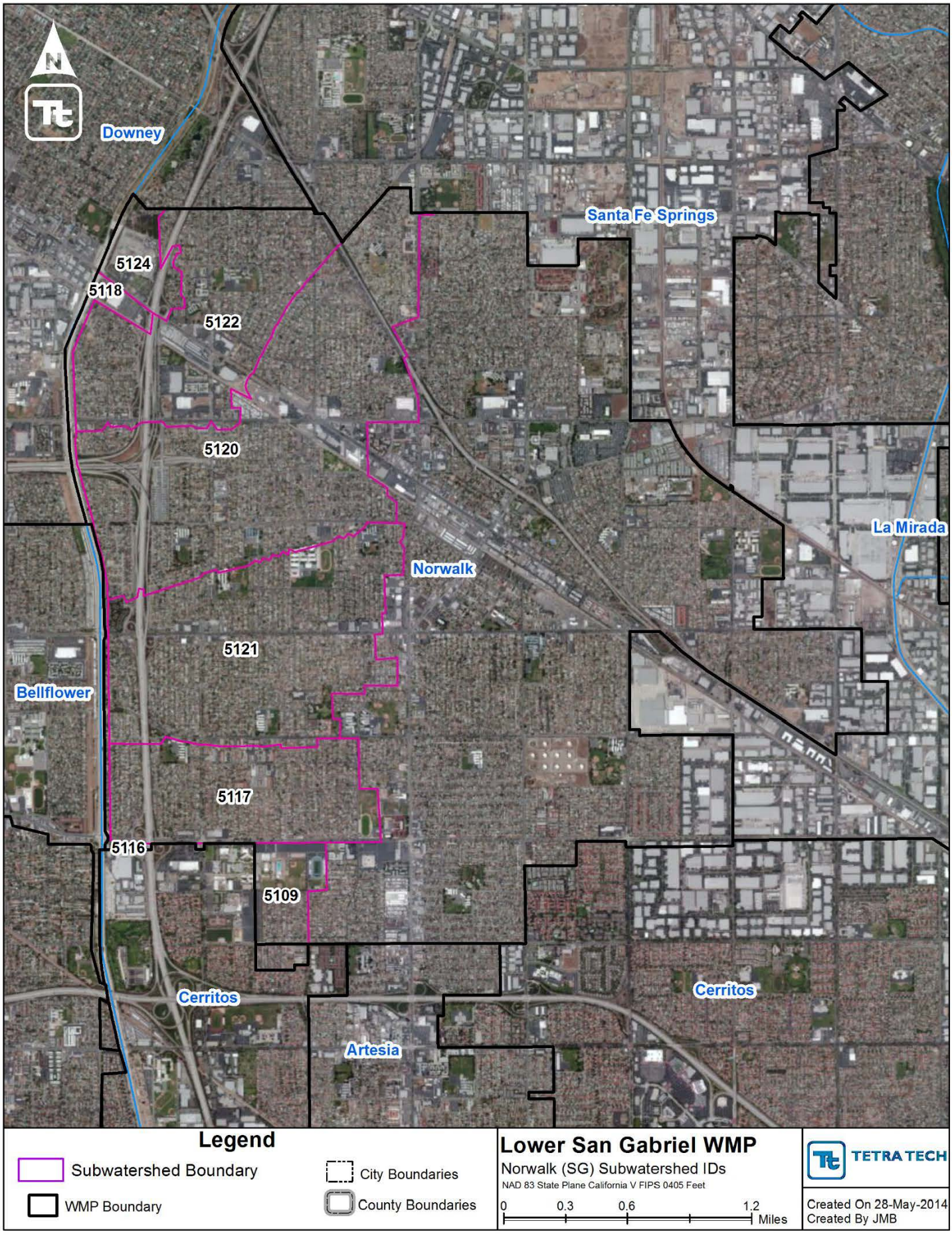


Figure 35. LSGR (SGR) Norwalk Subwatershed IDs

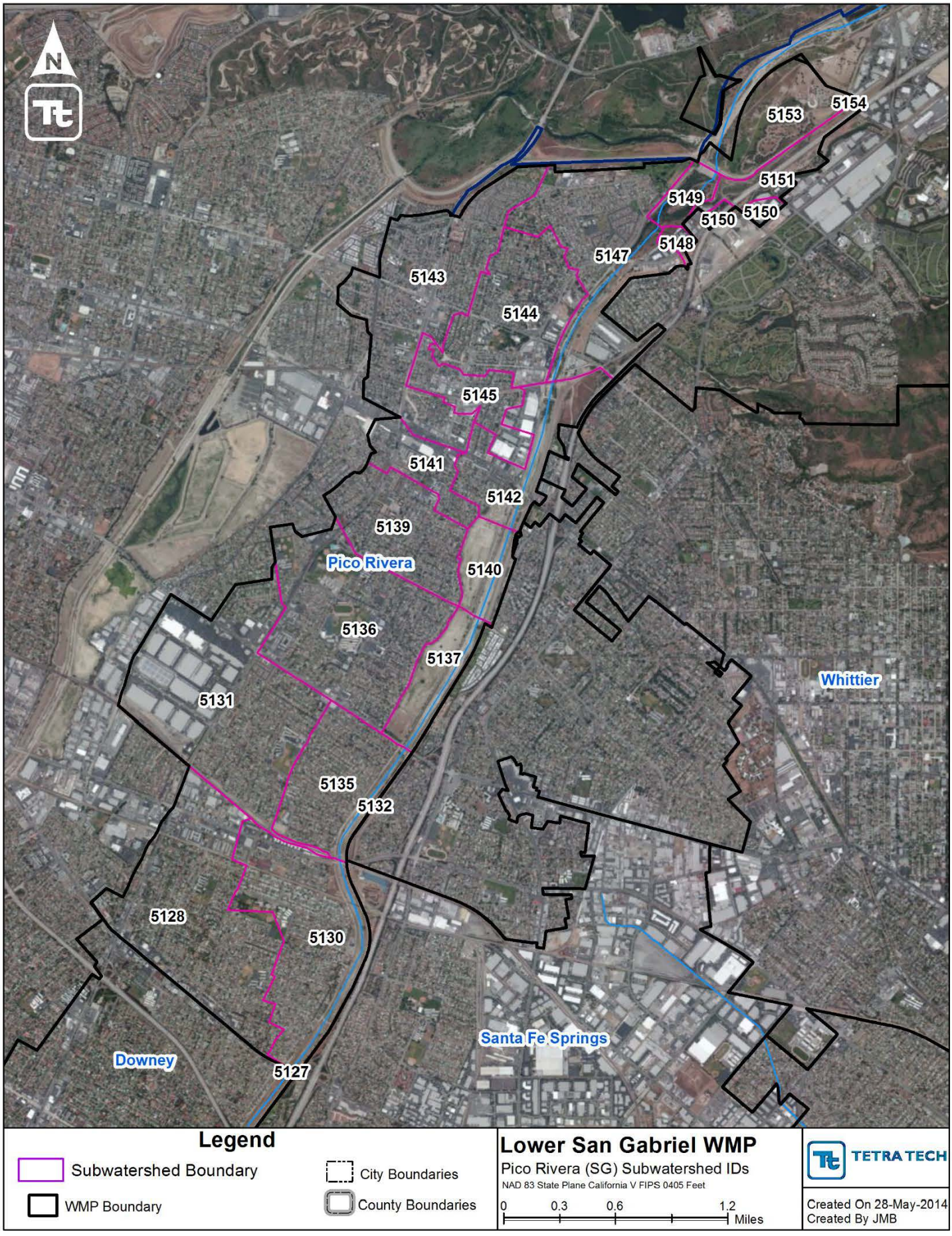


Figure 36. LSGR (SGR) Pico Rivera Subwatershed IDs

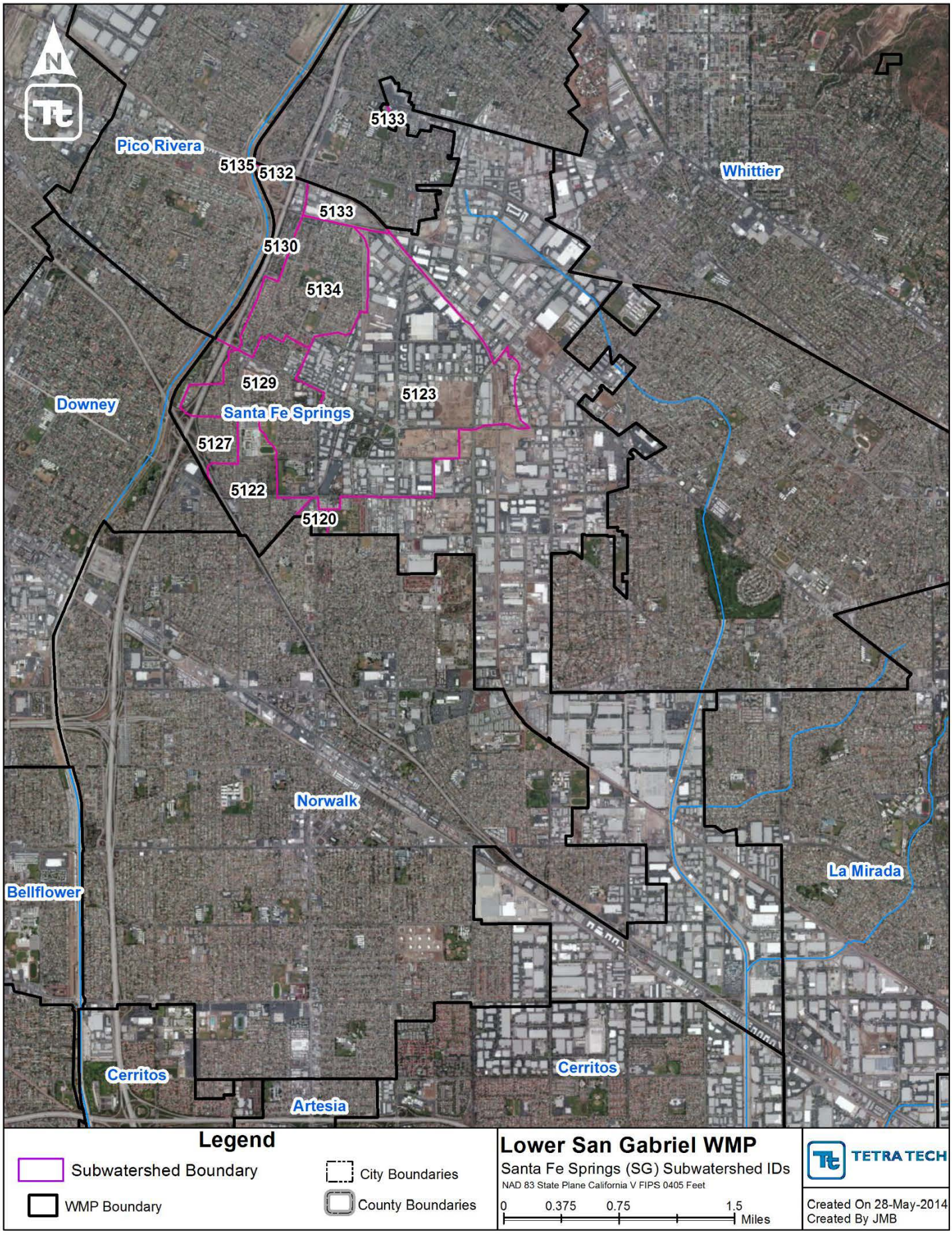


Figure 37. LSGR (SGR) Santa Fe Springs Subwatershed IDs

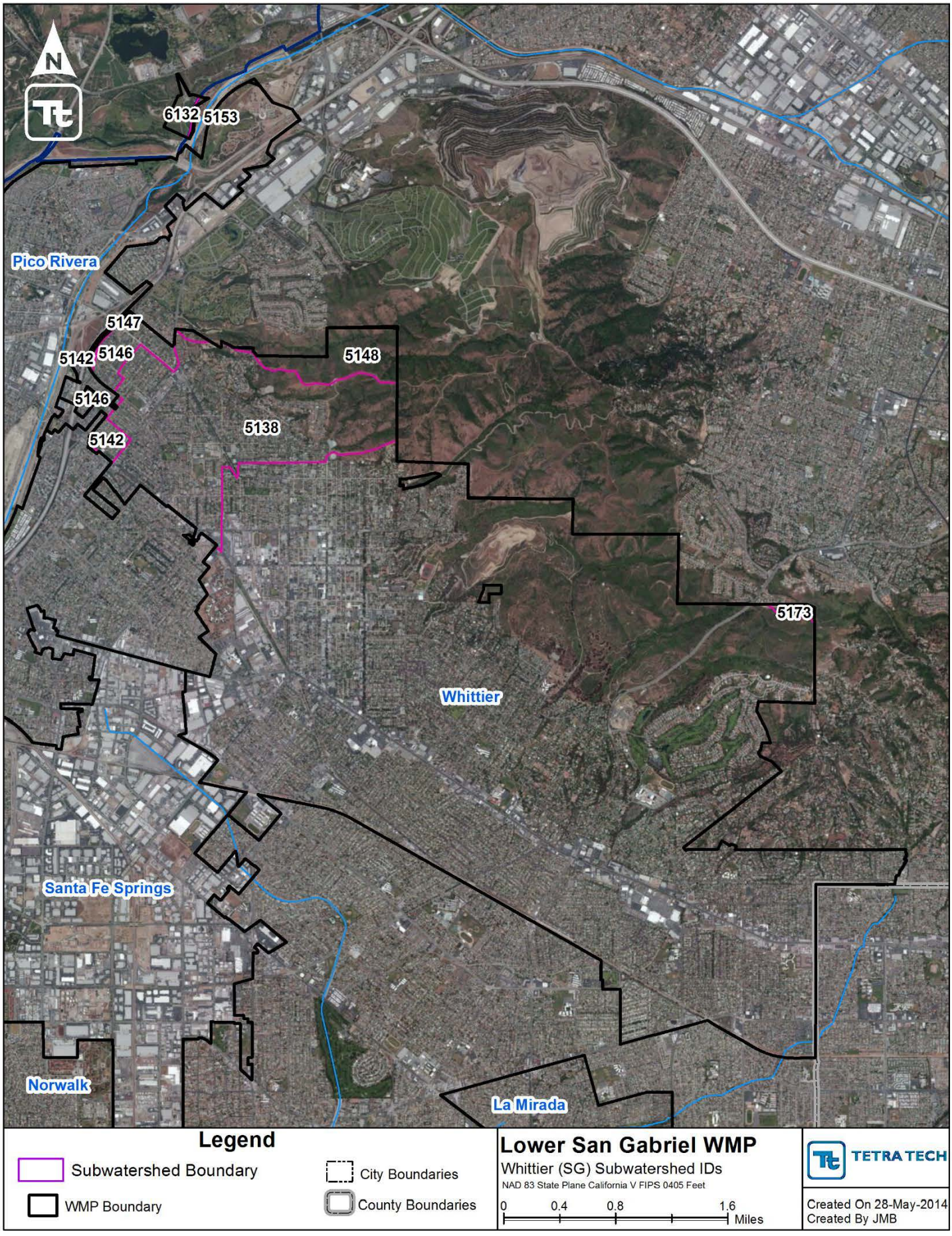


Figure 38. LSGR (SGR) Whittier Subwatershed IDs



Figure 39. LSGR (CC) Artesia Subwatershed IDs

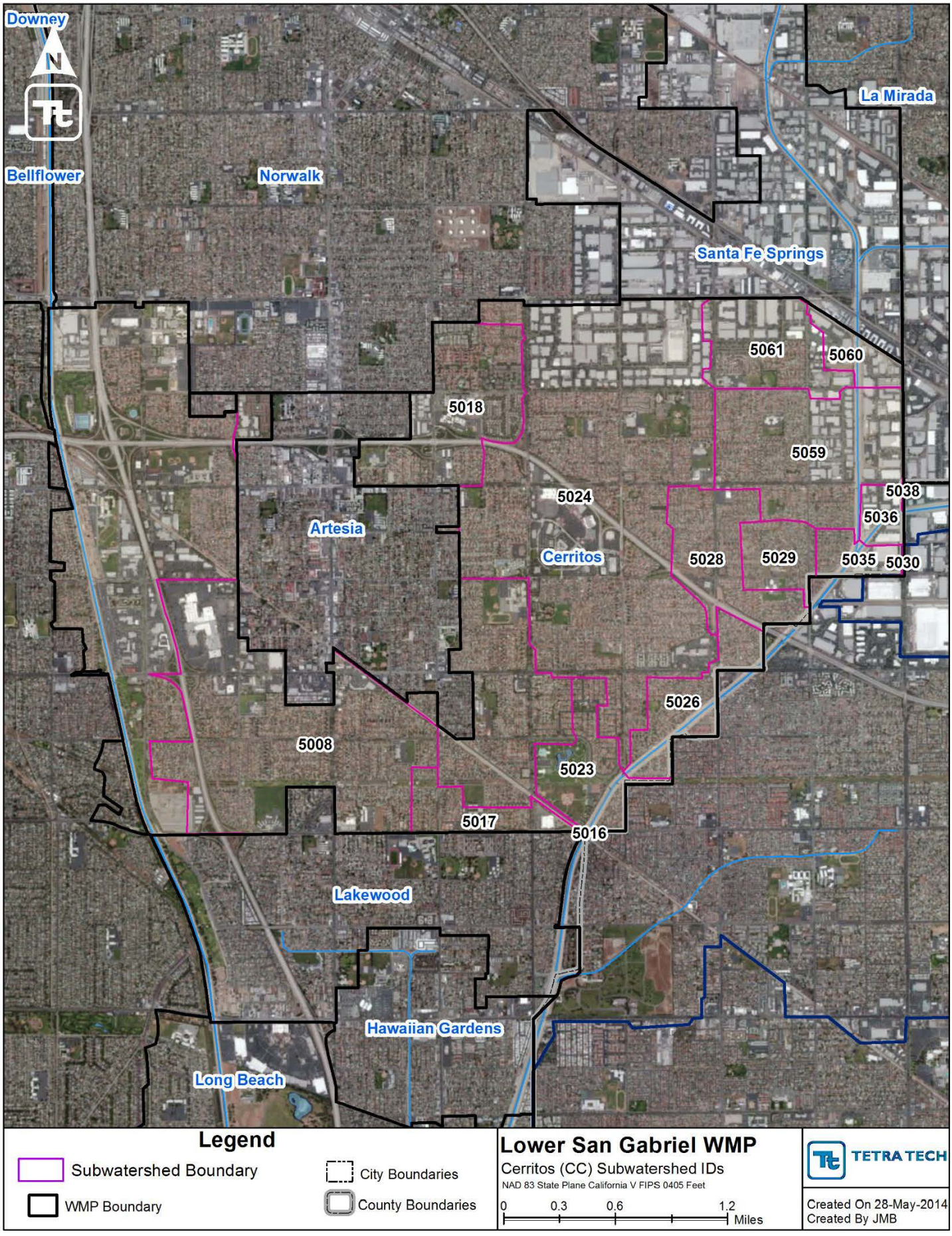


Figure 40. LSGR (CC) Cerritos Subwatershed IDs

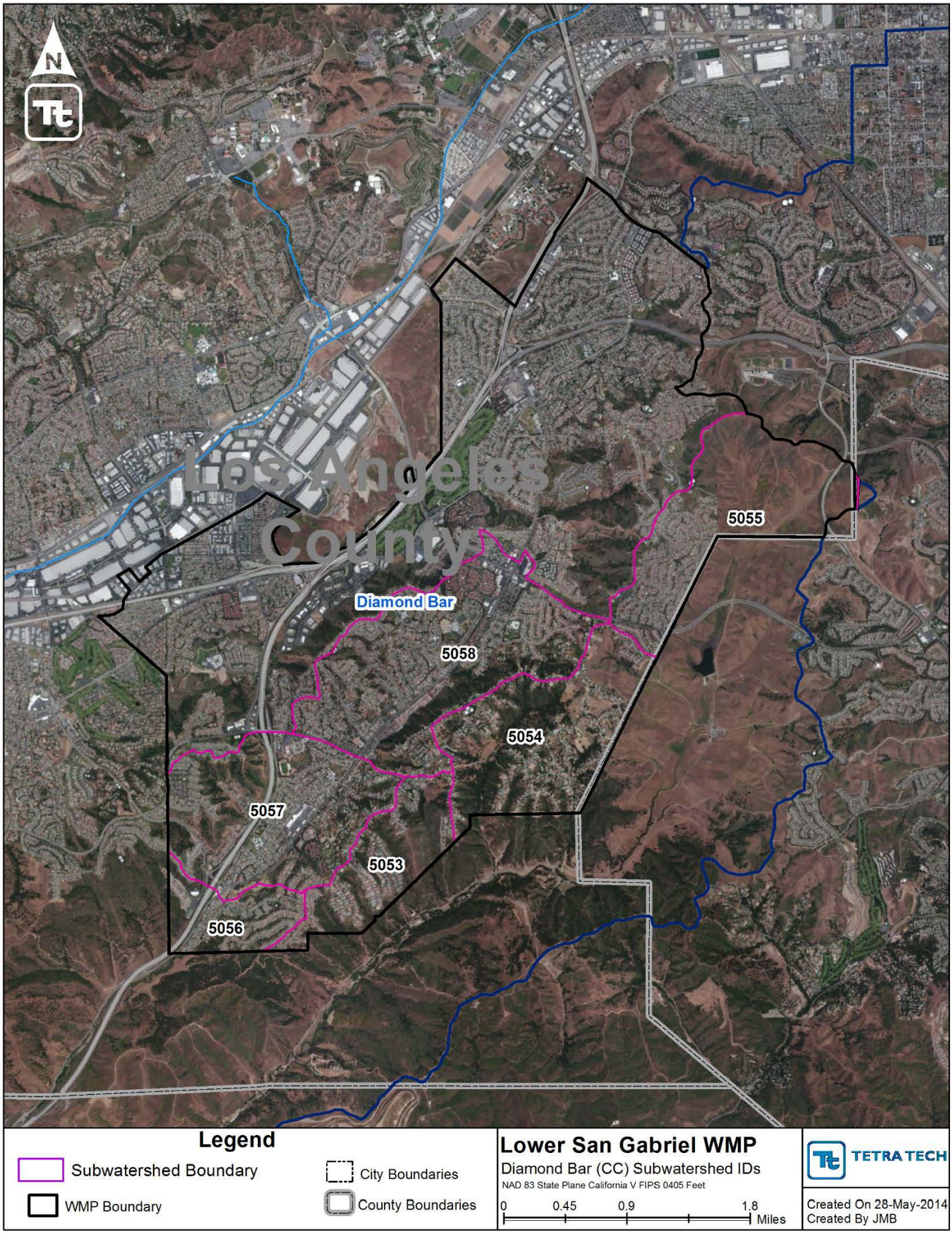


Figure 41. LSGR (CC) Diamond Bar Subwatershed IDs

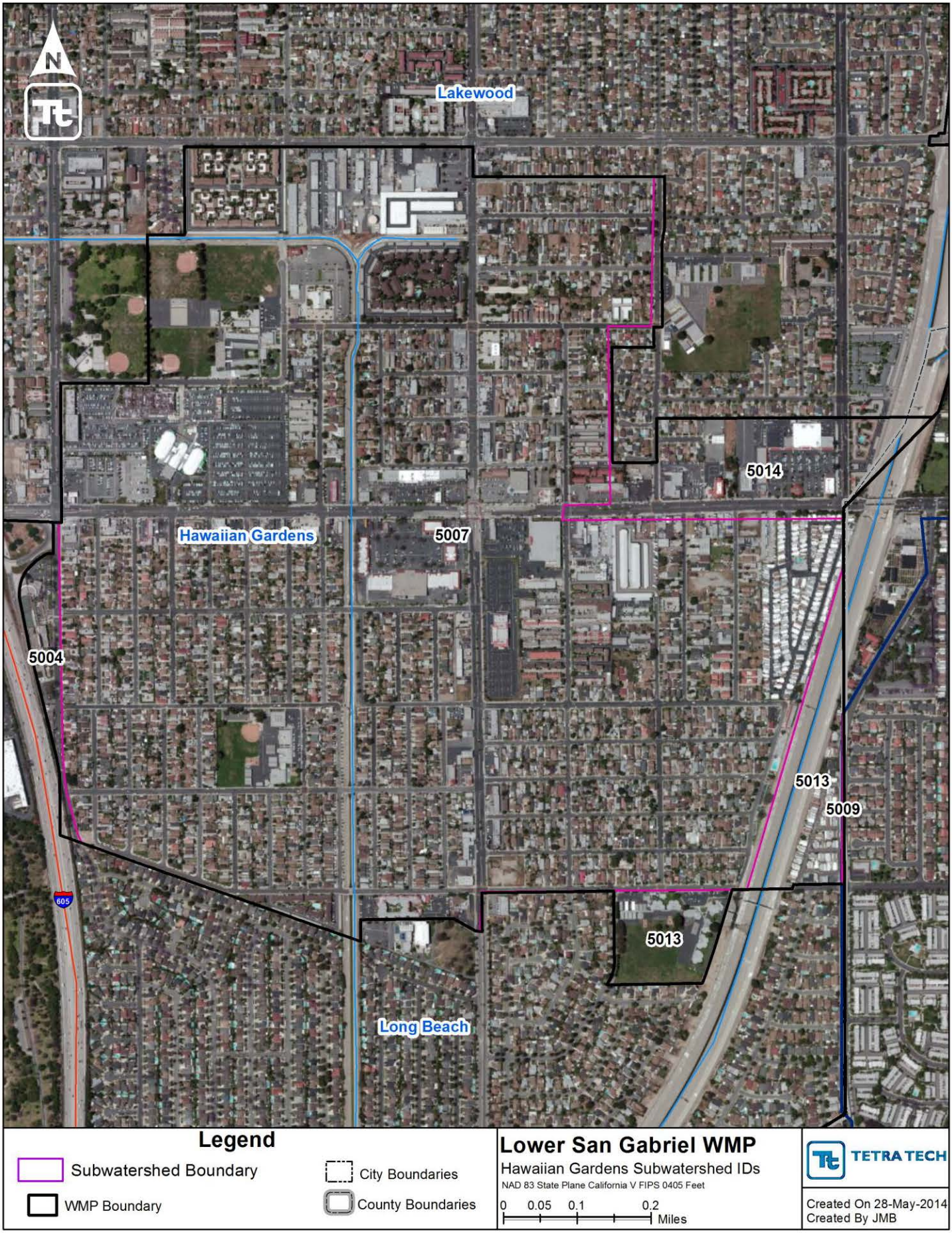


Figure 42. LSGR (CC) Hawaiian Gardens Subwatershed IDs

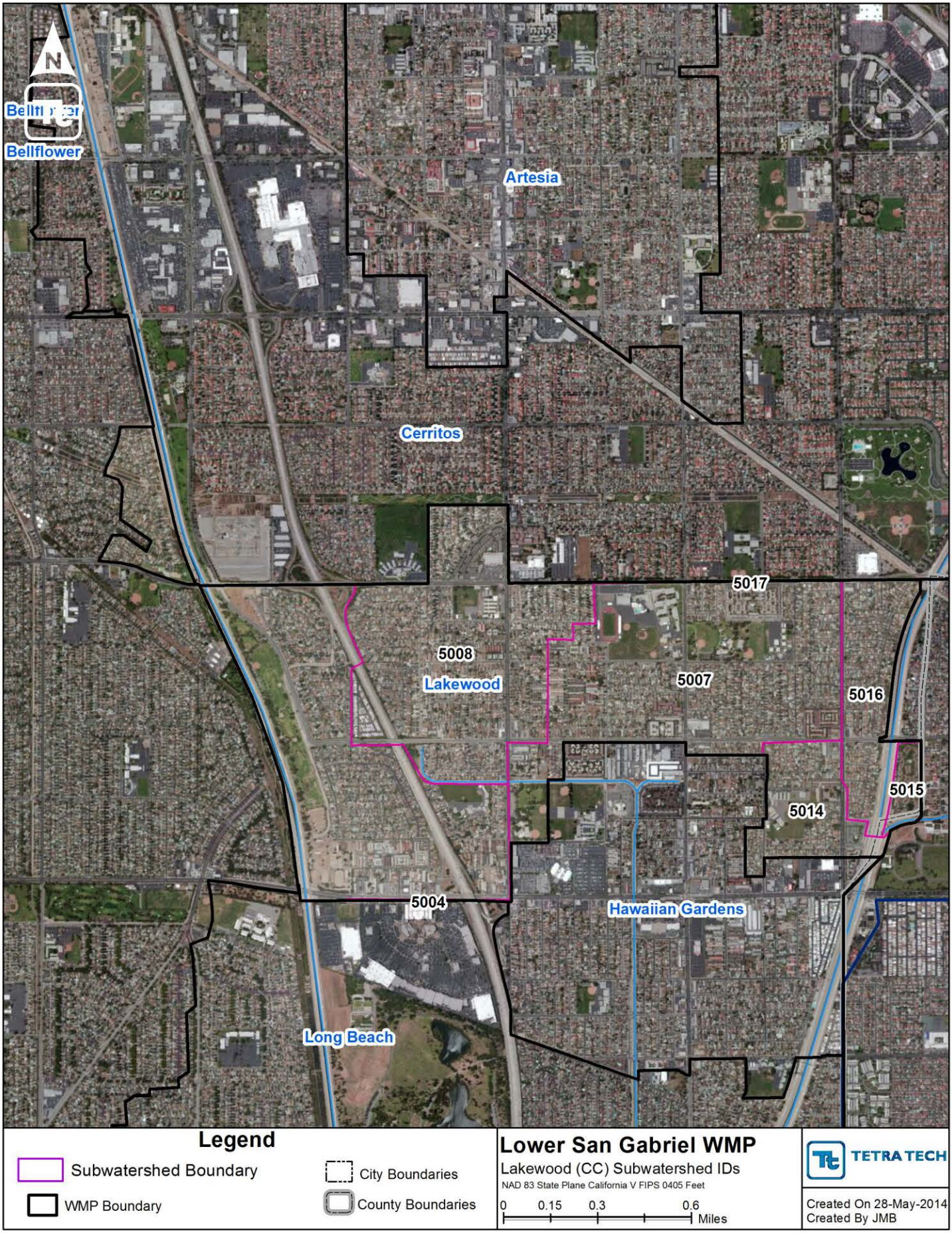


Figure 43. LSGR (CC) Lakewood Subwatershed IDs

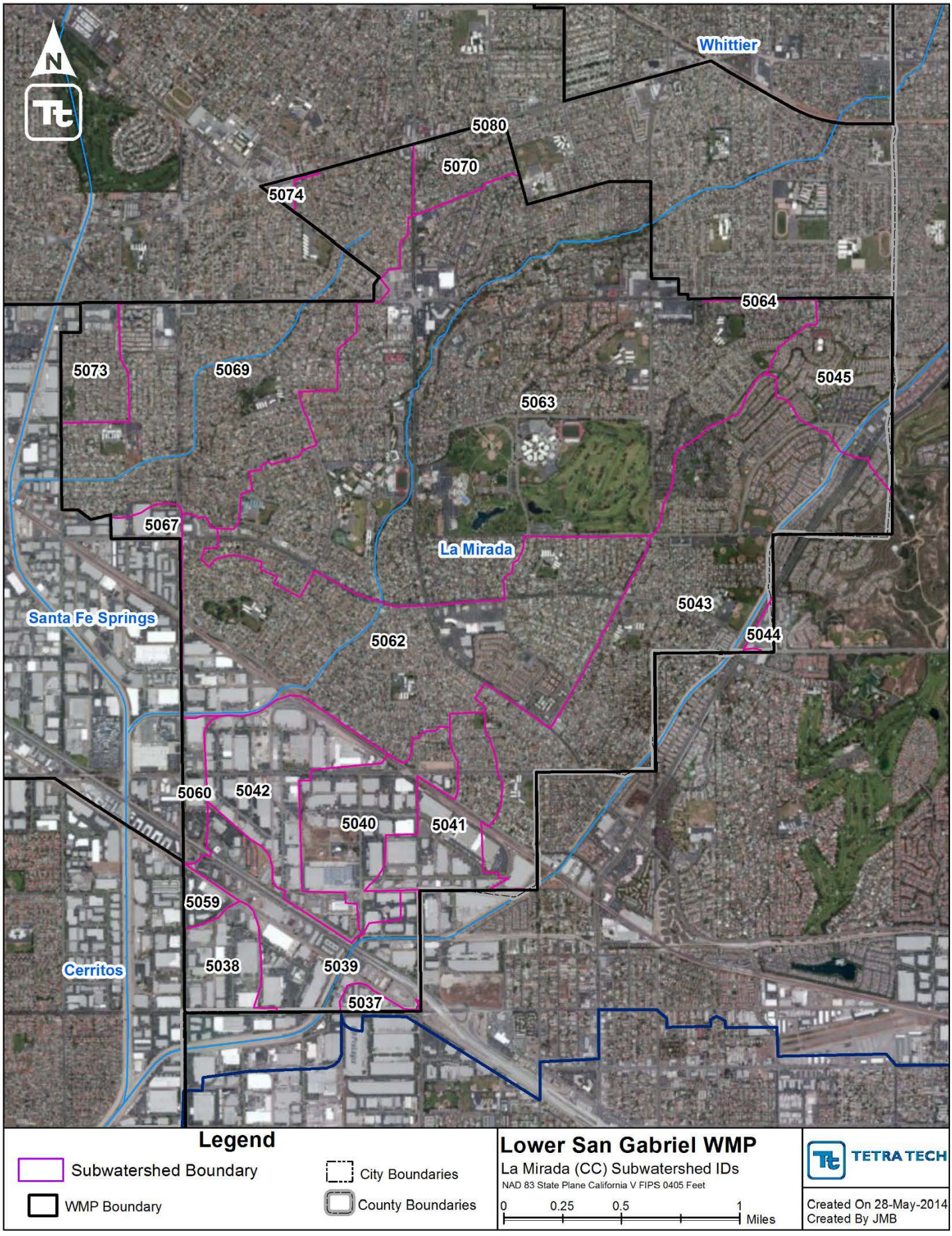


Figure 44. LSGR (CC) La Mirada Subwatershed IDs

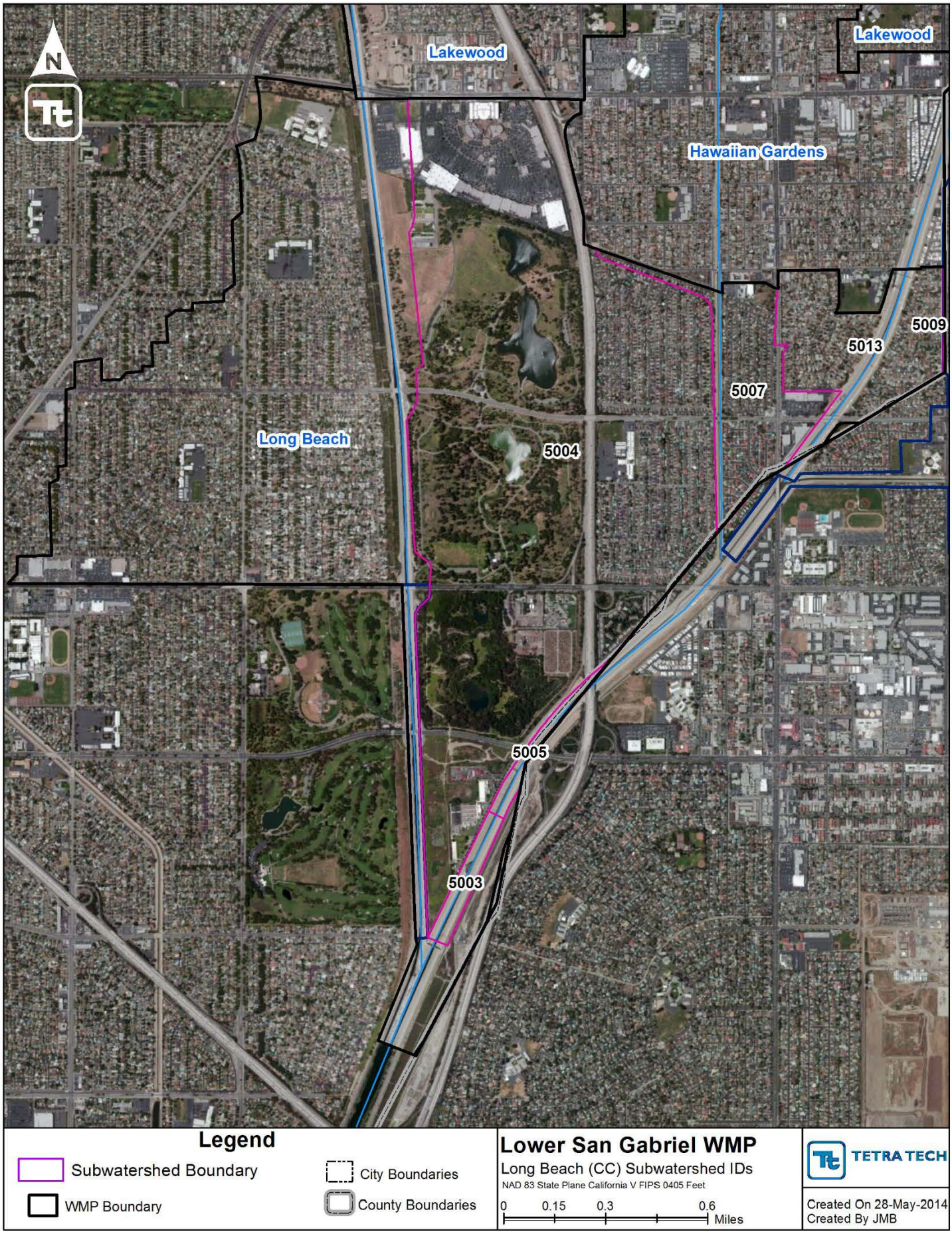


Figure 45. LSGR (CC) Long Beach Subwatershed IDs

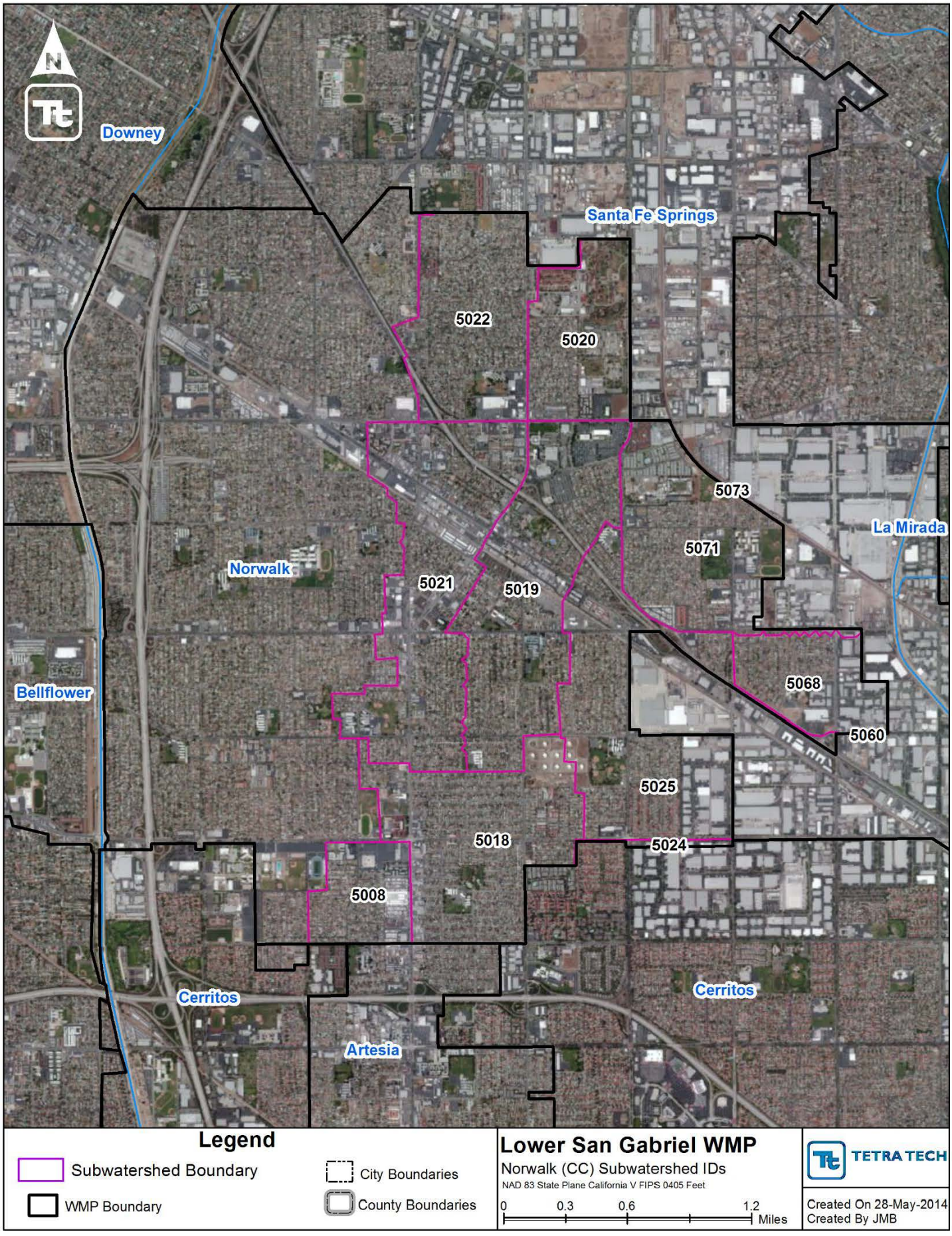


Figure 46. LSGR (CC) Norwalk Subwatershed IDs

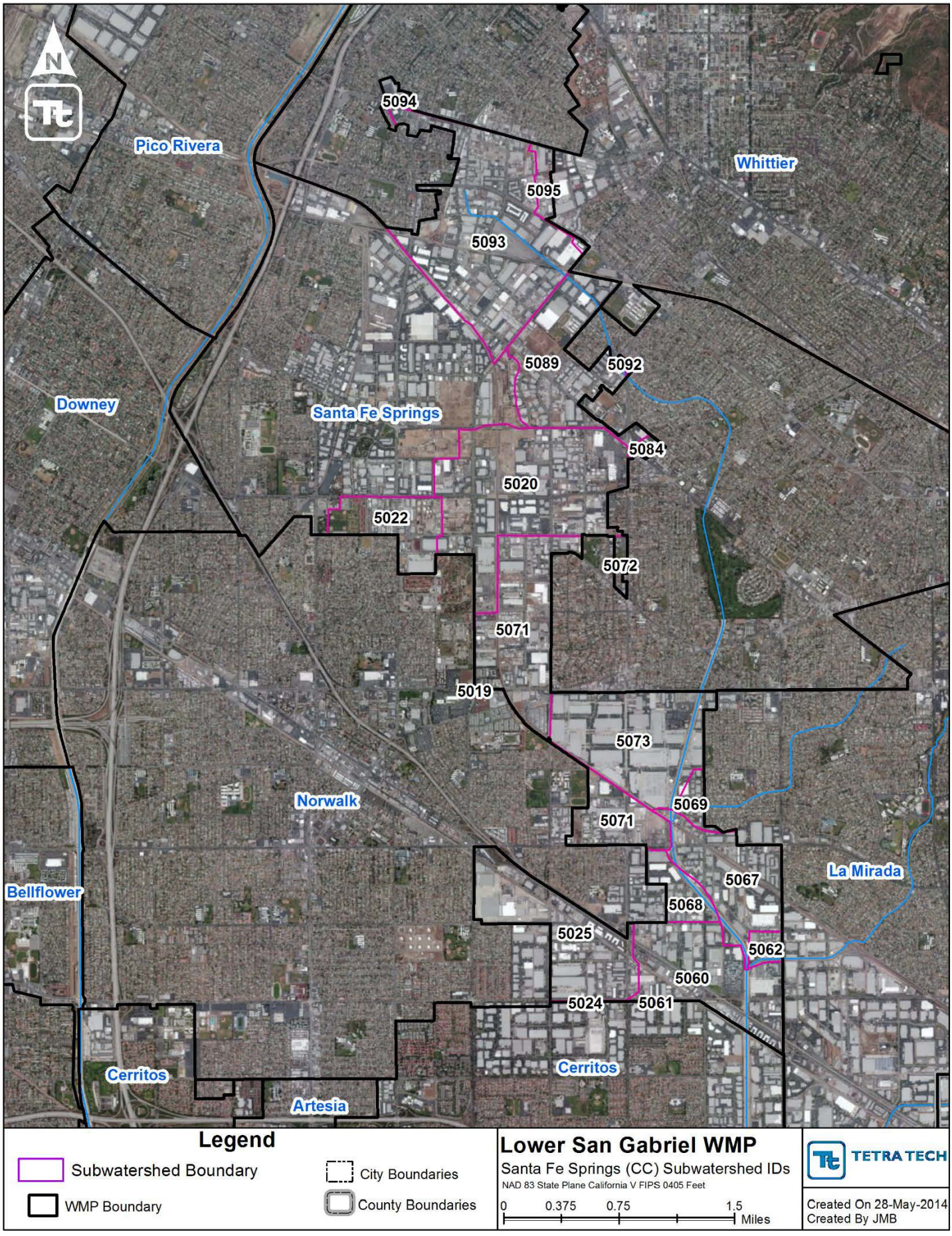


Figure 47. LSGR (CC) Santa Fe Springs Subwatershed IDs

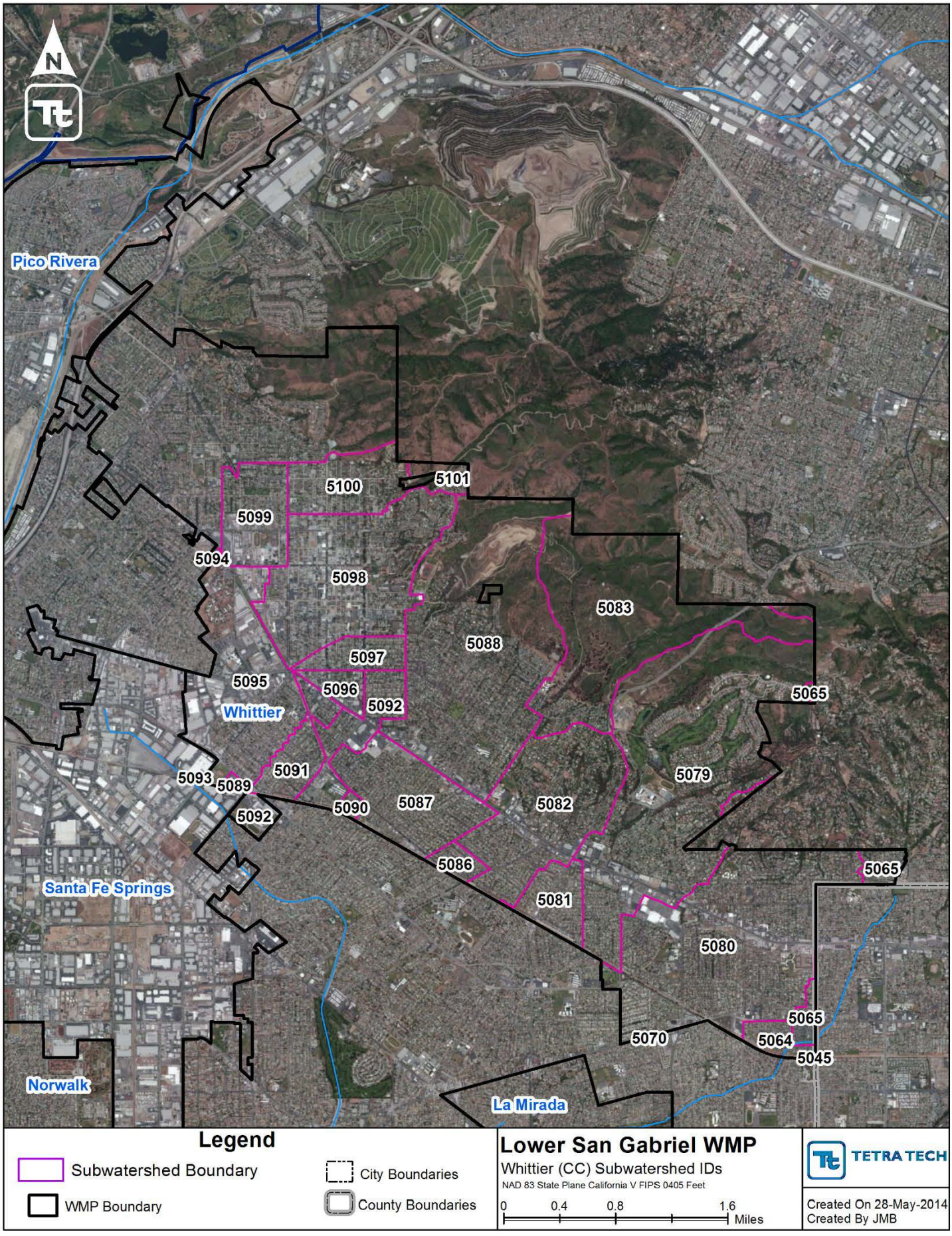


Figure 48. LSGR (CC) Whittier Subwatershed IDs

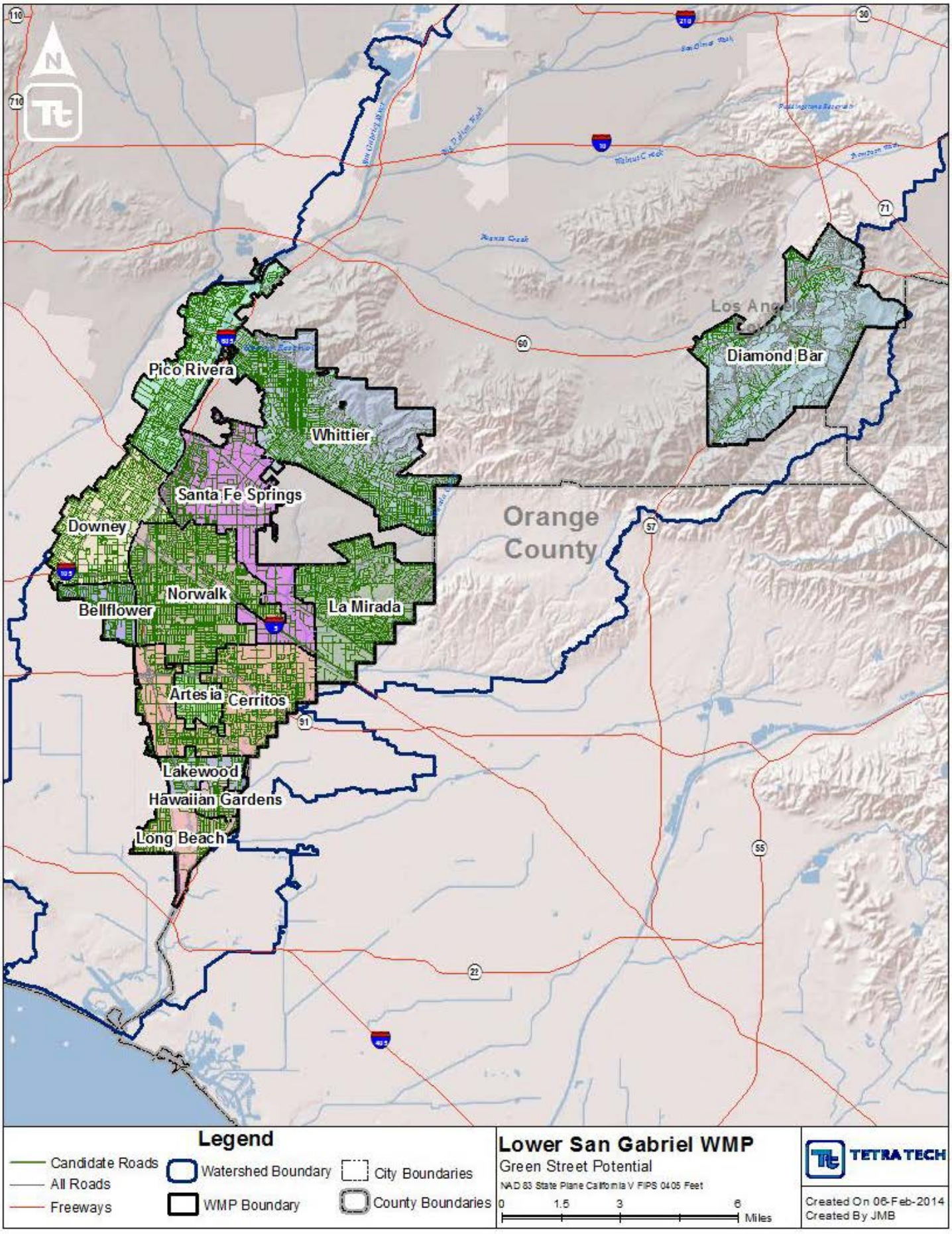


Figure 49. LSGR ROW BMP Potential Opportunities

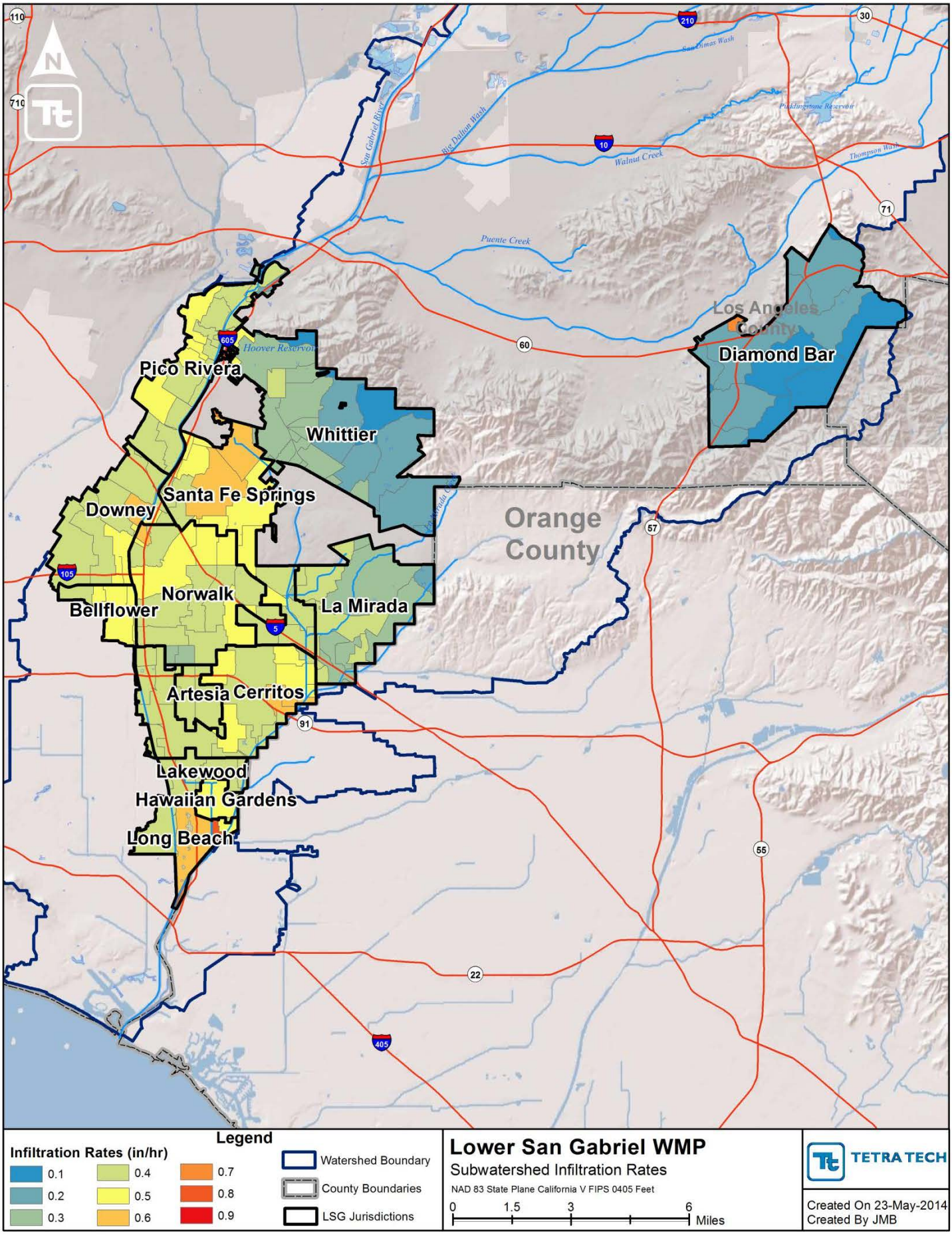


Figure 50. LSGR Subwatershed Infiltration Rates

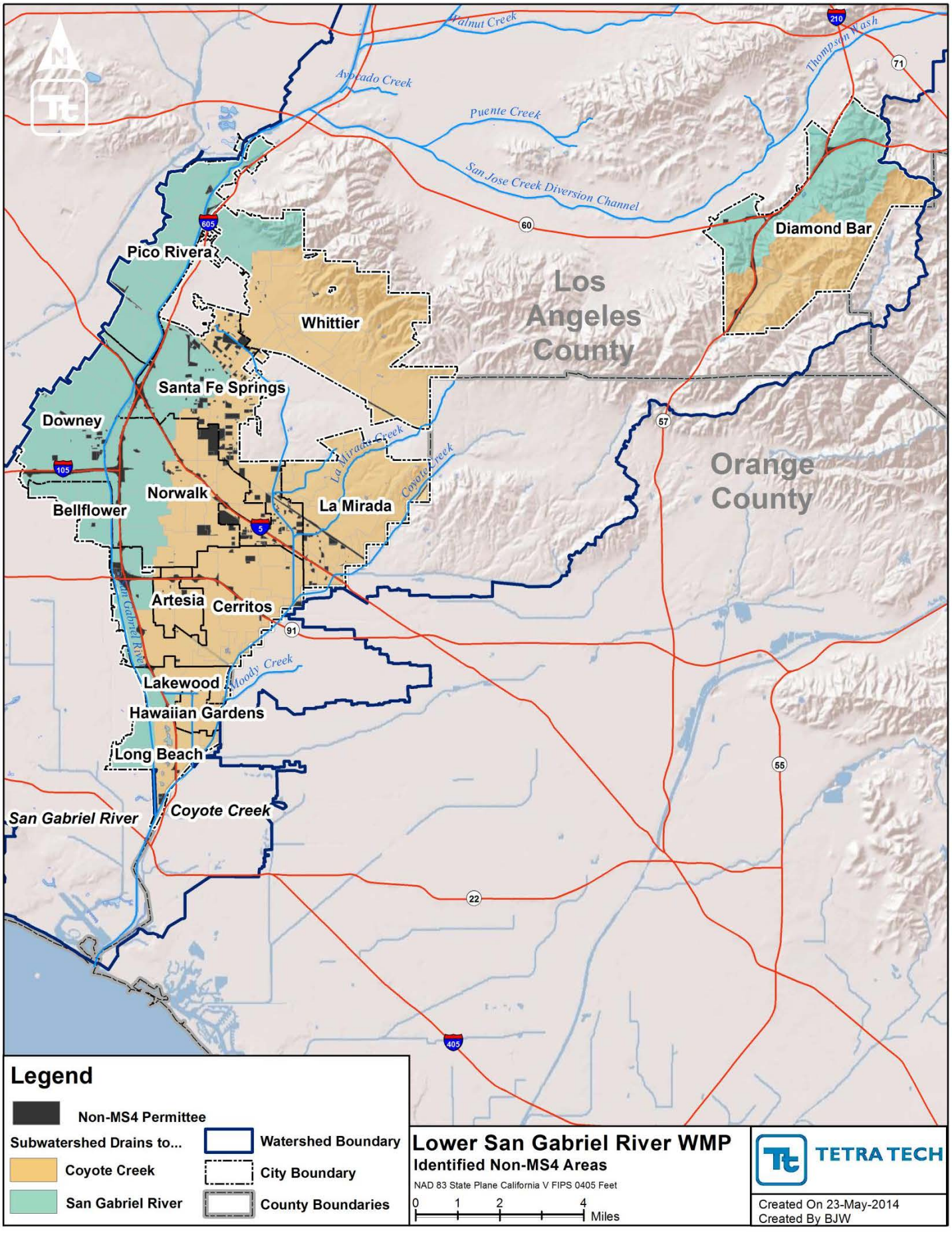


Figure 51. LSGR Non-MS4 Permittees

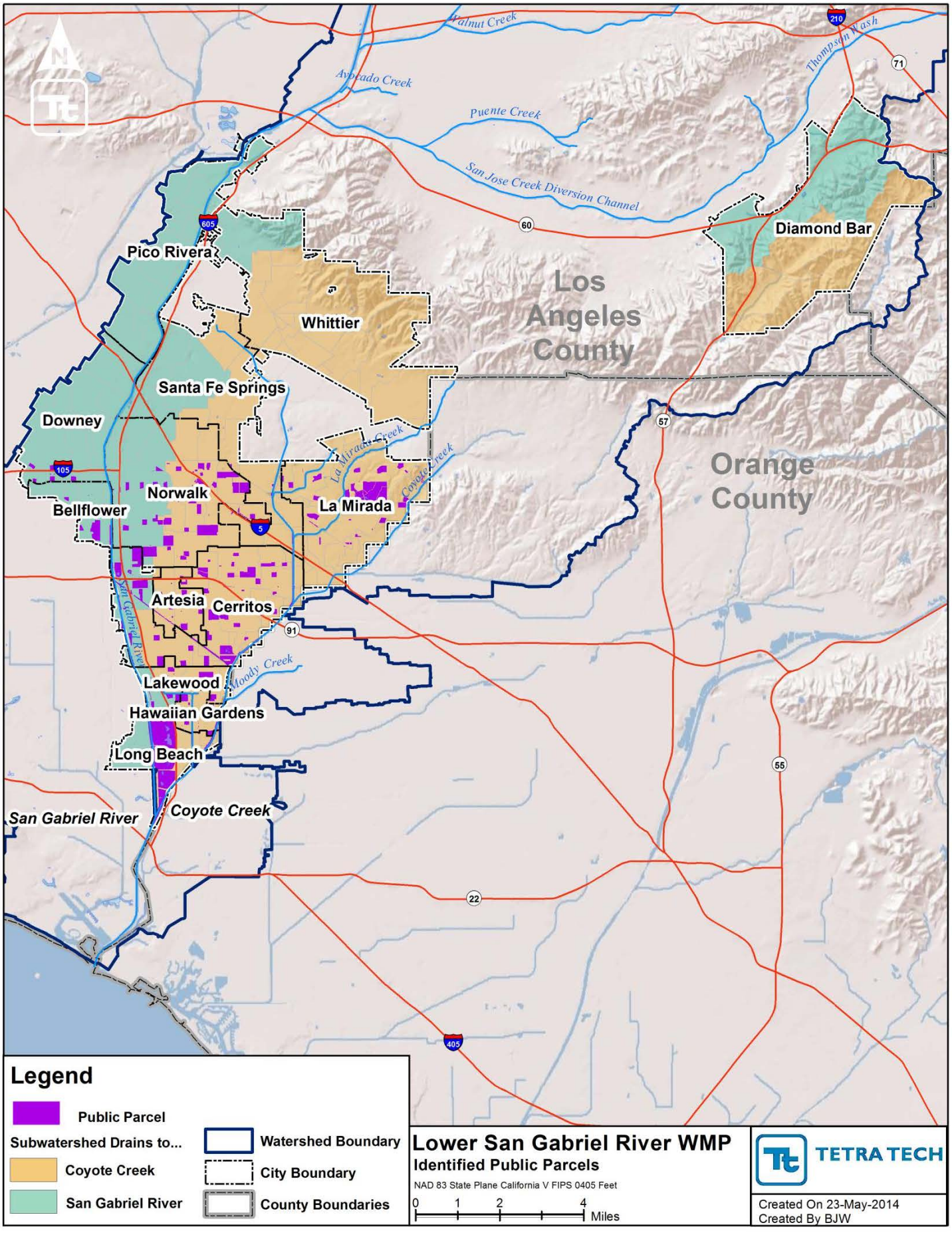


Figure 52. LSGR identified public parcels

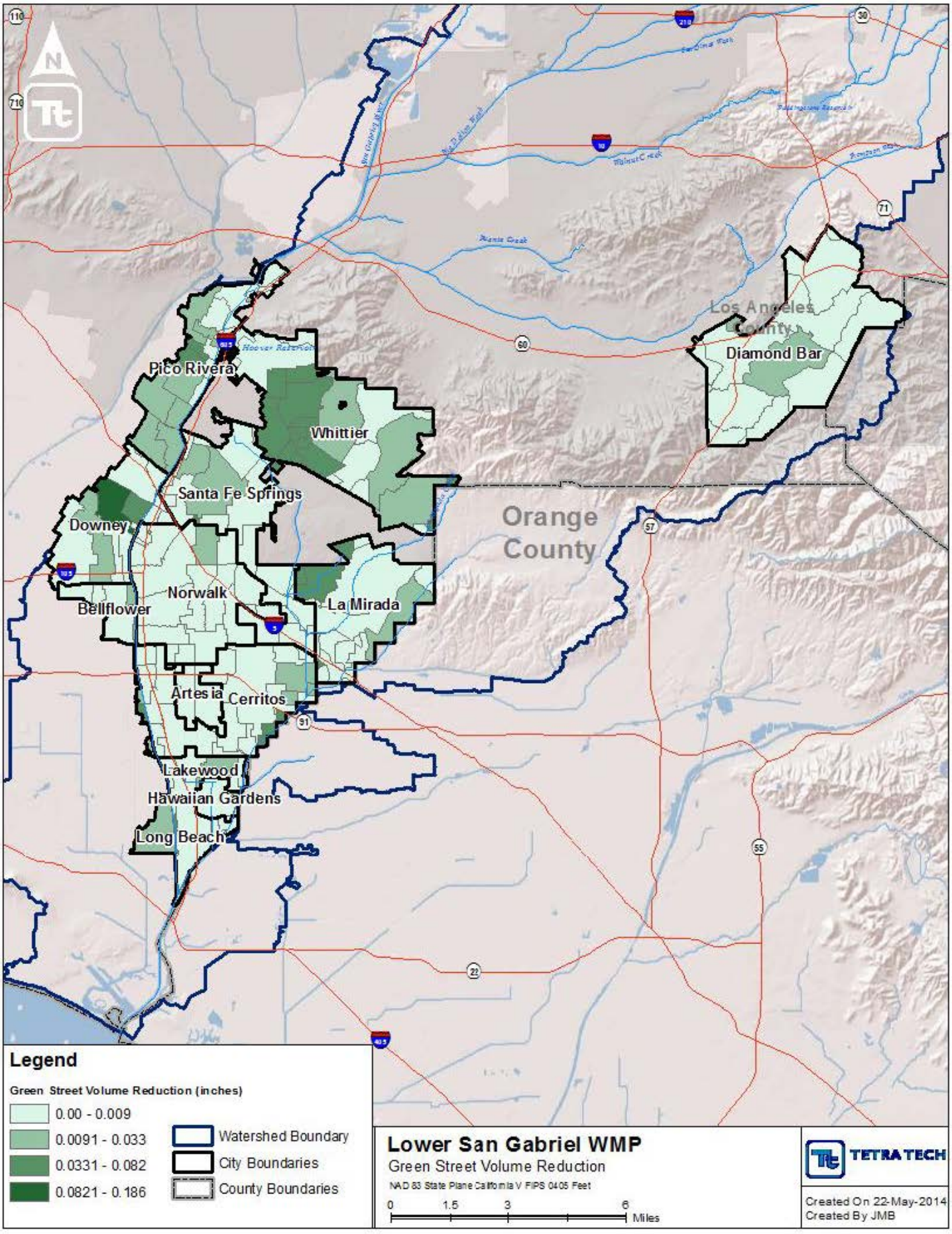


Figure 53. LSGR ROW BMP Volume Reduction

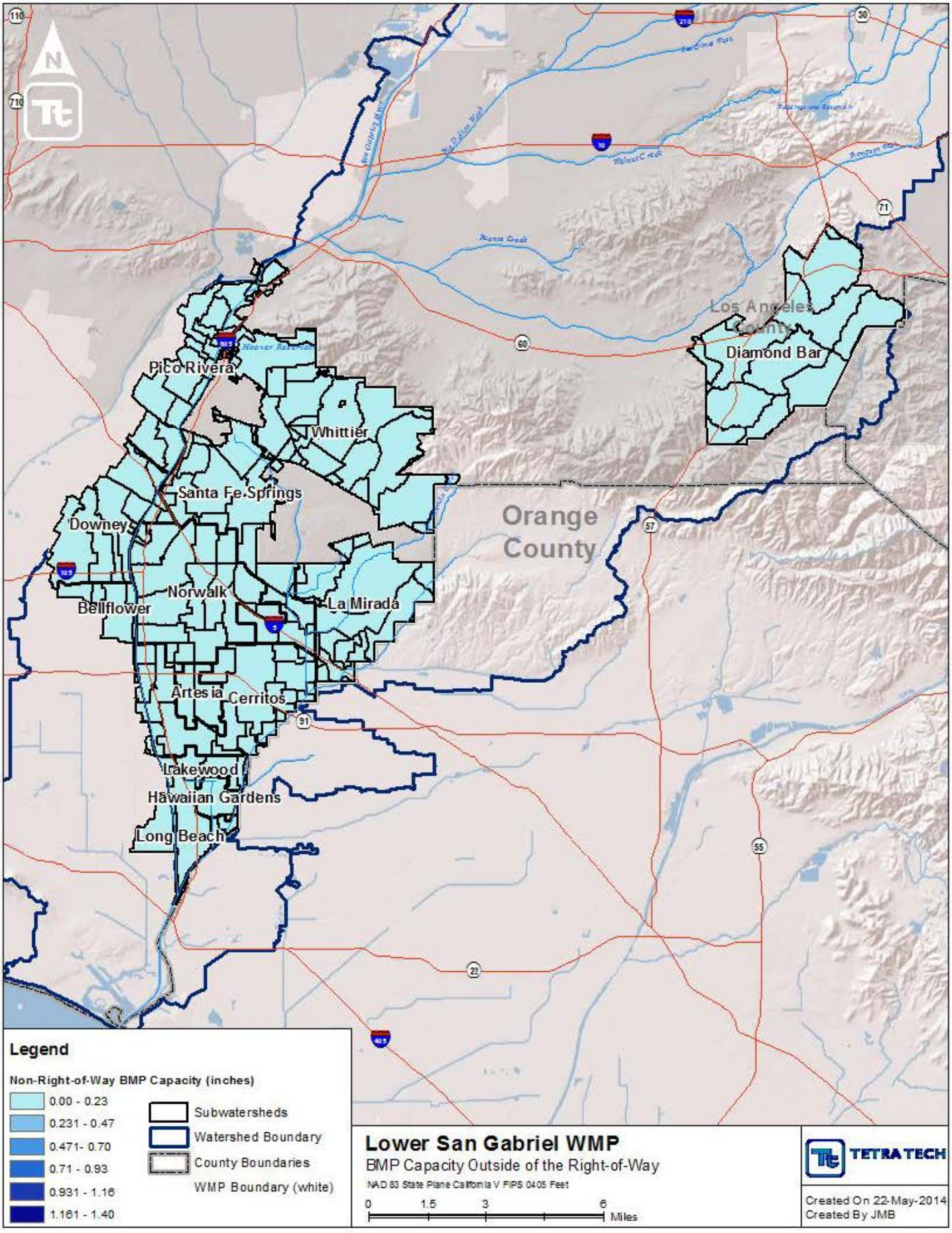


Figure 54. LSGR BMP capacity outside of the right-of-way

Attachment D: Existing and Planned BMPs

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

January 15, 2015

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D1. Existing and Planned BMPs

The following tables summarize existing and planned BMPs in each jurisdiction.

D1.1. City of Bellflower

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration	Existing	Riverview Park Infiltration Trenches	2012	10500 Somerset Blvd.	33.896662	-118.11016	105113	16	ac		
Bioretention / Biofiltration	Existing	Riverview Park Infiltration Trenches	2012	10500 Somerset Blvd.	33.896662	-118.11016	105113	16	ac		
Flow-Through Treatment BMP	Existing	Commercial Gas Station and mart	2008	14300 Bellflower Blvd	33.901581	-118.124915	105114	0.42	ac		
Flow-Through Treatment BMP	Existing	Commercial Storage	2005	10526 Rosecrans	33.902009	-118.108102	575118	19.5	ac		
Infiltration BMPs	Existing	St George Church	2012	15725 Cornuta	33.890539	-118.120735	105113	1.36	ac		
Infiltration BMPs	Existing	Autozone	2012	10239 Rosecrans	33.902265	-118.114834	105113	0.78	ac		

D1.2. City of Downey

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow Through Treatment BMP	Existing	8314 SECOND ST	2/14/2014		33.9409	-118.13243	245114	1322	sf	0.153	cfs
Flow Through Treatment BMP	Existing	10030 LAKEWOOD	8/17/2007		33.9477	-118.11664	245125	24560	sf	0.17	cfs
Infiltration BMP	Existing	12327 WOODRUFF AV	2/14/2014		33.91989	-118.11706	245113	6894.4	sf	430.9	cf
Infiltration BMP	Existing	12145 WOODRUFF	7/8/2008		33.92338	-118.11805	245113	3200	sf	200	cf
Infiltration BMP	Existing	9500 WASHBURN	2/14/2014		33.92366	-118.1172	245113	342000	sf	9500	cf
Infiltration BMP	Existing	9236 HALL	4/17/2007		33.92972	-118.12155	245113	411840	sf	25740	cf
Infiltration BMP	Existing	9737 IMPERIAL	6/22/2010		33.91761	-118.11961	245114	5600	sf	350	cf
Infiltration BMP	Existing	12254 BELLFLOWER	9/13/2003		33.9214	-118.1239	245114	57600	sf	3600	cf
Infiltration BMP	Existing	11904 BELLFLOWER	2/14/2014		33.92607	-118.12515	245114	5400	sf	300	cf
Infiltration BMP	Existing	11610 LAKEWOOD	9/28/2007		33.93101	-118.12594	245114	91520	sf	5720	cf
Infiltration BMP	Existing	8329 DAVIS	6/15/2010		33.9366	-118.13379	245114	12608	sf	788	cf
Infiltration BMP	Existing	8522 FIRESTONE	2/16/2005		33.93678	-118.12978	245114	105456	sf	6591	cf
Infiltration BMP	Existing	8320 FIRESTONE BLVD	1/1/2010		33.9387	-118.13176	245114	90660	sf	525	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9060 IMPERIAL	4/15/2005		33.91646	-118.13532	245115	7056	sf	441	cf
Infiltration BMP	Existing	8141 DE PALMAQ	6/30/2003		33.93618	-118.1402	245115	443008	sf	27688	cf
Infiltration BMP	Existing	8317 DAVIS ST	2/14/2014		33.93683	-118.13441	245115	13920	sf	870	cf
Infiltration BMP	Existing	8333 IOWA	10/11/2001		33.93756	-118.13356	245115	9808	sf	613	cf
Infiltration BMP	Existing	8100 PHLOX	5/20/2004		33.93956	-118.13854	245115	14400	sf	900	cf
Infiltration BMP	Existing	11040 BROOKSHIRE	1/1/2014		33.93932	-118.12496	245119	1923616	sf	120226	cf
Infiltration BMP	Existing	11136 DOLLISON	6/22/2010		33.93448	-118.09613	245122	13824	sf	864	cf
Infiltration BMP	Existing	10239 PICO VISTA	4/7/2003		33.939	-118.10316	245126	2176	sf	136	cf
Infiltration BMP	Existing	10233 PICO VISTA	4/7/2003		33.93914	-118.10305	245126	2176	sf	136	cf
Infiltration BMP	Existing	10228 PICO VISTA	4/7/2003		33.93919	-118.10235	245126	5856	sf	366	cf
Infiltration BMP	Existing	10229 PICO VISTA	4/7/2003		33.93928	-118.10295	245126	2176	sf	136	cf
Infiltration BMP	Existing	10223 PICO VISTA	4/7/2003		33.93946	-118.10289	245126	2048	sf	128	cf
Infiltration BMP	Existing	10218 PICO VISTA	4/7/2003		33.93947	-118.10223	245126	5952	sf	372	cf
Infiltration BMP	Existing	10215 PICO VISTA	4/7/2003		33.93962	-118.10237	245126	2112	sf	132	cf
Infiltration BMP	Existing	10211 PICO VISTA	4/7/2003		33.93969	-118.10255	245126	2304	sf	144	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10219 PICO VISTA	4/7/2003		33.93975	-118.10273	245126	2304	sf	144	cf
Infiltration BMP	Existing	12800 PARAMOUNT	9/16/2008		33.92108	-118.15383	246077	3168	sf	198	cf
Infiltration BMP	Existing	7930 STEWARD & GRAY	11/18/2004		33.93539	-118.14527	246077	1600	sf	100	cf
Infiltration BMP	Existing	12229 JULIUS	1/1/2006		33.93343	-118.1561	246079	944	sf	59	cf
Infiltration BMP	Existing	7845 BENARES ST	6/14/2001		33.93839	-118.14549	246079	3568	sf	223	cf
Infiltration BMP	Existing	7841 BENARES ST	6/14/2001		33.93851	-118.14537	246079	1760	sf	110	cf
Infiltration BMP	Existing	7837 BENARES ST	6/14/2001		33.93863	-118.14528	246079	1760	sf	110	cf
Infiltration BMP	Existing	7848 BENARES ST	6/14/2001		33.93863	-118.14598	246079	10640	sf	665	cf
Infiltration BMP	Existing	7833 BENARES ST	6/14/2001		33.93875	-118.14518	246079	1760	sf	110	cf
Infiltration BMP	Existing	7844 BENARES ST	6/14/2001		33.93876	-118.14591	246079	2000	sf	125	cf
Infiltration BMP	Existing	7840 BENARES ST	6/14/2001		33.93886	-118.14578	246079	2000	sf	125	cf
Infiltration BMP	Existing	11706 RIVES	6/14/2001		33.93888	-118.14506	246079	1760	sf	110	cf
Infiltration BMP	Existing	7816 BENARES ST	6/14/2001		33.93896	-118.14553	246079	9600	sf	600	cf
Infiltration BMP	Existing	7812 BENARES ST	6/14/2001		33.93904	-118.14568	246079	1760	sf	110	cf
Infiltration BMP	Existing	11726 RIVES	6/14/2001		33.93904	-118.14614	246079	1920	sf	120	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7808 BENARES ST	6/14/2001		33.93911	-118.14583	246079	1760	sf	110	cf
Infiltration BMP	Existing	7808 BENARES ST	6/14/2001		33.93919	-118.14598	246079	1760	sf	110	cf
Infiltration BMP	Existing	7821 BENARES ST	6/14/2001		33.93921	-118.14506	246079	1872	sf	117	cf
Infiltration BMP	Existing	7804 BENARES ST	6/14/2001		33.93926	-118.14613	246079	9760	sf	610	cf
Infiltration BMP	Existing	7817 BENARES ST	6/14/2001		33.93931	-118.14525	246079	1760	sf	110	cf
Infiltration BMP	Existing	7813 BENARES ST	6/14/2001		33.93938	-118.14542	246079	1760	sf	110	cf
Infiltration BMP	Existing	7809 BENARES ST	6/14/2001		33.93945	-118.14557	246079	1760	sf	110	cf
Infiltration BMP	Existing	7805 BENARES ST	6/14/2001		33.93953	-118.14572	246079	1760	sf	110	cf
Infiltration BMP	Existing	7801 BENARES ST	6/14/2001		33.93961	-118.14587	246079	9600	sf	600	cf
Infiltration BMP	Existing	7140 FIRESTONE	10/3/2005		33.94707	-118.15469	246079	24048	sf	1503	cf
Infiltration BMP	Existing	8233 FIRESTONE	6/21/2010		33.94076	-118.13358	246102	91648	sf	5728	cf
Infiltration BMP	Existing	7814 FIRESTONE	2/14/2014		33.94418	-118.14232	246102	3000	sf	125	cf
Infiltration BMP	Existing	7676 FIRESTONE	2/26/2004		33.94527	-118.144	246102	213824	sf	13364	cf
Infiltration BMP	Existing	7201 FIRESTONE	4/19/2007		33.94821	-118.15273	246102	34352	sf	2147	cf
Infiltration BMP	Existing	7360 FLORENCE	6/21/2010		33.95872	-118.141	246102	14496	sf	906	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8129 FLORENCE	6/23/2010		33.95231	-118.12677	246103	8880	sf	555	cf
Infiltration BMP	Existing	8605 GALLATIN ROAD	2/14/2014		33.95768	-118.11432	246103	85792	sf	5362	cf
Infiltration BMP	Existing	9276 DOWNEY	1/4/2007		33.95901	-118.11926	246103	6400	sf	400	cf
Infiltration BMP	Existing	8801 LAKEWOOD	7/14/2006		33.96317	-118.11498	246106	18352	sf	1147	cf
Infiltration BMP	Existing	7880 TELEGRAPH	11/14/2004		33.97112	-118.12113	246111	123104	sf	7694	cf
Permeable Pavement	Existing	9449 IMPERIAL	6/22/2010		33.91809	-118.12656	245115	32160	sf	2010	cf
Permeable Pavement	Existing	9565 FIRESTONE	6/3/2008		33.93043	-118.11175	245119	18928	sf	1183	cf
Permeable Pavement	Existing	12628 PARAMOUNT	2/14/2014		33.92329	-118.15283	246077	15000	sf	284	cf
Permeable Pavement	Existing	11555 PARAMOUNT	2/14/2014		33.94116	-118.14067	246077	8125	sf	400	cf
Permeable Pavement	Existing	8043 SECOND ST	1/1/2009		33.94254	-118.13737	246102	105023	sf	6787	cf
Permeable Pavement	Existing	9250 LAKEWOOD	2/14/2014		33.95768	-118.1153	246103	24662	sf	939	cf
Regional Detention Facility	Existing	9341 IMPERIAL	5/6/2004		33.91918	-118.12898	245115	664624	sf	41539	cf
Regional Infiltration Facility	Existing	12074 LAKEWOOD	5/22/2005		33.9257	-118.13203	245115	960800	sf	60050	cf
Regional Infiltration Facility	Existing	12002 LAKEWOOD	5/22/2005		33.9261	-118.13169	245115	605264	sf	37829	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8764 FIRESTONE	8/14/2008	6523923.595890	6523923.595890	1798908.496460	245119	20064	sf	1254	cf
Infiltration BMP	Existing	9915 DOWNEY	9/27/2005	6523909.682530	6523909.682530	1805554.600030	246103	2265	sf	142	cf
Infiltration BMP	Existing	7602 RUNDELL	1/27/2006	6514863.657960	6514863.657960	1798182.489930	246079	2265	sf	142	cf
Infiltration BMP	Existing	10403 SAMOLINE	10/3/2005	6521224.982130	6521224.982130	1804890.047210	246102	2265	sf	142	cf
Infiltration BMP	Existing	12516 DOLAN	11/18/2005	6518146.741440	6518146.741440	1794105.551200	245115	1698	sf	106	cf
Infiltration BMP	Existing	7845 QUILL	3/28/2006	6515351.811960	6515351.811960	1796427.555720	246079	1698	sf	106	cf
Infiltration BMP	Existing	10435 BIRCHDALE	5/19/2005	6524444.362750	6524444.362750	1802478.415410	245119	1132	sf	71	cf
Infiltration BMP	Existing	8538 ALBIA	9/23/2005	6520089.101510	6520089.101510	1795567.094110	245115	566	sf	35	cf
Infiltration BMP	Existing	12159 CORNUTA	9/16/2005	6525392.928460	6525392.928460	1794233.560240	245114	566	sf	35	cf
Infiltration BMP	Existing	8064 DACOSTA	7/7/2005	6523365.354910	6523365.354910	1805913.806160	246103	566	sf	35	cf
Infiltration BMP	Existing	8551 DALEN	10/6/2005	6518205.327280	6518205.327280	1792517.271110	245115	566	sf	35	cf
Infiltration BMP	Existing	8318 DINSDALE	6/15/2006	6523907.628300	6523907.628300	1804895.972630	246103	566	sf	35	cf
Infiltration BMP	Existing	12641 DOLAN	9/2/2005	6517370.498610	6517370.498610	1793094.154440	245115	566	sf	35	cf
Infiltration BMP	Existing	12837 DOWNEY	6/13/2008	6516221.544620	6516221.544620	1792552.216840	246077	566	sf	35	cf
Infiltration BMP	Existing	12608 DUNROBIN	1/1/2007	6525044.715110	6525044.715110	1792041.222140	245114	566	sf	35	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7715 GAINFORD	5/9/2006	6521302.031220	6521302.031220	1807578.393730	246106	566	sf	35	cf
Infiltration BMP	Existing	12337 HORLEY	6/20/2007	6514828.837130	6514828.837130	1797233.894880	246079	566	sf	35	cf
Infiltration BMP	Existing	12619 IBBETSON	4/7/2008	6525826.717640	6525826.717640	1791950.694670	245114	566	sf	35	cf
Infiltration BMP	Existing	12142 MARBEL	5/5/2008	6521265.537710	6521265.537710	1794924.230550	245115	566	sf	35	cf
Infiltration BMP	Existing	12228 NORLAIN	6/24/2005	6513924.473210	6513924.473210	1798288.206130	246079	566	sf	35	cf
Infiltration BMP	Existing	11733 PATTON	12/9/2005	6521629.388810	6521629.388810	1797656.681610	245114	566	sf	35	cf
Infiltration BMP	Existing	11712 PRUESS	3/29/2006	6518005.349510	6518005.349510	1799785.098800	246077	566	sf	35	cf
Infiltration BMP	Existing	8605 SAMOLINE	10/23/2006	6525562.919850	6525562.919850	1810382.622670	246106	566	sf	35	cf
Infiltration BMP	Existing	7814 SPRINGER	7/20/2005	6515325.745000	6515325.745000	1796943.250000	246079	566	sf	35	cf
Infiltration BMP	Existing	7406 THIRD	9/23/2005	6517102.209740	6517102.209740	1803992.224080	246102	566	sf	35	cf
Infiltration BMP	Existing	8836 TWEEDY	8/21/2006	6524333.205540	6524333.205540	1809897.996880	246106	566	sf	35	cf
Infiltration BMP	Existing	9702 TWEEDY	8/30/2005	6522704.033740	6522704.033740	1807211.824630	246103	566	sf	35	cf
Infiltration BMP	Existing	11414 PARAMOUNT	11/17/2006	6519592.558830	6519592.558830	1800943.348310	245115	37135	sf	2321	cf
Infiltration BMP	Existing	8077 FLORENCE AV	1/1/2009	6523000.000000	6523000.000000	1805200.000000	246103	31872	sf	1992	cf
Infiltration BMP	Existing	8351 FLORENCE	11/29/2005	6524092.726100	6524092.726100	1804613.455750	246103	8252	sf	516	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11003 LAKEWOOD	1/1/2006	6524400.000000	6524400.000000	1799800.000000	245119	8252	sf	516	cf
Infiltration BMP	Existing	9288 LUBEC	6/21/2010	6528705.843900	6528705.843900	1803218.787040	245125	8252	sf	516	cf
Infiltration BMP	Existing	13240 BARLIN	6/24/2005	6517118.017720	6517118.017720	1789361.126310	245524	6189	sf	387	cf
Infiltration BMP	Existing	9802 BROOKSHIRE	4/24/2007	6525737.765210	6525737.765210	1805415.750650	246103	6189	sf	387	cf
Infiltration BMP	Existing	9026 SUVA	10/5/2006	6527186.692380	6527186.692380	1804858.393970	245125	6189	sf	387	cf
Infiltration BMP	Existing	7325 IRWINGROVE	4/27/2005	6518419.969630	6518419.969630	1807291.337240	246102	5158	sf	322	cf
Infiltration BMP	Existing	10064 PANGBORN	8/16/2005	6529846.676910	6529846.676910	1801177.429270	245125	5158	sf	322	cf
Infiltration BMP	Existing	8102 THIRD	3/4/2009	6520617.238210	6520617.238210	1801805.039980	246103	7616	sf	476	cf
Infiltration BMP	Existing	12200 BELLFLOWER	11/4/2008	6524061.916580	6524061.916580	1794195.827920	245114	4126	sf	258	cf
Infiltration BMP	Existing	9818 BIRCHDALE	12/28/2005	6526194.448530	6526194.448530	1804634.814020	245125	4126	sf	258	cf
Infiltration BMP	Existing	10419 BROOKSHIRE	7/30/2007	6523842.460000	6523842.460000	1803179.994160	245119	4126	sf	258	cf
Infiltration BMP	Existing	10432 BROOKSHIRE	2/14/2007	6523911.001360	6523911.001360	1803018.354450	245119	4126	sf	258	cf
Infiltration BMP	Existing	10329 CASANES	1/1/2006	6528565.218740	6528565.218740	1800358.453120	245126	4126	sf	258	cf
Infiltration BMP	Existing	13221 CORRIGAN	3/9/2006	6523120.117490	6523120.117490	1789965.324450	245114	4126	sf	258	cf
Infiltration BMP	Existing	8816 ELSTON	12/28/2005	6526840.850650	6526840.850650	1808666.263650	246103	4126	sf	258	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9278 GAINFORD	6/15/2005	6528421.969980	6528421.969980	1803000.469050	245125	4126	sf	258	cf
Infiltration BMP	Existing	7340 IRWINGROVE	12/6/2005	6518415.507880	6518415.507880	1806990.616650	246102	4126	sf	258	cf
Infiltration BMP	Existing	9055 IRWINGROVE	10/17/2006	6526414.238800	6526414.238800	1802422.724820	245119	4126	sf	258	cf
Infiltration BMP	Existing	9005 KRISTIN	1/1/2006	6524171.005660	6524171.005660	1809376.398810	246106	4126	sf	258	cf
Infiltration BMP	Existing	9015 KRISTIN	1/1/2006	6524137.396040	6524137.396040	1809320.713720	246106	4126	sf	258	cf
Infiltration BMP	Existing	10014 LA REINA	11/3/2005	6523603.973220	6523603.973220	1805275.605180	246103	4126	sf	258	cf
Infiltration BMP	Existing	8334 LEXINGTON	3/20/2006	6523900.000000	6523900.000000	1804200.000000	246103	4126	sf	258	cf
Infiltration BMP	Existing	7114 LUXOR	7/27/2005	6513446.571340	6513446.571340	1802395.175860	246100	4126	sf	258	cf
Infiltration BMP	Existing	10348 PANGBORN	10/12/2006	6529020.867850	6529020.867850	1800144.106260	245126	4126	sf	258	cf
Infiltration BMP	Existing	7268 PELLET	12/8/2005	6516203.991240	6516203.991240	1804244.566160	246104	4126	sf	258	cf
Infiltration BMP	Existing	9821 RIVES	9/12/2005	6521261.613640	6521261.613640	1807221.725140	246106	4126	sf	258	cf
Infiltration BMP	Existing	10427 STAMPS	2/27/2006	6523141.588150	6523141.588150	1803526.008280	246103	4126	sf	258	cf
Infiltration BMP	Existing	8325 TEXAS	8/30/2007	6520789.744350	6520789.744350	1799109.948610	245114	4126	sf	258	cf
Infiltration BMP	Existing	9211 ARRINGTON	6/21/2010	6527822.609270	6527822.609270	1805896.813180	245125	3095	sf	193	cf
Infiltration BMP	Existing	10372 BIRCHDALE	1/17/2006	6524786.108330	6524786.108330	1802711.833690	245119	2660	sf	166	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9509 BROCK	10/6/2005	6524084.133490	6524084.133490	1807438.122200	246103	3095	sf	193	cf
Infiltration BMP	Existing	9600 CORD	5/12/2008	6529842.639410	6529842.639410	1803668.379590	245125	3095	sf	193	cf
Infiltration BMP	Existing	10943 CORD	3/13/2007	6526539.555830	6526539.555830	1798046.595190	245119	3095	sf	193	cf
Infiltration BMP	Existing	12569 DOLAN	9/27/2006	6517675.526540	6517675.526540	1793796.546690	245115	3095	sf	193	cf
Infiltration BMP	Existing	9252A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9252B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9258A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9258B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9258C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	3095	sf	193	cf
Infiltration BMP	Existing	9622 HALEDON	3/16/2006	6528283.868130	6528283.868130	1804260.791520	245125	3095	sf	193	cf
Infiltration BMP	Existing	11442 JULIUS	7/26/2007	6517126.240320	6517126.240320	1802109.297720	246079	3095	sf	193	cf
Infiltration BMP	Existing	10026 MATTOCK	1/1/2006	6530326.462180	6530326.462180	1801330.602850	245125	3095	sf	193	cf
Infiltration BMP	Existing	9303 PARAMOUNT	3/14/2006	6523934.101920	6523934.101920	1808355.150660	246106	3095	sf	193	cf
Infiltration BMP	Existing	8739 PARKCLIFF	1/23/2006	6516653.896010	6516653.896010	1788072.265990	245524	2063	sf	129	cf
Infiltration BMP	Existing	9303 PARROT	1/4/2007	6524270.384450	6524270.384450	1808221.036420	246106	3095	sf	193	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7313 PELLET	6/22/2010	6516478.702600	6516478.702600	1804386.841100	246104	3095	sf	193	cf
Infiltration BMP	Existing	10473 PICO VISTA	1/21/2009	6529579.260180	6529579.260180	1798825.132300	245126	3095	sf	193	cf
Infiltration BMP	Existing	7840 THIRD	8/29/2007	6519254.945150	6519254.945150	1802616.251380	246102	3095	sf	193	cf
Infiltration BMP	Existing	8347 VISTA DEL ROSA	7/26/2007	6527061.884710	6527061.884710	1808864.927170	246106	3095	sf	193	cf
Infiltration BMP	Existing	11632 ADENMOOR	6/15/2005	6524141.212380	6524141.212380	1797138.142940	245114	2063	sf	129	cf
Infiltration BMP	Existing	7124 ADWEN	12/20/2007	6513937.816490	6513937.816490	1803059.644840	246100	2063	sf	129	cf
Infiltration BMP	Existing	7258 ADWEN	1/3/2008	6515068.905460	6515068.905460	1802384.347520	246079	2063	sf	129	cf
Infiltration BMP	Existing	7646 ADWEN	10/6/2005	6517037.957040	6517037.957040	1801170.785850	246079	2063	sf	129	cf
Infiltration BMP	Existing	7702 ADWEN	5/11/2006	6517121.727310	6517121.727310	1801116.179360	246079	2063	sf	129	cf
Infiltration BMP	Existing	13032 AIRPOINT	5/14/2007	6517972.459000	6517972.459000	1790335.341940	245115	2063	sf	129	cf
Infiltration BMP	Existing	8455 ALAMEDA	8/7/2008	6519558.018350	6519558.018350	1795721.453060	245115	2063	sf	129	cf
Infiltration BMP	Existing	8632 ALAMEDA	11/2/2006	6520500.318510	6520500.318510	1795019.322380	245115	2063	sf	129	cf
Infiltration BMP	Existing	7945 ALBIA	10/11/2005	6516993.544600	6516993.544600	1797608.073070	246079	2063	sf	129	cf
Infiltration BMP	Existing	8704 ALBIA	5/28/2008	6520928.243910	6520928.243910	1795073.644330	245115	2063	sf	129	cf
Infiltration BMP	Existing	7845 ARNETT	6/18/2010	6518353.322440	6518353.322440	1801165.354440	246079	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9217 ARRINGTON	3/27/2006	6527795.727670	6527795.727670	1805838.303240	245125	2063	sf	129	cf
Infiltration BMP	Existing	7870 BAYSINGER	2/8/2008	6521311.922790	6521311.922790	1805484.679070	246102	2063	sf	129	cf
Infiltration BMP	Existing	9964 BELCHER	5/16/2007	6525622.979960	6525622.979960	1789815.793090	245113	2063	sf	129	cf
Infiltration BMP	Existing	12556 BELLDER	8/17/2007	6518567.857140	6518567.857140	1793310.793680	245115	2063	sf	129	cf
Infiltration BMP	Existing	11614 BELLFLOWER	11/7/2008	6523771.271210	6523771.271210	1797348.312220	245114	2063	sf	129	cf
Infiltration BMP	Existing	11802 BELLMAN	3/9/2007	6521898.080850	6521898.080850	1797268.375540	245114	2063	sf	129	cf
Infiltration BMP	Existing	7502 BENARES	1/30/2009	6515952.395710	6515952.395710	1801162.932420	246079	2063	sf	129	cf
Infiltration BMP	Existing	7824 BORSON	5/24/2007	6514090.231790	6514090.231790	1794571.039330	246077	2063	sf	129	cf
Infiltration BMP	Existing	7442 BROOKMILL	2/6/2006	6515991.568850	6515991.568850	1801492.813950	246079	2063	sf	129	cf
Infiltration BMP	Existing	9202 BUELL	7/21/2008	6526325.599230	6526325.599230	1799668.061170	245119	2063	sf	129	cf
Infiltration BMP	Existing	9340 BUELL	8/9/2006	6527287.659290	6527287.659290	1799162.594770	245126	2063	sf	129	cf
Infiltration BMP	Existing	8707 BYERS	3/15/2006	6521183.641890	6521183.641890	1796053.567730	245115	2063	sf	129	cf
Infiltration BMP	Existing	10446 CASANES	10/26/2006	6528470.793910	6528470.793910	1799828.787480	245126	2063	sf	129	cf
Infiltration BMP	Existing	10932 CASANES	11/17/2005	6527225.467210	6527225.467210	1797760.272650	245119	2063	sf	129	cf
Infiltration BMP	Existing	13341 CASTANA	10/28/2005	6517576.502130	6517576.502130	1788949.477410	245524	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7408 CECILIA	10/27/2005	6517829.130300	6517829.130300	1804625.827460	246102	2063	sf	129	cf
Infiltration BMP	Existing	7604 CECILIA	5/14/2007	6518455.494160	6518455.494160	1804215.794590	246102	2063	sf	129	cf
Infiltration BMP	Existing	9116 CHANEY	12/19/2005	6529189.877980	6529189.877980	1805493.817150	245125	2063	sf	129	cf
Infiltration BMP	Existing	8210 CHEYENNE	3/18/2008	6515440.785260	6515440.785260	1792057.306890	246077	2063	sf	129	cf
Infiltration BMP	Existing	9663 CLANCEY	8/17/2005	6527712.819630	6527712.819630	1804149.908320	245125	2063	sf	129	cf
Infiltration BMP	Existing	10708 CLANCEY	12/9/2005	6525546.299290	6525546.299290	1800088.746900	245119	2063	sf	129	cf
Infiltration BMP	Existing	8336 CLETA	5/8/2006	6520552.025180	6520552.025180	1798452.238760	245114	2063	sf	129	cf
Infiltration BMP	Existing	8557 CLETA	7/24/2006	6521804.225790	6521804.225790	1798033.515210	245114	2063	sf	129	cf
Infiltration BMP	Existing	8532 COLE	11/7/2005	6521000.000000	6521000.000000	1796400.000000	245115	2063	sf	129	cf
Infiltration BMP	Existing	9003 CORD	6/23/2010	6530731.156250	6530731.156250	1805583.409840	245127	2063	sf	129	cf
Infiltration BMP	Existing	9203 CORD	11/14/2008	6530209.591170	6530209.591170	1804419.169900	245125	2063	sf	129	cf
Infiltration BMP	Existing	13029 CORNUTA	5/17/2007	6525511.407030	6525511.407030	1790564.440990	245113	2063	sf	129	cf
Infiltration BMP	Existing	13102 CORNUTA	8/2/2007	6525701.503660	6525701.503660	1790504.914950	245113	2063	sf	129	cf
Infiltration BMP	Existing	13130 CORNUTA	6/25/2007	6525701.486250	6525701.486250	1790230.251310	245113	2063	sf	129	cf
Infiltration BMP	Existing	9245 DALEWOOD	9/23/2005	6532196.615620	6532196.615620	1804345.945760	245127	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	13440 DEMPSTER	10/26/2006	6516234.168650	6516234.168650	1789111.153470	245524	2063	sf	129	cf
Infiltration BMP	Existing	13448 DEMPSTER	5/10/2007	6516184.596670	6516184.596670	1789023.378330	245524	2063	sf	129	cf
Infiltration BMP	Existing	8125 DINSDALE	12/20/2005	6523223.693140	6523223.693140	1805447.514320	246103	2063	sf	129	cf
Infiltration BMP	Existing	10343 DOLAN	3/7/2007	6523688.489440	6523688.489440	1803733.392340	246103	2063	sf	129	cf
Infiltration BMP	Existing	10616 DOLAN	12/8/2005	6523091.688370	6523091.688370	1802186.196180	246103	2063	sf	129	cf
Infiltration BMP	Existing	8451 DONOVAN	10/20/2006	6518824.326830	6518824.326830	1794831.678890	245115	2063	sf	129	cf
Infiltration BMP	Existing	11915 DOWNEY	9/26/2007	6519404.158310	6519404.158310	1797577.606330	245115	2063	sf	129	cf
Infiltration BMP	Existing	12269 DOWNEY	3/16/2006	6518129.427940	6518129.427940	1795616.200900	246077	2063	sf	129	cf
Infiltration BMP	Existing	12631 DUNROBIN	1/14/2009	6524865.692630	6524865.692630	1791809.740080	245114	2063	sf	129	cf
Infiltration BMP	Existing	12644 DUNROBIN	12/27/2006	6525045.107610	6525045.107610	1791670.201830	245114	2063	sf	129	cf
Infiltration BMP	Existing	13212 DUNROBIN	3/6/2008	6525046.199690	6525046.199690	1790094.955960	245114	2063	sf	129	cf
Infiltration BMP	Existing	9018 EGLISE	6/18/2010	6530595.364130	6530595.364130	1805560.296250	245127	2063	sf	129	cf
Infiltration BMP	Existing	9252C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9252D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9252E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9254A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9254E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9258D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9258E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260E ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260A ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260B ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260C ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9260D ELM VISTA	4/5/2006	6524400.000000	6524400.000000	1795600.000000	245114	2063	sf	129	cf
Infiltration BMP	Existing	8902 ELSTON	6/22/2010	6526760.905110	6526760.905110	1808606.155990	246103	2063	sf	129	cf
Infiltration BMP	Existing	8420 EUCALYPTUS	11/1/2007	6518268.185230	6518268.185230	1794519.531140	245115	2063	sf	129	cf
Infiltration BMP	Existing	8543 FARM	7/14/2008	6524366.648200	6524366.648200	1802748.102990	245119	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7963 FIFTH	4/13/2007	6520492.297340	6520492.297340	1803181.748460	246103	2063	sf	129	cf
Infiltration BMP	Existing	7606 FINEVALE	7/23/2007	6522317.087820	6522317.087820	1809781.757910	246111	2063	sf	129	cf
Infiltration BMP	Existing	8740 FIRESTONE	2/5/2008	6523707.154590	6523707.154590	1799037.579000	245119	2063	sf	129	cf
Infiltration BMP	Existing	8663 FONTANA	8/11/2005	6522041.808010	6522041.808010	1796935.622550	245114	2063	sf	129	cf
Infiltration BMP	Existing	7435 FOSTORIA	8/30/2005	6517713.795360	6517713.795360	1804555.032870	246102	2063	sf	129	cf
Infiltration BMP	Existing	7611 FOSTORIA	7/5/2007	6518456.715640	6518456.715640	1804071.041810	246102	2063	sf	129	cf
Infiltration BMP	Existing	8029 FOURTH	6/15/2006	6520786.200710	6520786.200710	1802533.409070	246103	2063	sf	129	cf
Infiltration BMP	Existing	8524 GAINFORD	6/27/2008	6525485.453790	6525485.453790	1804820.431910	245125	2063	sf	129	cf
Infiltration BMP	Existing	9332 GAINFORD	7/20/2006	6528750.550820	6528750.550820	1802746.272930	245125	2063	sf	129	cf
Infiltration BMP	Existing	9330 GALLATIN	8/2/2007	6529116.628720	6529116.628720	1804180.197000	245125	2063	sf	129	cf
Infiltration BMP	Existing	12271 GLYNN	10/18/2005	6518435.603700	6518435.603700	1795389.616520	245115	2063	sf	129	cf
Infiltration BMP	Existing	9123 HALEDON	1/23/2006	6528738.408770	6528738.408770	1805747.051990	245125	2063	sf	129	cf
Infiltration BMP	Existing	7915 HARPER	2/7/2006	6520609.146350	6520609.146350	1804298.454990	246102	2063	sf	129	cf
Infiltration BMP	Existing	9108 HASTY	8/23/2006	6531133.870830	6531133.870830	1805211.202040	245127	2063	sf	129	cf
Infiltration BMP	Existing	10840 HASTY	1/16/2008	6527245.272860	6527245.272860	1798387.513250	245119	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7468 HONDO	12/31/2008	6513888.485770	6513888.485770	1797503.008930	246079	2063	sf	129	cf
Infiltration BMP	Existing	7838 HONDO	2/26/2008	6515366.533450	6515366.533450	1796561.911100	246079	2063	sf	129	cf
Infiltration BMP	Existing	7926 HONDO	7/25/2006	6515828.269550	6515828.269550	1796282.236280	246079	2063	sf	129	cf
Infiltration BMP	Existing	12023 HORTON	10/5/2005	6515547.066470	6515547.066470	1799512.855270	246079	1032	sf	64	cf
Infiltration BMP	Existing	10234 JULIUS	11/5/2009	6519723.348540	6519723.348540	1806551.787860	246102	2063	sf	129	cf
Infiltration BMP	Existing	11828 JULIUS	1/3/2008	6515976.382140	6515976.382140	1800524.752810	246079	2063	sf	129	cf
Infiltration BMP	Existing	9256 KLINEDALE	12/4/2007	6531745.367500	6531745.367500	1804500.031620	245127	2063	sf	129	cf
Infiltration BMP	Existing	9452 KLINEDALE	4/24/2008	6531257.497660	6531257.497660	1803653.019950	245127	2063	sf	129	cf
Infiltration BMP	Existing	9031 LEMORAN	1/30/2009	6529792.995960	6529792.995960	1806045.812140	245125	2063	sf	129	cf
Infiltration BMP	Existing	9910 LESTERFORD	8/3/2005	6531140.582200	6531140.582200	1801442.142180	245125	2063	sf	129	cf
Infiltration BMP	Existing	8533 LOWMAN	1/3/2008	6525796.079270	6525796.079270	1810845.309540	246106	2063	sf	129	cf
Infiltration BMP	Existing	8349 LUBEC	12/27/2006	6524776.248350	6524776.248350	1805794.753990	246103	2063	sf	129	cf
Infiltration BMP	Existing	7630 LUXOR	6/27/2005	6516552.896900	6516552.896900	1800452.817120	246079	2063	sf	129	cf
Infiltration BMP	Existing	12342 MARBEL	3/23/2006	6520586.635090	6520586.635090	1793799.804370	245115	2063	sf	129	cf
Infiltration BMP	Existing	9045 MARGARET ST	1/1/2006	6524143.176440	6524143.176440	1798109.987740	245114	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10410 MATTOCK	10/2/2007	6529164.649420	6529164.649420	1799820.803610	245126	2063	sf	129	cf
Infiltration BMP	Existing	10615 MATTOCK	2/22/2006	6528479.681880	6528479.681880	1798952.207590	245126	2063	sf	129	cf
Infiltration BMP	Existing	9136 MELDAR	3/1/2007	6526738.891530	6526738.891530	1807241.651780	246103	2063	sf	129	cf
Infiltration BMP	Existing	7437 MULLER	10/3/2005	6518230.115820	6518230.115820	1805283.479580	246102	1032	sf	64	cf
Infiltration BMP	Existing	7452 MULLER	10/3/2005	6518271.461030	6518271.461030	1805049.518080	246102	2063	sf	129	cf
Infiltration BMP	Existing	10715 NEW	8/9/2007	6521988.945450	6521988.945450	1802370.638520	246103	2063	sf	129	cf
Infiltration BMP	Existing	10715 NEW	7/14/2008	6521988.945450	6521988.945450	1802370.638520	246103	2063	sf	129	cf
Infiltration BMP	Existing	10261 NEWVILLE	10/30/2007	6529641.666020	6529641.666020	1800383.942770	245126	2063	sf	129	cf
Infiltration BMP	Existing	10311 NEWVILLE	1/29/2009	6529538.574620	6529538.574620	1800214.882210	245126	2063	sf	129	cf
Infiltration BMP	Existing	10420 NEWVILLE	4/11/2008	6529346.061190	6529346.061190	1799529.176420	245126	2063	sf	129	cf
Infiltration BMP	Existing	10524 NEWVILLE	6/11/2007	6529062.272820	6529062.272820	1798916.257500	245126	2063	sf	129	cf
Infiltration BMP	Existing	9842 NORLAIN	3/9/2007	6519878.070320	6519878.070320	1807987.575840	246111	2063	sf	129	cf
Infiltration BMP	Existing	10403 PANGBORN	9/16/2005	6528806.561730	6528806.561730	1800136.574080	245126	2063	sf	129	cf
Infiltration BMP	Existing	10421 PANGBORN	6/5/2006	6528710.057740	6528710.057740	1799977.600600	245126	2063	sf	129	cf
Infiltration BMP	Existing	10903 PANGBORN	5/12/2008	6527497.056040	6527497.056040	1797964.159830	245119	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9508 PARAMOUNT	7/23/2007	6523724.334180	6523724.334180	1807653.518330	246106	2063	sf	129	cf
Infiltration BMP	Existing	9709 PARROT	6/20/2008	6523336.123150	6523336.123150	1806770.831150	246103	2063	sf	129	cf
Infiltration BMP	Existing	7107 PELLET	10/26/2005	6515228.221140	6515228.221140	1805197.090730	246104	2063	sf	129	cf
Infiltration BMP	Existing	10316 PICO VISTA	6/22/2010	6530326.941520	6530326.941520	1799752.739480	245126	2063	sf	129	cf
Infiltration BMP	Existing	10459 PICO VISTA	8/20/2008	6529643.308750	6529643.308750	1798930.291180	245126	2063	sf	129	cf
Infiltration BMP	Existing	11809 POMERING	1/25/2008	6515588.727520	6515588.727520	1800891.851040	246079	2063	sf	129	cf
Infiltration BMP	Existing	11821 POMERING	11/20/2008	6515535.205010	6515535.205010	1800794.072400	246079	2063	sf	129	cf
Infiltration BMP	Existing	9050 PRISCILLA	2/21/2007	6519218.937330	6519218.937330	1790014.532510	245115	2063	sf	129	cf
Infiltration BMP	Existing	8230 PURITAN	7/12/2007	6515756.650110	6515756.650110	1792196.388750	246077	2063	sf	129	cf
Infiltration BMP	Existing	8107 RAVILLER	6/22/2010	6524405.759790	6524405.759790	1808219.110840	246106	2063	sf	129	cf
Infiltration BMP	Existing	9940 RICHEON	12/26/2007	6520640.158150	6520640.158150	1807053.597690	246106	2063	sf	129	cf
Infiltration BMP	Existing	12015 RICHEON	6/21/2010	6515852.443580	6515852.443580	1799404.256870	246079	2063	sf	129	cf
Infiltration BMP	Existing	7336 RIO HONDO PL	12/26/2007	6516915.991390	6516915.991390	1804928.334260	246104	2063	sf	129	cf
Infiltration BMP	Existing	8418 RIVES	9/30/2005	6525367.917230	6525367.917230	1811575.863460	246106	1032	sf	64	cf
Infiltration BMP	Existing	11638 RIVES	11/2/2006	6517541.202300	6517541.202300	1800577.741160	246079	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11706 RIVES	10/16/2006	6517702.333530	6517702.333530	1800238.435400	246079	2063	sf	129	cf
Infiltration BMP	Existing	12436 ROSE	11/6/2006	6520776.455000	6520776.455000	1793075.765000	245115	2063	sf	129	cf
Infiltration BMP	Existing	12033 SAMOLINE	2/22/2008	6517025.771360	6517025.771360	1798249.691900	246079	2063	sf	129	cf
Infiltration BMP	Existing	12051 SAMOLINE	9/3/2008	6516919.542440	6516919.542440	1798077.846870	246079	2063	sf	129	cf
Infiltration BMP	Existing	12302 SAMOLINE	6/22/2010	6516399.204110	6516399.204110	1796321.463670	246077	2063	sf	129	cf
Infiltration BMP	Existing	7921 SECOND	2/15/2006	6519427.915180	6519427.915180	1802349.970040	246102	2063	sf	129	cf
Infiltration BMP	Existing	9700 SHELLEYFIELD	7/17/2008	6527622.312900	6527622.312900	1804250.399390	245125	2063	sf	129	cf
Infiltration BMP	Existing	10553 SHELLEYFIELD	6/11/2008	6525493.222190	6525493.222190	1800845.190450	245119	2063	sf	129	cf
Infiltration BMP	Existing	8732 SMALLWOOD	2/16/2006	6524307.398160	6524307.398160	1810444.440300	246106	2063	sf	129	cf
Infiltration BMP	Existing	8816 SMALLWOOD	10/11/2005	6524123.348010	6524123.348010	1810138.117570	246106	2063	sf	129	cf
Infiltration BMP	Existing	9127 SONGFEST	12/1/2005	6531508.595900	6531508.595900	1805094.820630	245127	2063	sf	129	cf
Infiltration BMP	Existing	9143 STEWART & GRAY	11/30/2005	6523803.019500	6523803.019500	1796254.085000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9211 STEWART & GRAY	11/27/2006	6524190.537790	6524190.537790	1796254.765000	245114	2063	sf	129	cf
Infiltration BMP	Existing	9112 STOAKES	8/23/2006	6526782.391540	6526782.391540	1807626.036510	246103	2063	sf	129	cf
Infiltration BMP	Existing	9533 SUVA	6/27/2006	6530409.847860	6530409.847860	1802701.771860	245125	2063	sf	129	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9729 TRISTAN	10/18/2005	6526617.474570	6526617.474570	1804798.283870	245125	2063	sf	129	cf
Infiltration BMP	Existing	9216 TWEEDY	12/9/2005	6523630.155980	6523630.155980	1808715.397490	246106	2063	sf	129	cf
Infiltration BMP	Existing	13602 VERDURA	6/28/2007	6516296.473820	6516296.473820	1788728.235150	245524	2063	sf	129	cf
Infiltration BMP	Existing	10305 VULTEE	10/9/2006	6525949.622700	6525949.622700	1802510.250780	245119	2063	sf	129	cf
Infiltration BMP	Existing	10017 WILEY BURKE	6/22/2010	6520091.056520	6520091.056520	1807145.868160	246106	2063	sf	129	cf
Infiltration BMP	Existing	8538 ADOREE	9/26/2007	6517768.216360	6517768.216360	1792006.503470	245115	1032	sf	64	cf
Infiltration BMP	Existing	9407 ADOREE	1/1/2006	6522413.313750	6522413.313750	1791106.017430	245115	1032	sf	64	cf
Infiltration BMP	Existing	7134 ADWEN	1/1/2005	6514021.670500	6514021.670500	1803005.164870	246100	1032	sf	64	cf
Infiltration BMP	Existing	7343 ADWEN	9/4/2007	6515521.914470	6515521.914470	1802266.858280	246079	1032	sf	64	cf
Infiltration BMP	Existing	7743 ADWEN	12/5/2006	6517543.195590	6517543.195590	1801041.561520	246079	1032	sf	64	cf
Infiltration BMP	Existing	7802 ADWEN	10/18/2005	6517699.212930	6517699.212930	1800872.280990	246079	1032	sf	64	cf
Infiltration BMP	Existing	7828 ADWEN	8/4/2005	6517918.117250	6517918.117250	1800738.511970	246079	1032	sf	64	cf
Infiltration BMP	Existing	7852 ADWEN	1/9/2009	6518131.432520	6518131.432520	1800607.974520	246079	1032	sf	64	cf
Infiltration BMP	Existing	7855 ADWEN	11/23/2005	6518235.708380	6518235.708380	1800774.963010	246079	1032	sf	64	cf
Infiltration BMP	Existing	12823 AIRPOINT	6/29/2007	6518348.749200	6518348.749200	1791281.430170	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8441 ALAMEDA	10/31/2005	6519442.769190	6519442.769190	1795780.926380	245115	1032	sf	64	cf
Infiltration BMP	Existing	8549 ALAMEDA	6/23/2010	6520129.148230	6520129.148230	1795426.542360	245115	1032	sf	64	cf
Infiltration BMP	Existing	8448 ALBIA	1/1/2007	6519556.734390	6519556.734390	1795840.452920	245115	1032	sf	64	cf
Infiltration BMP	Existing	8528 ALBIA	2/27/2007	6520000.245000	6520000.245000	1795612.955000	245115	1032	sf	64	cf
Infiltration BMP	Existing	9718 ALIWIN	8/2/2005	6532030.038780	6532030.038780	1804115.104340	245127	1032	sf	64	cf
Infiltration BMP	Existing	7936 ALLENGROVE	1/22/2007	6524421.678930	6524421.678930	1809567.173140	246106	1032	sf	64	cf
Infiltration BMP	Existing	8116 ALLENGROVE	12/5/2005	6525137.825210	6525137.825210	1808747.451430	246106	1032	sf	64	cf
Infiltration BMP	Existing	9166 ANGELL	9/2/2008	6520625.089300	6520625.089300	1790394.866750	245115	1032	sf	64	cf
Infiltration BMP	Existing	9351 APPLEBY	1/3/2008	6529580.566170	6529580.566170	1804445.997380	245125	1032	sf	64	cf
Infiltration BMP	Existing	9520 ARDINE	10/6/2005	6527613.323800	6527613.323800	1797533.903060	245119	1032	sf	64	cf
Infiltration BMP	Existing	7814 ARNETT	6/22/2010	6517981.553910	6517981.553910	1801095.347060	246079	1032	sf	64	cf
Infiltration BMP	Existing	7815 ARNETT	6/22/2010	6518066.490340	6518066.490340	1801237.713920	246079	1032	sf	64	cf
Infiltration BMP	Existing	7832 ARNETT	1/11/2007	6518132.684800	6518132.684800	1801021.243050	246079	1032	sf	64	cf
Infiltration BMP	Existing	8241 ARNETT	11/29/2006	6520442.071210	6520442.071210	1799867.842140	245115	1032	sf	64	cf
Infiltration BMP	Existing	7743 BAIRNSDALE	5/16/2006	6523474.546480	6523474.546480	1810551.323320	246106	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12904 BARLIN	1/15/2009	6518150.890370	6518150.890370	1791163.941140	245115	1032	sf	64	cf
Infiltration BMP	Existing	13247 BARLIN	5/5/2005	6516868.829160	6516868.829160	1789428.146200	245524	1032	sf	64	cf
Infiltration BMP	Existing	7871 BAYSINGER	1/10/2007	6521422.493960	6521422.493960	1805635.813480	246102	1032	sf	64	cf
Infiltration BMP	Existing	8607 BAYSINGER	1/1/2005	6525304.240800	6525304.240800	1803291.716200	245119	1032	sf	64	cf
Infiltration BMP	Existing	9131 BAYSINGER	9/10/2008	6526918.982970	6526918.982970	1802474.767100	245119	1032	sf	64	cf
Infiltration BMP	Existing	9411 BAYSINGER	9/24/2007	6528736.042510	6528736.042510	1801262.782730	245126	1032	sf	64	cf
Infiltration BMP	Existing	9320 BELCHER	4/10/2007	6520600.361450	6520600.361450	1789754.109890	245115	1032	sf	64	cf
Infiltration BMP	Existing	9969 BELCHER	7/29/2009	6525669.288070	6525669.288070	1789992.480470	245113	1032	sf	64	cf
Infiltration BMP	Existing	10375 BELDER	6/22/2010	6522812.240000	6522812.240000	1803043.757460	246103	1032	sf	64	cf
Infiltration BMP	Existing	7441 BENARES	10/25/2005	6515921.019300	6515921.019300	1801396.174500	246079	1032	sf	64	cf
Infiltration BMP	Existing	7503 BENARES	1/16/2008	6516046.045620	6516046.045620	1801313.189720	246079	1032	sf	64	cf
Infiltration BMP	Existing	11014 BENFIELD	12/19/2005	6531918.630750	6531918.630750	1797937.959120	245122	1032	sf	64	cf
Infiltration BMP	Existing	8555 BIGBY	8/22/2005	6524606.668030	6524606.668030	1802914.545010	245119	1032	sf	64	cf
Infiltration BMP	Existing	9308 BIGBY	12/18/2008	6527591.908660	6527591.908660	1800839.109380	245126	1032	sf	64	cf
Infiltration BMP	Existing	9345 BIGBY	5/16/2006	6527999.312020	6527999.312020	1800803.102000	245126	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9389 BIGBY	9/20/2007	6528361.925530	6528361.925530	1800582.426270	245126	1032	sf	64	cf
Infiltration BMP	Existing	8246 BIRCHCREST	11/28/2005	6526713.325530	6526713.325530	1809350.628180	246106	1032	sf	64	cf
Infiltration BMP	Existing	10434 BIRCHDALE	12/2/2008	6524586.579650	6524586.579650	1802390.820140	245119	1032	sf	64	cf
Infiltration BMP	Existing	8812 BIRCHLEAF	5/3/2007	6527457.897210	6527457.897210	1808468.377860	246103	1032	sf	64	cf
Infiltration BMP	Existing	8912 BIRCHLEAF	10/9/2007	6527209.329660	6527209.329660	1808281.543500	246103	1032	sf	64	cf
Infiltration BMP	Existing	13330 BIXLER	3/21/2007	6516259.886220	6516259.886220	1789972.109000	245524	1032	sf	64	cf
Infiltration BMP	Existing	13411 BIXLER	9/30/2008	6515914.285010	6515914.285010	1789635.314360	245524	1032	sf	64	cf
Infiltration BMP	Existing	13425 BIXLER	8/17/2005	6515841.147610	6515841.147610	1789505.869380	245524	1032	sf	64	cf
Infiltration BMP	Existing	13454 BIXLER	5/10/2007	6515808.905200	6515808.905200	1789174.120800	245524	1032	sf	64	cf
Infiltration BMP	Existing	8220 BLANDWOOD	6/22/2010	6526086.691350	6526086.691350	1808873.058080	246103	1032	sf	64	cf
Infiltration BMP	Existing	12809 BLODGETT	1/1/2006	6518629.647540	6518629.647540	1791208.759970	245115	1032	sf	64	cf
Infiltration BMP	Existing	13026 BLODGETT	1/1/2005	6518225.401930	6518225.401930	1790248.943990	245115	1032	sf	64	cf
Infiltration BMP	Existing	13045 BLODGETT	10/6/2005	6517990.284020	6517990.284020	1790176.483690	245115	1032	sf	64	cf
Infiltration BMP	Existing	13114 BLODGETT	10/6/2005	6517888.613290	6517888.613290	1789931.616790	245115	1032	sf	64	cf
Infiltration BMP	Existing	7931 BORSON	9/6/2006	6514752.824370	6514752.824370	1794266.718830	246077	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8202 BORSON	6/5/2006	6516202.097710	6516202.097710	1793267.543860	246077	1032	sf	64	cf
Infiltration BMP	Existing	8428 BORSON	11/21/2008	6517449.915190	6517449.915190	1792528.167220	245115	1032	sf	64	cf
Infiltration BMP	Existing	8515 BORSON	3/14/2005	6517771.929480	6517771.929480	1792500.505870	245115	1032	sf	64	cf
Infiltration BMP	Existing	8345 BOYNE	6/18/2010	6519344.143470	6519344.143470	1796446.421390	245115	1032	sf	64	cf
Infiltration BMP	Existing	8402 BOYNE	1/1/2005	6519302.113240	6519302.113240	1796279.573520	245115	1032	sf	64	cf
Infiltration BMP	Existing	8525 BOYNE	7/20/2006	6520189.715440	6520189.715440	1796009.699660	245115	1032	sf	64	cf
Infiltration BMP	Existing	8528 BOYNE	2/22/2007	6520138.661540	6520138.661540	1795848.718800	245115	1032	sf	64	cf
Infiltration BMP	Existing	8613 BOYSON	1/1/2006	6520167.899980	6520167.899980	1794794.451220	245115	1032	sf	64	cf
Infiltration BMP	Existing	8647 BOYSON	7/29/2008	6520447.155570	6520447.155570	1794619.557270	245115	1032	sf	64	cf
Infiltration BMP	Existing	10216 BRANSCOMB	2/21/2007	6526794.108720	6526794.108720	1790310.156040	245113	1032	sf	64	cf
Infiltration BMP	Existing	10291 BRANSCOMB	7/25/2006	6527529.378260	6527529.378260	1790458.207730	245118	1032	sf	64	cf
Infiltration BMP	Existing	9624 BROCK	4/22/2005	6523849.153810	6523849.153810	1806723.688440	246103	1032	sf	64	cf
Infiltration BMP	Existing	12351 BROCK	9/3/2008	6516676.858850	6516676.858850	1795612.256100	246077	1032	sf	64	cf
Infiltration BMP	Existing	12608 BROCK	2/11/2005	6516008.590090	6516008.590090	1794308.259250	246077	1032	sf	64	cf
Infiltration BMP	Existing	8269 BROOKGREEN	1/1/2006	6526709.836510	6526709.836510	1808858.860970	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7847 BROOKMILL	6/21/2010	6518005.266020	6518005.266020	1800484.266850	246079	1032	sf	64	cf
Infiltration BMP	Existing	8025 BROOKPARK	1/1/2005	6525207.617130	6525207.617130	1809814.105880	246106	1032	sf	64	cf
Infiltration BMP	Existing	9707 BROOKSHIRE	3/14/2005	6525762.512240	6525762.512240	1805795.982660	246103	1032	sf	64	cf
Infiltration BMP	Existing	10429 BROOKSHIRE	1/19/2005	6523911.001360	6523911.001360	1803018.354450	245119	1032	sf	64	cf
Infiltration BMP	Existing	12404 BROOKSHIRE	6/25/2007	6518808.785660	6518808.785660	1794169.944640	245115	1032	sf	64	cf
Infiltration BMP	Existing	7622 BRUNACHE	10/31/2007	6515665.309920	6515665.309920	1799097.073030	246079	1032	sf	64	cf
Infiltration BMP	Existing	8216 BRUNACHE	11/6/2007	6518414.904440	6518414.904440	1797242.748270	245115	1032	sf	64	cf
Infiltration BMP	Existing	9033 BUCKLES	6/21/2010	6523179.898540	6523179.898540	1796909.863810	245114	1032	sf	64	cf
Infiltration BMP	Existing	7540 BUELL	1/1/2004	6518499.698980	6518499.698980	1804545.470300	246102	1032	sf	64	cf
Infiltration BMP	Existing	9330 BUELL	2/15/2006	6527195.126160	6527195.126160	1799219.087810	245126	1032	sf	64	cf
Infiltration BMP	Existing	9351 BUELL	6/21/2010	6527484.251630	6527484.251630	1799288.621620	245126	1032	sf	64	cf
Infiltration BMP	Existing	9634 BUELL	3/16/2006	6528774.281270	6528774.281270	1798139.573770	245126	1032	sf	64	cf
Infiltration BMP	Existing	9067 BUHMAN	11/20/2007	6530056.595350	6530056.595350	1805336.923900	245125	1032	sf	64	cf
Infiltration BMP	Existing	9208 BUHMAN	6/16/2008	6529799.831660	6529799.831660	1804544.819190	245125	1032	sf	64	cf
Infiltration BMP	Existing	10237 CASANES	3/23/2006	6528975.248660	6528975.248660	1801017.460740	245126	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10321 CASANES	1/1/2007	6528597.524650	6528597.524650	1800411.412530	245126	1032	sf	64	cf
Infiltration BMP	Existing	10403 CASANES	12/21/2005	6528532.829940	6528532.829940	1800305.536240	245126	1032	sf	64	cf
Infiltration BMP	Existing	10408 CASANES	1/1/2005	6528665.671960	6528665.671960	1800149.799930	245126	1032	sf	64	cf
Infiltration BMP	Existing	10812 CASANES	3/14/2005	6527610.698650	6527610.698650	1798391.295520	245119	1032	sf	64	cf
Infiltration BMP	Existing	10835 CASANES	4/1/2008	6527345.484730	6527345.484730	1798305.683780	245119	1032	sf	64	cf
Infiltration BMP	Existing	10944 CASANES	1/1/2006	6527151.352860	6527151.352860	1797710.972890	245119	1032	sf	64	cf
Infiltration BMP	Existing	8457 CAVEL	9/24/2007	6519984.576530	6519984.576530	1796420.555450	245115	1032	sf	64	cf
Infiltration BMP	Existing	9502 CECILIA	10/11/2007	6527927.079440	6527927.079440	1798327.652080	245126	1032	sf	64	cf
Infiltration BMP	Existing	9531 CECILIA	8/23/2006	6528208.236430	6528208.236430	1798317.933420	245126	1032	sf	64	cf
Infiltration BMP	Existing	9435 CEDARTREE	6/22/2010	6530636.457520	6530636.457520	1805866.234670	245127	1032	sf	64	cf
Infiltration BMP	Existing	9010 CHANEY	11/30/2005	6529789.693370	6529789.693370	1806340.793150	245125	1032	sf	64	cf
Infiltration BMP	Existing	9011 CHANEY	1/31/2006	6529640.900410	6529640.900410	1806424.653160	245125	1032	sf	64	cf
Infiltration BMP	Existing	9134 CHANEY	1/1/2005	6529119.825860	6529119.825860	1805332.958450	245125	1032	sf	64	cf
Infiltration BMP	Existing	10252 CHANEY	1/1/2006	6527373.631100	6527373.631100	1801932.130180	245119	1032	sf	64	cf
Infiltration BMP	Existing	10530 CHANEY	6/3/2008	6526461.472620	6526461.472620	1800532.795270	245119	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8355 CHARLOMA	9/16/2005	6524931.861530	6524931.861530	1806017.636180	246103	1032	sf	64	cf
Infiltration BMP	Existing	9037 CHARLOMA	9/25/2007	6527230.271760	6527230.271760	1804669.291940	245125	1032	sf	64	cf
Infiltration BMP	Existing	8565 CHEROKEE	2/14/2008	6524386.530150	6524386.530150	1802386.701010	245119	1032	sf	64	cf
Infiltration BMP	Existing	8030 CHEYENNE	1/1/2005	6514573.751210	6514573.751210	1792580.925090	246077	1032	sf	64	cf
Infiltration BMP	Existing	8117 CHEYENNE	4/10/2006	6515045.470000	6515045.470000	1792480.065000	246077	1032	sf	64	cf
Infiltration BMP	Existing	8418 CHEYENNE	1/1/2006	6516589.334020	6516589.334020	1791278.419980	245524	1032	sf	64	cf
Infiltration BMP	Existing	9303 CLANCEY	4/3/2006	6528228.489510	6528228.489510	1805319.961840	245125	1032	sf	64	cf
Infiltration BMP	Existing	10518 CLANCEY	3/9/2007	6526045.670270	6526045.670270	1800904.969960	245119	1032	sf	64	cf
Infiltration BMP	Existing	8316 CLETA	4/3/2007	6520383.826830	6520383.826830	1798544.940710	245114	1032	sf	64	cf
Infiltration BMP	Existing	8529 CLETA	1/1/2004	6521562.602410	6521562.602410	1798134.090240	245114	1032	sf	64	cf
Infiltration BMP	Existing	13113 COLDBROOK	6/13/2007	6524340.025750	6524340.025750	1790440.866070	245114	3095	sf	193	cf
Infiltration BMP	Existing	13227 COLDBROOK	2/22/2008	6524428.823880	6524428.823880	1789883.562480	245114	1032	sf	64	cf
Infiltration BMP	Existing	8554 COMOLETTE	6/21/2010	6517765.395020	6517765.395020	1791693.915800	245115	1032	sf	64	cf
Infiltration BMP	Existing	8417 CONKLIN	1/1/2006	6516931.143420	6516931.143420	1791819.671020	245524	1032	sf	64	cf
Infiltration BMP	Existing	7219 COOLGROVE	4/25/2006	6521787.460350	6521787.460350	1811479.001950	246111	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7605 COOLGROVE	6/22/2010	6522636.872680	6522636.872680	1810413.845850	246111	1032	sf	64	cf
Infiltration BMP	Existing	10210 CORD	2/12/2009	6528662.670970	6528662.670970	1801499.064930	245126	1032	sf	64	cf
Infiltration BMP	Existing	7706 COREY	6/22/2010	6515304.522120	6515304.522120	1798247.325380	246079	1032	sf	64	cf
Infiltration BMP	Existing	11708 CORRIGAN	5/30/2006	6523410.919990	6523410.919990	1796690.721900	245114	1032	sf	64	cf
Infiltration BMP	Existing	13227 CORRIGAN	4/11/2006	6523118.258510	6523118.258510	1789898.574120	245114	1032	sf	64	cf
Infiltration BMP	Existing	10809 CROSSDALE	1/30/2006	6532012.269030	6532012.269030	1798722.436870	245122	1032	sf	64	cf
Infiltration BMP	Existing	7803 DACOSTA	1/1/2006	6521705.534400	6521705.534400	1807011.928190	246106	1032	sf	64	cf
Infiltration BMP	Existing	7808 DACOSTA	3/29/2007	6521675.640660	6521675.640660	1806840.332210	246106	1032	sf	64	cf
Infiltration BMP	Existing	7826 DACOSTA	3/23/2007	6521825.889640	6521825.889640	1806744.301550	246106	1032	sf	64	cf
Infiltration BMP	Existing	8064 DACOSTA	1/6/2009	6523365.354910	6523365.354910	1805913.806160	246103	1032	sf	64	cf
Infiltration BMP	Existing	9242 DALEWOOD	5/17/2007	6532339.520890	6532339.520890	1804239.830010	245127	1032	sf	64	cf
Infiltration BMP	Existing	7044 DE PALMA	1/30/2006	6513058.006240	6513058.006240	1802286.102090	246100	1032	sf	64	cf
Infiltration BMP	Existing	7956 DE PALMA	7/28/2005	6517915.235930	6517915.235930	1799223.139650	246077	1032	sf	64	cf
Infiltration BMP	Existing	8232 DE PALMA	12/10/2008	6519342.730110	6519342.730110	1798392.424410	245115	1032	sf	64	cf
Infiltration BMP	Existing	13134 DEMING	2/6/2007	6518053.947000	6518053.947000	1789691.993030	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	13240 DEMING	8/12/2005	6518068.820530	6518068.820530	1789032.682680	245115	1032	sf	64	cf
Infiltration BMP	Existing	13415 DEMPSTER	1/1/2007	6516194.546390	6516194.546390	1789419.790430	245524	1032	sf	64	cf
Infiltration BMP	Existing	13434 DEMPSTER	1/12/2006	6516258.965410	6516258.965410	1789155.039770	245524	1032	sf	64	cf
Infiltration BMP	Existing	13452 DEMPSTER	9/20/2005	6516159.819690	6516159.819690	1788979.483200	245524	1032	sf	64	cf
Infiltration BMP	Existing	7324 DINSDALE	6/21/2010	6518936.024560	6518936.024560	1807958.155410	246106	1032	sf	64	cf
Infiltration BMP	Existing	8352 DINSDALE	12/19/2005	6524191.795240	6524191.795240	1804722.231880	246103	1032	sf	64	cf
Infiltration BMP	Existing	9325 DINSDALE	7/3/2007	6528635.640220	6528635.640220	1802187.000380	245125	1032	sf	64	cf
Infiltration BMP	Existing	9812 DOLAN	1/10/2007	6524918.033470	6524918.033470	1805427.859430	246103	1032	sf	64	cf
Infiltration BMP	Existing	10410 DOLAN	9/19/2007	6523686.660150	6523686.660150	1803351.652190	245119	1032	sf	64	cf
Infiltration BMP	Existing	12522 DOLAN	12/9/2005	6518109.498100	6518109.498100	1794046.260040	245115	1032	sf	64	cf
Infiltration BMP	Existing	12634 DOLAN	4/11/2006	6517527.198260	6517527.198260	1793053.966010	245115	1032	sf	64	cf
Infiltration BMP	Existing	12712 DOLAN	4/27/2005	6517393.756980	6517393.756980	1792842.640770	245115	1032	sf	64	cf
Infiltration BMP	Existing	8740 DONOVAN	11/2/2006	6520467.711390	6520467.711390	1793463.175520	245115	1032	sf	64	cf
Infiltration BMP	Existing	6408 DOS RIOS	3/7/2007	6523246.583700	6523246.583700	1811462.058000	246111	1032	sf	64	cf
Infiltration BMP	Existing	6420 DOS RIOS	7/14/2008	6523082.430580	6523082.430580	1811381.024700	246111	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	6449 DOS RIOS	8/23/2005	6522675.424950	6522675.424950	1811505.638050	246111	1032	sf	64	cf
Infiltration BMP	Existing	6481 DOS RIOS	8/8/2007	6522296.417970	6522296.417970	1811546.494500	246111	1032	sf	64	cf
Infiltration BMP	Existing	9532 DOWNEY	9/21/2007	6524828.225510	6524828.225510	1806555.186060	246103	1032	sf	64	cf
Infiltration BMP	Existing	12115 DOWNEY	8/12/2005	6518801.058860	6518801.058860	1796628.276370	245115	1032	sf	64	cf
Infiltration BMP	Existing	12116 DOWNEY	7/24/2008	6518985.048760	6518985.048760	1796501.621880	245115	1032	sf	64	cf
Infiltration BMP	Existing	12545 DOWNEY	7/7/2005	6517126.997680	6517126.997680	1794204.833310	246077	1032	sf	64	cf
Infiltration BMP	Existing	13620 DOWNEY	10/24/2007	6515777.167020	6515777.167020	1788934.803130	245524	1032	sf	64	cf
Infiltration BMP	Existing	9756 DOWNEY SANFORD BRIDGE	11/6/2008	6530232.905320	6530232.905320	1802732.275270	245125	1032	sf	64	cf
Infiltration BMP	Existing	12109 DUNROBIN	5/27/2008	6524849.554990	6524849.554990	1794742.565720	245114	1032	sf	64	cf
Infiltration BMP	Existing	12602 DUNROBIN	4/21/2008	6525045.021790	6525045.021790	1792096.938130	245114	1032	sf	64	cf
Infiltration BMP	Existing	13118 DUNROBIN	8/1/2008	6525045.611060	6525045.611060	1790357.500340	245114	1032	sf	64	cf
Infiltration BMP	Existing	13447 EARNSHAW	3/4/2005	6516486.580000	6516486.580000	1788881.960000	245524	1032	sf	64	cf
Infiltration BMP	Existing	12246 EASTBROOK	7/3/2007	6525290.855020	6525290.855020	1793729.113600	245114	1032	sf	64	cf
Infiltration BMP	Existing	13102 EASTBROOK	5/30/2006	6525376.065000	6525376.065000	1790509.718450	245114	1032	sf	64	cf
Infiltration BMP	Existing	13207 EASTBROOK	1/1/2006	6525181.215010	6525181.215010	1790147.343800	245114	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9010 EGLISE	6/22/2010	6530616.481070	6530616.481070	1805612.930940	245127	1032	sf	64	cf
Infiltration BMP	Existing	9124 EGLISE	1/1/2006	6530099.347460	6530099.347460	1804464.036140	245125	1032	sf	64	cf
Infiltration BMP	Existing	10228 EGLISE	6/16/2008	6528317.527320	6528317.527320	1801552.496190	245126	1032	sf	64	cf
Infiltration BMP	Existing	8432 EUCALYPTUS	6/21/2010	6518375.883890	6518375.883890	1794450.252220	245115	1032	sf	64	cf
Infiltration BMP	Existing	8451 EUCALYPTUS	11/5/2008	6518648.903650	6518648.903650	1794509.449160	245115	1032	sf	64	cf
Infiltration BMP	Existing	8449 EVEREST	9/20/2006	6518402.636450	6518402.636450	1794253.840980	245115	1032	sf	64	cf
Infiltration BMP	Existing	9036 FARM	1/1/2005	6525791.032450	6525791.032450	1801568.335890	245119	1032	sf	64	cf
Infiltration BMP	Existing	9068 FARM	1/1/2005	6526062.157630	6526062.157630	1801402.977290	245119	1032	sf	64	cf
Infiltration BMP	Existing	8334 FIFTH	6/24/2005	6522409.331110	6522409.331110	1801742.536430	245114	1032	sf	64	cf
Infiltration BMP	Existing	8540 FIFTH	1/1/2005	6523591.182480	6523591.182480	1801021.450470	245114	1032	sf	64	cf
Infiltration BMP	Existing	7238 FLORENCE	11/14/2005	6518231.298960	6518231.298960	1807648.949310	246104	1032	sf	64	cf
Infiltration BMP	Existing	8324 FONTANA	1/1/2006	6519936.868340	6519936.868340	1797701.691440	245115	1032	sf	64	cf
Infiltration BMP	Existing	7322 FOSTER BRIDGE	6/18/2010	6520302.817760	6520302.817760	1810322.849060	246111	1032	sf	64	cf
Infiltration BMP	Existing	7441 FOSTORIA	10/25/2005	6517764.674110	6517764.674110	1804520.953030	246102	1032	sf	64	cf
Infiltration BMP	Existing	7520 FOSTORIA	1/20/2006	6517974.460950	6517974.460950	1804167.759820	246102	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7639 FOSTORIA	7/27/2007	6518691.469740	6518691.469740	1803918.676960	246102	1032	sf	64	cf
Infiltration BMP	Existing	7915 FOURTH	5/29/2007	6519890.537430	6519890.537430	1803170.158590	246102	1032	sf	64	cf
Infiltration BMP	Existing	7922 FOURTH	1/1/2005	6519878.319950	6519878.319950	1802959.531390	246102	1032	sf	64	cf
Infiltration BMP	Existing	7411 FOURTH PL	9/10/2007	6517375.746060	6517375.746060	1804408.156270	246102	1032	sf	64	cf
Infiltration BMP	Existing	7519 FOURTH PL	6/23/2005	6517868.488420	6517868.488420	1804088.501010	246102	1032	sf	64	cf
Infiltration BMP	Existing	7329 GAINFORD	9/20/2007	6519599.973200	6519599.973200	1808409.397520	246111	1032	sf	64	cf
Infiltration BMP	Existing	7725 GAINFORD	6/21/2010	6521357.607460	6521357.607460	1807543.814610	246106	1032	sf	64	cf
Infiltration BMP	Existing	7735 GAINFORD	12/15/2006	6521461.236080	6521461.236080	1807480.220630	246106	1032	sf	64	cf
Infiltration BMP	Existing	7771 GAINFORD	12/3/2007	6521758.954890	6521758.954890	1807297.289390	246106	1032	sf	64	cf
Infiltration BMP	Existing	8353 GAINFORD	1/4/2007	6524689.963810	6524689.963810	1805534.024270	246103	1032	sf	64	cf
Infiltration BMP	Existing	8553 GAINFORD	4/7/2008	6525875.670020	6525875.670020	1804802.065800	245125	1032	sf	64	cf
Infiltration BMP	Existing	9114 GAINFORD	6/23/2010	6527375.967240	6527375.967240	1803418.253090	245125	1032	sf	64	cf
Infiltration BMP	Existing	8319 GALLATIN	6/23/2010	6525634.222480	6525634.222480	1807445.394810	246103	1032	sf	64	cf
Infiltration BMP	Existing	9069 GALLATIN	3/1/2005	6527846.830170	6527846.830170	1805432.059660	245125	1032	sf	64	cf
Infiltration BMP	Existing	9243 GALLATIN	6/19/2006	6528915.102070	6528915.102070	1804595.777040	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8408 GALT	6/18/2010	6520848.594160	6520848.594160	1798562.646220	245114	1032	sf	64	cf
Infiltration BMP	Existing	8435 GALT	12/27/2005	6521154.530230	6521154.530230	1798569.782020	245114	1032	sf	64	cf
Infiltration BMP	Existing	9119 GARNISH	6/22/2010	6529517.516530	6529517.516530	1805110.082900	245125	1032	sf	64	cf
Infiltration BMP	Existing	9136 GARNISH	2/5/2007	6529607.954040	6529607.954040	1804869.027300	245125	1032	sf	64	cf
Infiltration BMP	Existing	9024 GAYMONT	8/28/2007	6523451.624790	6523451.624790	1809501.434890	246111	1032	sf	64	cf
Infiltration BMP	Existing	12636 GLYNN	10/25/2005	6517337.921050	6517337.921050	1793251.757000	245524	1032	sf	64	cf
Infiltration BMP	Existing	12751 GLYNN	1/1/2005	6516780.406550	6516780.406550	1792749.927780	245524	1032	sf	64	cf
Infiltration BMP	Existing	12755 GLYNN	6/18/2010	6516753.778610	6516753.778610	1792707.557200	245524	1032	sf	64	cf
Infiltration BMP	Existing	12912 GLYNN	1/1/2005	6516567.905690	6516567.905690	1791996.175300	245524	1032	sf	64	cf
Infiltration BMP	Existing	8731 GUATEMALA	10/30/2008	6523507.693960	6523507.693960	1811098.218950	246106	1032	sf	64	cf
Infiltration BMP	Existing	9203 GUATEMALA	3/23/2006	6521893.308510	6521893.308510	1810154.570390	246111	1032	sf	64	cf
Infiltration BMP	Existing	9959 GUATEMALA	6/23/2010	6518699.649950	6518699.649950	1808234.818150	246111	1032	sf	64	cf
Infiltration BMP	Existing	13537 GUNDERSON	3/3/2008	6517350.406160	6517350.406160	1787757.556610	245524	1032	sf	64	cf
Infiltration BMP	Existing	13547 GUNDERSON	6/19/2006	6517298.502270	6517298.502270	1787667.099660	245524	1032	sf	64	cf
Infiltration BMP	Existing	11538 GURLEY	5/3/2005	6520211.328840	6520211.328840	1799382.602480	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11935 GURLEY	6/18/2010	6519051.777570	6519051.777570	1797582.114550	245115	1032	sf	64	cf
Infiltration BMP	Existing	12019 GURLEY	6/18/2010	6518869.145640	6518869.145640	1797295.091770	245115	1032	sf	64	cf
Infiltration BMP	Existing	12052 GURLEY	1/10/2006	6518841.793230	6518841.793230	1796925.916150	245115	1032	sf	64	cf
Infiltration BMP	Existing	12117 GURLEY	1/1/2007	6518497.250390	6518497.250390	1796711.283370	245115	1032	sf	64	cf
Infiltration BMP	Existing	9117 HALEDON	7/31/2006	6528761.573350	6528761.573350	1805801.190120	245125	1032	sf	64	cf
Infiltration BMP	Existing	10341 HALEDON	5/1/2006	6526657.457480	6526657.457480	1801653.926760	245119	1032	sf	64	cf
Infiltration BMP	Existing	10349 HALEDON	2/8/2005	6526618.690140	6526618.690140	1801591.635520	245119	1032	sf	64	cf
Infiltration BMP	Existing	10425 HALEDON	4/14/2005	6526424.760130	6526424.760130	1801280.406410	245119	1032	sf	64	cf
Infiltration BMP	Existing	10439 HALEDON	9/30/2005	6526346.747570	6526346.747570	1801155.573630	245119	1032	sf	64	cf
Infiltration BMP	Existing	10525 HALEDON	1/28/2005	6526113.410380	6526113.410380	1800804.505840	245119	1032	sf	64	cf
Infiltration BMP	Existing	10550 HALEDON	12/19/2005	6526112.578950	6526112.578950	1800485.376650	245119	1032	sf	64	cf
Infiltration BMP	Existing	9049 HALL ROAD	4/30/2008	6523684.587500	6523684.587500	1797586.831540	245114	1032	sf	64	cf
Infiltration BMP	Existing	7215 HANNON	12/19/2008	6521498.261440	6521498.261440	1811442.204100	246111	1032	sf	64	cf
Infiltration BMP	Existing	13005 HANWELL	2/11/2009	6519590.457150	6519590.457150	1789492.134120	245115	1032	sf	64	cf
Infiltration BMP	Existing	9022 HASTY	10/13/2005	6531232.650260	6531232.650260	1805433.916070	245127	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9205 HASTY	6/22/2010	6530848.690890	6530848.690890	1804978.371330	245127	1032	sf	64	cf
Infiltration BMP	Existing	9206 HASTY	1/1/2005	6531000.691980	6531000.691980	1804885.411940	245127	1032	sf	64	cf
Infiltration BMP	Existing	9241 HASTY	1/1/2006	6530719.487200	6530719.487200	1804649.180550	245127	1032	sf	64	cf
Infiltration BMP	Existing	7736 HONDO	2/8/2005	6514830.078530	6514830.078530	1796886.774430	246079	1032	sf	64	cf
Infiltration BMP	Existing	7753 HONDO	1/24/2007	6515005.269000	6515005.269000	1796951.957630	246079	1032	sf	64	cf
Infiltration BMP	Existing	7803 HONDO	10/11/2005	6515156.509020	6515156.509020	1796903.351830	246079	1032	sf	64	cf
Infiltration BMP	Existing	7808 HONDO	6/22/2010	6515109.805390	6515109.805390	1796717.393590	246079	1032	sf	64	cf
Infiltration BMP	Existing	7814 HONDO	7/25/2008	6515161.093050	6515161.093050	1796686.379320	246079	1032	sf	64	cf
Infiltration BMP	Existing	7920 HONDO	8/21/2006	6515777.018460	6515777.018460	1796313.217950	246079	1032	sf	64	cf
Infiltration BMP	Existing	7932 HONDO	1/1/2006	6515879.568480	6515879.568480	1796251.099580	246079	1032	sf	64	cf
Infiltration BMP	Existing	9008 HORLEY	7/19/2007	6523080.991430	6523080.991430	1809910.740800	246111	1032	sf	64	cf
Infiltration BMP	Existing	9838 HORLEY	7/3/2008	6521155.061500	6521155.061500	1807271.870840	246106	1032	sf	64	cf
Infiltration BMP	Existing	12307 HORLEY	1/1/2005	6514989.782150	6514989.782150	1797487.116040	246079	1032	sf	64	cf
Infiltration BMP	Existing	11427 HORTON	11/23/2005	6517266.456490	6517266.456490	1802136.009270	246079	1032	sf	64	cf
Infiltration BMP	Existing	11553 HORTON	4/21/2005	6516872.120940	6516872.120940	1801498.085040	246079	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11708 HORTON	10/25/2005	6516455.941870	6516455.941870	1800783.417100	246079	1032	sf	64	cf
Infiltration BMP	Existing	12646 IBBETSON	5/6/2005	6526008.756240	6526008.756240	1791650.535870	245114	1032	sf	64	cf
Infiltration BMP	Existing	8217 IMPERIAL	1/5/2009	6516889.628840	6516889.628840	1794092.786860	246077	1032	sf	64	cf
Infiltration BMP	Existing	7320 IRWINGROVE	1/1/2006	6518255.802480	6518255.802480	1807084.876440	246102	1032	sf	64	cf
Infiltration BMP	Existing	7710 IRWINGROVE	12/11/2007	6520151.425540	6520151.425540	1805902.138310	246102	1032	sf	64	cf
Infiltration BMP	Existing	12208 IZETTA	1/1/2006	6524718.745010	6524718.745010	1794118.344290	245114	1032	sf	64	cf
Infiltration BMP	Existing	12252 IZETTA	7/10/2008	6524718.900100	6524718.900100	1793666.382200	245114	1032	sf	64	cf
Infiltration BMP	Existing	12631 IZETTA	8/28/2007	6524602.625920	6524602.625920	1791809.267080	245114	1032	sf	64	cf
Infiltration BMP	Existing	10228 JULIUS	5/20/2008	6519748.327880	6519748.327880	1806603.074440	246102	1032	sf	64	cf
Infiltration BMP	Existing	10234 JULIUS	6/22/2010	6519723.348540	6519723.348540	1806551.787860	246102	1032	sf	64	cf
Infiltration BMP	Existing	11848 JULIUS	6/23/2010	6515875.825190	6515875.825190	1800351.825190	246079	1032	sf	64	cf
Infiltration BMP	Existing	11859 JULIUS	8/23/2005	6515676.490910	6515676.490910	1800355.137490	246079	1032	sf	64	cf
Infiltration BMP	Existing	11865 JULIUS	11/13/2006	6515650.173870	6515650.173870	1800309.916770	246079	1032	sf	64	cf
Infiltration BMP	Existing	12129 JULIUS	9/29/2005	6514728.334670	6514728.334670	1798846.683770	246079	1032	sf	64	cf
Infiltration BMP	Existing	9263 KLINEDALE	6/21/2010	6531573.525950	6531573.525950	1804517.918460	245127	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9205 LA REINA	11/27/2006	6525690.537020	6525690.537020	1808255.600740	246103	1032	sf	64	cf
Infiltration BMP	Existing	9251 LA REINA	8/10/2007	6525325.121400	6525325.121400	1807968.316200	246103	1032	sf	64	cf
Infiltration BMP	Existing	9260 LA REINA	6/14/2007	6525343.506110	6525343.506110	1807785.350080	246103	1032	sf	64	cf
Infiltration BMP	Existing	9633 LA REINA	9/24/2007	6524180.010720	6524180.010720	1806496.849820	246103	1032	sf	64	cf
Infiltration BMP	Existing	10026 LA REINA	1/1/2005	6523542.730590	6523542.730590	1805175.247470	246103	1032	sf	64	cf
Infiltration BMP	Existing	10219 LA REINA	5/25/2006	6522978.941790	6522978.941790	1804778.433210	246103	1032	sf	64	cf
Infiltration BMP	Existing	8346 LA VILLA	8/29/2005	6522426.709000	6522426.709000	1801414.465390	245114	1032	sf	64	cf
Infiltration BMP	Existing	9524 LA VILLA	9/27/2005	6527942.492070	6527942.492070	1797972.664540	245119	1032	sf	64	cf
Infiltration BMP	Existing	14305 LAKEWOOD	1/1/2006	6518183.322800	6518183.322800	1787270.059950	245524	1032	sf	64	cf
Infiltration BMP	Existing	8218 LANKIN	3/28/2006	6516908.705740	6516908.705740	1794755.893760	246077	1032	sf	64	cf
Infiltration BMP	Existing	13407 LAURELDALE	10/25/2005	6516128.982330	6516128.982330	1789557.891060	245524	1032	sf	64	cf
Infiltration BMP	Existing	11034 LE FLOSS	3/21/2008	6531318.633350	6531318.633350	1797718.334360	245124	1032	sf	64	cf
Infiltration BMP	Existing	9013 LEMORAN	3/16/2006	6529860.990680	6529860.990680	1806212.694780	245125	1032	sf	64	cf
Infiltration BMP	Existing	10036 LESTERFORD	1/11/2006	6530911.516090	6530911.516090	1801094.347740	245125	1032	sf	64	cf
Infiltration BMP	Existing	8355 LEXINGTON	6/15/2005	6523932.891700	6523932.891700	1804236.927600	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7432 LUBEC	7/8/2005	6519806.105180	6519806.105180	1808430.037290	246111	1032	sf	64	cf
Infiltration BMP	Existing	9318 LUBEC	1/1/2006	6528946.832250	6528946.832250	1803071.454980	245125	1032	sf	64	cf
Infiltration BMP	Existing	7341 LUXOR	9/30/2005	6515165.173860	6515165.173860	1801559.243950	246079	1032	sf	64	cf
Infiltration BMP	Existing	7743 LUXOR	8/18/2006	6517197.964320	6517197.964320	1800308.569440	246079	1032	sf	64	cf
Infiltration BMP	Existing	7809 LUXOR	1/1/2006	6517239.593210	6517239.593210	1799986.863830	246079	1032	sf	64	cf
Infiltration BMP	Existing	7982 LUXOR	7/3/2007	6518306.219270	6518306.219270	1799333.376300	246077	1032	sf	64	cf
Infiltration BMP	Existing	8509 LUXOR	12/31/2008	6521183.510000	6521183.510000	1797885.775000	245114	1032	sf	64	cf
Infiltration BMP	Existing	11505 MAC GOVERN	5/1/2006	6519990.708800	6519990.708800	1799977.759420	245115	1032	sf	64	cf
Infiltration BMP	Existing	11527 MAC GOVERN	11/19/2007	6519889.562820	6519889.562820	1799806.361750	245115	1032	sf	64	cf
Infiltration BMP	Existing	8518 MANATEE	4/27/2005	6521541.591450	6521541.591450	1798287.495050	245114	1032	sf	64	cf
Infiltration BMP	Existing	12306 MARBEL	12/29/2005	6520780.434840	6520780.434840	1794110.003960	245115	1032	sf	64	cf
Infiltration BMP	Existing	12322 MARBEL	8/24/2005	6520697.258530	6520697.258530	1793976.926170	245115	1032	sf	64	cf
Infiltration BMP	Existing	10423 MATTOCK	11/21/2008	6528946.576280	6528946.576280	1799798.739650	245126	1032	sf	64	cf
Infiltration BMP	Existing	10527 MATTOCK	1/11/2007	6528618.163260	6528618.163260	1799183.483330	245126	1032	sf	64	cf
Infiltration BMP	Existing	8602 MEADOW	2/28/2008	6519007.155950	6519007.155950	1793158.643900	245115	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8606 MEADOW	10/26/2006	6519050.372960	6519050.372960	1793129.529230	245115	1032	sf	64	cf
Infiltration BMP	Existing	8739 MEADOW	12/17/2007	6520051.313480	6520051.313480	1792689.390880	245115	1032	sf	64	cf
Infiltration BMP	Existing	9106 MELDAR	4/23/2007	6526980.004600	6526980.004600	1807421.893550	246103	1032	sf	64	cf
Infiltration BMP	Existing	7819 MELVA	1/1/2005	6515811.952890	6515811.952890	1797638.263460	246079	1032	sf	64	cf
Infiltration BMP	Existing	8609 MELVA	4/6/2007	6520260.479750	6520260.479750	1795043.474460	245115	1032	sf	64	cf
Infiltration BMP	Existing	9558 METRO	4/3/2008	6531485.802060	6531485.802060	1804114.777900	245127	1032	sf	64	cf
Infiltration BMP	Existing	11711 MITLA	7/13/2005	6513453.724060	6513453.724060	1802912.278240	246100	1032	sf	64	cf
Infiltration BMP	Existing	11819 MORNING	6/21/2010	6517496.555960	6517496.555960	1799723.226450	246077	1032	sf	64	cf
Infiltration BMP	Existing	12070 MORNING	9/13/2006	6516788.931410	6516788.931410	1797957.975300	246079	1032	sf	64	cf
Infiltration BMP	Existing	8637 MORY	1/1/2005	6520217.929830	6520217.929830	1794453.857040	245115	1032	sf	64	cf
Infiltration BMP	Existing	10903 MYRTLE	10/25/2005	6520809.999180	6520809.999180	1802308.735020	246103	1032	sf	64	cf
Infiltration BMP	Existing	8208 NADA	6/29/2005	6518679.653960	6518679.653960	1797804.552950	245115	1032	sf	64	cf
Infiltration BMP	Existing	8249 NADA	2/12/2008	6519111.183860	6519111.183860	1797730.010570	245115	1032	sf	64	cf
Infiltration BMP	Existing	9458 NANCE	6/20/2005	6526752.832360	6526752.832360	1796717.105850	245119	1032	sf	64	cf
Infiltration BMP	Existing	10609 NEDRA	6/3/2005	6522752.614640	6522752.614640	1802538.434710	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10850 NEWVILLE	7/3/2007	6528159.933410	6528159.933410	1797635.549950	245119	1032	sf	64	cf
Infiltration BMP	Existing	7510 NOREN	5/23/2006	6520838.348300	6520838.348300	1809064.222230	246111	1032	sf	64	cf
Infiltration BMP	Existing	11720 NORLAIN	9/22/2006	6515696.110230	6515696.110230	1801264.632180	246079	1032	sf	64	cf
Infiltration BMP	Existing	12336 NORLAIN	8/1/2007	6513658.838460	6513658.838460	1797875.767390	246079	1032	sf	64	cf
Infiltration BMP	Existing	11628 OLD RIVER SCHOOL	1/1/2006	6515797.838400	6515797.838400	1801876.521840	246079	1032	sf	64	cf
Infiltration BMP	Existing	8521 ORANGE	3/9/2007	6519427.831130	6519427.831130	1794911.101980	245115	1032	sf	64	cf
Infiltration BMP	Existing	9255 ORIZABA	2/15/2006	6525108.451310	6525108.451310	1808168.208600	246103	1032	sf	64	cf
Infiltration BMP	Existing	9719 ORIZABA	8/8/2007	6523780.810110	6523780.810110	1806377.528150	246103	1032	sf	64	cf
Infiltration BMP	Existing	12615 ORIZABA	1/27/2006	6516062.877730	6516062.877730	1794206.618320	246077	1032	sf	64	cf
Infiltration BMP	Existing	8511 OTTO	4/12/2005	6525130.700850	6525130.700850	1804530.864040	245125	1032	sf	64	cf
Infiltration BMP	Existing	9933 PANGBORN	6/29/2006	6530067.434760	6530067.434760	1801915.181390	245125	1032	sf	64	cf
Infiltration BMP	Existing	10202 PANGBORN	1/1/2006	6529571.236640	6529571.236640	1801045.668670	245125	1032	sf	64	cf
Infiltration BMP	Existing	11009 PANGBORN	1/31/2007	6527339.080190	6527339.080190	1797691.116980	245119	1032	sf	64	cf
Infiltration BMP	Existing	9530 PARAMOUNT	7/14/2005	6523601.663290	6523601.663290	1807461.311510	246103	1032	sf	64	cf
Infiltration BMP	Existing	9624 PARAMOUNT	5/9/2005	6523328.526550	6523328.526550	1807031.980170	246103	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8603 PARROT	3/14/2006	6526080.240790	6526080.240790	1809719.746830	246106	1032	sf	64	cf
Infiltration BMP	Existing	9625 PARROT	1/1/2005	6523451.735380	6523451.735380	1806960.011690	246103	1032	sf	64	cf
Infiltration BMP	Existing	9708 PARROT	6/29/2006	6523491.321500	6523491.321500	1806678.668660	246103	1032	sf	64	cf
Infiltration BMP	Existing	12045 PARROT	6/22/2010	6517861.439330	6517861.439330	1797868.798060	246077	1032	sf	64	cf
Infiltration BMP	Existing	12751 PARROT	12/14/2006	6515222.728500	6515222.728500	1793830.999240	246077	1032	sf	64	cf
Infiltration BMP	Existing	7130 PELLET	1/27/2005	6515276.387650	6515276.387650	1804845.311440	246104	1032	sf	64	cf
Infiltration BMP	Existing	7323 PELLET	1/1/2005	6516571.171210	6516571.171210	1804327.110650	246104	1032	sf	64	cf
Infiltration BMP	Existing	7354 PELLET	1/1/2006	6516665.448760	6516665.448760	1803945.359790	246102	1032	sf	64	cf
Infiltration BMP	Existing	7861 PHLOX	9/17/2007	6518688.116640	6518688.116640	1801430.417420	246079	1032	sf	64	cf
Infiltration BMP	Existing	10620 PICO VISTA	3/7/2007	6529428.403390	6529428.403390	1798283.402620	245126	1032	sf	64	cf
Infiltration BMP	Existing	10635 PICO VISTA	8/28/2007	6529197.816790	6529197.816790	1798270.093070	245126	1032	sf	64	cf
Infiltration BMP	Existing	7530 PIVOT	11/23/2005	6516899.016370	6516899.016370	1802660.318910	246079	1032	sf	64	cf
Infiltration BMP	Existing	7709 PIVOT	10/11/2005	6517859.569570	6517859.569570	1802212.124870	246079	1032	sf	64	cf
Infiltration BMP	Existing	7753 PIVOT	6/14/2005	6518241.212950	6518241.212950	1801966.921690	246079	1032	sf	64	cf
Infiltration BMP	Existing	11974 POMERING	6/18/2010	6515116.938670	6515116.938670	1799645.797070	246079	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8732 PRICHARD ST	1/12/2009	6516786.371080	6516786.371080	1788406.289900	245524	1032	sf	64	cf
Infiltration BMP	Existing	8734 PRICHARD ST	1/12/2009	6516831.574810	6516831.574810	1788380.860770	245524	1032	sf	64	cf
Infiltration BMP	Existing	8738 PRICHARD ST	1/12/2009	6516876.454020	6516876.454020	1788355.597890	245524	1032	sf	64	cf
Infiltration BMP	Existing	8740 PRICHARD ST	1/12/2009	6516921.333860	6516921.333860	1788330.343610	245524	1032	sf	64	cf
Infiltration BMP	Existing	8240 PRISCILLA	9/13/2007	6515555.844810	6515555.844810	1791697.292180	246077	1032	sf	64	cf
Infiltration BMP	Existing	9044 PRISCILLA	8/18/2005	6519169.042140	6519169.042140	1790017.667840	245115	1032	sf	64	cf
Infiltration BMP	Existing	9060 PRISCILLA	6/21/2010	6519318.719160	6519318.719160	1790008.270400	245115	1032	sf	64	cf
Infiltration BMP	Existing	11448 PRUESS	1/1/2006	6518742.114860	6518742.114860	1801046.878700	246077	1032	sf	64	cf
Infiltration BMP	Existing	11609 PRUESS	11/16/2006	6518299.675980	6518299.675980	1800455.121300	246077	1032	sf	64	cf
Infiltration BMP	Existing	11619 PRUESS	6/10/2005	6518270.484730	6518270.484730	1800355.677990	246077	1032	sf	64	cf
Infiltration BMP	Existing	11708 PRUESS	1/18/2005	6518033.994760	6518033.994760	1799832.073440	246077	1032	sf	64	cf
Infiltration BMP	Existing	8121 PURITAN	6/5/2006	6515245.448070	6515245.448070	1792698.037730	246077	1032	sf	64	cf
Infiltration BMP	Existing	7707 QUILL	6/1/2007	6514508.683200	6514508.683200	1796937.770200	246079	1032	sf	64	cf
Infiltration BMP	Existing	8108 QUOIT	6/5/2008	6516594.034560	6516594.034560	1795288.918170	246077	1032	sf	64	cf
Infiltration BMP	Existing	9109 RAVILLER	2/6/2007	6527953.464140	6527953.464140	1804924.402110	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9367 RAVILLER	1/1/2006	6529435.914270	6529435.914270	1803746.913820	245125	1032	sf	64	cf
Infiltration BMP	Existing	9728 RICHEON	6/18/2010	6521201.804800	6521201.804800	1807962.626360	246106	1032	sf	64	cf
Infiltration BMP	Existing	12217 RICHEON	1/1/2005	6514937.033870	6514937.033870	1797986.477150	246079	1032	sf	64	cf
Infiltration BMP	Existing	12336 RICHEON	1/10/2007	6514721.816510	6514721.816510	1797298.695230	246079	1032	sf	64	cf
Infiltration BMP	Existing	12342 RICHEON	1/1/2005	6514694.932100	6514694.932100	1797256.523880	246079	1032	sf	64	cf
Infiltration BMP	Existing	12352 RICHEON	10/30/2008	6514641.834370	6514641.834370	1797172.034360	246079	1032	sf	64	cf
Infiltration BMP	Existing	11010 RIO HONDO	2/6/2006	6514511.989690	6514511.989690	1805412.886430	246104	1032	sf	64	cf
Infiltration BMP	Existing	8515 RIVES	2/6/2006	6524958.575190	6524958.575190	1811619.081610	246111	1032	sf	64	cf
Infiltration BMP	Existing	8546 RIVES	6/14/2010	6524726.063490	6524726.063490	1811337.492550	246106	1032	sf	64	cf
Infiltration BMP	Existing	11828 RIVES	1/1/2006	6517020.372820	6517020.372820	1799741.223590	246079	1032	sf	64	cf
Infiltration BMP	Existing	12056 RIVES	10/7/2005	6516252.097820	6516252.097820	1798479.870770	246079	1032	sf	64	cf
Infiltration BMP	Existing	12213 RIVES	6/7/2007	6515544.034920	6515544.034920	1797794.303030	246079	1032	sf	64	cf
Infiltration BMP	Existing	12301 RIVES	1/27/2006	6515274.134590	6515274.134590	1797373.251430	246079	1032	sf	64	cf
Infiltration BMP	Existing	12542 ROSE	6/18/2010	6520775.320830	6520775.320830	1792425.734550	245115	1032	sf	64	cf
Infiltration BMP	Existing	7444 RUNDELL	9/28/2006	6514195.392880	6514195.392880	1798477.819400	246079	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7458 RUNDELL	1/1/2006	6514328.036950	6514328.036950	1798395.544300	246079	1032	sf	64	cf
Infiltration BMP	Existing	8734 RUPP	5/24/2007	6518769.625610	6518769.625610	1791861.464390	245115	1032	sf	64	cf
Infiltration BMP	Existing	9206 SAMOLINE	9/20/2006	6524105.922670	6524105.922670	1808777.784250	246106	1032	sf	64	cf
Infiltration BMP	Existing	9363 SAMOLINE	2/12/2009	6523342.697990	6523342.697990	1808041.206940	246106	1032	sf	64	cf
Infiltration BMP	Existing	9630 SAMOLINE	1/1/2006	6523000.405210	6523000.405210	1807164.143360	246103	1032	sf	64	cf
Infiltration BMP	Existing	12041 SAMOLINE	6/23/2010	6516971.702030	6516971.702030	1798170.274910	246079	1032	sf	64	cf
Infiltration BMP	Existing	10629 SHELLEYFIELD	6/21/2010	6525284.582980	6525284.582980	1800508.363190	245119	1032	sf	64	cf
Infiltration BMP	Existing	9118 SHERIDELL	6/22/2010	6528683.896100	6528683.896100	1805941.227670	245125	1032	sf	64	cf
Infiltration BMP	Existing	10042 SIDEVIEW	6/21/2010	6529464.806690	6529464.806690	1801729.923910	245125	1032	sf	64	cf
Infiltration BMP	Existing	8349 SIXTH	6/21/2010	6522706.066860	6522706.066860	1802231.249170	245114	1032	sf	64	cf
Infiltration BMP	Existing	8363 SIXTH	6/18/2010	6522832.335670	6522832.335670	1802150.209500	245114	1032	sf	64	cf
Infiltration BMP	Existing	8532 SIXTH	6/23/2010	6523697.106090	6523697.106090	1801388.440460	245119	1032	sf	64	cf
Infiltration BMP	Existing	8514 SMALLWOOD	8/24/2006	6525167.581560	6525167.581560	1811228.866910	246106	1032	sf	64	cf
Infiltration BMP	Existing	12007 SMALLWOOD	1/1/2005	6516682.861570	6516682.861570	1798786.226940	246079	1032	sf	64	cf
Infiltration BMP	Existing	12936 SMALLWOOD	7/31/2006	6513688.714060	6513688.714060	1793540.982580	246077	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9235 SONGFEST	6/14/2006	6531351.855720	6531351.855720	1804709.858310	245127	1032	sf	64	cf
Infiltration BMP	Existing	7939 SPRINGER	10/6/2006	6516193.792450	6516193.792450	1796630.732180	246079	1032	sf	64	cf
Infiltration BMP	Existing	9306 STAMPS	6/21/2010	6525546.826990	6525546.826990	1807197.501010	246103	1032	sf	64	cf
Infiltration BMP	Existing	10446 STAMPS	1/1/2005	6523214.650320	6523214.650320	1803242.228000	246103	1032	sf	64	cf
Infiltration BMP	Existing	10536 STAMPS	6/1/2006	6522871.528480	6522871.528480	1802783.838380	246103	1032	sf	64	cf
Infiltration BMP	Existing	13219 STANBRIDGE	9/17/2007	6522806.618420	6522806.618420	1790045.381220	245114	1032	sf	64	cf
Infiltration BMP	Existing	8723 STEWART & GRAY	2/11/2009	6522100.372490	6522100.372490	1796545.507760	245114	1032	sf	64	cf
Infiltration BMP	Existing	9028 STOAKES	8/17/2007	6527221.634250	6527221.634250	1807951.198320	246103	1032	sf	64	cf
Infiltration BMP	Existing	7809 SUVA	1/13/2009	6522703.875430	6522703.875430	1808490.998990	246106	1032	sf	64	cf
Infiltration BMP	Existing	7827 SUVA	1/1/2006	6522849.829890	6522849.829890	1808368.560310	246106	1032	sf	64	cf
Infiltration BMP	Existing	8564 SUVA	1/1/2006	6526403.328390	6526403.328390	1805373.281490	245125	1032	sf	64	cf
Infiltration BMP	Existing	9943 TECUM	4/11/2008	6519363.349470	6519363.349470	1808047.658450	246111	1032	sf	64	cf
Infiltration BMP	Existing	9636 TELEGRAPH	5/8/2006	6531995.042290	6531995.042290	1804929.677680	245128	1032	sf	64	cf
Infiltration BMP	Existing	7968 THIRD	6/21/2005	6519929.169700	6519929.169700	1802199.016820	246102	1032	sf	64	cf
Infiltration BMP	Existing	9819 TRISTAN	10/7/2005	6526302.584780	6526302.584780	1804524.383680	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9253 TRUE	1/1/2005	6531891.994890	6531891.994890	1804462.821310	245127	1032	sf	64	cf
Infiltration BMP	Existing	8843 TWEEDY	9/12/2006	6524140.679400	6524140.679400	1809940.135780	246106	1032	sf	64	cf
Infiltration BMP	Existing	9012 TWEEDY	1/1/2005	6523977.735950	6523977.735950	1809300.273240	246106	1032	sf	64	cf
Infiltration BMP	Existing	9029 TWEEDY	1/1/2006	6523763.012330	6523763.012330	1809288.681880	246106	1032	sf	64	cf
Infiltration BMP	Existing	9612 TWEEDY	6/22/2010	6522847.016620	6522847.016620	1807449.028980	246106	1032	sf	64	cf
Infiltration BMP	Existing	9636 TWEEDY	10/11/2005	6522732.626430	6522732.626430	1807259.266340	246103	1032	sf	64	cf
Infiltration BMP	Existing	9714 TWEEDY	7/24/2006	6522647.237500	6522647.237500	1807116.822930	246103	1032	sf	64	cf
Infiltration BMP	Existing	9718 TWEEDY	9/22/2008	6522619.325230	6522619.325230	1807068.990310	246103	1032	sf	64	cf
Infiltration BMP	Existing	9730 TWEEDY	6/18/2010	6522565.360970	6522565.360970	1806976.155270	246103	1032	sf	64	cf
Infiltration BMP	Existing	13409 VERDURA	1/1/2006	6516484.588360	6516484.588360	1789346.159960	245524	1032	sf	64	cf
Infiltration BMP	Existing	8607 VIA AMORITA	1/19/2006	6524994.226680	6524994.226680	1803003.226520	245119	1032	sf	64	cf
Infiltration BMP	Existing	9356 VIA AMORITA	4/27/2005	6528170.664540	6528170.664540	1800850.979140	245126	1032	sf	64	cf
Infiltration BMP	Existing	7402 VIA RIO NIDO	2/10/2005	6518371.376580	6518371.376580	1806186.704160	246102	1032	sf	64	cf
Infiltration BMP	Existing	8303 VISTA DEL RIO	5/1/2007	6526003.249760	6526003.249760	1808077.011440	246103	1032	sf	64	cf
Infiltration BMP	Existing	8303 VISTA DEL ROSA	4/26/2007	6526763.242710	6526763.242710	1809159.607970	246106	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8351 VISTA DEL ROSA	12/19/2005	6527091.635630	6527091.635630	1808824.632820	246106	2063	sf	129	cf
Infiltration BMP	Existing	10265 VULTEE	4/24/2006	6525980.530560	6525980.530560	1802568.772980	245119	1032	sf	64	cf
Infiltration BMP	Existing	10339 VULTEE	6/18/2010	6525804.209560	6525804.209560	1802209.879860	245119	1032	sf	64	cf
Infiltration BMP	Existing	12709 VULTEE	3/9/2007	6519587.948000	6519587.948000	1791264.714830	245115	1032	sf	64	cf
Infiltration BMP	Existing	12725 WHITEWOOD	7/26/2005	6520341.668580	6520341.668580	1791179.460770	245115	1032	sf	64	cf
Infiltration BMP	Existing	9702 WILEY BURKE	6/21/2010	6521126.099980	6521126.099980	1808337.656530	246106	1032	sf	64	cf
Infiltration BMP	Existing	9750 WILEY BURKE	12/11/2006	6520822.729060	6520822.729060	1807995.132410	246106	1032	sf	64	cf
Infiltration BMP	Existing	9925 WILEY BURKE	1/10/2007	6520271.299840	6520271.299840	1807447.007570	246106	1032	sf	64	cf
Infiltration BMP	Existing	10540 WILEY BURKE	6/21/2007	6519089.326110	6519089.326110	1805048.306870	246102	1032	sf	64	cf
Infiltration BMP	Existing	10643 WOODRUFF	1/1/2006	6526887.322420	6526887.322420	1799535.375650	245119	1032	sf	64	cf
Infiltration BMP	Existing	7515 YANKEY	10/24/2006	6515115.108440	6515115.108440	1798924.389740	246079	1032	sf	64	cf
Infiltration BMP	Existing	10047 CASANES	1/1/2006	6529512.635540	6529512.635540	1801587.658100	245125	1032	sf	64	cf
Infiltration BMP	Existing	9220 CORD	1/1/2004	6530296.778820	6530296.778820	1804178.901350	245125	1032	sf	64	cf
Infiltration BMP	Existing	10040 MATTOCK	1/1/2006	6530247.042350	6530247.042350	1801200.601240	245125	1032	sf	64	cf
Infiltration BMP	Existing	10018 PANGBORN	1/1/2006	6530084.251260	6530084.251260	1801567.525640	245125	1032	sf	64	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12053 PATTON	10/19/2004	6520642.037410	6520642.037410	1796050.004800	245115	1032	sf	64	cf
Infiltration BMP	Existing	12048 SAMOLINE	3/20/2007	6517021.712450	6517021.712450	1798014.455830	246079	2063	sf	129	cf
Infiltration BMP	Existing	7879 FLORENCE	2/14/2014	6521700.000000	6521700.000000	1806100.000000	246103	16504	sf	1032	cf
Infiltration BMP	Existing	9020 FIRESTONE	9/12/2008	6524113.023390	6524113.023390	1798572.164290	245119	70288	sf	4393	cf
Infiltration BMP	Existing	7910 FIRESTONE	6/28/2005	6519165.968790	6519165.968790	1801736.513180	246102	55686	sf	3480	cf
Infiltration BMP	Existing	7252 FIRESTONE	5/19/2004	6515489.000650	6515489.000650	1803082.633110	246079	36224	sf	2264	cf
Infiltration BMP	Existing	12256 PARAMOUNT	3/13/2006	6516813.225030	6516813.225030	1796497.685630	246077	34112	sf	2132	cf
Infiltration BMP	Existing	9462 FIRESTONE BL	2/14/2014	6526885.862260	6526885.862260	1797100.585140	245119	35437	sf	2215	cf
Infiltration BMP	Existing	8250 FIRESTONE BLVD	2/14/2014	6521000.000000	6521000.000000	1800300.000000	245115	59085	sf	3693	cf
Infiltration BMP	Existing	8018 TELEGRAPH	8/20/2004	6526800.000000	6526800.000000	1809400.000000	246106	35437	sf	2215	cf
Infiltration BMP	Existing	7447 FIRESTONE BLVD	7/9/2009	6516971.590923	6516971.590923	1803474.089243	246102	43124	sf	2192	cf
Infiltration BMP	Existing	9126 FLORENCE	4/25/2008	6526980.883730	6526980.883730	1802613.015890	245119	29248	sf	1828	cf
Infiltration BMP	Existing	11111 OLD RIVER SCHOOL	6/15/2004	6515500.000000	6515500.000000	1803800.000000	246102	27843	sf	1740	cf
Infiltration BMP	Existing	9634 WASHBURN	5/25/2004	6526574.558590	6526574.558590	1794738.334020	245118	35712	sf	2232	cf
Infiltration BMP	Existing	9475 FIRESTONE	9/20/2004	6527102.470060	6527102.470060	1797292.175990	245119	25078	sf	1567	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9125 IMPERIAL	9/17/2007	6520700.000000	6520700.000000	1792100.000000	245115	53104	sf	3319	cf
Infiltration BMP	Existing	11231 RIVES	4/25/2006	6518392.506170	6518392.506170	1802335.247680	246102	20250	sf	1266	cf
Infiltration BMP	Existing	7936 QUILL	8/23/2006	6515830.400000	6515830.400000	1795880.196930	246079	18984	sf	1187	cf
Infiltration BMP	Existing	8337 FONTANA	8/11/2005	6520206.194620	6520206.194620	1797870.434810	245114	36672	sf	2292	cf
Infiltration BMP	Existing	10225 LESTERFORD	6/22/2010	6530244.844140	6530244.844140	1800567.187010	245126	17718	sf	1107	cf
Infiltration BMP	Existing	7915 FLORENCE	8/11/2009	6522019.025220	6522019.025220	1805973.779210	246103	20192	sf	1262	cf
Infiltration BMP	Existing	11229 PARAMOUNT	3/16/2004	6519482.925030	6519482.925030	1801457.806750	246102	16453	sf	1028	cf
Infiltration BMP	Existing	8103 COLE	5/1/2007	6518213.448370	6518213.448370	1798049.118910	246077	0	sf	0	cf
Infiltration BMP	Existing	8722 BOYNE	7/1/2008	6521213.643060	6521213.643060	1795216.473800	245115	11390	sf	712	cf
Infiltration BMP	Existing	10612 LESTERFORD	6/14/2006	6529218.389270	6529218.389270	1798513.115960	245126	11390	sf	712	cf
Infiltration BMP	Existing	8444 LEXINGTON	4/24/2006	6524361.433930	6524361.433930	1803767.599820	246103	11390	sf	712	cf
Infiltration BMP	Existing	13221 BARLIN	10/10/2006	6516992.431610	6516992.431610	1789646.610200	245524	10125	sf	633	cf
Infiltration BMP	Existing	9611 GARNISH	6/7/2007	6529217.309540	6529217.309540	1803965.758960	245125	10125	sf	633	cf
Infiltration BMP	Existing	7118 PELLET	12/3/2008	6515184.074160	6515184.074160	1804905.113850	246104	10125	sf	633	cf
Infiltration BMP	Existing	9325 RIVES AM	2/14/2014	6522517.375370	6522517.375370	1808878.723180	246111	10125	sf	633	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9371 SUVA	3/13/2007	6529247.009310	6529247.009310	1803484.685240	245125	10125	sf	633	cf
Infiltration BMP	Existing	8556 FLORENCE	1/1/2006	6525137.675720	6525137.675720	1803770.147850	245125	8859	sf	554	cf
Infiltration BMP	Existing	9755 IMPERIAL	3/29/2006	6525700.000000	6525700.000000	1792200.000000	245114	8859	sf	554	cf
Infiltration BMP	Existing	10000 IMPERIAL	3/29/2006	6527246.839530	6527246.839530	1791706.604350	245118	8859	sf	554	cf
Infiltration BMP	Existing	10030 LESTERFORD	6/21/2010	6530953.991420	6530953.991420	1801165.004470	245125	8859	sf	554	cf
Infiltration BMP	Existing	7235 LUXOR	12/12/2005	6514593.326010	6514593.326010	1801941.887350	246079	8859	sf	554	cf
Infiltration BMP	Existing	8115 STEWART & GRAY	3/25/2009	6518648.406750	6518648.406750	1798495.150040	246077	11760	sf	735	cf
Infiltration BMP	Existing	9804 BROOKSHIRE	5/2/2007	6525737.765210	6525737.765210	1805415.750650	246103	7594	sf	475	cf
Infiltration BMP	Existing	7830 DANVERS	12/18/2008	6523967.248740	6523967.248740	1810379.348050	246106	7594	sf	475	cf
Infiltration BMP	Existing	8357 FLORENCE	11/29/2005	6524137.162990	6524137.162990	1804589.285090	246103	7594	sf	475	cf
Infiltration BMP	Existing	8562 FLORENCE	1/1/2006	6525210.620820	6525210.620820	1803736.004200	245125	7594	sf	475	cf
Infiltration BMP	Existing	10735 LAKEWOOD	1/19/2007	6524698.379320	6524698.379320	1800460.893140	245119	8640	sf	540	cf
Infiltration BMP	Existing	9732 ORIZABA	6/5/2008	6523842.356050	6523842.356050	1806158.297200	246103	7594	sf	475	cf
Infiltration BMP	Existing	12066 SAMOLINE	6/18/2010	6517119.562750	6517119.562750	1797806.070750	246079	7594	sf	475	cf
Infiltration BMP	Existing	7711 SECOND	6/21/2010	6518493.103400	6518493.103400	1802942.740750	246102	7594	sf	475	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9517 STOAKES	6/21/2010	6525287.319840	6525287.319840	1806612.266920	246103	7594	sf	475	cf
Infiltration BMP	Existing	12133 ANDERBERG	6/26/2009	6518010.879310	6518010.879310	1796818.463370	245115	6328	sf	396	cf
Infiltration BMP	Existing	9115 BROCK	6/21/2010	6524898.717190	6524898.717190	1808433.166330	246106	6328	sf	396	cf
Infiltration BMP	Existing	9541 CECILIA	6/23/2010	6528302.087900	6528302.087900	1798262.111790	245126	6328	sf	396	cf
Infiltration BMP	Existing	10243 CORD	11/4/2008	6528334.164460	6528334.164460	1801344.678940	245126	6328	sf	396	cf
Infiltration BMP	Existing	13108 CORNUTA	6/21/2010	6525701.475550	6525701.475550	1790449.882450	245113	6328	sf	396	cf
Infiltration BMP	Existing	8129 DACOSTA	8/5/2008	6523736.839560	6523736.839560	1805716.362640	246103	6328	sf	396	cf
Infiltration BMP	Existing	7247 DINWIDDIE	6/22/2010	6515896.418780	6515896.418780	1804170.223670	246104	6328	sf	396	cf
Infiltration BMP	Existing	12002A DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	6328	sf	396	cf
Infiltration BMP	Existing	12002C DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	6328	sf	396	cf
Infiltration BMP	Existing	8529 EUCALYPTUS	6/18/2010	6519136.171020	6519136.171020	1794210.333930	245115	6328	sf	396	cf
Infiltration BMP	Existing	9204 LA REINA	6/22/2010	6525799.255250	6525799.255250	1808110.827020	246103	6328	sf	396	cf
Infiltration BMP	Existing	9241 LUBEC	6/21/2010	6528410.398740	6528410.398740	1803633.947240	245125	6328	sf	396	cf
Infiltration BMP	Existing	10051 MATTOCK	9/25/2008	6530040.953970	6530040.953970	1801237.222590	245125	6328	sf	396	cf
Infiltration BMP	Existing	12273 PLANETT	6/21/2010	6518942.439290	6518942.439290	1795136.426680	245115	6328	sf	396	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9075 RAVILLER	4/9/2007	6527819.498980	6527819.498980	1805031.907810	245125	6328	sf	396	cf
Infiltration BMP	Existing	7149 ADWEN	5/31/2006	6514275.907390	6514275.907390	1803122.312290	246079	5062	sf	316	cf
Infiltration BMP	Existing	8703 ALAMEDA	9/14/2005	6520830.700880	6520830.700880	1795016.469260	245115	4594	sf	287	cf
Infiltration BMP	Existing	9242 APPLEBY	11/21/2008	6528866.478730	6528866.478730	1804798.824690	245125	5062	sf	316	cf
Infiltration BMP	Existing	9926 BELLDER	3/19/2007	6525715.329050	6525715.329050	1804487.716960	245125	5062	sf	316	cf
Infiltration BMP	Existing	11715 BELLFLOWER	6/15/2009	6523530.688010	6523530.688010	1796655.823230	245114	5062	sf	316	cf
Infiltration BMP	Existing	8019 BERGMAN	10/22/2008	6517711.829130	6517711.829130	1797726.503570	246077	5062	sf	316	cf
Infiltration BMP	Existing	8417 BIGBY	7/23/2007	6523908.146010	6523908.146010	1803525.055670	245119	5062	sf	316	cf
Infiltration BMP	Existing	10004 BIRCHDALE	1/23/2006	6525798.638290	6525798.638290	1803985.957400	245125	5062	sf	316	cf
Infiltration BMP	Existing	9951 BROOKSHIRE	6/18/2010	6525004.036100	6525004.036100	1804835.952720	246103	5062	sf	316	cf
Infiltration BMP	Existing	10927 BROOKSHIRE AV	2/14/2014	6522640.981090	6522640.981090	1800949.695110	245114	5062	sf	316	cf
Infiltration BMP	Existing	10304 CLANCEY	9/19/2008	6526762.243870	6526762.243870	1802017.295250	245119	5062	sf	316	cf
Infiltration BMP	Existing	7213 DINWIDDIE	6/21/2010	6515644.523280	6515644.523280	1804333.457340	246104	5062	sf	316	cf
Infiltration BMP	Existing	9245 DOWNEY	9/19/2007	6525582.317560	6525582.317560	1807792.114420	246103	5062	sf	316	cf
Infiltration BMP	Existing	12002B DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	5062	sf	316	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12002D DOWNEY	8/24/2005	6519100.000000	6519100.000000	1797100.000000	245115	5062	sf	316	cf
Infiltration BMP	Existing	10250 EGLISE AV	2/14/2014	6528202.138900	6528202.138900	1801366.096440	245126	5062	sf	316	cf
Infiltration BMP	Existing	8719 ELMONT	6/18/2010	6526144.563940	6526144.563940	1809393.110180	246106	5062	sf	316	cf
Infiltration BMP	Existing	9355 FLORENCE	7/30/2007	6528769.559400	6528769.559400	1801814.385750	245125	5062	sf	316	cf
Infiltration BMP	Existing	9252 GALLATIN	3/29/2006	6528859.757520	6528859.757520	1804394.594600	245125	5062	sf	316	cf
Infiltration BMP	Existing	9553 GALLATIN	7/28/2004	6530910.776140	6530910.776140	1803037.898220	245125	5062	sf	316	cf
Infiltration BMP	Existing	9724 GARNISH	1/14/2008	6529062.109120	6529062.109120	1803453.035240	245125	5062	sf	316	cf
Infiltration BMP	Existing	8610 GUATEMALA	10/24/2006	6524386.905480	6524386.905480	1811339.167280	246106	5062	sf	316	cf
Infiltration BMP	Existing	10214 HORLEY	8/14/2007	6520372.544870	6520372.544870	1806355.591210	246102	5062	sf	316	cf
Infiltration BMP	Existing	10513 JULIUS	1/22/2009	6518877.932890	6518877.932890	1805532.376750	246102	5062	sf	316	cf
Infiltration BMP	Existing	9204 LA REINA	4/18/2007	6525799.255250	6525799.255250	1808110.827020	246103	5062	sf	316	cf
Infiltration BMP	Existing	9528 LEMORAN	8/29/2008	6529000.799820	6529000.799820	1804066.473220	245125	5062	sf	316	cf
Infiltration BMP	Existing	7334 LUXOR	4/25/2007	6514999.892740	6514999.892740	1801407.207050	246079	5062	sf	316	cf
Infiltration BMP	Existing	9226 MANZANAR	7/8/2005	6526470.419470	6526470.419470	1806685.422630	246103	5062	sf	316	cf
Infiltration BMP	Existing	10524 MATTOCK	2/5/2009	6528788.349750	6528788.349750	1799096.345380	245126	5062	sf	316	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12123 ORIZABA	12/28/2005	6517943.193960	6517943.193960	1797041.752750	245115	5062	sf	316	cf
Infiltration BMP	Existing	7130 PELLET	6/4/2008	6515276.387650	6515276.387650	1804845.311440	246104	5062	sf	316	cf
Infiltration BMP	Existing	8322 PURITAN	6/14/2007	6516164.281440	6516164.281440	1791774.558840	245524	5062	sf	316	cf
Infiltration BMP	Existing	7312 RIO FLORA	6/18/2010	6516577.089870	6516577.089870	1804589.040390	246104	5062	sf	316	cf
Infiltration BMP	Existing	9331 SAMOLINE	2/17/2006	6523511.819100	6523511.819100	1808307.819060	246106	5062	sf	316	cf
Infiltration BMP	Existing	8015 SEVENTH	8/16/2005	6521322.893520	6521322.893520	1803640.949260	246103	5062	sf	316	cf
Infiltration BMP	Existing	7821 SIXTH	12/6/2005	6519846.881130	6519846.881130	1804004.436800	246102	5062	sf	316	cf
Infiltration BMP	Existing	8409 SIXTH	12/10/2008	6523050.669740	6523050.669740	1802016.668700	245114	5062	sf	316	cf
Infiltration BMP	Existing	9317 STAMPS	1/30/2007	6525356.702810	6525356.702810	1807182.805460	246103	5062	sf	316	cf
Infiltration BMP	Existing	9322 STAMPS	3/16/2006	6525453.602600	6525453.602600	1807062.934260	246103	5062	sf	316	cf
Infiltration BMP	Existing	10443 STAMPS	5/21/2008	6523061.022110	6523061.022110	1803394.248860	246103	5062	sf	316	cf
Infiltration BMP	Existing	10517 STAMPS	6/18/2010	6522812.240000	6522812.240000	1803043.757460	246103	5062	sf	316	cf
Infiltration BMP	Existing	9444 STOAKES	5/22/2007	6525587.983230	6525587.983230	1806625.551490	246103	5062	sf	316	cf
Infiltration BMP	Existing	8329 VISTA DEL RIO	6/18/2010	6526300.133280	6526300.133280	1808123.116520	246103	5062	sf	316	cf
Infiltration BMP	Existing	8368 VISTA DEL RIO	6/1/2007	6526427.553640	6526427.553640	1807729.596630	246103	5062	sf	316	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8543 ALBIA	1/1/2006	6520215.566510	6520215.566510	1795689.212970	245115	3797	sf	237	cf
Infiltration BMP	Existing	7162 BENARES	1/1/2008	6514067.610360	6514067.610360	1802493.217160	246079	3797	sf	237	cf
Infiltration BMP	Existing	12812 BLODGETT	6/8/2009	6518629.647540	6518629.647540	1791208.759970	245115	3797	sf	237	cf
Infiltration BMP	Existing	9503 BROCK AV	2/14/2014	6524115.247920	6524115.247920	1807488.010330	246106	3797	sf	237	cf
Infiltration BMP	Existing	9045 BUCKLES	12/11/2008	6523278.581350	6523278.581350	1796905.300470	245114	3797	sf	237	cf
Infiltration BMP	Existing	10045 CHANEY	7/5/2007	6527656.534860	6527656.534860	1802672.871800	245125	3797	sf	237	cf
Infiltration BMP	Existing	8714 CHEROKEE	5/1/2007	6525056.428300	6525056.428300	1801833.489170	245119	3797	sf	237	cf
Infiltration BMP	Existing	10729 CLANCEY	7/5/2007	6525292.127080	6525292.127080	1799996.460370	245119	3797	sf	237	cf
Infiltration BMP	Existing	8215 COMOLETTE	5/18/2006	6516024.585540	6516024.585540	1792904.896040	246077	3563	sf	223	cf
Infiltration BMP	Existing	7809 DACOSTA	10/5/2007	6521756.096640	6521756.096640	1806979.884160	246106	3797	sf	237	cf
Infiltration BMP	Existing	10424 DOLAN AV	2/14/2014	6523609.999510	6523609.999510	1803226.099470	245119	3797	sf	237	cf
Infiltration BMP	Existing	12337 DUNROBIN	6/21/2010	6524854.924990	6524854.924990	1793158.910710	245114	3797	sf	237	cf
Infiltration BMP	Existing	13234 DUNROBIN	9/30/2005	6525046.618370	6525046.618370	1789885.630870	245114	3797	sf	237	cf
Infiltration BMP	Existing	12612 EASTBROOK	5/30/2006	6525374.680490	6525374.680490	1791988.629320	245114	3797	sf	237	cf
Infiltration BMP	Existing	9400 FLORENCE	7/8/2005	6528900.299250	6528900.299250	1801380.002980	245126	3797	sf	237	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7823 FOURTH PL	9/16/2005	6519381.530610	6519381.530610	1803107.418050	246102	3797	sf	237	cf
Infiltration BMP	Existing	7826 GAINFORD	10/13/2005	6521963.408230	6521963.408230	1806968.662960	246106	3797	sf	237	cf
Infiltration BMP	Existing	7909 GALLATIN	4/27/2006	6523955.572760	6523955.572760	1809190.106160	246106	3797	sf	237	cf
Infiltration BMP	Existing	9118 GARNISH	6/21/2010	6529677.777690	6529677.777690	1805040.238300	245125	3797	sf	237	cf
Infiltration BMP	Existing	12752 GLYNN	6/18/2010	6516929.257070	6516929.257070	1792615.717350	245524	3797	sf	237	cf
Infiltration BMP	Existing	9116 HALEDON	3/2/2006	6528925.738880	6528925.738880	1805732.953010	245125	3797	sf	237	cf
Infiltration BMP	Existing	12819 IBBETSON	11/23/2005	6525827.025010	6525827.025010	1791350.711010	245114	3797	sf	237	cf
Infiltration BMP	Existing	9528 LEMORAN	8/26/2008	6528914.390000	6528914.390000	1804053.870620	245125	3797	sf	237	cf
Infiltration BMP	Existing	10514 LESTERFORD	2/14/2006	6529382.491640	6529382.491640	1798787.162960	245126	3797	sf	237	cf
Infiltration BMP	Existing	9030 LUBEC	2/9/2006	6526996.357320	6526996.357320	1804242.372880	245125	3797	sf	237	cf
Infiltration BMP	Existing	9264 LUBEC	4/19/2006	6528519.099740	6528519.099740	1803331.221940	245125	3797	sf	237	cf
Infiltration BMP	Existing	8545 LUBEC ST	2/14/2014	6525866.355120	6525866.355120	1805123.134500	246103	3797	sf	237	cf
Infiltration BMP	Existing	9247 MANZANAR	10/30/2006	6526227.935330	6526227.935330	1806695.994430	246103	3797	sf	237	cf
Infiltration BMP	Existing	7866 MELVA	6/20/2006	6516126.027390	6516126.027390	1797191.628010	246079	3797	sf	237	cf
Infiltration BMP	Existing	12109 MORNING	5/16/2006	6516408.716280	6516408.716280	1797765.727430	246079	3797	sf	237	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7332 NADA	6/18/2007	6514319.703850	6514319.703850	1800394.247560	246079	3797	sf	237	cf
Infiltration BMP	Existing	7334 NADA	6/18/2007	6514319.703850	6514319.703850	1800394.247560	246079	3797	sf	237	cf
Infiltration BMP	Existing	9821 NEWVILLE	7/30/2007	6530987.438110	6530987.438110	1802116.080780	245125	3797	sf	237	cf
Infiltration BMP	Existing	10268 NEWVILLE	4/24/2007	6529747.604150	6529747.604150	1800228.046080	245126	3797	sf	237	cf
Infiltration BMP	Existing	12280 ORIZABA	6/18/2010	6517505.248620	6517505.248620	1795784.740290	246077	3797	sf	237	cf
Infiltration BMP	Existing	10404 PANGBORN	6/18/2010	6528952.556500	6528952.556500	1800031.154520	245126	3797	sf	237	cf
Infiltration BMP	Existing	12531 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	3797	sf	237	cf
Infiltration BMP	Existing	12537 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	3797	sf	237	cf
Infiltration BMP	Existing	11994 POMERING	2/23/2005	6514993.390330	6514993.390330	1799517.781680	246079	3797	sf	237	cf
Infiltration BMP	Existing	9525 QUINN	2/8/2007	6528803.711540	6528803.711540	1799421.544220	245126	3797	sf	237	cf
Infiltration BMP	Existing	8048 QUOIT	1/21/2009	6516443.407630	6516443.407630	1795348.218010	246077	3797	sf	237	cf
Infiltration BMP	Existing	12326 SAMOLINE	8/29/2008	6516269.535370	6516269.535370	1796118.615320	246077	3797	sf	237	cf
Infiltration BMP	Existing	12504 SMALLWOOD	9/30/2008	6515227.996100	6515227.996100	1795705.820110	246079	3797	sf	237	cf
Infiltration BMP	Existing	9520 STEWART & GRAY	4/10/2008	6526628.650930	6526628.650930	1796061.800920	245118	3797	sf	237	cf
Infiltration BMP	Existing	7411 THIRD	6/2/2006	6517216.302090	6517216.302090	1804140.837740	246102	3797	sf	237	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12706 WHITEWOOD	9/20/2007	6520505.791550	6520505.791550	1791390.733010	245115	3797	sf	237	cf
Infiltration BMP	Existing	9049 HALL ROAD	2/9/2007	6523684.587500	6523684.587500	1797586.831540	245114	2531	sf	158	cf
Infiltration BMP	Existing	7118 ADWEN	1/27/2006	6513895.884030	6513895.884030	1803086.756410	246100	2531	sf	158	cf
Infiltration BMP	Existing	13202 BARLIN	2/14/2007	6517303.317510	6517303.317510	1789688.349400	245524	2531	sf	158	cf
Infiltration BMP	Existing	10216 BELLMAN	1/5/2009	6525703.110200	6525703.110200	1803293.056930	245119	2531	sf	158	cf
Infiltration BMP	Existing	11809 BELLMAN	2/8/2006	6521732.804620	6521732.804620	1797303.369450	245114	2531	sf	158	cf
Infiltration BMP	Existing	7117 BENARES	8/10/2006	6513814.981610	6513814.981610	1802936.506930	246079	2531	sf	158	cf
Infiltration BMP	Existing	9108 BIGBY	11/23/2005	6526215.785230	6526215.785230	1801649.270450	245119	2531	sf	158	cf
Infiltration BMP	Existing	10213 BIRCHDALE	4/19/2006	6525304.414970	6525304.414970	1803562.084330	245119	2531	sf	158	cf
Infiltration BMP	Existing	9004 BIRCHLEAF	3/7/2007	6527047.235450	6527047.235450	1808159.837050	246103	2531	sf	158	cf
Infiltration BMP	Existing	13126 BLODGETT	8/18/2005	6517829.686700	6517829.686700	1789824.186060	245115	2531	sf	158	cf
Infiltration BMP	Existing	9508 BROCK	2/27/2006	6524228.012180	6524228.012180	1807355.118100	246103	2531	sf	158	cf
Infiltration BMP	Existing	7418 BROOKMILL	7/25/2008	6515791.043440	6515791.043440	1801624.672750	246079	2531	sf	158	cf
Infiltration BMP	Existing	12201 BROOKSHIRE	6/22/2010	6519506.452440	6519506.452440	1795585.950880	245115	2531	sf	158	cf
Infiltration BMP	Existing	7942 BRUNACHE	11/28/2005	6517219.149000	6517219.149000	1798061.073260	246079	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9349 CECILIA	9/25/2008	6527282.306940	6527282.306940	1798988.874460	245126	2531	sf	158	cf
Infiltration BMP	Existing	9365 CECILIA	6/18/2010	6527411.791310	6527411.791310	1798910.665650	245126	2531	sf	158	cf
Infiltration BMP	Existing	9608 CECILIA	1/1/2007	6528406.351870	6528406.351870	1798010.127160	245126	2531	sf	158	cf
Infiltration BMP	Existing	9624 CEDARTREE	8/8/2005	6531911.946630	6531911.946630	1804673.812930	245127	2531	sf	158	cf
Infiltration BMP	Existing	8519 CLETA	9/10/2007	6521470.081710	6521470.081710	1798172.541560	245114	2531	sf	158	cf
Infiltration BMP	Existing	7803 CONKLIN	9/2/2005	6513317.560580	6513317.560580	1793980.901190	246077	2297	sf	144	cf
Infiltration BMP	Existing	12816 CORNUTA	10/9/2006	6525701.592160	6525701.592160	1791350.505200	245114	2531	sf	158	cf
Infiltration BMP	Existing	8018 DANVERS	1/26/2009	6524882.345060	6524882.345060	1809453.159850	246106	2531	sf	158	cf
Infiltration BMP	Existing	8517 DEVENIR	10/11/2005	6517399.640210	6517399.640210	1791811.493450	245115	2531	sf	158	cf
Infiltration BMP	Existing	8049 DINSDALE	6/15/2006	6522974.989820	6522974.989820	1805624.556380	246103	2531	sf	158	cf
Infiltration BMP	Existing	9317 DINSDALE	11/5/2008	6528560.545810	6528560.545810	1802232.852640	245125	2531	sf	158	cf
Infiltration BMP	Existing	8510 DONOVAN	7/5/2005	6519046.837890	6519046.837890	1794446.597550	245115	2531	sf	158	cf
Infiltration BMP	Existing	8415 DONOVAN ST	2/14/2014	6518508.946270	6518508.946270	1795018.898890	245115	2531	sf	158	cf
Infiltration BMP	Existing	9635 DOWNEY	7/15/2004	6524420.085960	6524420.085960	1806308.452290	246103	2531	sf	158	cf
Infiltration BMP	Existing	9830 DOWNEY	1/1/2006	6524176.121770	6524176.121770	1805651.929490	246103	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12718 DOWNEY	8/30/2007	6516814.229160	6516814.229160	1793075.140590	245524	2531	sf	158	cf
Infiltration BMP	Existing	12650 DUNROBIN	7/27/2007	6525045.587920	6525045.587920	1791614.482510	245114	2531	sf	158	cf
Infiltration BMP	Existing	9067 EGLISE	9/30/2005	6530265.716940	6530265.716940	1805184.414240	245127	2531	sf	158	cf
Infiltration BMP	Existing	9131 EGLISE	1/16/2009	6529904.336320	6529904.336320	1804464.041860	245125	2531	sf	158	cf
Infiltration BMP	Existing	8573 ELEVENTH	4/24/2006	6525253.900610	6525253.900610	1803595.328980	245119	2531	sf	158	cf
Infiltration BMP	Existing	9061 FARM ST	2/14/2014	6526099.027600	6526099.027600	1801582.141470	245119	2531	sf	158	cf
Infiltration BMP	Existing	7936 FOURTH	1/26/2006	6520005.666040	6520005.666040	1802880.634680	246103	2531	sf	158	cf
Infiltration BMP	Existing	7829 FOURTH PL	2/14/2014	6519381.530610	6519381.530610	1803107.418050	246102	2531	sf	158	cf
Infiltration BMP	Existing	7528 GAINFORD	6/18/2010	6520331.076350	6520331.076350	1807734.704270	246106	1266	sf	79	cf
Infiltration BMP	Existing	8150 GALLATIN	1/14/2008	6524851.065410	6524851.065410	1807922.731550	246103	2531	sf	158	cf
Infiltration BMP	Existing	9068 GALLATIN	7/18/2005	6527754.167230	6527754.167230	1805244.499940	245125	2531	sf	158	cf
Infiltration BMP	Existing	12703 GLENSHIRE	8/18/2006	6520090.968440	6520090.968440	1791341.816710	245115	2531	sf	158	cf
Infiltration BMP	Existing	8703 GUATEMALA	6/18/2010	6523747.929510	6523747.929510	1811239.685330	246111	2531	sf	158	cf
Infiltration BMP	Existing	9903 GUATEMALA	6/21/2010	6519189.043810	6519189.043810	1808530.913060	246111	2531	sf	158	cf
Infiltration BMP	Existing	9208 HALEDON	3/29/2007	6528788.981770	6528788.981770	1805412.621690	245125	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9083 HALL	12/8/2005	6524025.781090	6524025.781090	1797583.104370	245114	2531	sf	158	cf
Infiltration BMP	Existing	10348 HASTY	9/14/2006	6528480.545700	6528480.545700	1800482.839460	245126	2531	sf	158	cf
Infiltration BMP	Existing	7844 HONDO	7/8/2005	6515417.898670	6515417.898670	1796530.778030	246079	2531	sf	158	cf
Infiltration BMP	Existing	9244 HORLEY	6/22/2006	6522498.248530	6522498.248530	1809199.750130	246111	2531	sf	158	cf
Infiltration BMP	Existing	12612 IBBETSON	2/9/2007	6526008.655610	6526008.655610	1792000.536540	245114	2531	sf	158	cf
Infiltration BMP	Existing	7214 IRWINGROVE	8/17/2007	6517736.835580	6517736.835580	1807424.228480	246104	2531	sf	158	cf
Infiltration BMP	Existing	10209 JULIUS	6/21/2010	6519702.452650	6519702.452650	1806880.883230	246102	2531	sf	158	cf
Infiltration BMP	Existing	10341 JULIUS	6/4/2008	6519700.000000	6519700.000000	1806100.000000	246102	2531	sf	158	cf
Infiltration BMP	Existing	12313 JULIUS	6/21/2010	6514155.209020	6514155.209020	1797936.932020	246079	2531	sf	158	cf
Infiltration BMP	Existing	7944 KINGBEE	5/31/2007	6516311.045420	6516311.045420	1796702.710410	246079	2531	sf	158	cf
Infiltration BMP	Existing	9605 LA REINA	6/18/2010	6524325.141120	6524325.141120	1806744.664340	246103	2531	sf	158	cf
Infiltration BMP	Existing	10074 LESTERFORD	4/12/2006	6530716.286370	6530716.286370	1800772.683680	245125	2531	sf	158	cf
Infiltration BMP	Existing	9626 LUBEC	6/21/2005	6530889.535260	6530889.535260	1801910.718740	245125	2531	sf	158	cf
Infiltration BMP	Existing	7156 LUXOR	10/28/2005	6513800.826420	6513800.826420	1802169.595300	246100	2531	sf	158	cf
Infiltration BMP	Existing	9202 MANZANAR	4/13/2004	6526663.177850	6526663.177850	1806830.315690	246103	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9020 MARGARET	10/2/2006	6523822.925930	6523822.925930	1798066.530690	245114	2531	sf	158	cf
Infiltration BMP	Existing	9127 MELDAR	4/29/2004	6526710.714590	6526710.714590	1807437.827920	246103	2531	sf	158	cf
Infiltration BMP	Existing	11814 MORNING	9/2/2005	6517648.916460	6517648.916460	1799680.107480	246077	2531	sf	158	cf
Infiltration BMP	Existing	7440 MULLER	11/7/2006	6518162.654940	6518162.654940	1805120.460880	246102	2531	sf	158	cf
Infiltration BMP	Existing	12334 ORIZABA	5/5/2005	6517231.678930	6517231.678930	1795384.927500	246077	2531	sf	158	cf
Infiltration BMP	Existing	9311 OTTO	2/2/2008	6528809.245500	6528809.245500	1802513.951810	245125	2531	sf	158	cf
Infiltration BMP	Existing	10436 PANGBORN	7/6/2006	6528781.443840	6528781.443840	1799746.387720	245126	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12531 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12531 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12533 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12535 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12537 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	12537 PARAMOUNT	9/11/2003	6515510.297280	6515510.297280	1795114.190420	246079	2531	sf	158	cf
Infiltration BMP	Existing	9008 PARROT	6/22/2010	6524997.125330	6524997.125330	1808680.720210	246106	2531	sf	158	cf
Infiltration BMP	Existing	9530 PARROT	10/11/2006	6523866.950960	6523866.950960	1807305.627380	246103	2531	sf	158	cf
Infiltration BMP	Existing	7125 PELLET	11/21/2005	6515366.521160	6515366.521160	1805107.133170	246104	2531	sf	158	cf
Infiltration BMP	Existing	7335 PELLET	2/15/2007	6516661.302200	6516661.302200	1804268.401510	246104	2531	sf	158	cf
Infiltration BMP	Existing	7348 PELLET	6/22/2010	6516619.400060	6516619.400060	1803975.379460	246102	2531	sf	158	cf
Infiltration BMP	Existing	10433 PICO VISTA	6/21/2010	6529704.381130	6529704.381130	1799155.408730	245126	2531	sf	158	cf
Infiltration BMP	Existing	7629 PIVOT	6/4/2008	6517523.064870	6517523.064870	1802428.507060	246079	2531	sf	158	cf
Infiltration BMP	Existing	11962 POMERING	2/24/2006	6515175.131420	6515175.131420	1799743.806870	246079	2531	sf	158	cf
Infiltration BMP	Existing	8133 PRISCILLA	6/22/2010	6515078.400000	6515078.400000	1792153.440000	246077	2531	sf	158	cf
Infiltration BMP	Existing	7603 QUILL	2/28/2007	6514155.935840	6514155.935840	1797151.984960	246079	2531	sf	158	cf
Infiltration BMP	Existing	11539 RICHEON	7/8/2005	6517174.382020	6517174.382020	1801464.078770	246079	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	6545 RIVERGROVE	10/11/2005	6520696.757140	6520696.757140	1811248.378990	246111	2531	sf	158	cf
Infiltration BMP	Existing	9320 SAMOLINE	11/3/2006	6523716.410960	6523716.410960	1808296.703240	246106	2531	sf	158	cf
Infiltration BMP	Existing	9602 SAMOLINE	11/23/2005	6523146.135200	6523146.135200	1807399.732010	246103	2531	sf	158	cf
Infiltration BMP	Existing	12015 SAMOLINE	9/29/2008	6517129.601540	6517129.601540	1798409.043860	246079	2531	sf	158	cf
Infiltration BMP	Existing	12048 SAMOLINE	6/22/2010	6517021.712450	6517021.712450	1798014.455830	246079	2531	sf	158	cf
Infiltration BMP	Existing	7962 SECOND	10/3/2007	6519694.108620	6519694.108620	1801968.426700	246102	2531	sf	158	cf
Infiltration BMP	Existing	7712 SEVERY ST	1/1/2008	6524575.222650	6524575.222650	1807124.160130	246103	2531	sf	158	cf
Infiltration BMP	Existing	7331 SHADYOAK	1/16/2009	6521597.847660	6521597.847660	1810725.646550	246111	2531	sf	158	cf
Infiltration BMP	Existing	9103 SHERIDELL	10/29/2007	6528594.889520	6528594.889520	1806159.584670	245125	2531	sf	158	cf
Infiltration BMP	Existing	8345 SIXTH	4/23/2008	6522663.428460	6522663.428460	1802257.170290	245114	2531	sf	158	cf
Infiltration BMP	Existing	9124 STOAKES	4/29/2004	6526659.033140	6526659.033140	1807538.875170	246103	2531	sf	158	cf
Infiltration BMP	Existing	9906 TECUM	8/26/2008	6519710.324270	6519710.324270	1808196.223590	246111	2531	sf	158	cf
Infiltration BMP	Existing	9520 TELEGRAPH	12/4/2008	6531301.476840	6531301.476840	1805512.099740	245127	2531	sf	158	cf
Infiltration BMP	Existing	8302 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1840	sf	115	cf
Infiltration BMP	Existing	8304 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8306 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8308 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8310 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8312 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8314 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8316 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8318 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8320 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8322 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8324 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8326 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8328 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8330 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8332 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8334 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8336 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8338 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8340 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8342 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8344 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8346 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8348 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8350 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	8352 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	2531	sf	158	cf
Infiltration BMP	Existing	7438 THIRD	11/10/2005	6517353.808450	6517353.808450	1803828.489190	246102	2531	sf	158	cf
Infiltration BMP	Existing	7955 THIRD	1/30/2006	6519871.299810	6519871.299810	1802440.525110	246103	2531	sf	158	cf
Infiltration BMP	Existing	9819 TRISTAN	11/19/2007	6526302.584780	6526302.584780	1804524.383680	245125	2531	sf	158	cf
Infiltration BMP	Existing	8555 VIA AMORITA	10/27/2008	6524751.467620	6524751.467620	1803150.610950	245119	2531	sf	158	cf
Infiltration BMP	Existing	9631 WILEY BURKE	3/27/2006	6521095.475640	6521095.475640	1808618.175130	246106	2531	sf	158	cf
Infiltration BMP	Existing	10419 WILEY BURKE	3/7/2008	6519382.492080	6519382.492080	1805731.311650	246102	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7319 ADWEN	2/22/2006	6515346.754980	6515346.754980	1802425.342900	246079	1266	sf	79	cf
Infiltration BMP	Existing	13033 AIRPOINT	6/14/2010	6517837.198260	6517837.198260	1790420.981040	245115	1266	sf	79	cf
Infiltration BMP	Existing	8446 ALAMEDA	6/24/2005	6519341.878190	6519341.878190	1795502.737620	245115	1266	sf	79	cf
Infiltration BMP	Existing	9336 APPLEBY	3/9/2006	6529377.514420	6529377.514420	1804389.744220	245125	1266	sf	79	cf
Infiltration BMP	Existing	9540 ARDINE	1/1/2006	6527800.346060	6527800.346060	1797420.079620	245119	1266	sf	79	cf
Infiltration BMP	Existing	7849 ARNETT	7/8/2005	6518395.700160	6518395.700160	1801138.921810	246079	1266	sf	79	cf
Infiltration BMP	Existing	8645 BAYSINGER	11/10/2005	6525612.031290	6525612.031290	1803108.706240	245119	1266	sf	79	cf
Infiltration BMP	Existing	9210 BELCHER	10/12/2006	6519891.840050	6519891.840050	1789806.904790	245115	1266	sf	79	cf
Infiltration BMP	Existing	9245 BELCHER	9/4/2007	6520247.532430	6520247.532430	1789967.036150	245115	1266	sf	79	cf
Infiltration BMP	Existing	10234 BELCHER	6/18/2010	6527119.239350	6527119.239350	1789810.183210	245113	1266	sf	79	cf
Infiltration BMP	Existing	10285 BELCHER	6/21/2010	6527612.081010	6527612.081010	1789959.646450	245118	1266	sf	79	cf
Infiltration BMP	Existing	10028 BELLDER	1/1/2006	6525360.965940	6525360.965940	1803913.208580	245125	1266	sf	79	cf
Infiltration BMP	Existing	10304 BELLMAN	6/1/2005	6525418.498520	6525418.498520	1803041.069680	245119	1266	sf	79	cf
Infiltration BMP	Existing	11014 BENFIELD	6/24/2008	6531918.630750	6531918.630750	1797937.959120	245122	1266	sf	79	cf
Infiltration BMP	Existing	9324 BIRCHBARK	10/7/2005	6524879.129350	6524879.129350	1807661.831210	246103	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7847 BLANDWOOD	6/29/2006	6525016.522210	6525016.522210	1811074.341940	246106	1266	sf	79	cf
Infiltration BMP	Existing	8415 BORSON	10/9/2006	6517421.536650	6517421.536650	1792735.849280	245115	1266	sf	79	cf
Infiltration BMP	Existing	8710 BOYNE	6/29/2006	6521119.595500	6521119.595500	1795272.757840	245115	1266	sf	79	cf
Infiltration BMP	Existing	8910 BROCK	2/3/2009	6525582.226600	6525582.226600	1808734.892600	246106	1266	sf	79	cf
Infiltration BMP	Existing	9702 BROCK	9/25/2006	6523765.203820	6523765.203820	1806580.253440	246103	1266	sf	79	cf
Infiltration BMP	Existing	9730 BROCK	10/16/2009	6523625.354460	6523625.354460	1806340.478590	246103	1266	sf	79	cf
Infiltration BMP	Existing	7550 BROOKMILL	9/25/2006	6516432.435790	6516432.435790	1801137.496710	246079	1266	sf	79	cf
Infiltration BMP	Existing	10360 BROOKSHIRE	8/2/2005	6524254.056510	6524254.056510	1803200.425100	245119	1266	sf	79	cf
Infiltration BMP	Existing	9336 BUELL	5/4/2007	6527241.052050	6527241.052050	1799190.479610	245126	1266	sf	79	cf
Infiltration BMP	Existing	9408 BUELL	1/1/2007	6527563.840160	6527563.840160	1798993.546660	245126	1266	sf	79	cf
Infiltration BMP	Existing	10210 CASANES	7/20/2005	6529273.829610	6529273.829610	1801143.143100	245125	1266	sf	79	cf
Infiltration BMP	Existing	10308 CASANES	6/9/2005	6528827.020030	6528827.020030	1800415.364480	245126	1266	sf	79	cf
Infiltration BMP	Existing	10845 CASANES	12/4/2007	6527288.943480	6527288.943480	1798213.890680	245119	1266	sf	79	cf
Infiltration BMP	Existing	10922 CASANES	8/3/2005	6527279.490710	6527279.490710	1797849.792160	245119	1266	sf	79	cf
Infiltration BMP	Existing	8715 CAVEL	6/22/2010	6521261.550160	6521261.550160	1795688.489420	245115	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9707 CEDARTREE	5/25/2006	6532283.863380	6532283.863380	1804587.051690	245127	1266	sf	79	cf
Infiltration BMP	Existing	10260 CHANEY	6/21/2010	6527337.911630	6527337.911630	1801874.691650	245119	1266	sf	79	cf
Infiltration BMP	Existing	10362 CHANEY	9/4/2007	6526983.558290	6526983.558290	1801306.071650	245119	1266	sf	79	cf
Infiltration BMP	Existing	9246 CLANCEY	5/1/2007	6528479.118010	6528479.118010	1805448.947460	245125	1266	sf	79	cf
Infiltration BMP	Existing	10546 CLANCEY	5/26/2005	6525904.831900	6525904.831900	1800674.595520	245119	1266	sf	79	cf
Infiltration BMP	Existing	12658 COLDBROOK	6/25/2009	6524501.637760	6524501.637760	1791525.543010	245114	1266	sf	79	cf
Infiltration BMP	Existing	8111 COMOLETTE	12/18/2006	6515465.796840	6515465.796840	1793242.397990	246077	1266	sf	79	cf
Infiltration BMP	Existing	8140 COMOLETTE	12/2/2008	6515640.775000	6515640.775000	1792943.865000	246077	1266	sf	79	cf
Infiltration BMP	Existing	8316 COMOLETTE	5/23/2005	6516475.681440	6516475.681440	1792370.081790	245524	1266	sf	79	cf
Infiltration BMP	Existing	9325 CORD	3/21/2008	6529940.912480	6529940.912480	1803762.584020	245125	1266	sf	79	cf
Infiltration BMP	Existing	7732 COREY	1/8/2009	6515481.796500	6515481.796500	1798137.416600	246079	1266	sf	79	cf
Infiltration BMP	Existing	11810 CORRIGAN	3/4/2009	6523411.287590	6523411.287590	1796210.739300	245114	1266	sf	79	cf
Infiltration BMP	Existing	10925 CROSSDALE	6/9/2005	6532012.125130	6532012.125130	1798163.740010	245122	1266	sf	79	cf
Infiltration BMP	Existing	7757 DACOSTA	6/7/2005	6521506.383470	6521506.383470	1807138.583520	246106	1266	sf	79	cf
Infiltration BMP	Existing	8324 DAVIS	6/15/2005	6520852.481770	6520852.481770	1799213.987880	245114	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8517 DEVENIR	2/19/2008	6517399.640210	6517399.640210	1791811.493450	245115	1266	sf	79	cf
Infiltration BMP	Existing	7345 DINSDALE	9/29/2005	6519203.299320	6519203.299320	1808002.090250	246111	1266	sf	79	cf
Infiltration BMP	Existing	8330 DINSDALE	6/21/2010	6524002.238290	6524002.238290	1804838.107610	246103	1266	sf	79	cf
Infiltration BMP	Existing	10340 DOLAN	8/15/2007	6523856.967630	6523856.967630	1803630.622810	245119	1266	sf	79	cf
Infiltration BMP	Existing	12260 DOLAN	4/5/2006	6518910.565000	6518910.565000	1795264.305000	245115	1266	sf	79	cf
Infiltration BMP	Existing	12521 DOLAN	7/19/2007	6517914.404040	6517914.404040	1794175.419610	245115	1266	sf	79	cf
Infiltration BMP	Existing	12621 DOLAN	8/17/2007	6517501.190610	6517501.190610	1793293.644730	245115	1266	sf	79	cf
Infiltration BMP	Existing	12308 DOWNEY	4/19/2007	6518251.608680	6518251.608680	1795363.261670	245115	1266	sf	79	cf
Infiltration BMP	Existing	12532 DOWNEY	10/11/2005	6517442.718730	6517442.718730	1794104.887260	245115	1266	sf	79	cf
Infiltration BMP	Existing	12820 DOWNEY	5/17/2007	6516486.923440	6516486.923440	1792584.707230	245524	1266	sf	79	cf
Infiltration BMP	Existing	12603 DUNROBIN	6/22/2010	6524864.880980	6524864.880980	1792095.613000	245114	1266	sf	79	cf
Infiltration BMP	Existing	12643 DUNROBIN	11/21/2006	6524865.889210	6524865.889210	1791696.268120	245114	1266	sf	79	cf
Infiltration BMP	Existing	12818 DUNROBIN	12/15/2006	6525044.191110	6525044.191110	1791331.787300	245114	1266	sf	79	cf
Infiltration BMP	Existing	12823 DUNROBIN	2/12/2008	6524866.593650	6524866.593650	1791299.463030	245114	1266	sf	79	cf
Infiltration BMP	Existing	13024 DUNROBIN	5/24/2005	6525048.058670	6525048.058670	1790633.750860	245114	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	13240 DUNROBIN	10/1/2008	6525046.731200	6525046.731200	1789833.348360	245114	1266	sf	79	cf
Infiltration BMP	Existing	13638 EARNSHAW	9/16/2005	6516330.576340	6516330.576340	1788317.037630	245524	1266	sf	79	cf
Infiltration BMP	Existing	12155 EASTBROOK	9/16/2005	6525128.882510	6525128.882510	1794289.182720	245114	2297	sf	144	cf
Infiltration BMP	Existing	9125 EGLISE	1/24/2007	6529928.564580	6529928.564580	1804520.963270	245125	1266	sf	79	cf
Infiltration BMP	Existing	10213 EGLISE	10/14/2008	6528271.447820	6528271.447820	1801803.093100	245126	1266	sf	79	cf
Infiltration BMP	Existing	8331 EVEREST	2/21/2007	6517984.856770	6517984.856770	1794526.994330	245115	1266	sf	79	cf
Infiltration BMP	Existing	9037 FARM	6/18/2010	6525882.141210	6525882.141210	1801714.480720	245119	1266	sf	79	cf
Infiltration BMP	Existing	9542 FARM	11/15/2005	6529019.221950	6529019.221950	1799423.700160	245126	1266	sf	79	cf
Infiltration BMP	Existing	8445 FIFTH	6/24/2005	6523180.907390	6523180.907390	1801530.163340	245114	1266	sf	79	cf
Infiltration BMP	Existing	8529 FIFTH	9/23/2005	6523578.003250	6523578.003250	1801288.543780	245114	1266	sf	79	cf
Infiltration BMP	Existing	9221 FOSTER	2/16/2008	6519835.324440	6519835.324440	1789377.664880	245115	1266	sf	79	cf
Infiltration BMP	Existing	9303 FOSTER	8/9/2006	6520280.515660	6520280.515660	1789513.941670	245115	1266	sf	79	cf
Infiltration BMP	Existing	9536 FOSTORIA	10/13/2005	6527900.524680	6527900.524680	1797686.001250	245119	1266	sf	79	cf
Infiltration BMP	Existing	7339 GAINFORD	11/5/2007	6519739.997490	6519739.997490	1808338.936030	246111	1266	sf	79	cf
Infiltration BMP	Existing	8426 GAINFORD	1/7/2008	6524961.213810	6524961.213810	1805124.602410	246103	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	9315 GAINFORD	7/5/2005	6528715.710300	6528715.710300	1803034.881460	245125	1266	sf	79	cf
Infiltration BMP	Existing	9641 GAINFORD	10/16/2006	6530976.949360	6530976.949360	1801752.372100	245125	1266	sf	79	cf
Infiltration BMP	Existing	9357 GALLATIN	4/17/2006	6529509.957360	6529509.957360	1804133.004270	245125	1266	sf	79	cf
Infiltration BMP	Existing	8411 GALT	7/18/2007	6520931.662600	6520931.662600	1798681.676310	245114	1266	sf	79	cf
Infiltration BMP	Existing	8125 GARDENDALE	10/3/2007	6514840.842010	6514840.842010	1791988.219650	246077	1266	sf	79	cf
Infiltration BMP	Existing	7553 GLENCLIFF	11/5/2008	6521939.189570	6521939.189570	1809565.009220	246111	1266	sf	79	cf
Infiltration BMP	Existing	12615 GURLEY	9/8/2008	6516705.632650	6516705.632650	1793818.816440	246077	1266	sf	79	cf
Infiltration BMP	Existing	10557 HALEDON	3/22/2006	6525946.687500	6525946.687500	1800529.637640	245119	1266	sf	79	cf
Infiltration BMP	Existing	10714 HALEDON	7/11/2008	6525734.412480	6525734.412480	1799854.605530	245119	1266	sf	79	cf
Infiltration BMP	Existing	9101 HALL	7/19/2007	6524088.768660	6524088.768660	1797585.986810	245114	1266	sf	79	cf
Infiltration BMP	Existing	7416 HONDO	11/21/2007	6513414.170490	6513414.170490	1797767.919490	246079	1266	sf	79	cf
Infiltration BMP	Existing	7927 HONDO	1/8/2007	6515926.722240	6515926.722240	1796435.751150	246079	1266	sf	79	cf
Infiltration BMP	Existing	9228 HORLEY	7/20/2005	6522584.029360	6522584.029360	1809343.702000	246111	1266	sf	79	cf
Infiltration BMP	Existing	9929 HORLEY	6/23/2005	6520827.895940	6520827.895940	1807104.698370	246106	1266	sf	79	cf
Infiltration BMP	Existing	12316 HORLEY	1/1/2007	6515085.680000	6515085.680000	1797312.060000	246079	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	11544 HORTON	5/1/2006	6517050.314050	6517050.314050	1801482.158860	246079	1266	sf	79	cf
Infiltration BMP	Existing	12619 IBBETSON	12/26/2007	6525826.717640	6525826.717640	1791950.694670	245114	1266	sf	79	cf
Infiltration BMP	Existing	12816 IBBETSON	11/23/2005	6526008.922590	6526008.922590	1791350.504040	245114	1266	sf	79	cf
Infiltration BMP	Existing	9030 IOWA	8/29/2007	6523719.000250	6523719.000250	1797706.215730	245114	1266	sf	79	cf
Infiltration BMP	Existing	9036 IOWA	1/23/2006	6523761.535660	6523761.535660	1797679.990250	245114	1266	sf	79	cf
Infiltration BMP	Existing	7214 IRWINGROVE	2/7/2008	6517736.835580	6517736.835580	1807424.228480	246104	1266	sf	79	cf
Infiltration BMP	Existing	7425 IRWINGROVE	11/22/2005	6519037.305040	6519037.305040	1806826.286520	246102	1266	sf	79	cf
Infiltration BMP	Existing	7431 IVO	5/23/2005	6520452.019960	6520452.019960	1808862.657860	246106	1266	sf	79	cf
Infiltration BMP	Existing	12258 IZETTA	11/19/2008	6524718.529730	6524718.529730	1793607.751080	245114	1266	sf	79	cf
Infiltration BMP	Existing	11427 JULIUS	10/6/2005	6517068.729490	6517068.729490	1802337.821610	246079	1266	sf	79	cf
Infiltration BMP	Existing	7863 KINGBEE	6/2/2005	6515998.395150	6515998.395150	1797104.463380	246079	1266	sf	79	cf
Infiltration BMP	Existing	10633 LA REINA	6/7/2005	6521844.406030	6521844.406030	1802801.159980	246103	1266	sf	79	cf
Infiltration BMP	Existing	10726 LA REINA	9/20/2005	6521763.725850	6521763.725850	1802369.001800	246103	1266	sf	79	cf
Infiltration BMP	Existing	10717 LAKEWOOD	1/1/2005	6524762.764130	6524762.764130	1800632.321080	245119	1266	sf	79	cf
Infiltration BMP	Existing	13229 LAKEWOOD	8/30/2005	6518145.854860	6518145.854860	1789091.323220	245115	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8248 LANKIN	5/16/2007	6517152.534650	6517152.534650	1794608.293130	246077	1266	sf	79	cf
Infiltration BMP	Existing	13413 LAURELDALE	9/4/2007	6516097.983610	6516097.983610	1789503.029570	245524	1266	sf	79	cf
Infiltration BMP	Existing	9040 LEMORAN	9/16/2005	6529896.207920	6529896.207920	1805874.052840	245125	1266	sf	79	cf
Infiltration BMP	Existing	10225 LESTERFORD	12/22/2005	6530244.844140	6530244.844140	1800567.187010	245126	1266	sf	79	cf
Infiltration BMP	Existing	10415 LESTERFORD	6/22/2010	6529502.521580	6529502.521580	1799500.525910	245126	1266	sf	79	cf
Infiltration BMP	Existing	10730 LESTERFORD	6/8/2005	6528927.837490	6528927.837490	1798058.051080	245126	1266	sf	79	cf
Infiltration BMP	Existing	8020 LUBEC	3/8/2007	6523117.786070	6523117.786070	1806398.918760	246103	1266	sf	79	cf
Infiltration BMP	Existing	9230 LUBEC	9/30/2005	6528205.943320	6528205.943320	1803519.420650	245125	1266	sf	79	cf
Infiltration BMP	Existing	7259 LUXOR	1/1/2007	6514801.884280	6514801.884280	1801808.218080	246079	1266	sf	79	cf
Infiltration BMP	Existing	7315 LUXOR	3/16/2006	6514953.117040	6514953.117040	1801695.155730	246079	1266	sf	79	cf
Infiltration BMP	Existing	8444 LUXOR	11/10/2005	6520775.356850	6520775.356850	1797851.842110	245114	1266	sf	79	cf
Infiltration BMP	Existing	9102 MANZANAR	7/20/2005	6527192.246670	6527192.246670	1807219.965690	246103	1266	sf	79	cf
Infiltration BMP	Existing	10434 MANZANAR	6/7/2005	6523771.930100	6523771.930100	1803007.033470	245119	1266	sf	79	cf
Infiltration BMP	Existing	11109 MARBEL	7/20/2006	6523692.717760	6523692.717760	1799490.635090	245119	1266	sf	79	cf
Infiltration BMP	Existing	12108 MARBEL	1/31/2006	6521445.538760	6521445.538760	1795214.942010	245115	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7830 MELVA	1/1/2006	6515802.415360	6515802.415360	1797387.108860	246079	1266	sf	79	cf
Infiltration BMP	Existing	7844 MELVA	1/5/2006	6515910.196660	6515910.196660	1797321.983490	246079	1266	sf	79	cf
Infiltration BMP	Existing	12120 MORNING	8/14/2008	6516533.621320	6516533.621320	1797558.681060	246079	1266	sf	79	cf
Infiltration BMP	Existing	7339 NADA	7/8/2005	6514489.286480	6514489.286480	1800567.411080	246079	1266	sf	79	cf
Infiltration BMP	Existing	7351 NADA	6/23/2008	6514590.536380	6514590.536380	1800503.774190	246079	1266	sf	79	cf
Infiltration BMP	Existing	8202 NADA	1/9/2006	6518631.371590	6518631.371590	1797835.542430	245115	1266	sf	79	cf
Infiltration BMP	Existing	7415 NOREN	7/26/2005	6520794.671000	6520794.671000	1809286.272790	246111	1266	sf	79	cf
Infiltration BMP	Existing	9921 NORLAIN	11/3/2008	6519614.140210	6519614.140210	1807835.435830	246111	1266	sf	79	cf
Infiltration BMP	Existing	8127 ORANGE	6/23/2010	6517401.744430	6517401.744430	1796403.841780	246077	1266	sf	79	cf
Infiltration BMP	Existing	9554 ORIZABA	8/19/2005	6524235.753500	6524235.753500	1806817.618650	246103	1266	sf	79	cf
Infiltration BMP	Existing	12333 ORIZABA	1/23/2006	6517077.475660	6517077.475660	1795538.435260	246077	1266	sf	79	cf
Infiltration BMP	Existing	10834 PANGBORN	9/17/2007	6527760.431910	6527760.431910	1798051.772160	245119	1266	sf	79	cf
Infiltration BMP	Existing	7156 PELLET	6/22/2010	6515507.126970	6515507.126970	1804695.751890	246104	1266	sf	79	cf
Infiltration BMP	Existing	9466 PELLET	5/26/2005	6527082.799410	6527082.799410	1797550.782940	245119	1266	sf	79	cf
Infiltration BMP	Existing	10238 PICO VISTA	7/22/2008	6530559.495000	6530559.495000	1800212.246520	245126	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	7706 PIVOT	6/18/2010	6517776.543940	6517776.543940	1802077.153370	246079	1266	sf	79	cf
Infiltration BMP	Existing	11951 POMERING	6/18/2010	6515072.562230	6515072.562230	1799936.867790	246079	1266	sf	79	cf
Infiltration BMP	Existing	12010 POMERING	9/20/2005	6514897.027930	6514897.027930	1799318.472210	246079	1266	sf	79	cf
Infiltration BMP	Existing	7803 PURITAN	6/22/2010	6513186.710850	6513186.710850	1793767.422040	246077	1266	sf	79	cf
Infiltration BMP	Existing	8249 QUOIT	5/17/2007	6517406.484080	6517406.484080	1795006.472870	246077	1266	sf	79	cf
Infiltration BMP	Existing	8506 RAVILLER	6/22/2010	6526200.032280	6526200.032280	1805944.598850	246103	1266	sf	79	cf
Infiltration BMP	Existing	9441 RAVILLER	10/7/2005	6529831.524430	6529831.524430	1803323.207760	245125	1266	sf	79	cf
Infiltration BMP	Existing	7110 RIO FLORA	6/1/2010	6515643.202310	6515643.202310	1805187.382260	246104	1266	sf	79	cf
Infiltration BMP	Existing	7371 RIO HONDO PL	7/11/2005	6517283.740950	6517283.740950	1804924.767440	246104	1266	sf	79	cf
Infiltration BMP	Existing	10802 RIVES	3/23/2007	6519422.470020	6519422.470020	1803623.413330	246102	1266	sf	79	cf
Infiltration BMP	Existing	11916 RIVES	2/6/2007	6516737.168290	6516737.168290	1799258.165990	246079	1266	sf	79	cf
Infiltration BMP	Existing	10912 RYERSON	7/14/2005	6515882.754330	6515882.754330	1804962.955590	246104	1266	sf	79	cf
Infiltration BMP	Existing	9505 SAMOLINE	6/21/2010	6523279.038200	6523279.038200	1807936.970620	246106	1266	sf	79	cf
Infiltration BMP	Existing	9631 SAMOLINE	9/4/2007	6522855.010000	6522855.010000	1807250.890000	246103	1266	sf	79	cf
Infiltration BMP	Existing	12030 SAMOLINE	9/23/2005	6517133.868790	6517133.868790	1798177.361600	246079	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	12238 SAMOLINE	9/8/2006	6516738.176240	6516738.176240	1796883.684630	246079	1266	sf	79	cf
Infiltration BMP	Existing	7915 SECOND	3/23/2006	6519374.854020	6519374.854020	1802382.905560	246102	1266	sf	79	cf
Infiltration BMP	Existing	7816 SEVENTH	3/27/2007	6519884.790380	6519884.790380	1804163.292550	246102	1266	sf	79	cf
Infiltration BMP	Existing	8646 SEVENTH	1/3/2006	6524439.566780	6524439.566780	1801605.289810	245119	1266	sf	79	cf
Infiltration BMP	Existing	9225 SIDEVIEW	4/24/2006	6531114.889310	6531114.889310	1804872.365930	245127	1266	sf	79	cf
Infiltration BMP	Existing	8810 SMALLWOOD	6/20/2005	6524153.815510	6524153.815510	1810188.858090	246106	1266	sf	79	cf
Infiltration BMP	Existing	9264 SONGFEST	6/10/2008	6531394.983570	6531394.983570	1804360.661210	245127	1266	sf	79	cf
Infiltration BMP	Existing	7838 SPRINGER	11/21/2006	6515530.871940	6515530.871940	1796818.950680	246079	1266	sf	79	cf
Infiltration BMP	Existing	7844 SPRINGER	3/18/2008	6515582.250000	6515582.250000	1796787.835000	246079	1266	sf	79	cf
Infiltration BMP	Existing	10517 STAMPS	8/18/2005	6522812.240000	6522812.240000	1803043.757460	246103	1266	sf	79	cf
Infiltration BMP	Existing	9520 STEWART & GRAY	2/27/2009	6526628.650930	6526628.650930	1796061.800920	245118	1266	sf	79	cf
Infiltration BMP	Existing	8840 STOAKES	7/15/2005	6527643.045070	6527643.045070	1808263.273840	245125	1266	sf	79	cf
Infiltration BMP	Existing	11831 SUSAN	5/25/2006	6514568.915250	6514568.915250	1801466.560490	246079	1266	sf	79	cf
Infiltration BMP	Existing	8354 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8356 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8358 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8360 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8362 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8364 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8366 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	8368 TELEGRAPH	1/5/2004	6526800.000000	6526800.000000	1809400.000000	246106	1266	sf	79	cf
Infiltration BMP	Existing	7420 THIRD	9/20/2007	6517202.761340	6517202.761340	1803926.714420	246102	1266	sf	79	cf
Infiltration BMP	Existing	7964 THIRD	2/21/2006	6519886.681280	6519886.681280	1802225.378910	246102	1266	sf	79	cf
Infiltration BMP	Existing	9532 TWEEDY	4/20/2007	6523025.939870	6523025.939870	1807743.953100	246106	1266	sf	79	cf
Infiltration BMP	Existing	7347 VIA RIO NIDO	8/1/2007	6518199.953350	6518199.953350	1806523.073370	246104	1266	sf	79	cf
Infiltration BMP	Existing	10419 WILEY BURKE	1/2/2008	6519382.492080	6519382.492080	1805731.311650	246102	1266	sf	79	cf
Infiltration BMP	Existing	10442 WILEY BURKE	1/1/2007	6519428.439440	6519428.439440	1805422.866650	246102	1266	sf	79	cf
Infiltration BMP	Existing	12639 WOODRUFF	12/22/2006	6526127.737740	6526127.737740	1791800.878460	245113	1266	sf	79	cf
Infiltration BMP	Existing	12356 DOWNEY	4/29/2004	6518006.757310	6518006.757310	1794978.083160	245115	5062	sf	316	cf
Infiltration BMP	Existing	10613 NEWVILLE	4/21/2004	6528761.027810	6528761.027810	1798786.621380	245126	2531	sf	158	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	10627 OLD RIVER SCHOOL	7/24/2003	6515233.048270	6515233.048270	1805631.128330	246104	174752	sf	10922	cf
Infiltration BMP	Existing	9215 HALL	12/9/2002	6524758.793890	6524758.793890	1797647.866960	245113	74592	sf	4662	cf
Infiltration BMP	Existing	10933 LAKEWOOD BLVD	10/5/2005	6524600.000000	6524600.000000	1800100.000000	245119	6400	sf	400	cf
Infiltration BMP	Existing	12322 SAMOLINE	7/8/2005	6516301.814120	6516301.814120	1796169.128220	246077	4256	sf	266	cf
Infiltration BMP	Existing	12731 LAKEWOOD	9/17/2003	6519215.285000	6519215.285000	1791371.090000	245115	2128	sf	133	cf
Infiltration BMP	Existing	12739 LAKEWOOD	9/17/2003	6519200.000000	6519200.000000	1791100.000000	245115	2128	sf	133	cf
Infiltration BMP	Existing	8927 BIRCHLEAF	7/11/2006	6527008.160170	6527008.160170	1808327.449830	246103	1056	sf	66	cf
Infiltration BMP	Existing	11929 POMERING	5/1/2006	6515108.241040	6515108.241040	1800149.473170	246079	1056	sf	66	cf
Infiltration BMP	Existing	12240 WOODRUFF	3/19/2010	6526758.991120	6526758.991120	1793878.747920	245118	300224	sf	18764	cf
Infiltration BMP	Existing	12222 WOODRUFF	9/14/2009	6526625.121210	6526625.121210	1794009.479990	245118	70200	sf	4388	cf
Infiltration BMP	Existing	7624 FIRESTONE	1/1/2008	6517500.000000	6517500.000000	1802600.000000	246079	41632	sf	2602	cf
Infiltration BMP	Existing	7714 STEWART & GRAY	4/9/2007	6516397.756580	6516397.756580	1799563.749470	246079	30016	sf	1876	cf
Infiltration BMP	Existing	9637 LAKEWOOD	10/2/2008	6526780.802630	6526780.802630	1805111.536210	245125	15136	sf	946	cf
Infiltration BMP	Existing	12428 BENEDICT	6/14/2007	6525687.022380	6525687.022380	1792528.538110	245114	8080	sf	505	cf
Infiltration BMP	Existing	7774 DINSDALE	2/14/2014	6521332.495780	6521332.495780	1806385.183840	246103	4680	sf	293	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMP	Existing	8030 IMPERIAL HWY	2/14/2014	6515729.368090	6515729.368090	1794471.493939	246077	41789	sf	2000	cf
Infiltration BMP	Existing	9623 IMPERIAL HWY	2/14/2014	6524482.209740	6524482.209740	1792569.983950	245114	35408	sf	2213	cf
Infiltration BMP	Existing	10531 LAKEWOOD BL	2/14/2014	6525178.634060	6525178.634060	1801497.338680	245119	5840	sf	365	cf
Infiltration BMP	Existing	8121 FOURTH ST	2/14/2014	6521147.926450	6521147.926450	1802216.858440	246103	4680	sf	293	cf
Infiltration BMP	Existing	8123 FOURTH ST	2/14/2014	6521147.926450	6521147.926450	1802216.858440	246103	4680	sf	293	cf
Infiltration BMP	Existing	8555 TENTH ST	2/14/2014	6524962.328390	6524962.328390	1803501.510410	245119	4680	sf	293	cf
Infiltration BMP	Existing	9356 BUELL ST	2/14/2014	6527425.774610	6527425.774610	1799078.145910	245126	3120	sf	195	cf
Infiltration BMP	Existing	8449 COLE ST	2/14/2014	6520362.597670	6520362.597670	1796910.373080	245115	1560	sf	98	cf

D1.3. City of Lakewood

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Filterra Tree Wells (2)		Paramount & Arbor	33.843398	-118.159673	445521				
Infiltration BMP	Existing	Retention Basin at Cherry Cove Park			33.850296	-118.165478	446014				

D1.4. City of Paramount

Type of BMP	Existing or Planned ?	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioswales	Existing	Landscape Swale	2012	Texaco/Alondra	33.889066	-118.171849	606071	37,500	sf	2109	cf
Bioswales	Existing	Landscape Swale	2012	Orange/Windmill	33.891602	-118.177436	606072	0.6	ac	1470	cf

D1.5. City of Pico Rivera

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Site-Scale Detention Basin	Existing	French drains at Smith Park	2013	6016 Rosemead Blvd				16	ac		
Site-Scale Detention Basin	Existing	French drains at Rio Vista	2013	Coffman Pico Road				7	ac		
Bioswales	Existing	Beverly Boulevard medians	2012	Beverly Blvd				5280	sf		
Permeable Pavement	Existing	Pico Park permeable pavement	2012	9528 Beverly Blvd				12	ac		
Bioswales	Existing	Telegraph Road medians	2013	Telegraph Rd from Rosemead Blvd to Eastside limit				5280	sf		
Bioswales	Planned	Paramount Blvd medians	2016	Paramount Blvd from Whittier Blvd to Mines Ave				5280	sf		
Infiltration BMPs	Planned	Two (2) Filterra Systems	2016	various				1	ac		
Infiltration BMPs	Existing	City of Pico Rivera City Hall	2011	8615 Passons Blvd				2.75	ac		
Infiltration BMPs	Existing	Rivera Park	2012	9530 Shade Lane				16	ac		

D1.6. City of Signal Hill

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration		Palm Drive Business Center	2/19/2008	2445 N Palm Drive	33.801973	-118.157962	775510	1	ac		
Bioretention / Biofiltration		Aragon Townhomes & Duplexes (City View)	3/9/2007	1902 (1890) Oribaza Ave	33.790924	-118.156725	776003	93,780	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2755 California Avenue	33.807881	-118.181769	776011	9,583	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2756 California Avenue	33.807881	-118.181769	776011	17,424	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2757 California Avenue	33.807881	-118.181769	776011	33,106	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2758 California Avenue	33.807881	-118.181769	776011	10,454	sf		
Bioretention / Biofiltration		EDCO Recycling & Transfer		2759 California Avenue	33.807881	-118.181769	776011	78,486	sf		
Bioretention / Biofiltration		2-Story Building and Parking Lot	12/28/2010	2653 Walnut Avenue	33.805754	-118.171978	776012	0.51	ac		
Bioretention / Biofiltration		EDCO Administrative Terminal	8/1/2011	950 27th Street	33.806179	-118.1812	776012	9583	sf	0.06	cfs
Bioretention / Biofiltration		EDCO Administrative Terminal	8/2/2011	951 27th Street	33.806179	-118.1812	776012	17424	sf	0.08	cfs
Bioretention / Biofiltration		EDCO Administrative Terminal	8/3/2011	952 27th Street	33.806179	-118.1812	776012	33106	sf	0.14	cfs
Bioretention / Biofiltration		EDCO Administrative Terminal	8/4/2011	953 27th Street	33.806179	-118.1812	776012	10454	sf	0.08	cfs
Bioretention / Biofiltration		Fantasy Castle	6/30/2009	2801 Walnut Ave	33.808289	118.171777		1,584	sf		
Bioswales	Existing	Fresh and Easy Neighborhood Market	11/16/2010	3300 Atlantic Avenue	33.817504	-118.184643	485510	18,000	sf	931	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioswales	Existing	Fresh and Easy Neighborhood Market	11/17/2010	3301 Atlantic Avenue	33.817504	-118.184643	485510	120	sf	7	cf
Bioswales	Existing	Fresh and Easy Neighborhood Market	11/18/2010	3302 Atlantic Avenue	33.817504	-118.184643	485510	10,904	sf	542	cf
Bioswales	Existing	Signal Hill Police Station and Emergency Operation	5/26/2011	2745 Walnut Avenue	33.807067	-118.171984	775510	115,870	sf		
Bioswales	Existing	Jack in the Box	10/21/2008	802 Spring Street	33.812049	-118.182595	775510	12,000	sf		
Bioswales		Boiler Tech Warehouse	10/2/2009	2503 Cerritos Avenue	33.802564	-118.177391	776002	6,754	sf		
Bioswales		Aragon Townhomes & Duplexes (City View)	3/11/2007	1904 (1890) Oribaza Ave	33.790924	-118.156725	776003	31,100	sf		
Bioswales		Fantasy Castle	6/29/2009	2800 Walnut Ave	33.808289	118.171777		32,883	sf		
Flow-Through Treatment BMP	Existing	Petco, Party City	3/3/2009	3100 Atlantic Ave	33.813946	-118.184789	485510				
Flow-Through Treatment BMP	Existing	Petco, Party City	3/4/2009	3101 Atlantic Ave	33.813946	-118.184789	485510				
Flow-Through Treatment BMP	Existing	The Home Depot		3100 Atlantic Avenue	33.813946	-118.184789	485510	3.65	ac		
Flow-Through Treatment BMP	Existing	The Home Depot		3101 Atlantic Avenue	33.813946	-118.184789	485510	7.99	ac		
Flow-Through Treatment BMP	Existing	The Home Depot		3102 Atlantic Avenue	33.813946	-118.184789	485510	3.28	ac		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	The Home Depot		3103 Atlantic Avenue	33.813946	-118.184789	485510	4.79	ac		
Flow-Through Treatment BMP		Palm Drive Business Center	2/20/2008	2446 N Palm Drive	33.801973	-118.157962	775510	7,000	sf		
Flow-Through Treatment BMP	Existing	Fresh & Easy	11/17/2009	2475 Cherry Avenue	33.802363	-118.168152	775510	0.68	ac		
Flow-Through Treatment BMP	Existing	Fresh & Easy	11/18/2009	2476 Cherry Avenue	33.802363	-118.168152	775510	0.58	ac		
Flow-Through Treatment BMP	Existing	US Bank	9/17/2008	2615 Cherry Ave	33.804856	-118.167999	775510	18732	sf		
Flow-Through Treatment BMP	Existing	Signal Hill Industrial Center		2665-2745 Temple Ave	33.80648	-118.159782	775510	143,312	sf		
Flow-Through Treatment BMP	Existing	Tanker Interior Washing Facility		1710 E 29th Street	33.80935	-118.170824	775510	10,000	sf		
Flow-Through Treatment BMP	Existing	Delius Restaurant	7/14/2006	2951 Cherry Ave	33.81111	-118.168077	775510	32,000	sf		
Flow-Through Treatment BMP	Existing	Jack in the Box	10/20/2008	801 Spring Street	33.812049	-118.182595	775510	12,000	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Target (T-2319)	2/13/2007	950 E 33rd Street	33.816767	-118.181488	775510	178,600	sf		
Flow-Through Treatment BMP	Existing	Hawk Industries	5/8/2007	1245 E. 23rd Street	33.799126	-118.17577	776002	27,322	sf		
Flow-Through Treatment BMP	Existing	Hawk Industries	5/9/2007	1246 E. 23rd Street	33.799126	-118.17577	776002	1575	sf		
Flow-Through Treatment BMP		Boiler Tech Warehouse	9/30/2009	2501 Cerritos Avenue	33.802564	-118.177391	776002	6,754	sf		
Flow-Through Treatment BMP	Existing	Las Brisas II Community Housing	1/11/2006	2400-2418 California Ave	33.803504	-118.180639	776002	16,247	sf		
Flow-Through Treatment BMP	Existing	Las Brisas II Community Housing	1/12/2006	2400-2418 California Ave	33.803504	-118.180639	776002	25,047	sf		
Flow-Through Treatment BMP	Existing	Villagio	12/5/2005	2550 Gundry Ave	33.803577	-118.173289	776002	61,000	sf		
Flow-Through Treatment BMP	Existing	Villagio	12/6/2005	2551 Gundry Ave	33.803577	-118.173289	776002	30,492	sf		
Flow-Through Treatment BMP	Existing	Villagio	12/7/2005	2552 Gundry Ave	33.803577	-118.173289	776002	4,356	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP		Aragon Townhomes & Duplexes (City View)	3/6/2007	1899 (1890) Oribaza Ave	33.790924	-118.156725	776003	31,350	sf		
Flow-Through Treatment BMP		Aragon Townhomes & Duplexes (City View)	3/7/2007	1900 (1890) Oribaza Ave	33.790924	-118.156725	776003	63,400	sf		
Flow-Through Treatment BMP		In-N-Out Burger	5/27/2011	799 E. Spring Street	33.812066	-118.183197	776011	65,220	sf		
Flow-Through Treatment BMP		Shoreline Fabricators	8/1/2007	2652 Gundry Ave	33.805493	-118.173804	776012	16,300	sf		
Flow-Through Treatment BMP		Shoreline Fabricators	8/2/2007	2653 Gundry Ave	33.805493	-118.173804	776012	1,395	sf		
Flow-Through Treatment BMP		2-Story Building and Parking Lot	12/29/2010	2654 Walnut Avenue	33.805754	-118.171978	776012				
Flow-Through Treatment BMP		Islamic Center	5/29/2009	996 27th St	33.806216	-118.180729	776012	5000	sf		
Flow-Through Treatment BMP		Crescent Square Development	8/10/2007	1600-1799 Green House Place				136,955	sf		
Infiltration BMPs	Existing	Fresh & Easy	11/19/2009	2477 Cherry Avenue	33.802363	-118.168152	775510	76,143	sf		
Infiltration BMPs	Existing	US Bank	9/19/2008	2617 Cherry Ave	33.804856	-118.167999	775510	18732	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMPs	Planned	Applebee's	3/12/2013	899 E. Spring Street	33.812089	-118.181855	775510	23,580	sf		
Infiltration BMPs	Existing	Hawk Industries	5/10/2007	1247 E. 23rd Street	33.799126	-118.17577	776002	27,322	sf		
Infiltration BMPs		Boiler Tech Warehouse	10/1/2009	2502 Cerritos Avenue	33.802564	-118.177391	776002	6,754	sf		
Infiltration BMPs		Pacific Walk	1/4/2011	PCH and Orizaba Avenue	33.789847	-118.156748	776003	100,200	sf		
Infiltration BMPs		Pacific Walk	1/5/2011	PCH and Orizaba Avenue	33.789847	-118.156748	776003	149,015	sf		
Infiltration BMPs		Pacific Walk	1/6/2011	PCH and Orizaba Avenue	33.789847	-118.156748	776003	1,300	sf		
Infiltration BMPs		Aragon Townhomes & Duplexes (City View)	3/8/2007	1901 (1890) Oribaza Ave	33.790924	-118.156725	776003	94,750	sf		
Infiltration BMPs		Aragon Townhomes & Duplexes (City View)	3/10/2007	1903 (1890) Oribaza Ave	33.790924	-118.156725	776003	93,780	sf		
Infiltration BMPs	Planned	Willow Street Medical Office Building	12/9/2013	845 E. Willow Street	33.804664	-118.182279	776009	22,651	sf	1095	cf
Infiltration BMPs	Planned	Willow Street Medical Office Building	12/10/2013	846 E. Willow Street	33.804664	-118.182279	776009	37,304	sf	1890	cf
Infiltration BMPs		In-N-Out Burger	5/28/2011	800 E. Spring Street	33.812066	-118.183197	776011	65,220	sf	3425	cf
Infiltration BMPs		Shoreline Fabricators	8/3/2007	2654 Gundry Ave	33.805493	-118.173804	776012	16,300	sf		
Infiltration BMPs		Islamic Center	5/28/2009	995 27th St	33.806216	-118.180729	776012	5000	sf		
Infiltration BMPs	Existing	A & A Ready Mix Concrete	8/1/2007	900 E. Patterson	33.806664	-118.182206	776012	2	ac		
Permeable Pavement	Existing	US Bank	9/18/2008	2616 Cherry Ave	33.804856	-118.167999	775510	60	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Permeable Pavement	Existing	Hawk Industries	5/11/2007	1248 E. 23rd Street	33.799126	-118.17577	776002	5,628	sf		

D1.7. City of South Gate

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration		Self Storage	9/15/2008	2405 Southern Ave	33.953436	-118.229363	796034	0.25	ac		
Bioretention / Biofiltration		Hollydale Plaza	3/30/2010	12222 Garfield Avenue	33.915655	-118.168383	796076	15,278	sf		
Bioretention / Biofiltration		Atlantic Avenue Improvements	4/21/2010	Atlantice from Abbott to Firestone	33.943066	-118.181112	796084	7.44	ac		
Bioretention / Biofiltration	Planned	azalea	11/25/2012	4641 Firestone Blvd.	33.952413	-118.187909	796084	7,328	sf	0.22	cfs
Bioswales		South Gate McDonald's	9/30/2013	3313 Tweedy Boulevard	33.945113	-118.211464	796034	5,119	sf		
Bioswales		South Gate McDonald's	10/1/2013	3314 Tweedy Boulevard	33.945113	-118.211464	796034	5,545	sf		
Bioswales		Commercial Center	10/4/2010	9200 Califlornia Avenue	33.950805	-118.206221	796034	12,367	sf		
Bioswales		Commercial Center	10/5/2010	9201 Califlornia Avenue	33.950805	-118.206221	796034	4,263	sf		
Bioswales		Hot Mix Asphalt Plant	5/11/2001	5626 Southern Avenue	33.944913	-118.168148	796083	2.7	ac		
Bioswales		Goals Soccer Centers - South Gate	2/9/2010	9599 Pinehurst Avenue	33.945107	-118.182378	796084	53,142	sf		
Flow-Through Treatment BMP	Existing	South Gate McDonald's	9/26/2013	3309 Tweedy Boulevard	33.945113	-118.211464	796034	2,394	sf		
Flow-Through Treatment BMP		South Gate McDonald's	9/28/2013	3311 Tweedy Boulevard	33.945113	-118.211464	796034	2,436	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Walgreens	7/24/2006	9830 Long Beach	33.946082	-118.215937	796034	48,725	sf		
Flow-Through Treatment BMP	Existing	King's Car Wash	11/29/2006	9801-9807 Long Beach Blvd	33.946452	-118.216775	796034	10,461	sf		
Flow-Through Treatment BMP		King's Car Wash	12/1/2006	9801-9807 Long Beach Blvd	33.946452	-118.216775	796034				
Flow-Through Treatment BMP	Existing	Sarina Townhomes	2/12/2007	9321 State Street	33.950368	-118.21325	796034	14,375	sf		
Flow-Through Treatment BMP		Commercial Center	10/6/2010	9202 Califlornia Avenue	33.950805	-118.206221	796034	16,630	sf		
Flow-Through Treatment BMP		Office Bldg	12/20/2007	3830 Firestone Blvd	33.953324	-118.201934	796034	1,000	sf		
Flow-Through Treatment BMP		Office Bldg	12/21/2007	3831 Firestone Blvd	33.953324	-118.201934	796034	112,000	sf		
Flow-Through Treatment BMP		Office Bldg	12/20/2007	3800 Firestone Blvd	33.95348	-118.202386	796034	1,000	sf		
Flow-Through Treatment BMP		Office Bldg	12/21/2007	3801 Firestone Blvd	33.95348	-118.202386	796034	112,000	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Planned	Calden Court Appartments	9/27/2013	8901 Calden Avenue	33.95515	-118.228736	796034	219,543	sf		
Flow-Through Treatment BMP		Hollydale Plaza	3/31/2010	12223 Garfield Avenue	33.915655	-118.168383	796076	27,381	sf		
Flow-Through Treatment BMP	Existing	Sherwin Inc	4/10/2007	5530 Borwick Ave	33.925749	-118.172611	796082	7,892	sf		
Flow-Through Treatment BMP		Hot Mix Asphalt Plant	5/10/2001	5625 Southern Avenue	33.944913	-118.168148	796083	9.5	ac		
Flow-Through Treatment BMP		Atlantic Avenue Improvements	4/22/2010	Atlantice from Abbott to Firestone	33.943066	-118.181112	796084	13.32	ac		
Flow-Through Treatment BMP		Goals Soccer Centers - South Gate	2/11/2010	9601 Pinehurst Avenue	33.945107	-118.182378	796084	70,036	sf		
Flow-Through Treatment BMP		Goals Soccer Centers - South Gate	2/12/2010	9602 Pinehurst Avenue	33.945107	-118.182378	796084	37,897	sf		
Flow-Through Treatment BMP		Goals Soccer Centers - South Gate	2/13/2010	9603 Pinehurst Avenue	33.945107	-118.182378	796084	63,400	sf		
Flow-Through Treatment BMP	Planned	azalea	11/24/2012	4640 Firestone Blvd.	33.952413	-118.187909	796084	1,583,819	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Flow-Through Treatment BMP	Existing	Interior Removal Specialist Demolition	5/21/2007	9309 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Interior Removal Specialist Demolition	5/22/2007	9310 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Interior Removal Specialist Demolition	5/23/2007	9311 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Interior Removal Specialist Demolition	5/24/2007	9312 Rayo Ave	33.949331	-118.17896	796089				
Flow-Through Treatment BMP		Petrochem Manufacturing	12/18/2006	8401 Quartz	33.957949	-118.191835	796090	162,305	sf		
Flow-Through Treatment BMP		Petrochem Manufacturing	12/19/2006	8402 Quartz	33.957949	-118.191835	796090	51,401	sf		
Infiltration BMPs		South Gate McDonald's	9/27/2013	3310 Tweedy Boulevard	33.945113	-118.211464	796034	2,394	sf		
Infiltration BMPs		South Gate McDonald's	9/29/2013	3312 Tweedy Boulevard	33.945113	-118.211464	796034	2,436	sf		
Infiltration BMPs		South Gate McDonald's	10/4/2013	3317 Tweedy Boulevard	33.945113	-118.211464	796034	3,743	sf		
Infiltration BMPs		King's Car Wash	11/30/2006	9801-9807 Long Beach Blvd	33.946452	-118.216775	796034	3,047	sf		
Infiltration BMPs		Sarina Townhomes	2/13/2007	9322 State Street	33.950368	-118.21325	796034	17,519	sf		

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMPs		Office Bldg	12/22/2007	3832 Firestone Blvd	33.953324	-118.201934	796034	112,000	sf		
Infiltration BMPs		Office Bldg	12/22/2007	3802 Firestone Blvd	33.95348	-118.202386	796034	112,000	sf		
Infiltration BMPs	Existing	Family Dollar	10/8/2012	3610 Firestone	33.95374	-118.204546	796034		sf		
Infiltration BMPs	Planned	Calden Court Appartments	9/28/2013	8902 Calden Avenue	33.95515	-118.228736	796034	219,543	sf		
Infiltration BMPs		South Gate Ward Building New Parking Lot	10/15/2010	2771 Liberty Boulevard	33.961969	-118.220918	796034	14,811	sf		
Infiltration BMPs		Sherwin Inc	4/11/2007	5531 Borwick Ave	33.925749	-118.172611	796082	7,892	sf		
Infiltration BMPs		Atlantic Avenue Improvements	4/23/2010	Atlantice from Abbott to Firestone	33.943066	-118.181112	796084	22,400	sf		
Infiltration BMPs		Batting Cages	11/4/2010	9599 Pinehurst Avenue	33.945107	-118.182378	796084	7,953	sf		
Infiltration BMPs		Goals Soccer Centers - South Gate	2/10/2010	9600 Pinehurst Avenue	33.945107	-118.182378	796084	113	sf		
Infiltration BMPs		Goals Soccer Centers - South Gate	2/14/2010	9604 Pinehurst Avenue	33.945107	-118.182378	796084	171,333	sf		
Infiltration BMPs	Planned	azalea	11/19/2012	4635 Firestone Blvd.	33.952413	-118.187909	796084	444,636	sf	31,365	cf
Infiltration BMPs	Planned	azalea	11/20/2012	4636 Firestone Blvd.	33.952413	-118.187909	796084	110,869	sf	12,946	cf
Infiltration BMPs	Planned	azalea	11/21/2012	4637 Firestone Blvd.	33.952413	-118.187909	796084	582,860	sf	72,234	cf
Infiltration BMPs	Planned	azalea	11/22/2012	4638 Firestone Blvd.	33.952413	-118.187909	796084	222,727	sf	25,348	cf
Infiltration BMPs	Planned	azalea	11/23/2012	4639 Firestone Blvd.	33.952413	-118.187909	796084	222,727	sf	64,314	cf

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Infiltration BMPs	Existing	New South Central Properties, LLC	5/28/2009	8600 Rheem Ave	33.955566	-118.192042	796084	20,960	sf		
Infiltration BMPs		LA Water	8/4/2010	9415 Burtis	33.947369	-118.176109	796350	154,538	sf		
Permeable Pavement		South Gate McDonald's	10/2/2013	3315 Tweedy Boulevard	33.945113	-118.211464	796034	8,697	sf		
Permeable Pavement		South Gate McDonald's	10/3/2013	3316 Tweedy Boulevard	33.945113	-118.211464	796034	3,550	sf		

D1.8. City of Whittier

Type of BMP	Existing or Planned	BMP Name	Year Constructed or Planned	Location (Lat/long, or cross streets)	Latitude	Longitude	Sub-watershed	Contributing Area	Unit	Total Capture Volume or Flow Rate	Unit
Bioretention / Biofiltration	Planned	GWT Biolswale	2014	Greenway Trail from to	33.972121	-118.044253	895098				
Bioretention / Biofiltration	Planned	Whittier Blvd Widening and Bioswale	2017	Whittier Blvd from to							
Green Streets (Describe)	Planned	Lower Uptown reverse drains	2014	Milton, Newlin, Comstock from La Cuarta to Walnut	33.970199	-118.039721	895098		TBD		TBD
Site-Scale Detention Basin	Existing	Police Building and City Hall Storm Drainage	2010	13230 Penn St	33.974748	-118.03371	895098				

Attachment E: SUPPORTING CALIBRATION DATA

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

January 15, 2015

RB-AR12926

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1. Lower San Gabriel River

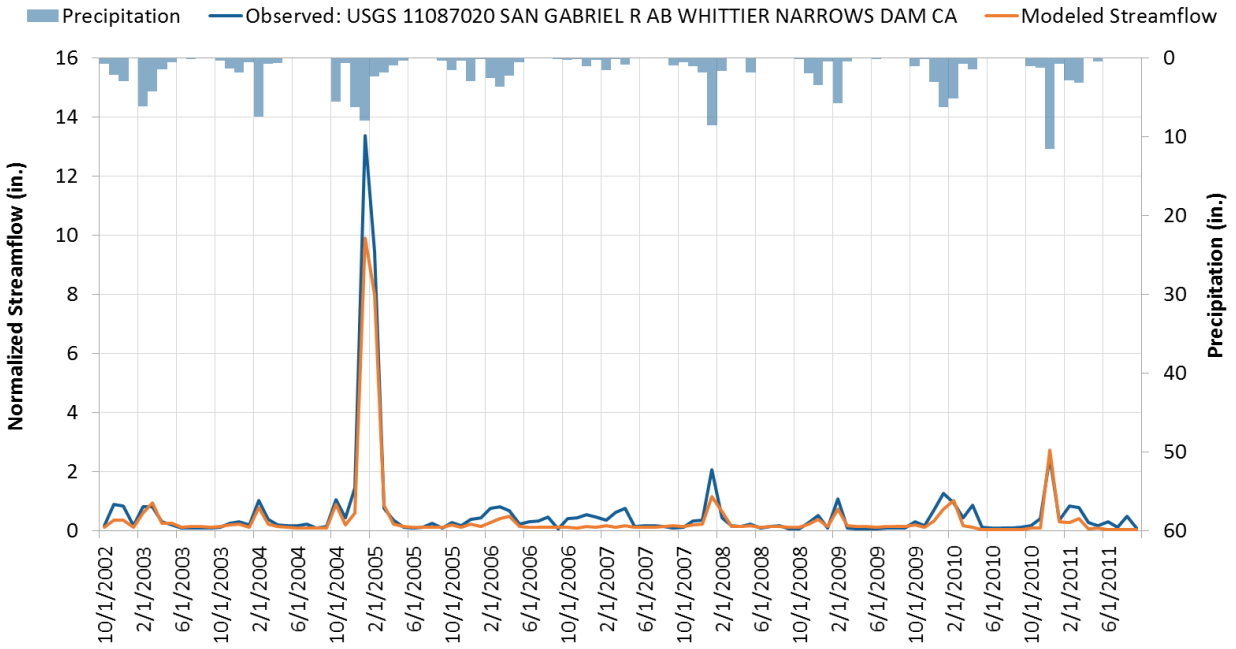


Figure 1. Monthly hydrograph for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

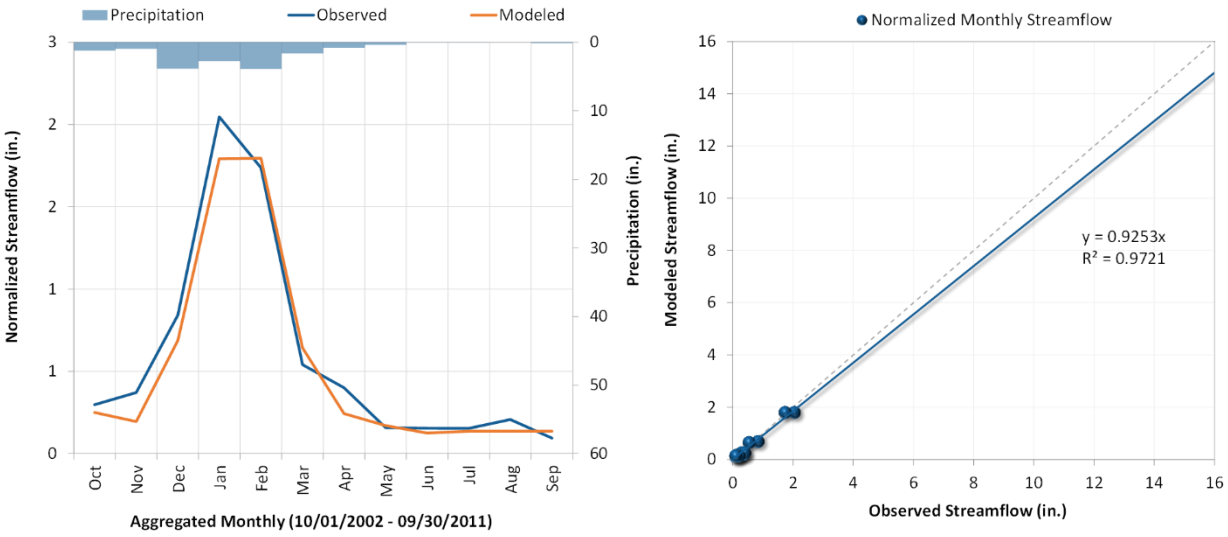


Figure 2. Aggregated monthly hydrograph for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

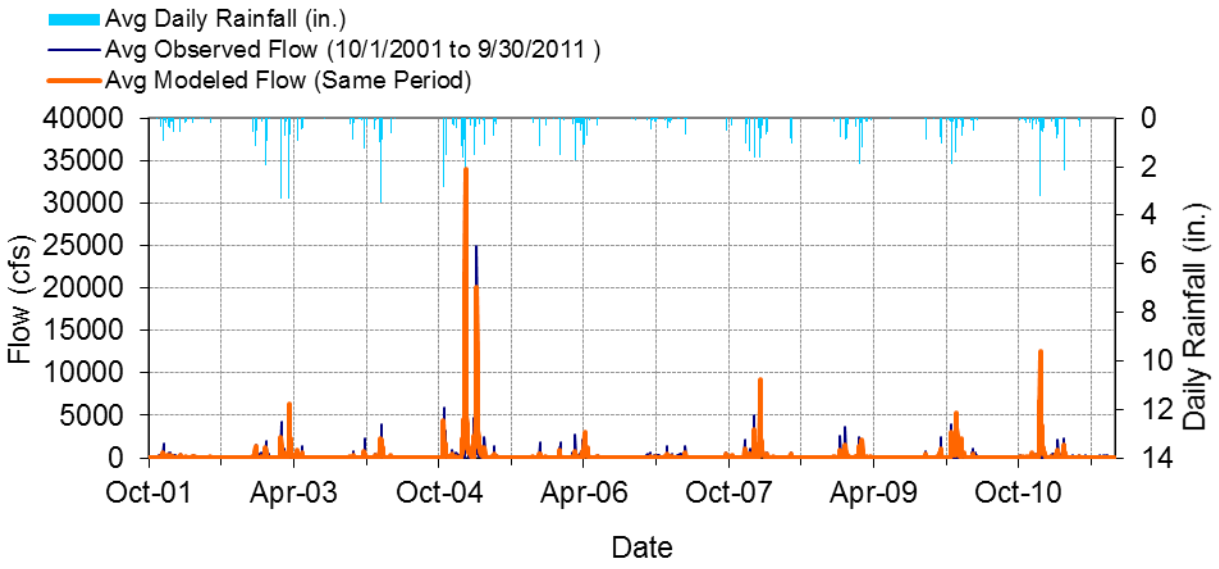


Figure 3. Mean daily flow for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

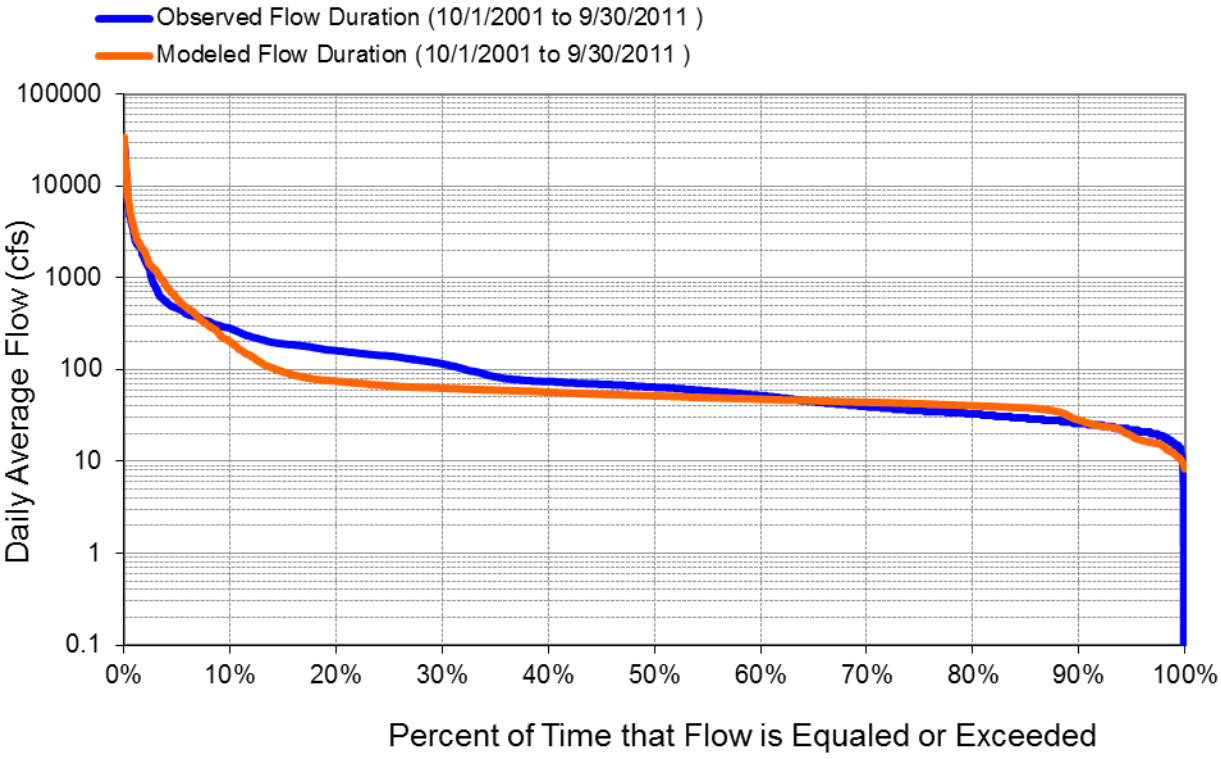


Figure 4. Daily flow exceedance for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

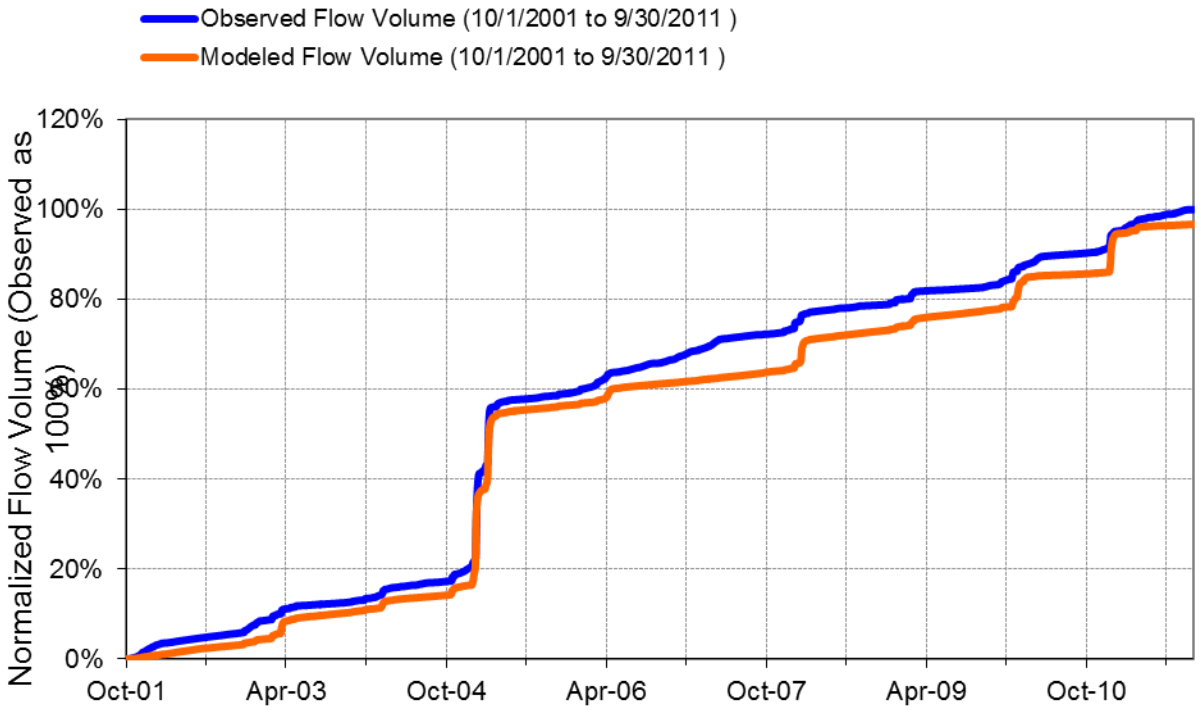


Figure 5. Flow accumulation for USGS 11087020 SAN GABRIEL R AB WHITTIER NARROWS DAM CA (10/1/2002 – 9/30/2011).

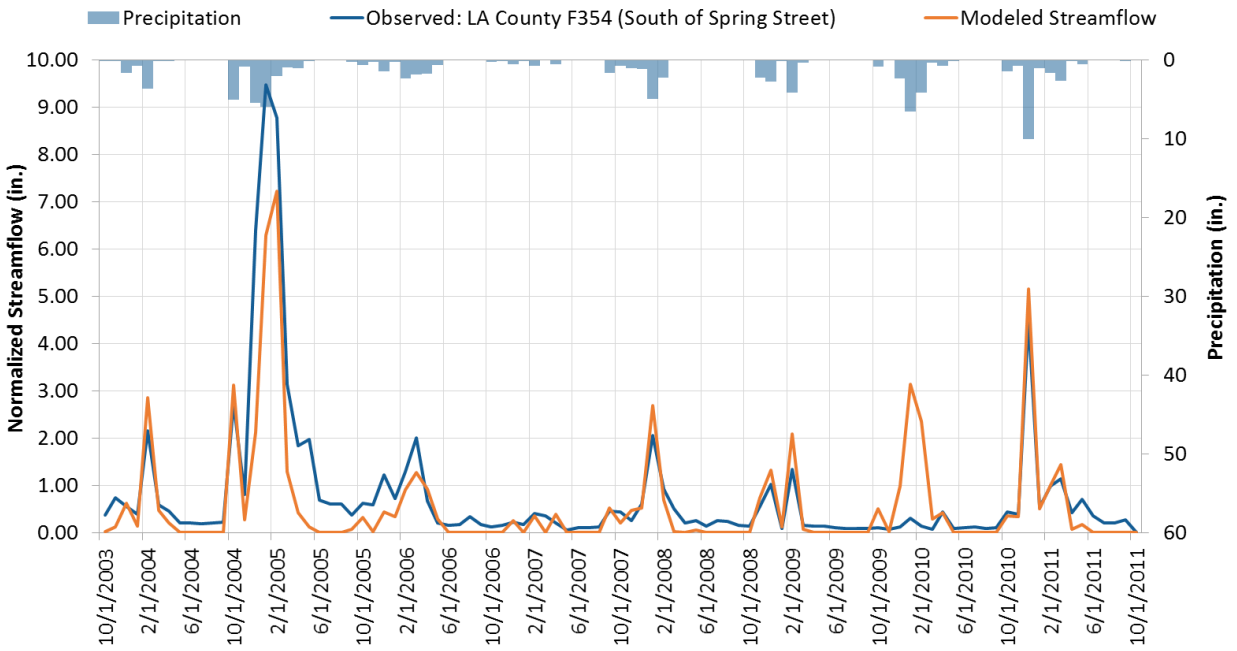


Figure 6. Monthly hydrograph for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

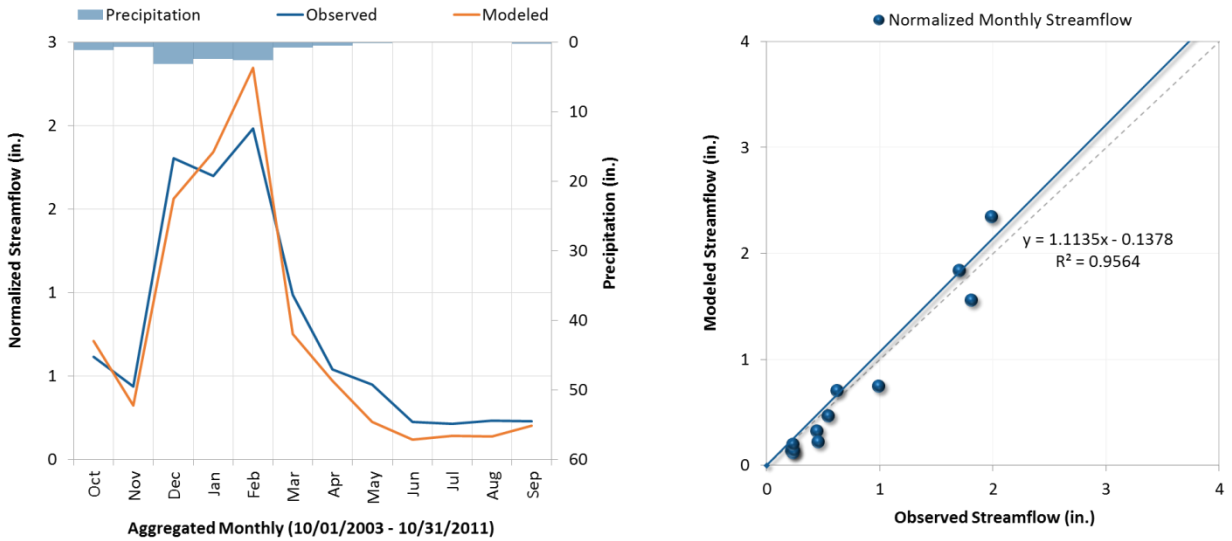


Figure 7. Aggregated monthly hydrograph for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

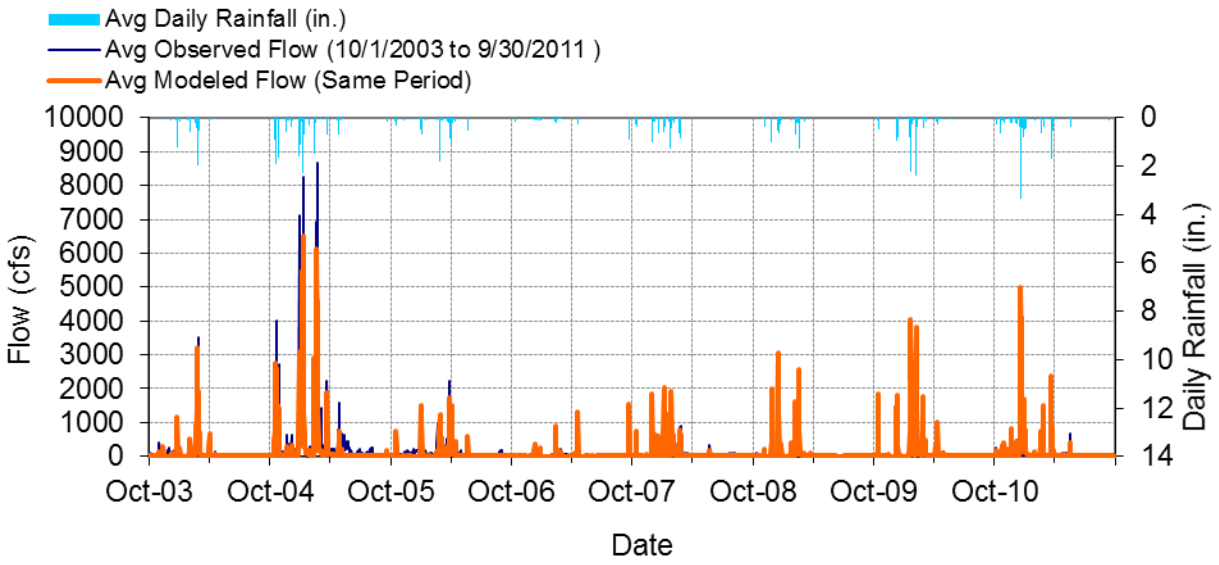


Figure 8. Mean daily flow for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

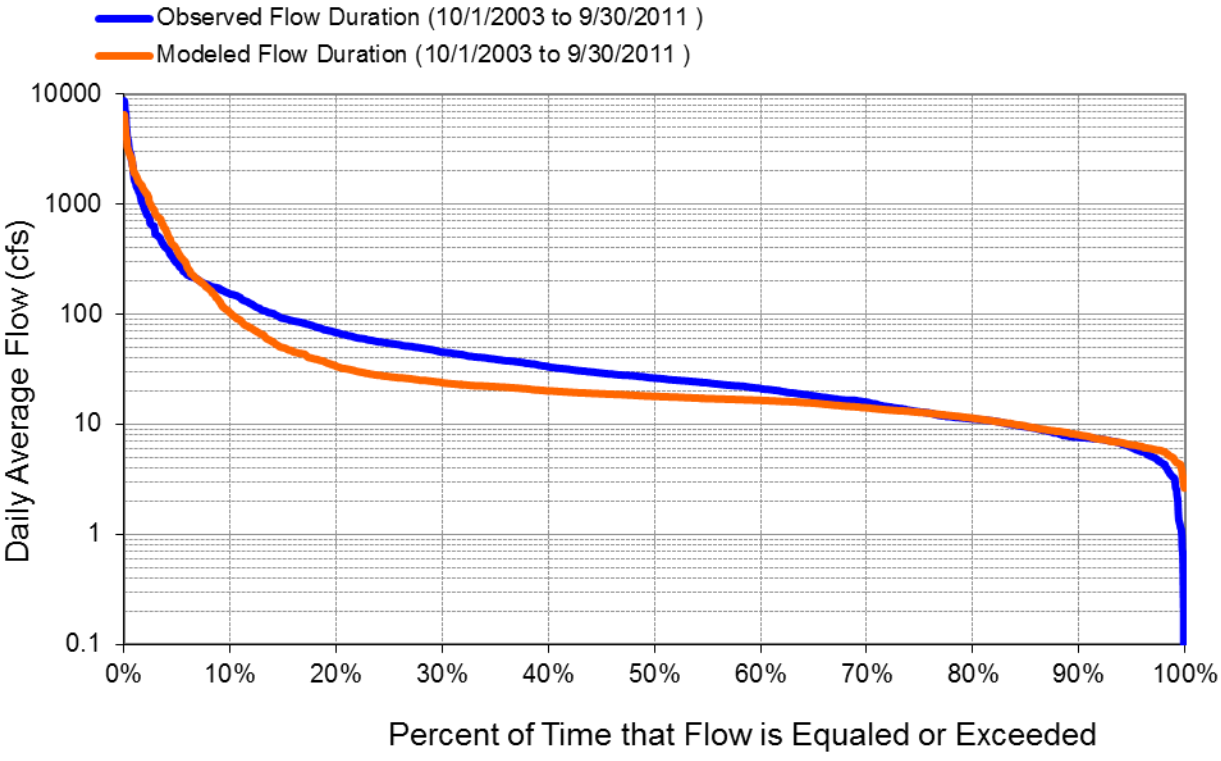


Figure 9. Daily flow exceedance for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

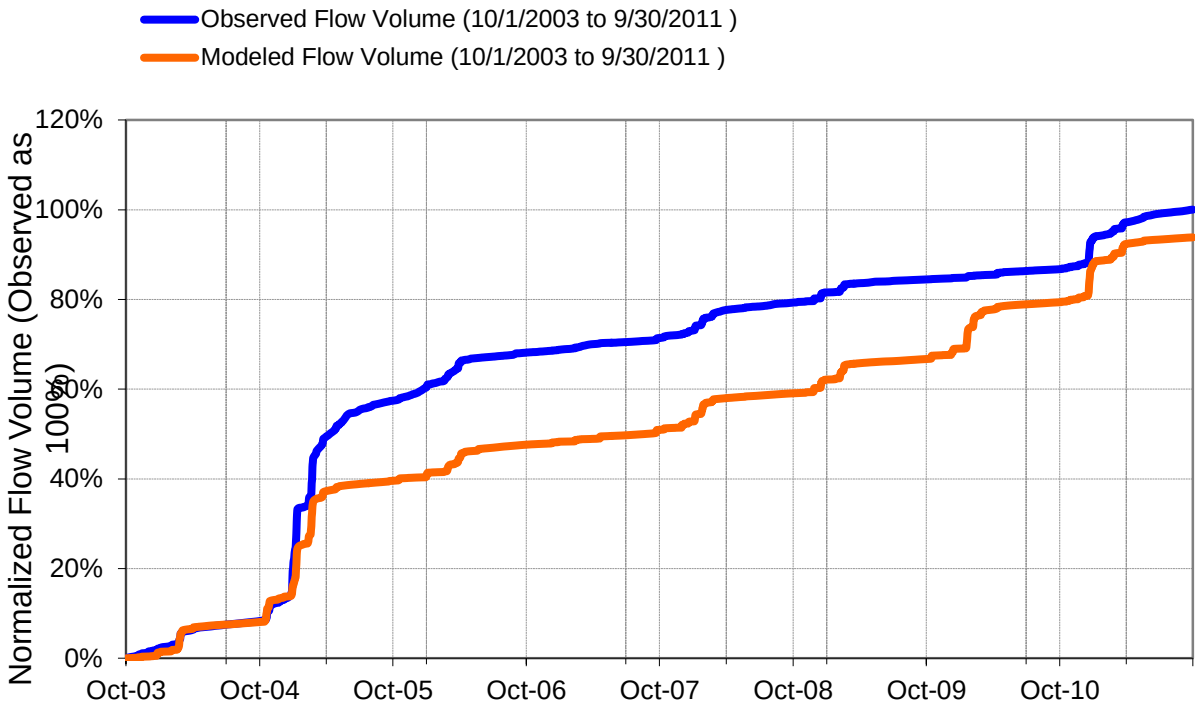


Figure 10. Flow accumulation for USGS 11089200 COYOTE C NR BUENA PARK CA (10/1/2003 – 9/30/2011.

Table 1. Summary of water quality data evaluated for the Lower San Gabriel River

Gage	Constituent	Minimum	Q1	Median	Q3	Maximum
S14	Total Copper (ug/l)	5.0	10.5	13.1	23.9	81.4
S13	Total Copper (ug/l)	0.5	11.8	28.1	48.3	351.0
S14	Total Lead (ug/l)	0.7	1.4	2.9	8.2	56.0
S13	Total Lead (ug/l)	0.2	1.1	10.2	19.2	147.0
S14	TSS (mg/L)	5.0	16.8	38.0	169.8	1258.0
S13	TSS (mg/L)	1.0	48.0	97.0	230.5	1556.0
S14	Total Zinc (ug/l)	19.8	36.6	61.0	86.9	440.0
S13	Total Zinc (ug/l)	1.0	62.0	135.0	241.5	2010.0
S14	Fecal Coliform (MPN/100mL)	20	300	1,300	50,000	16,000,000
S13	FC (MPN/100mL)	20	1,300	16,000	90,000	2,200,000
S14	Total Nitrogen (mg/l)	-	-	-	-	-
S13	Total Nitrogen (mg/l)	-	-	-	-	-
S14	Total Phosphorous (mg/l)	0.05	0.11	0.18	0.41	0.86
S13	Total Phosphorous (mg/l)	-	-	-	-	-

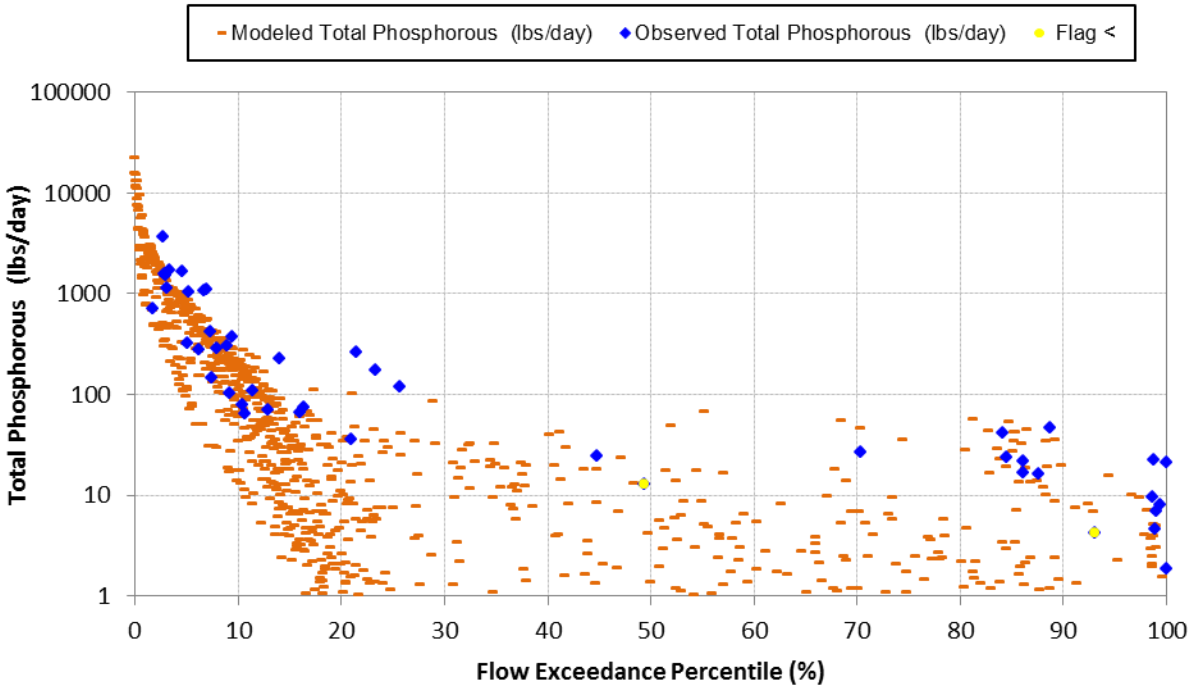


Figure 11. Simulated vs. observed load duration plots for Total Phosphorous (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

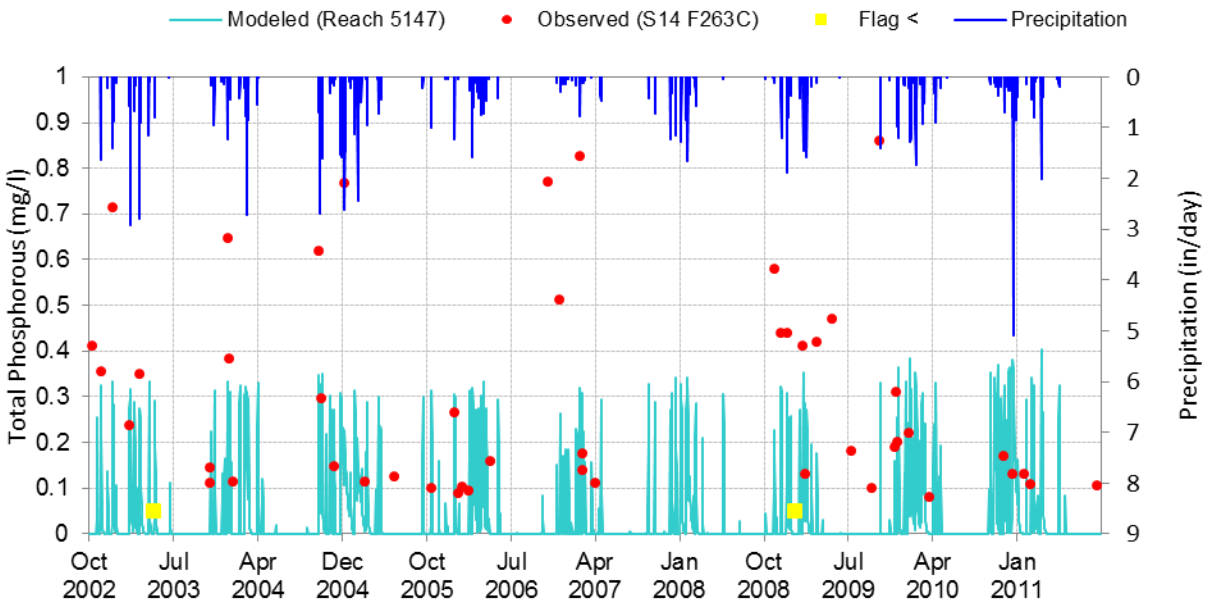


Figure 12. Simulated vs. observed time series plots for Total Phosphorous (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

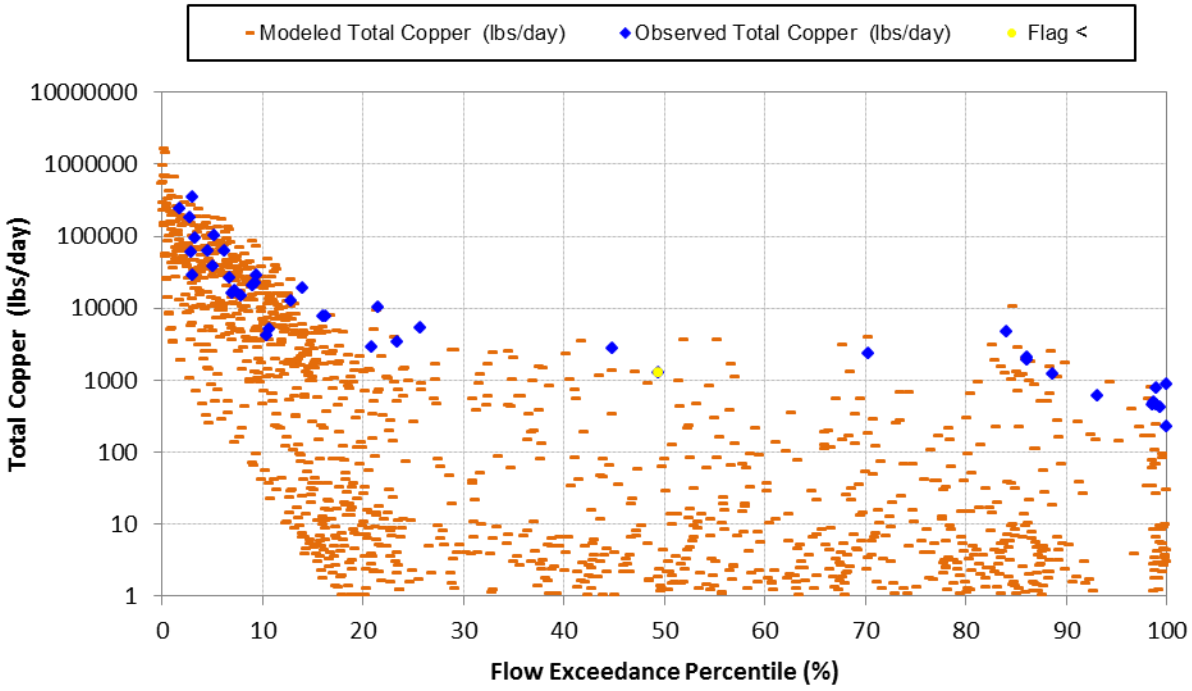


Figure 13. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

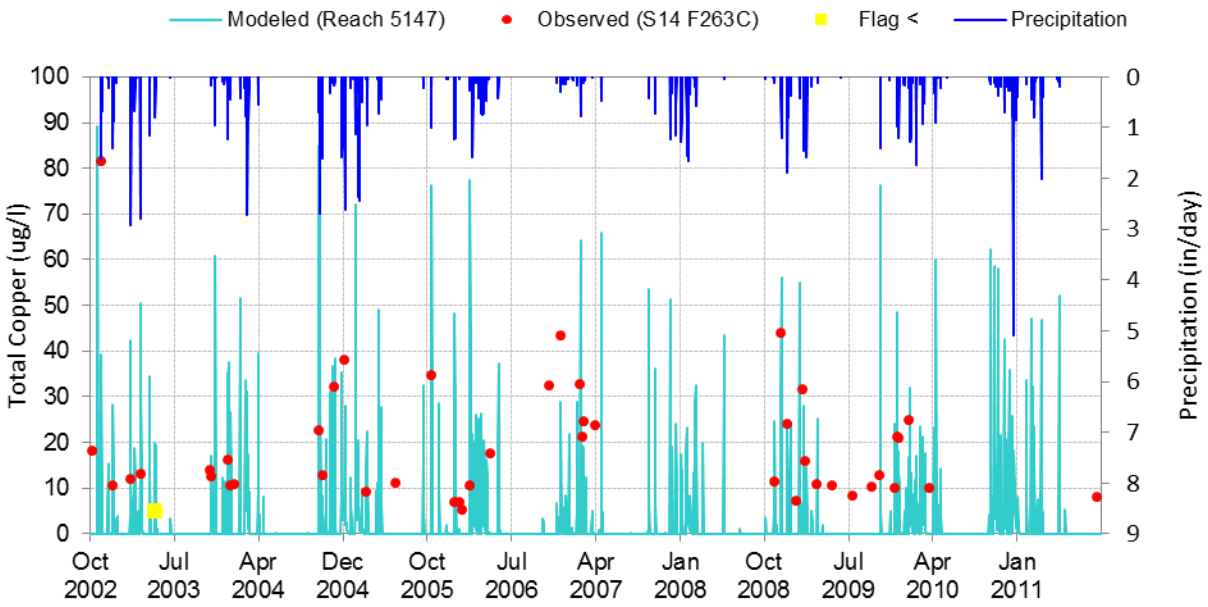


Figure 14. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

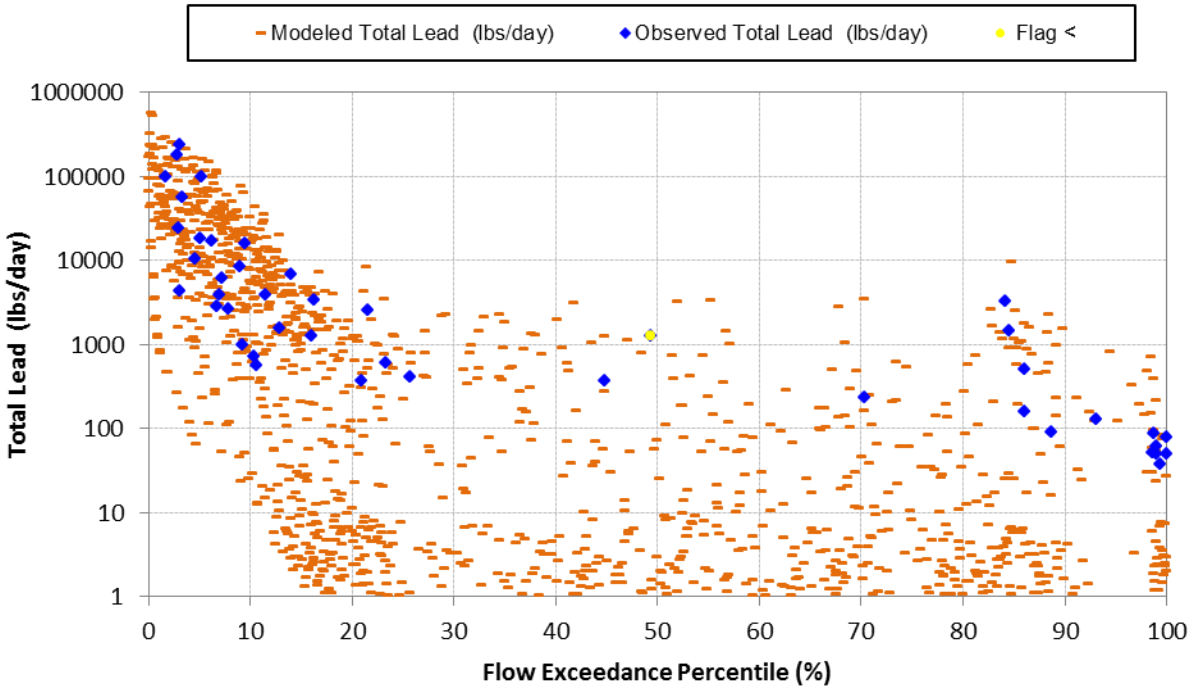


Figure 15. Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

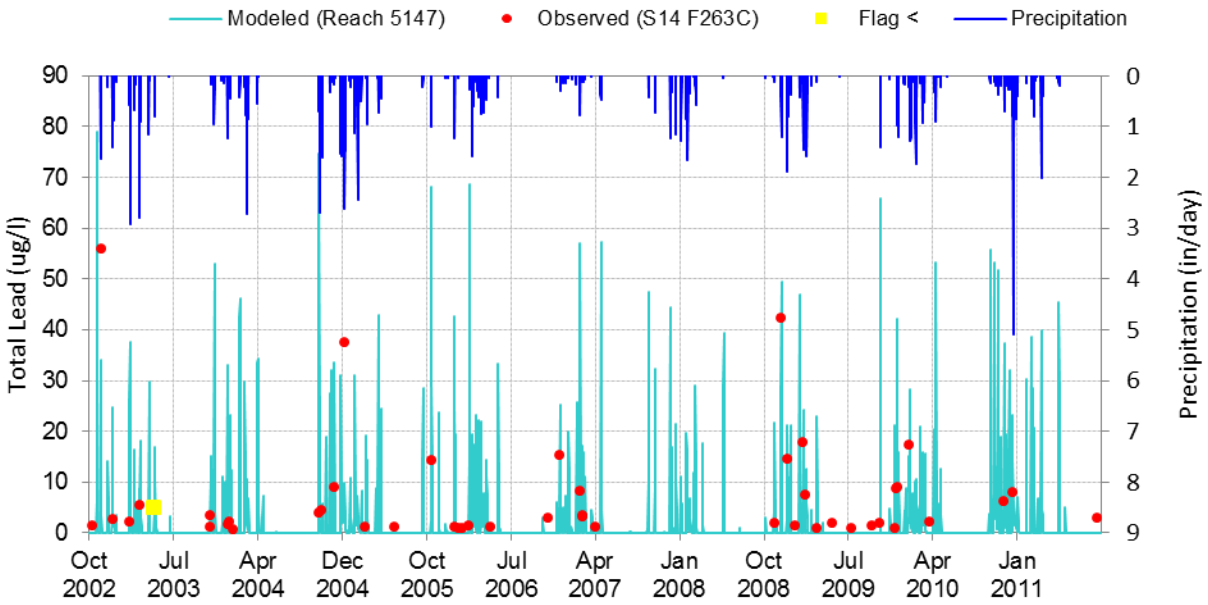


Figure 16. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

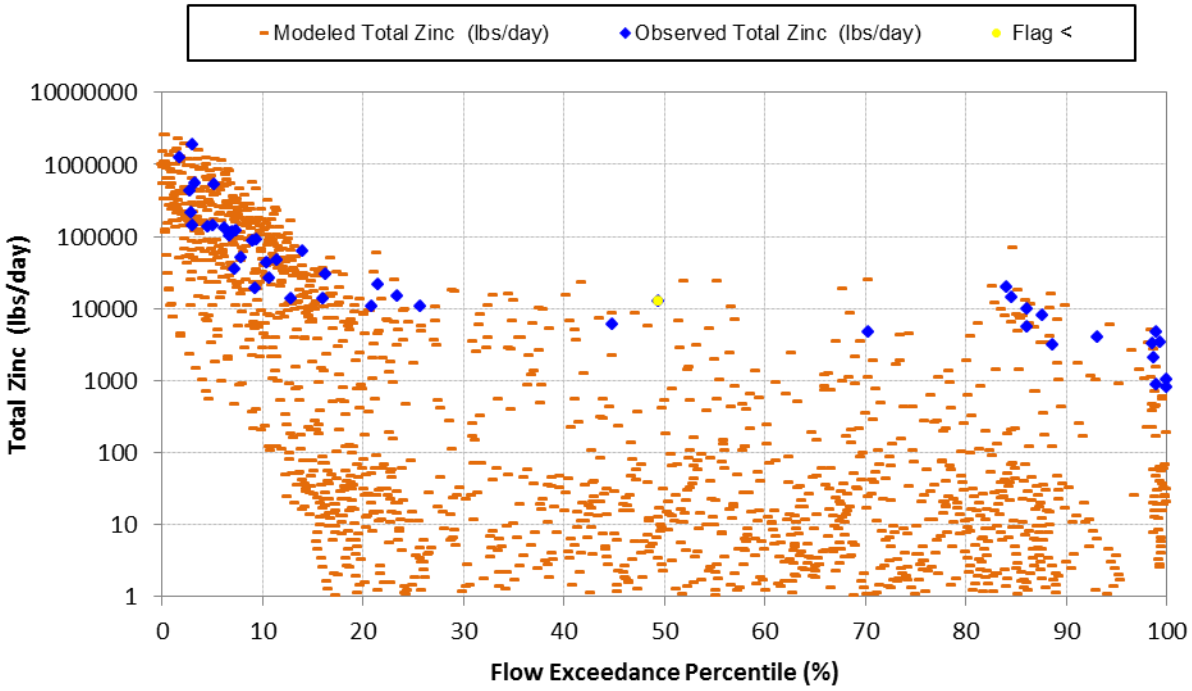


Figure 17. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

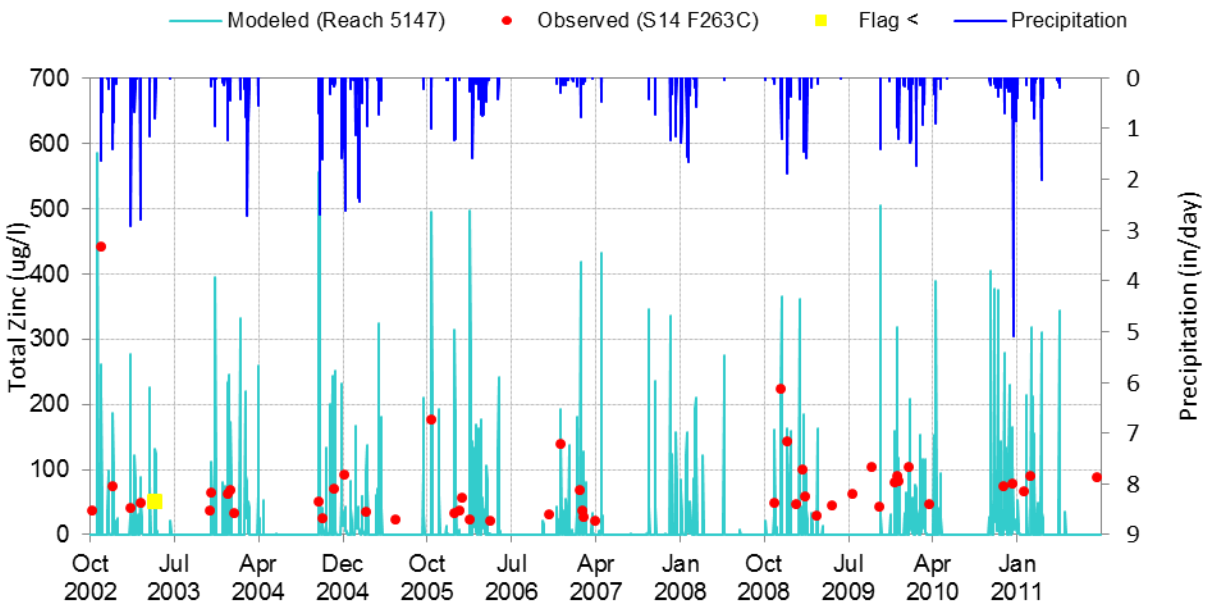


Figure 18. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

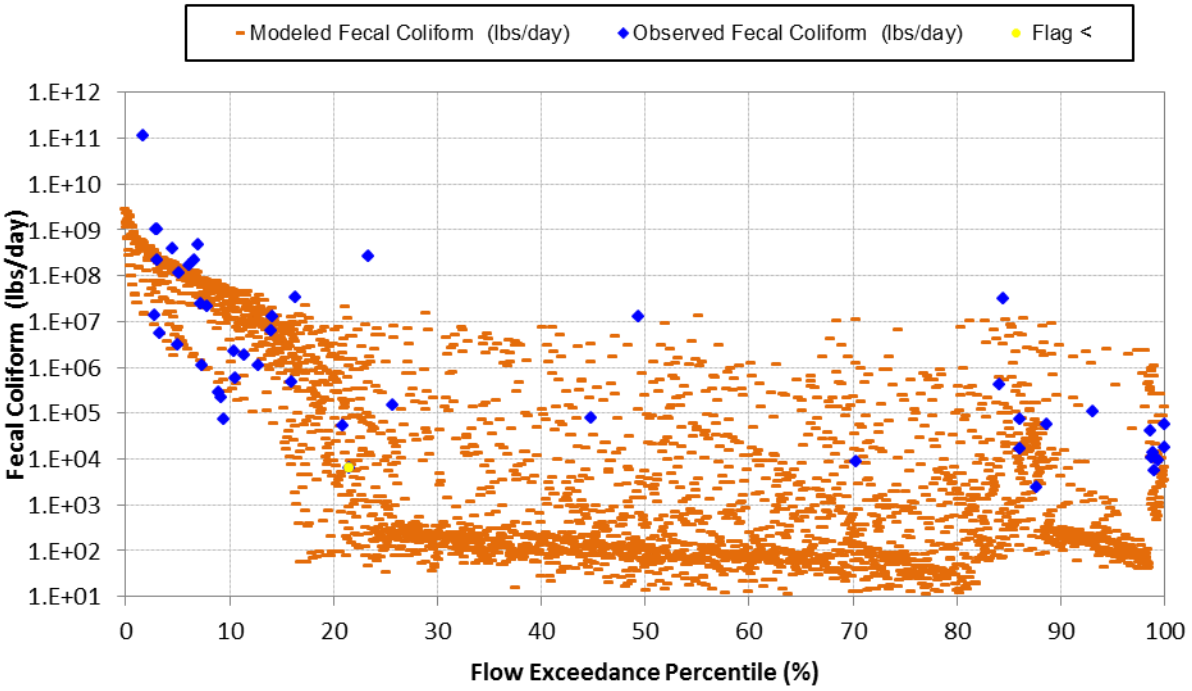


Figure 19. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011).

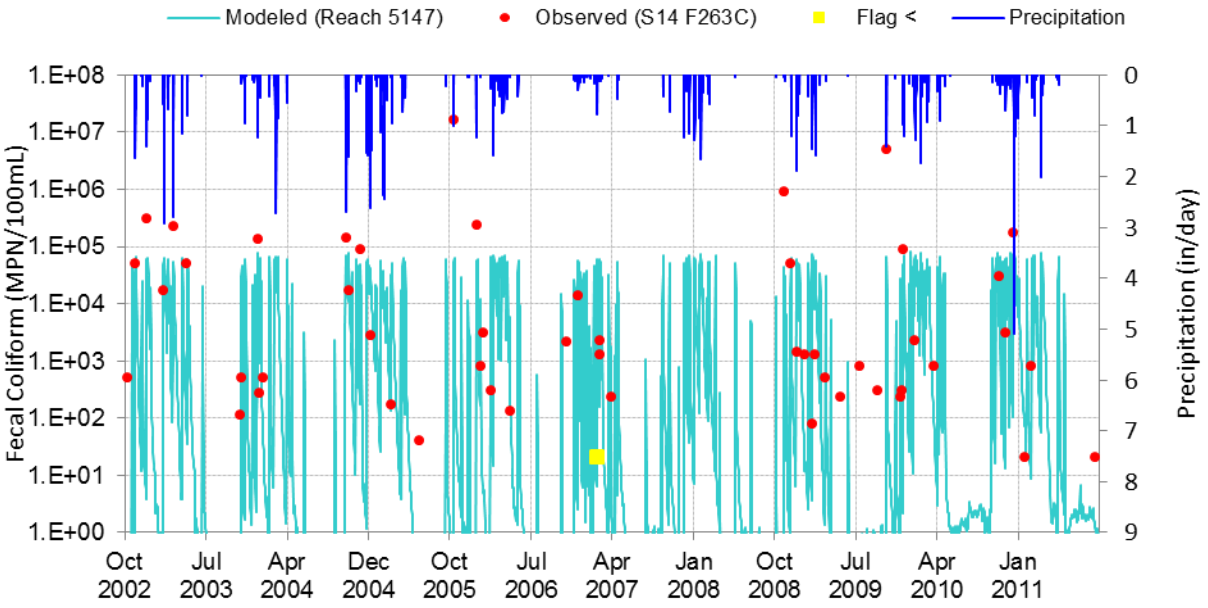


Figure 20. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011).

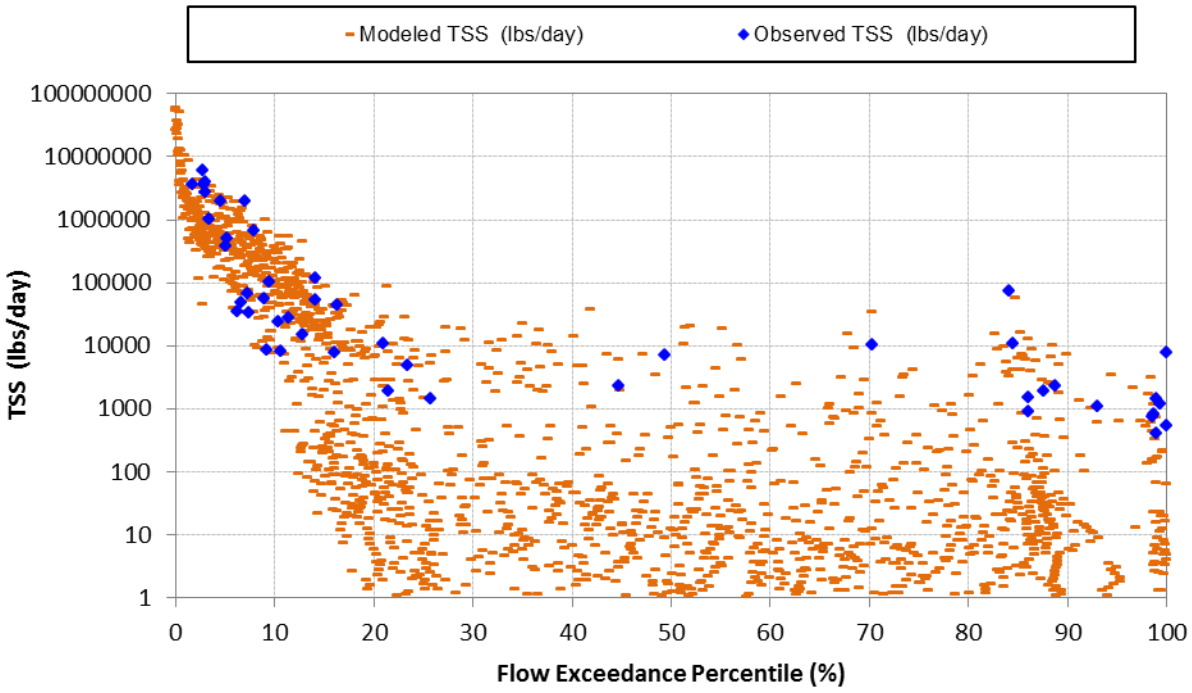


Figure 21. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011).

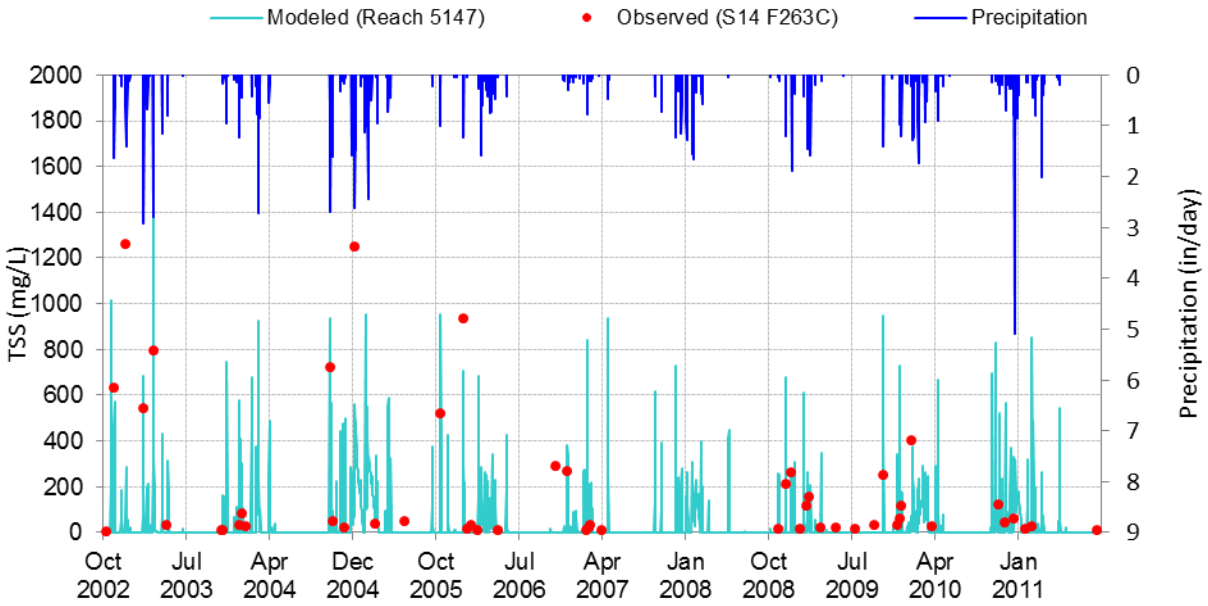


Figure 22. Simulated vs. observed time series plots for Total Sediment (10/1/2002 through 9/30/2011).

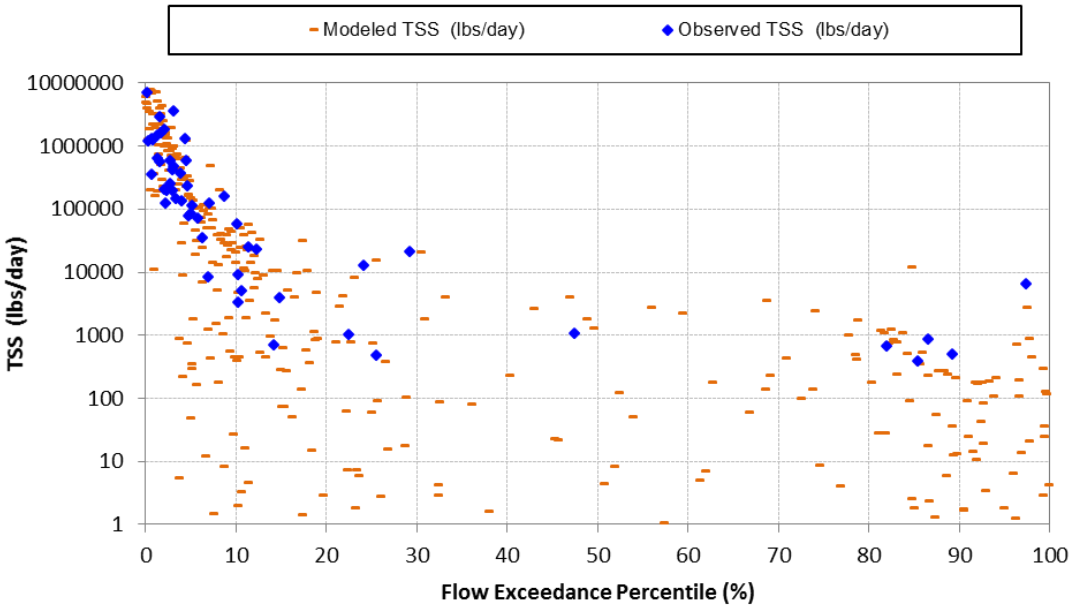


Figure 23. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011) at Coyote Creek mass emission station S13.

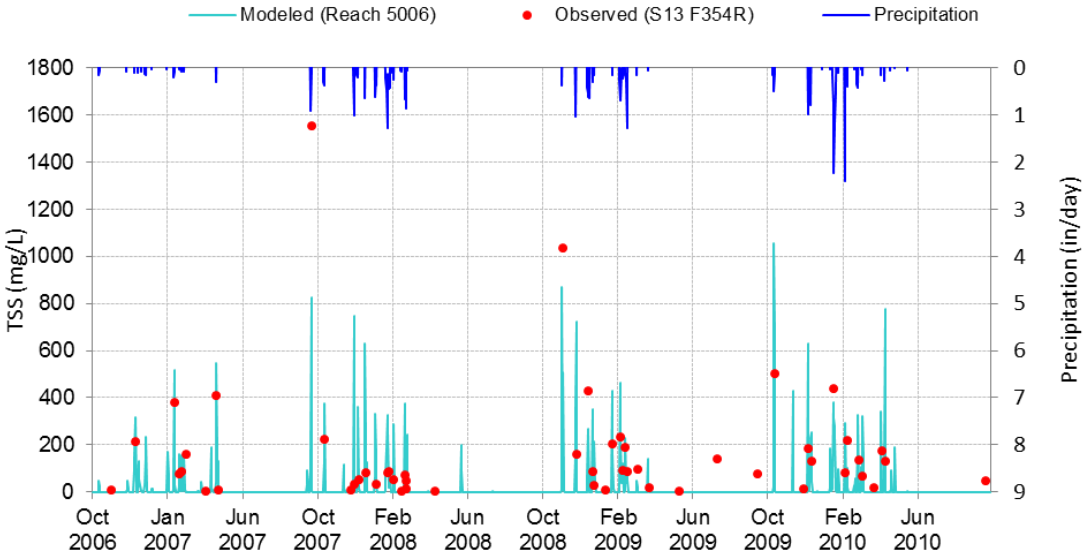


Figure 24. Simulated vs. observed timeseries plots for Total Sediment (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

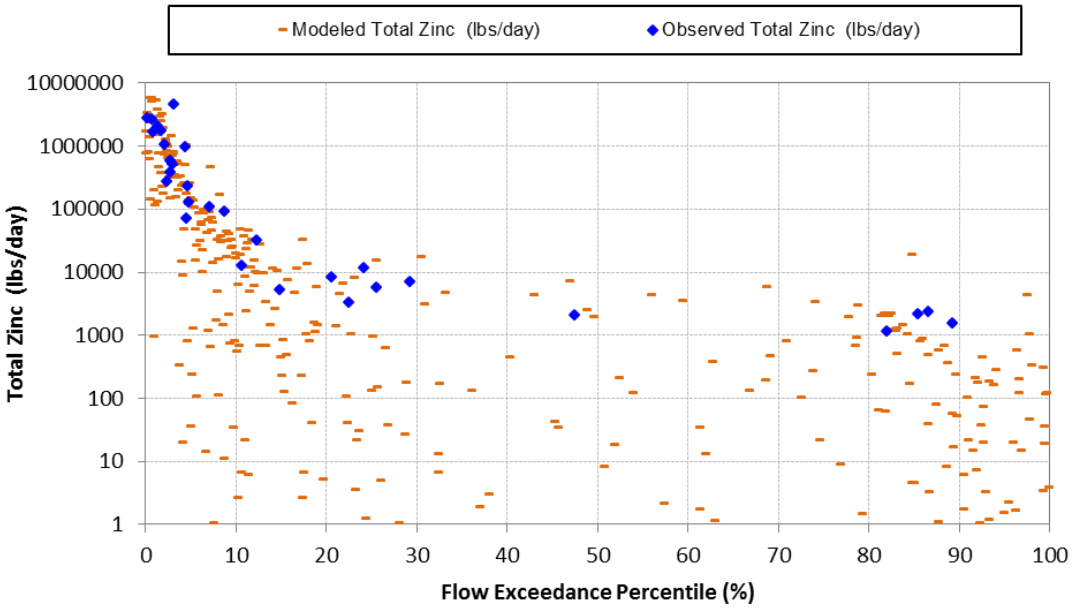


Figure 25. Simulated vs. observed load duration plots for Total Zinc (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

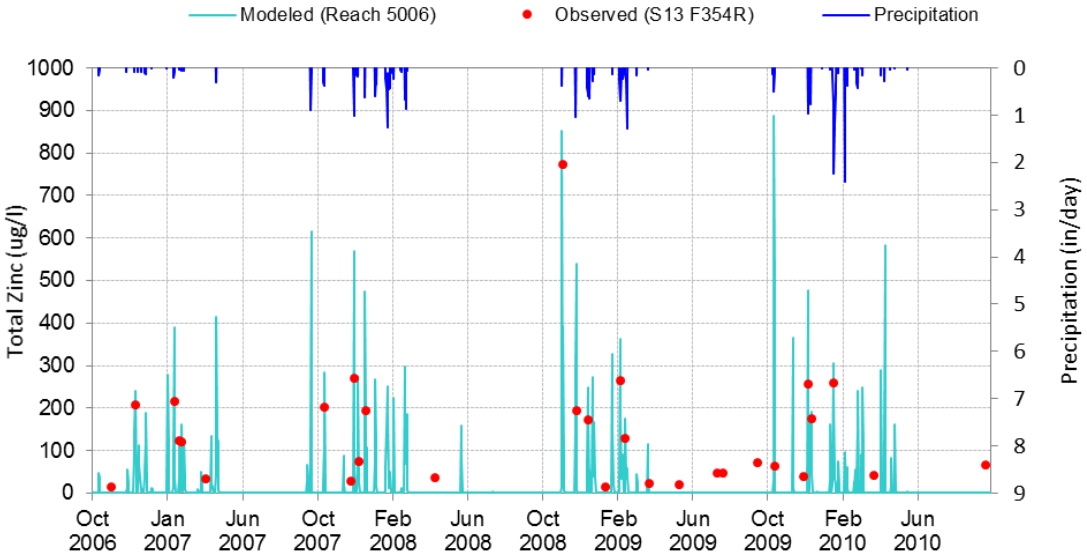


Figure 26. Simulated vs. observed timeseries plots for Total Zinc (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

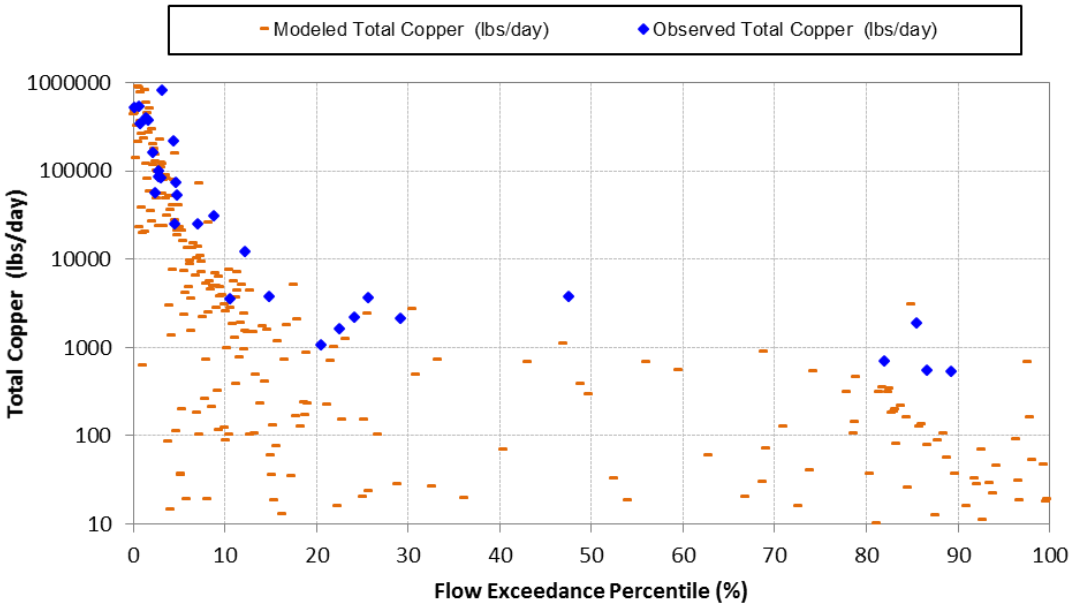


Figure 27. Simulated vs. observed load duration plots for Total Copper (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

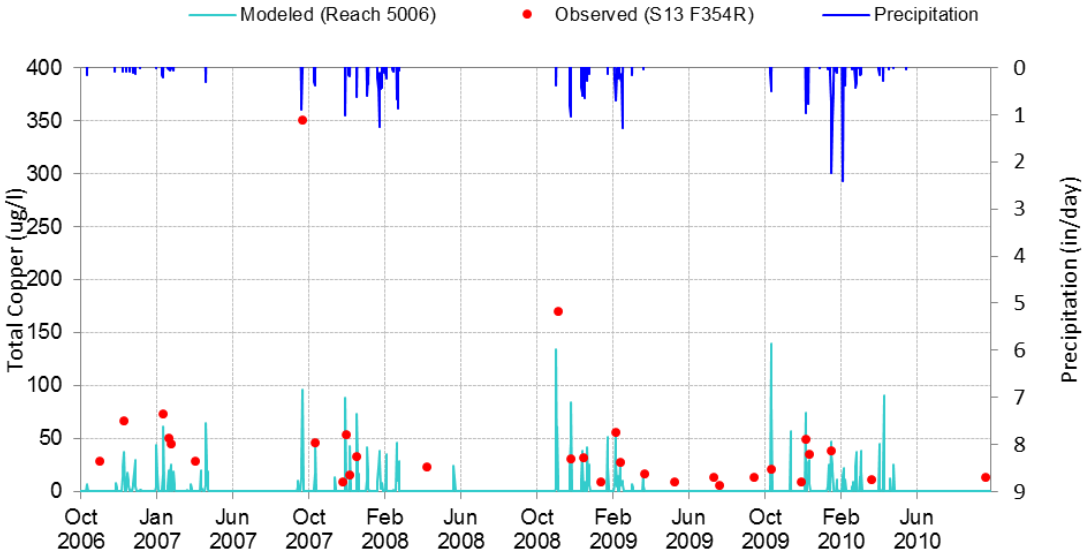


Figure 28. Simulated vs. observed timeseries plots for Total Copper (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

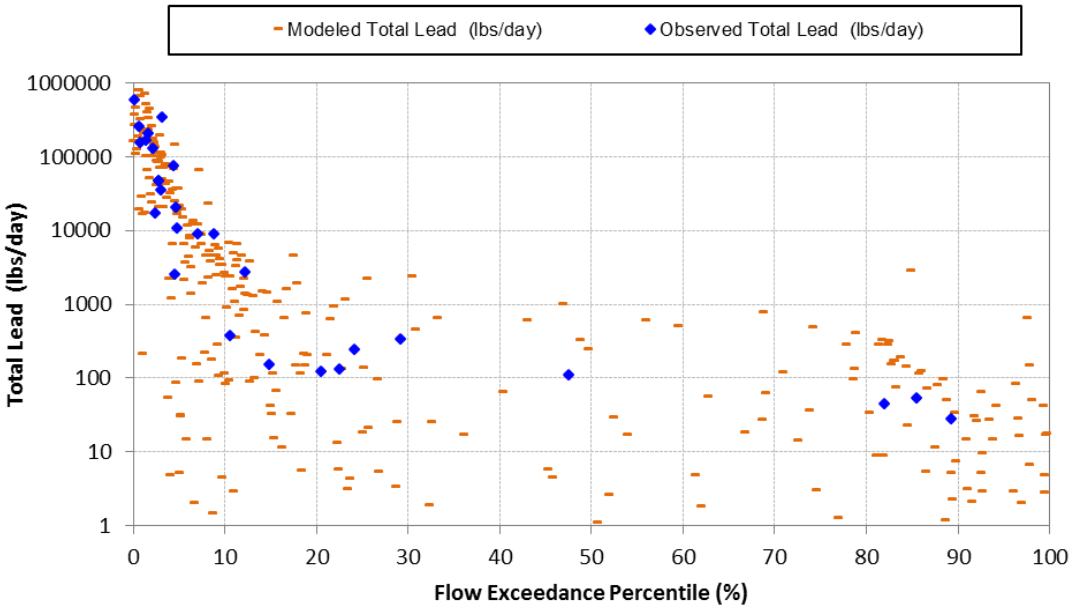


Figure 29 Simulated vs. observed load duration plots for Total Lead (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

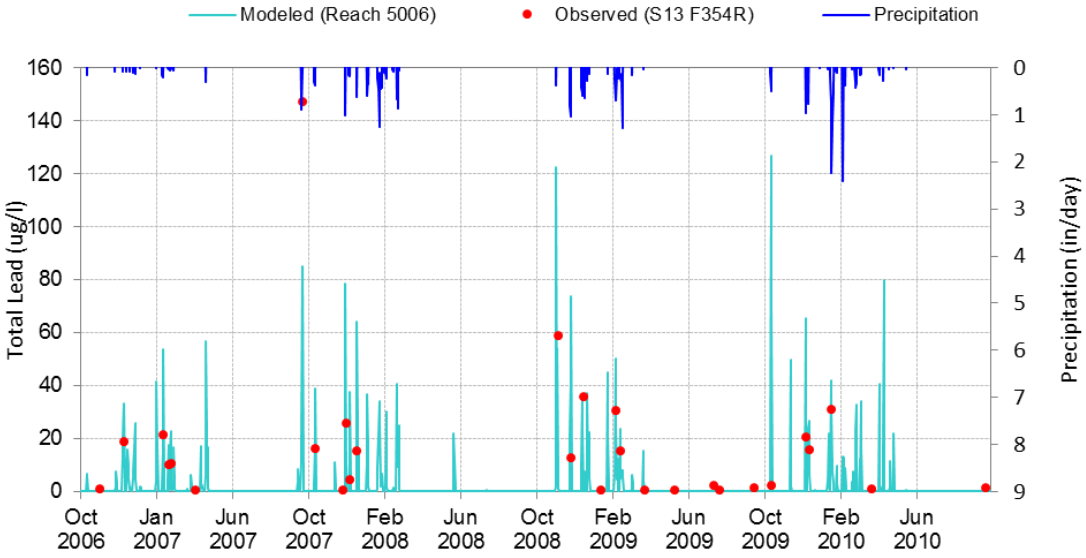


Figure 30. Simulated vs. observed timeseries plots for Total Lead (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

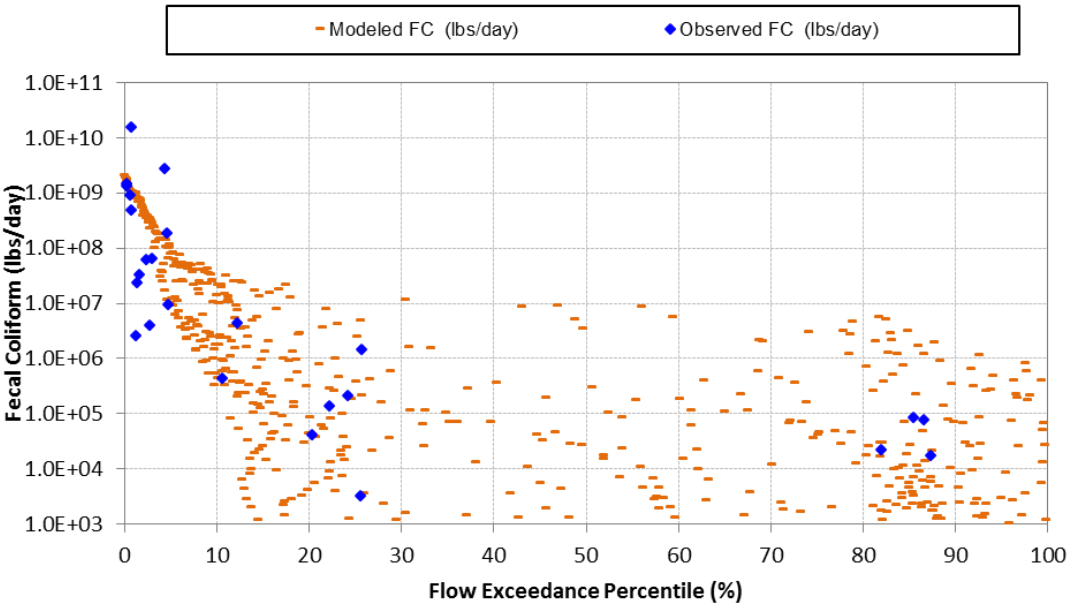


Figure 31. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

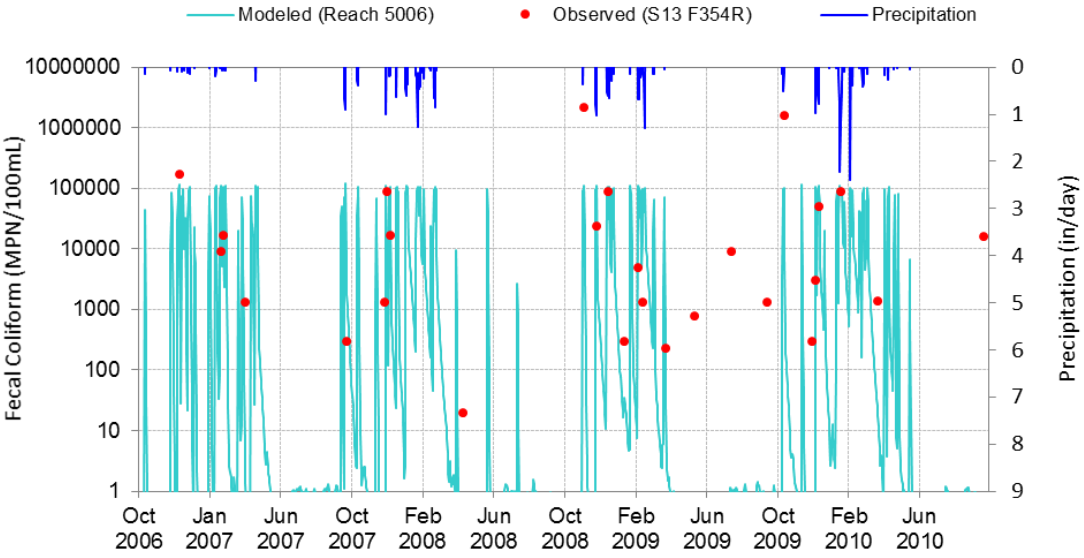


Figure 32. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2006 through 9/30/2010) at Coyote Creek mass emission station S13.

2. Lower Los Angeles River

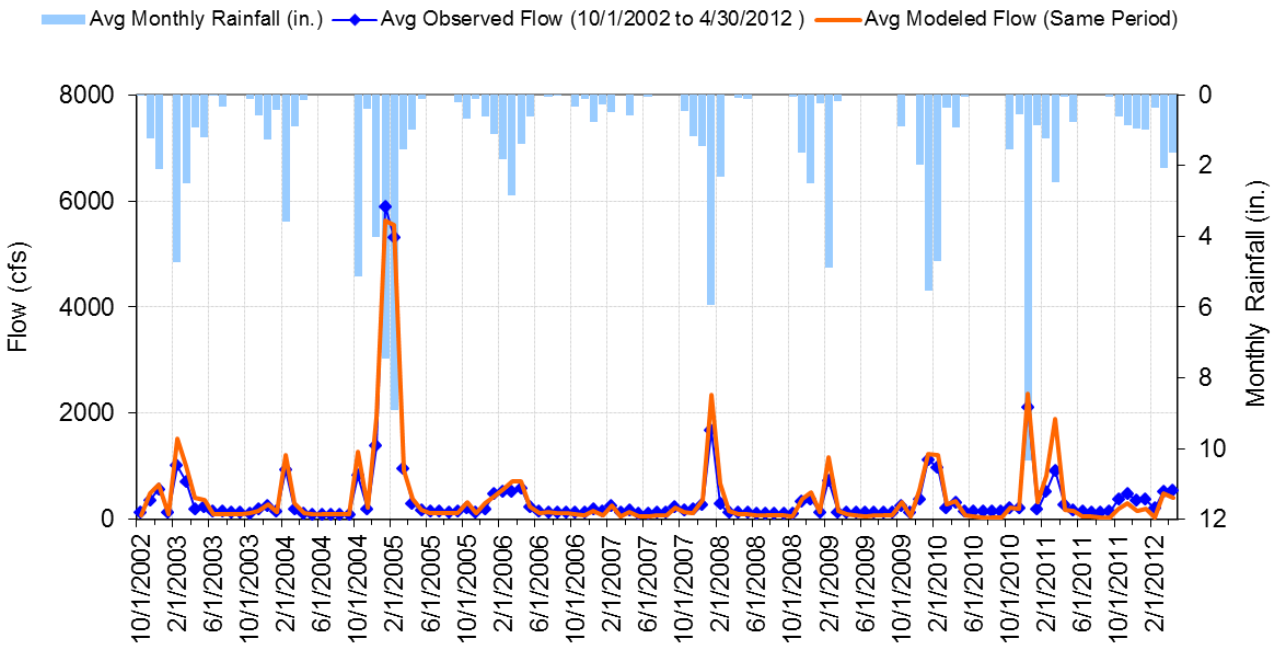


Figure 33. Monthly hydrograph for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

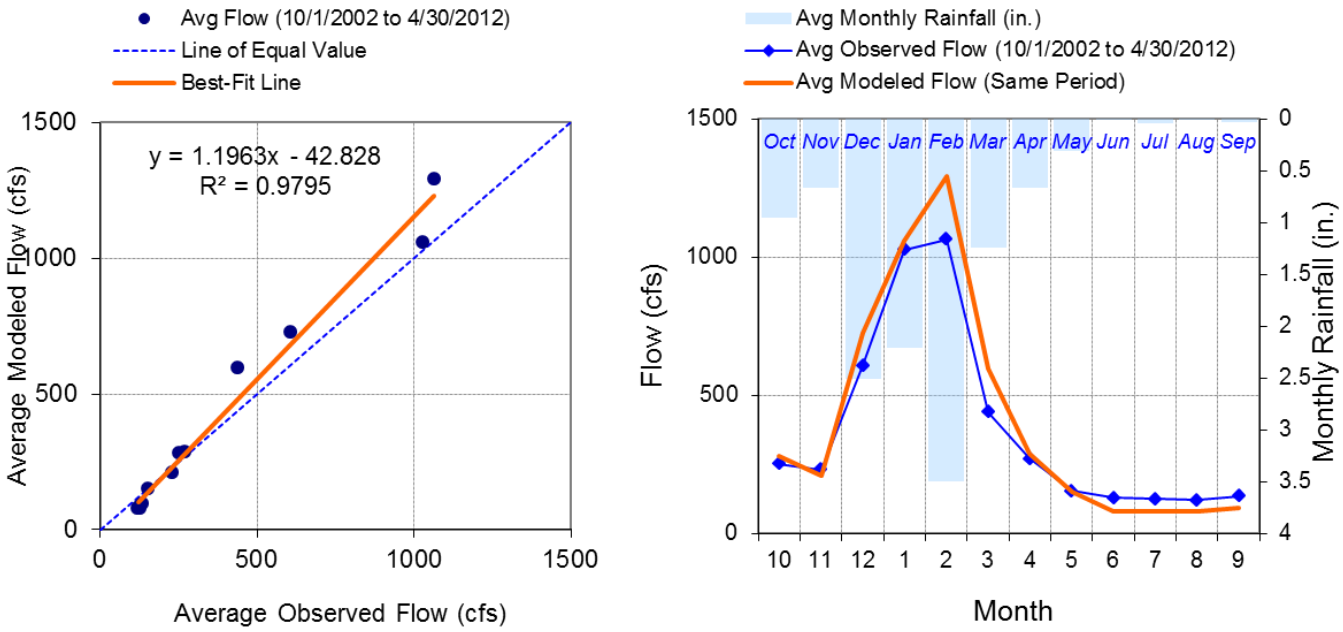


Figure 34. Aggregated monthly hydrograph for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

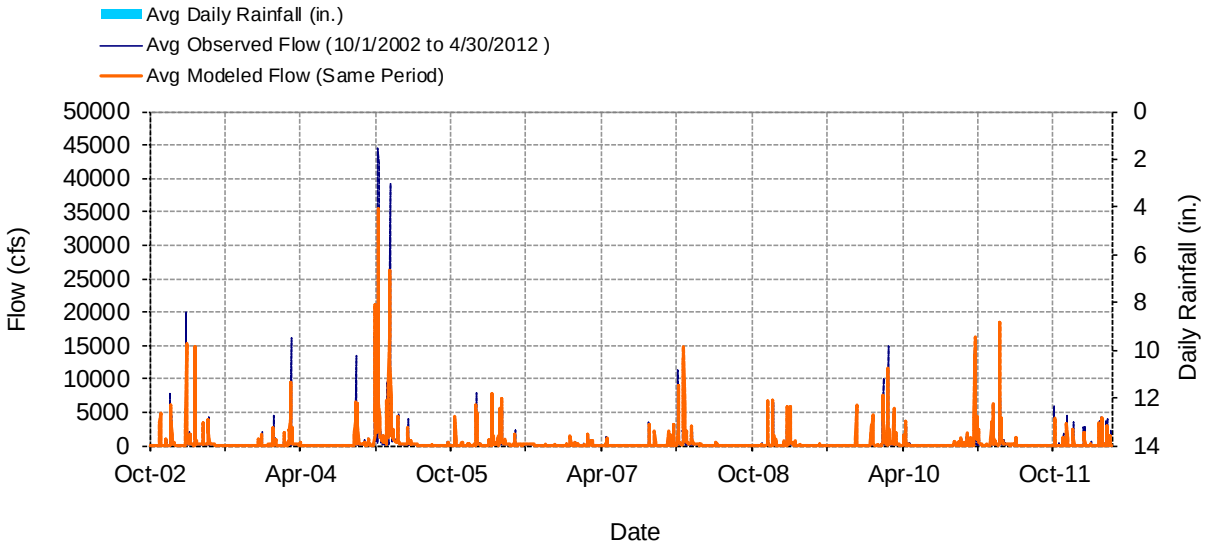


Figure 35. Mean daily flow for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

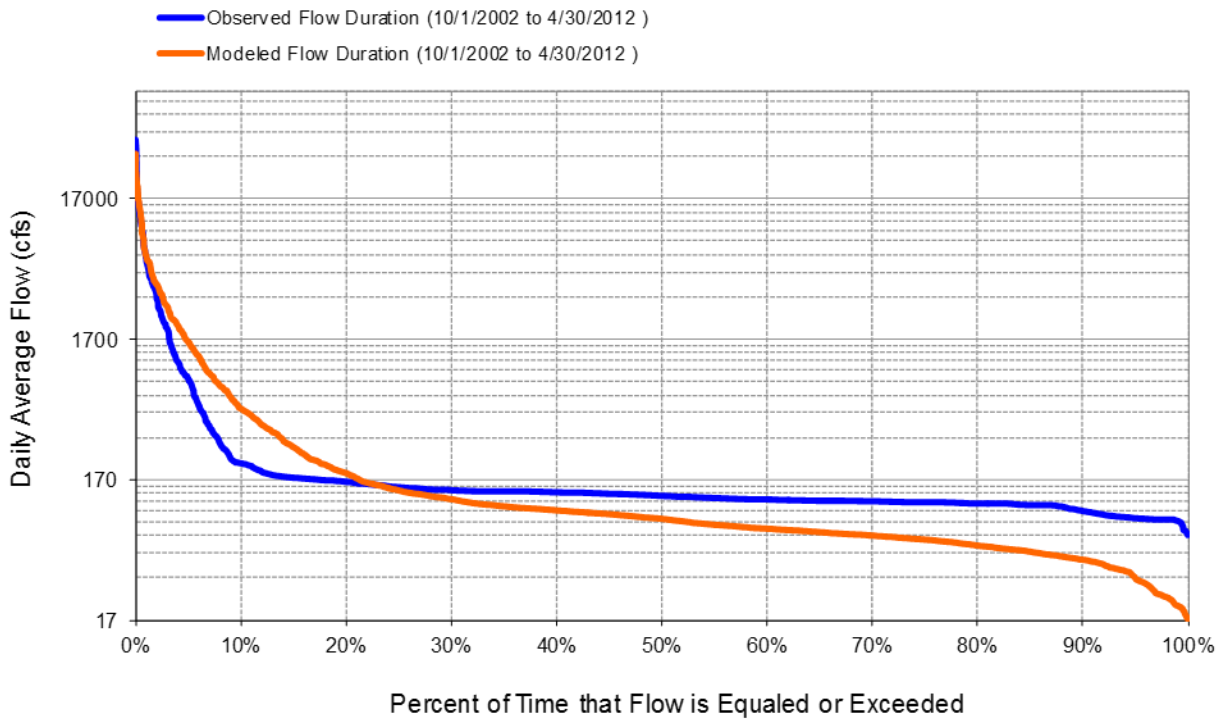


Figure 36. Daily flow exceedance for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

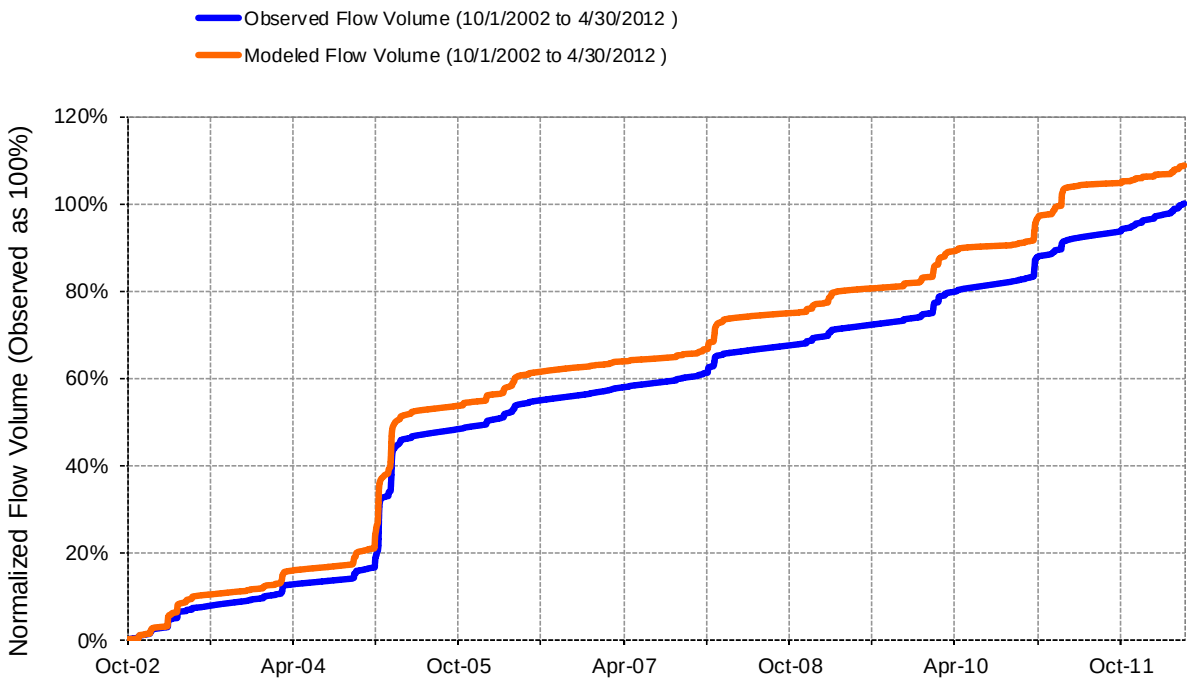


Figure 37. Flow accumulation for LA DPW Los Angeles River below Wardlow Road (10/1/2002 – 9/30/2011).

Table 2. Summary of water quality data evaluated for the Lower Los Angeles River

Gage	Constituent	Minimum	Q1	Median	Q3	Maximum
S10	Total Copper (ug/l)	0.5	12.975	25.8	49.55	424
S10	Total Lead (ug/l)	0.2	2.45	15.6	35.775	1070
S10	TSS (mg/L)	1	63	142.5	295	2280
S10	Total Zinc (ug/l)	22.3	63.85	124	261.75	2590
S10	Fecal Coliform (MPN/100mL)	20	500	24000	240000	24000000
S10	Total Nitrogen (mg/l)	0.03	0.60245	1.064	1.725	6.75
S10	Total Phosphorous (mg/l)	0.05	0.24	0.3785	0.538	8.24

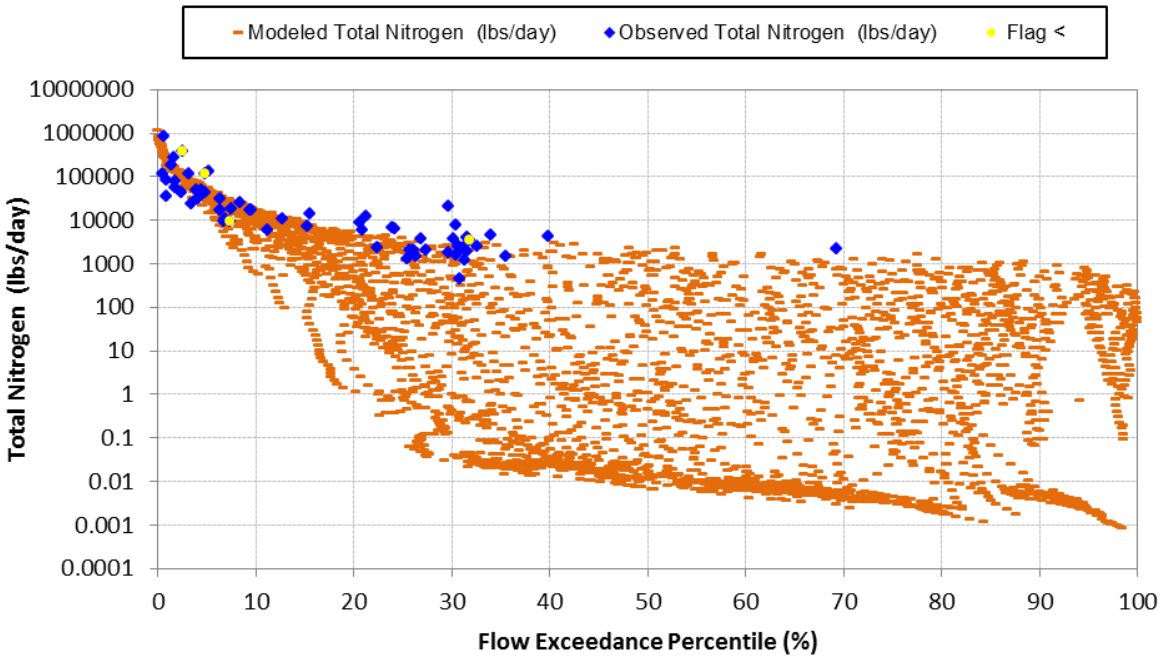


Figure 38. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

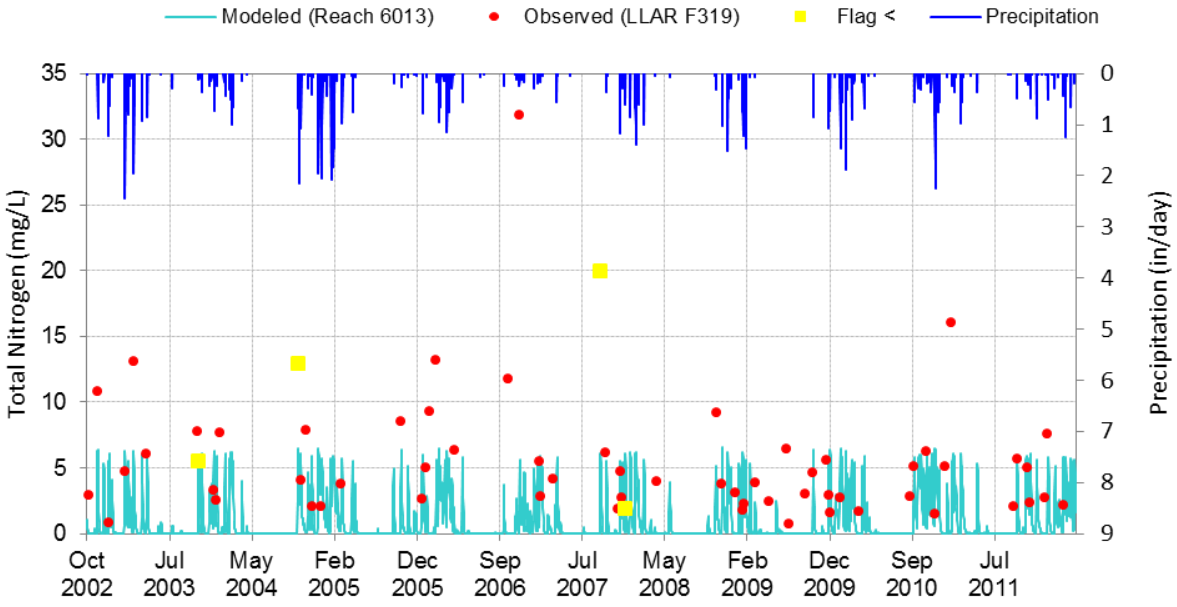


Figure 39. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

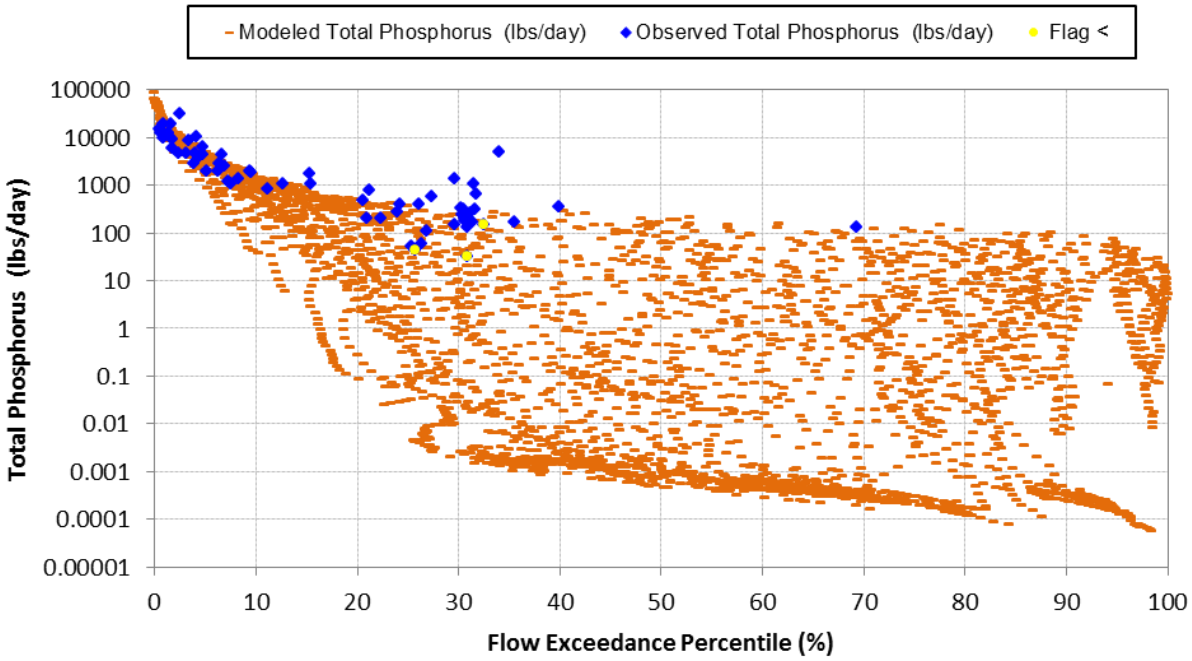


Figure 40. Simulated vs. observed load duration plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

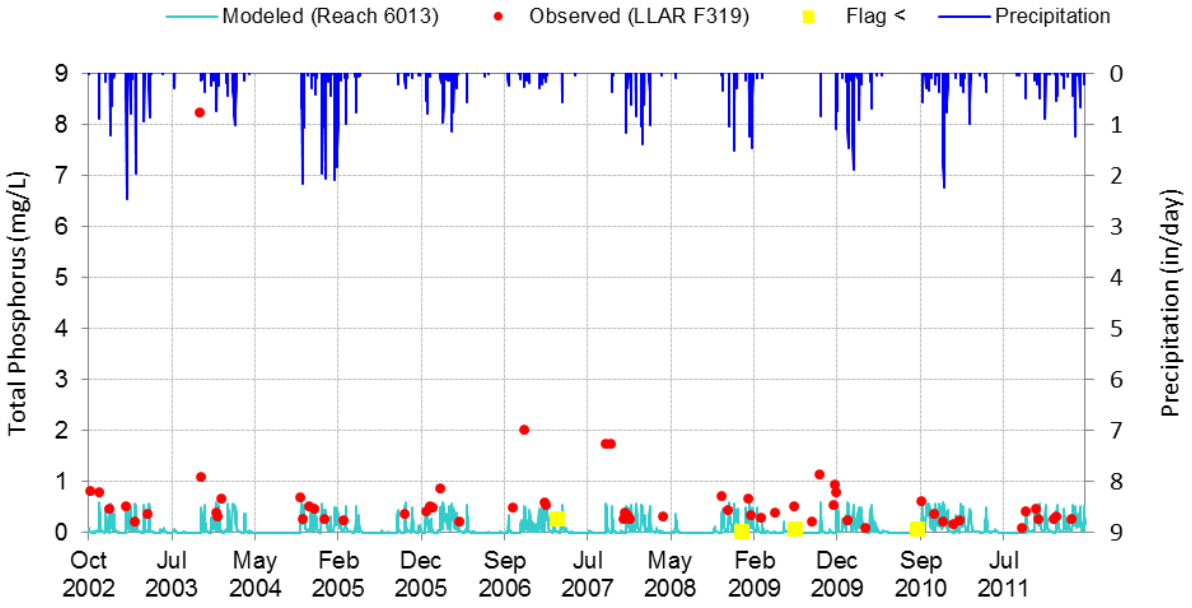


Figure 41. Simulated vs. observed time series plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

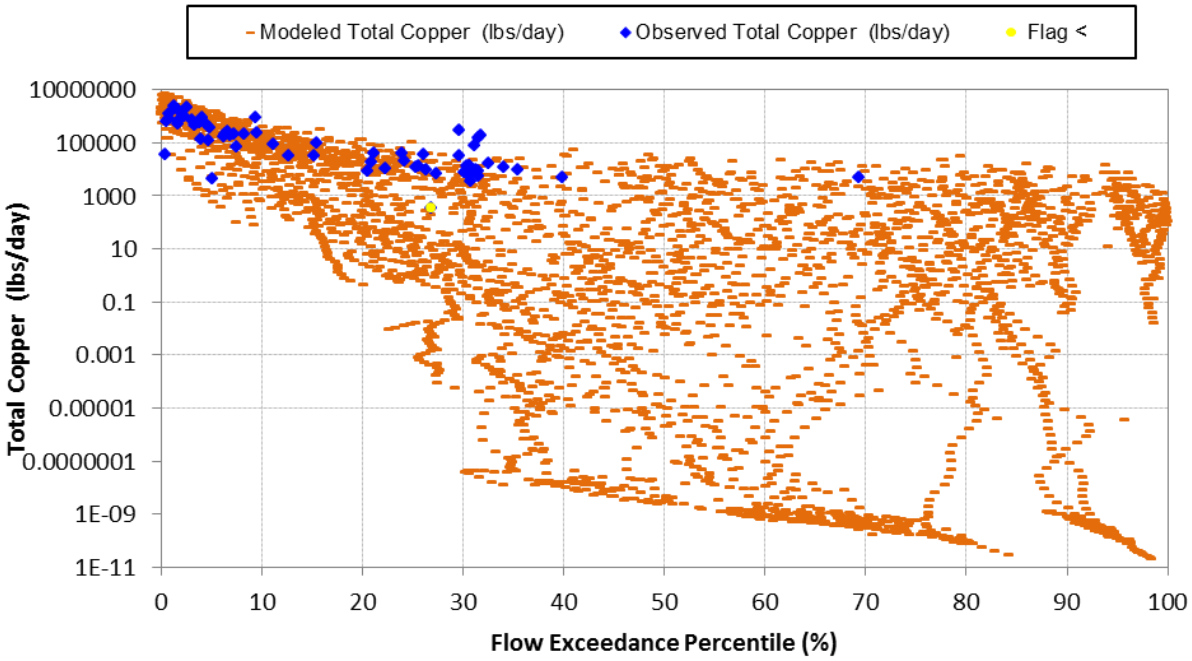


Figure 42. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

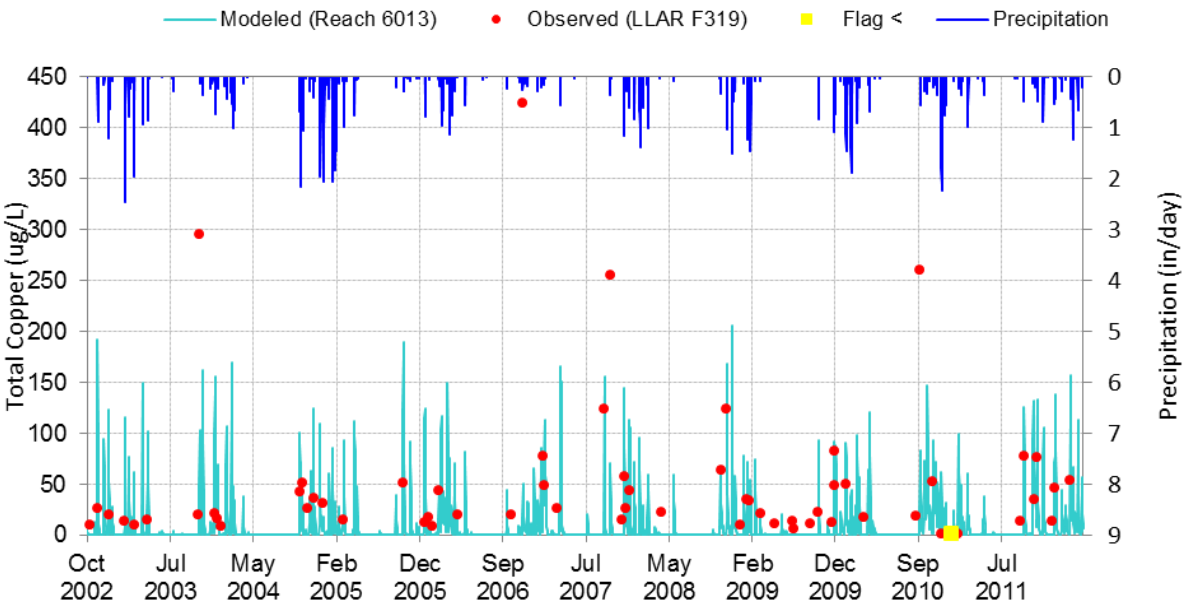


Figure 43. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

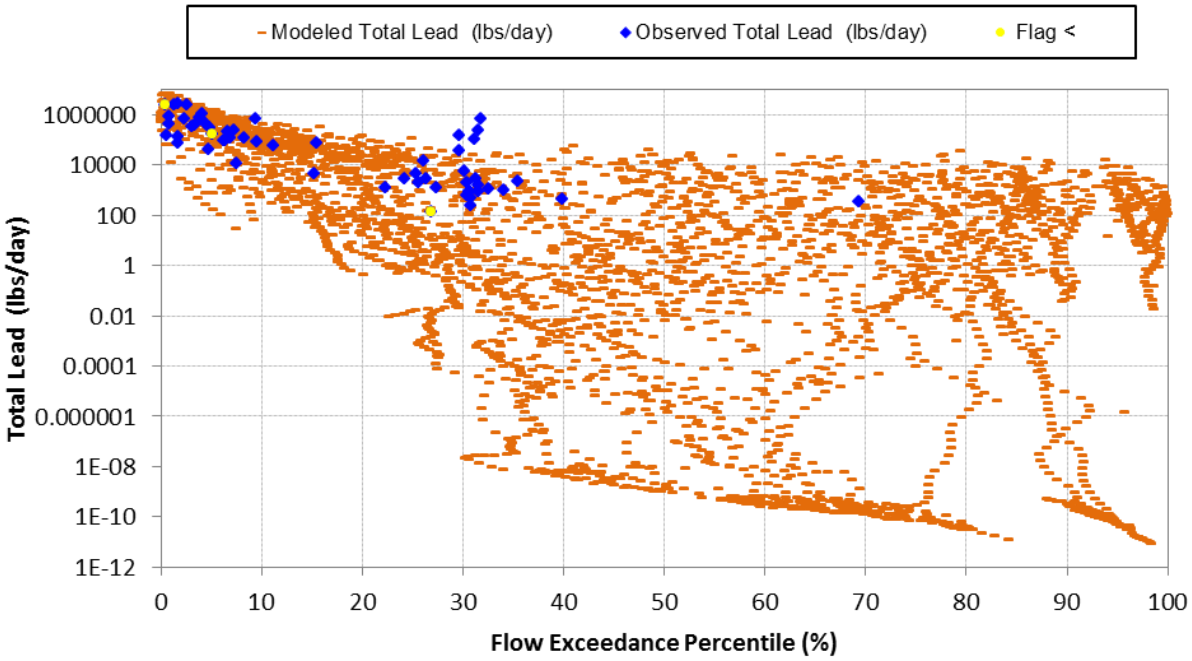


Figure 44. Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

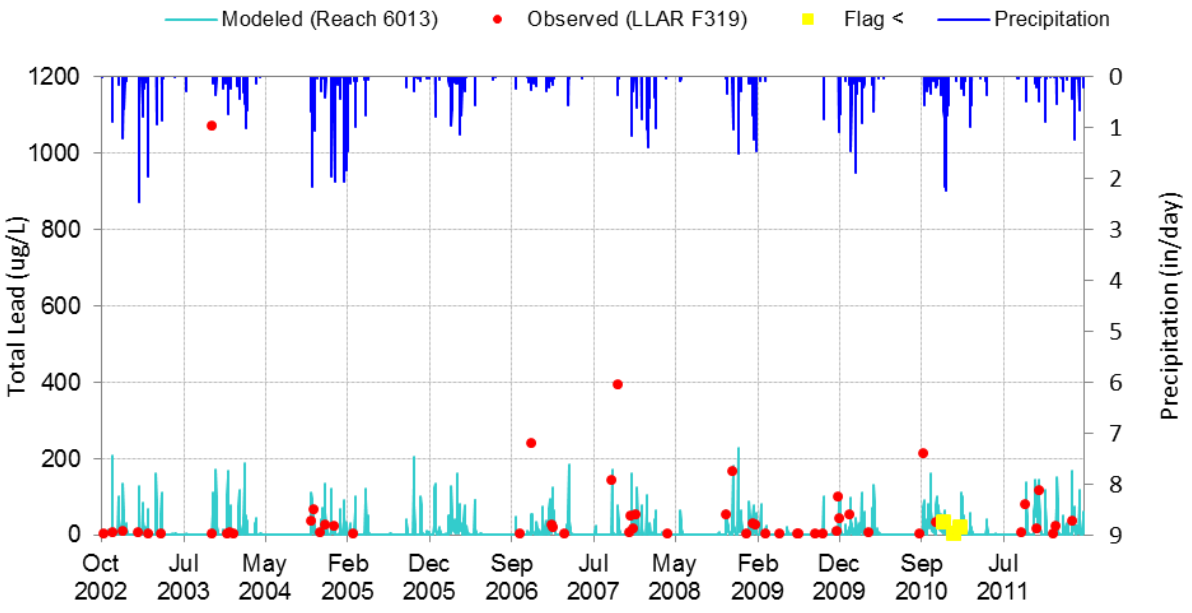


Figure 45. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

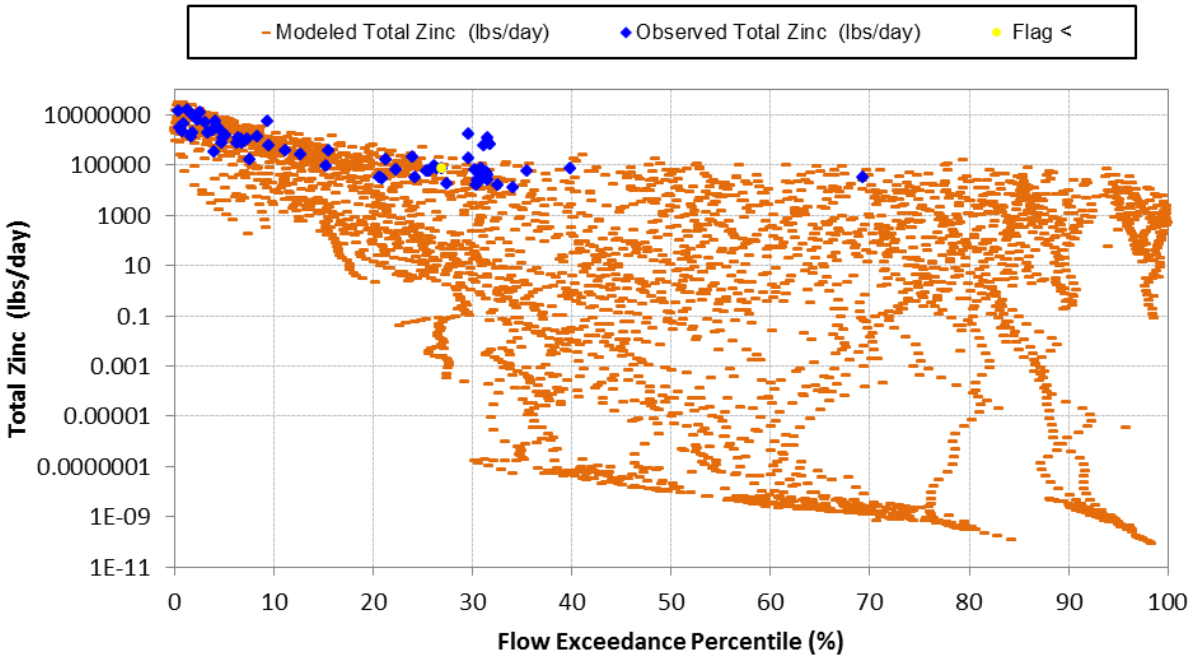


Figure 46. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

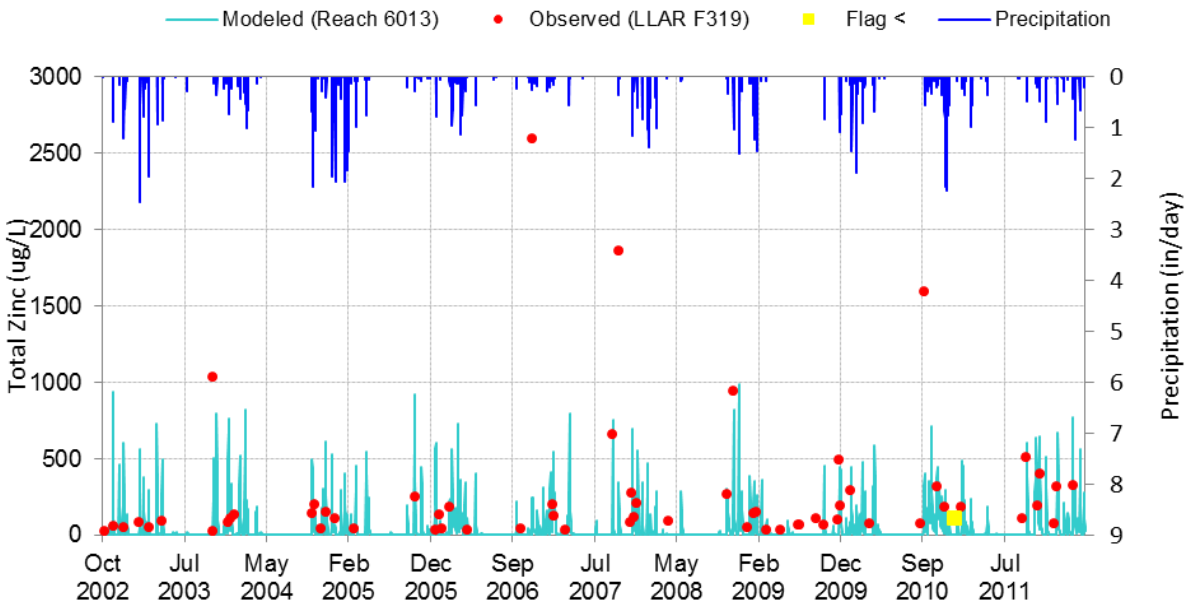


Figure 47. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

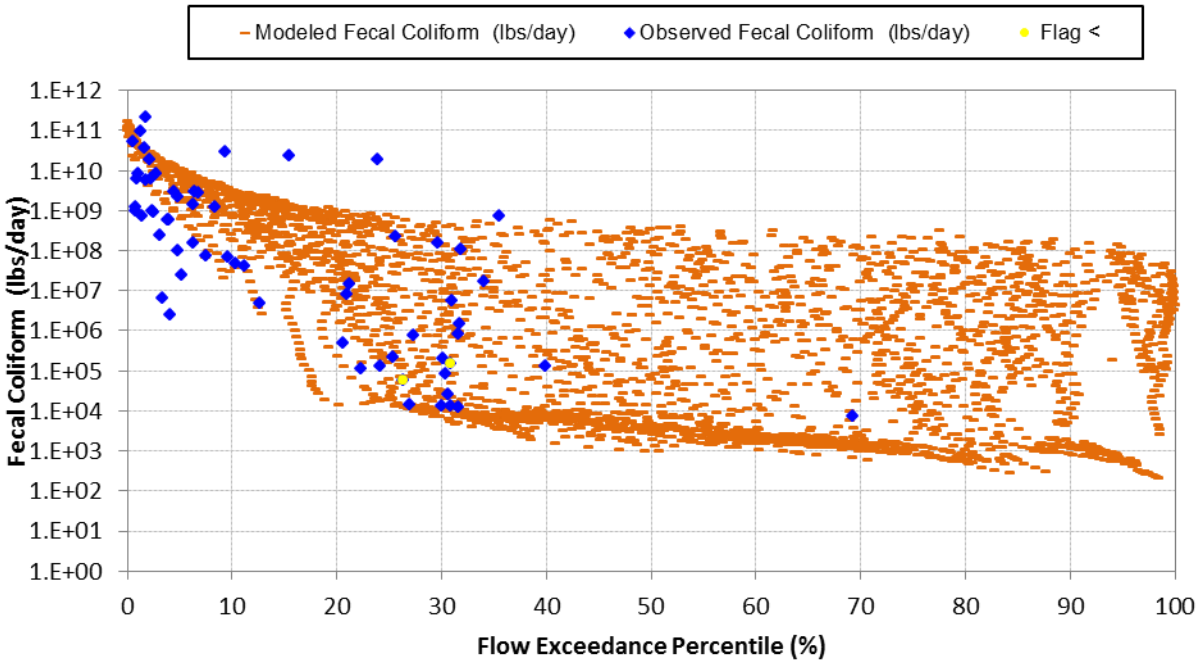


Figure 48. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

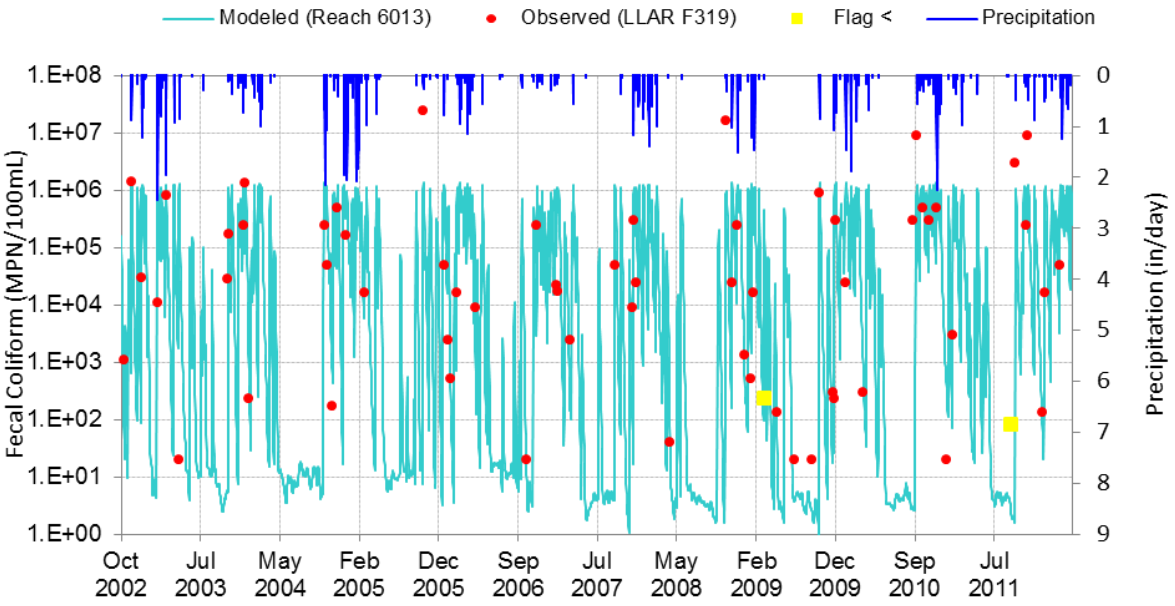


Figure 49. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

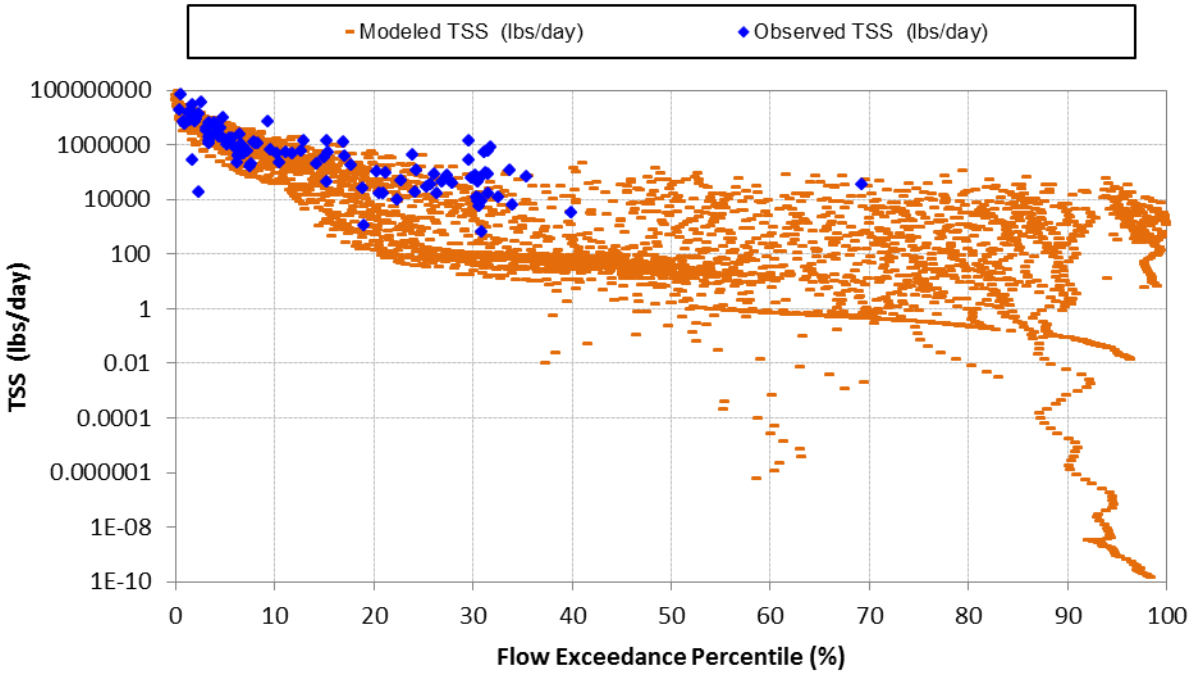


Figure 50. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

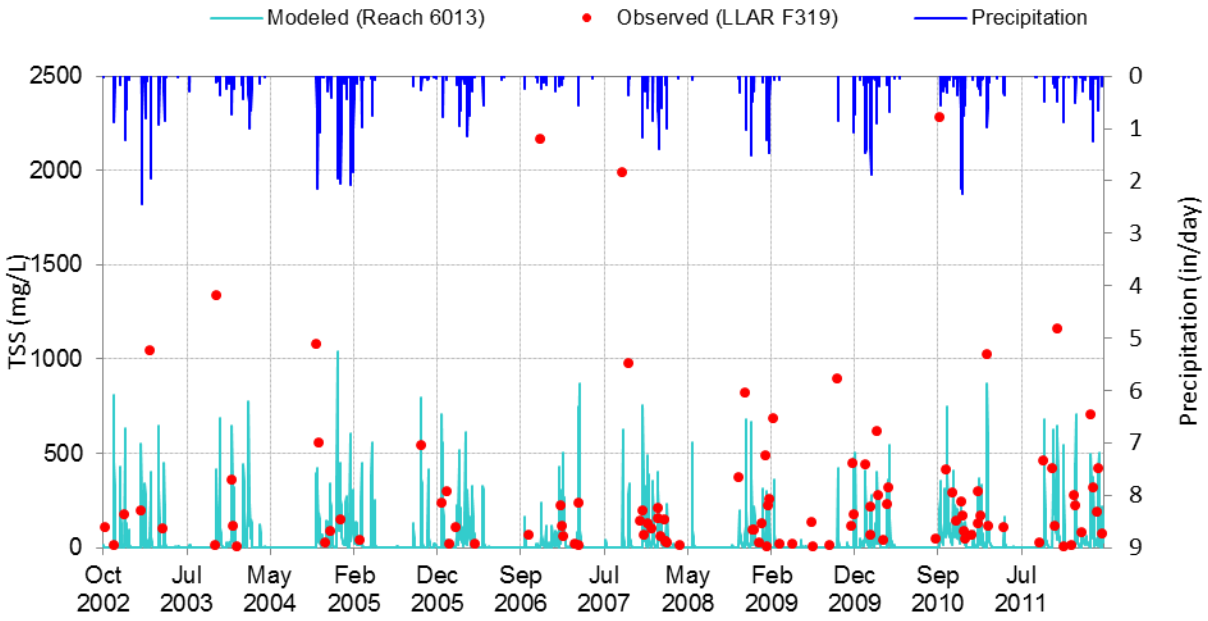


Figure 51. Simulated vs. observed time series plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

3. Los Cerritos Channel

Table 3. Summary of water quality data evaluated for Los Cerritos Channel

Gage	Constituent	Minimum	Q1	Median	Q3	Maximum
Stearns St.	Total Copper (ug/l)	8.4	17.25	25	43.5	240
Stearns St.	Total Lead (ug/l)	0.78	3.025	17	41.75	370
Stearns St.	TSS (mg/L)	2	52.5	110	210	1700
Stearns St.	Total Zinc (ug/l)	9.5	33	180	390	2600
Stearns St.	Fecal Coliform (MPN/100mL)	18	2275	8000	28500	1600000
Stearns St.	Total Nitrogen (mg/l)	0.9	2.147	3.292	4.532	23.7
Stearns St.	Total Phosphorous (mg/l)	0.083	0.22	0.53	0.91	6.2

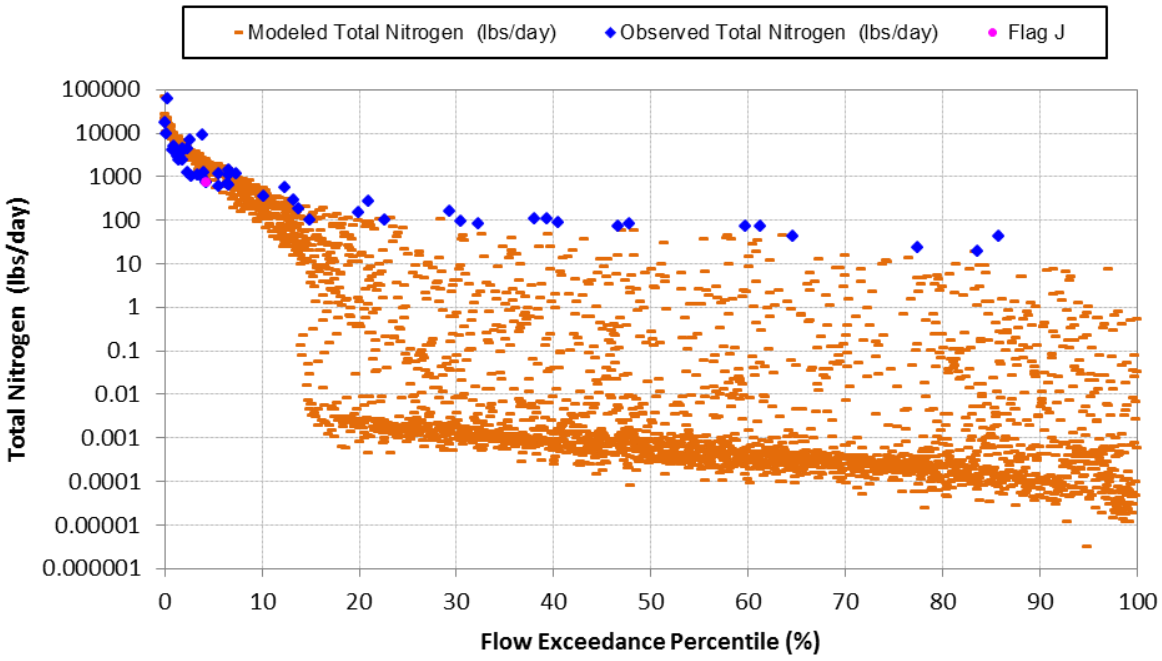


Figure 52. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

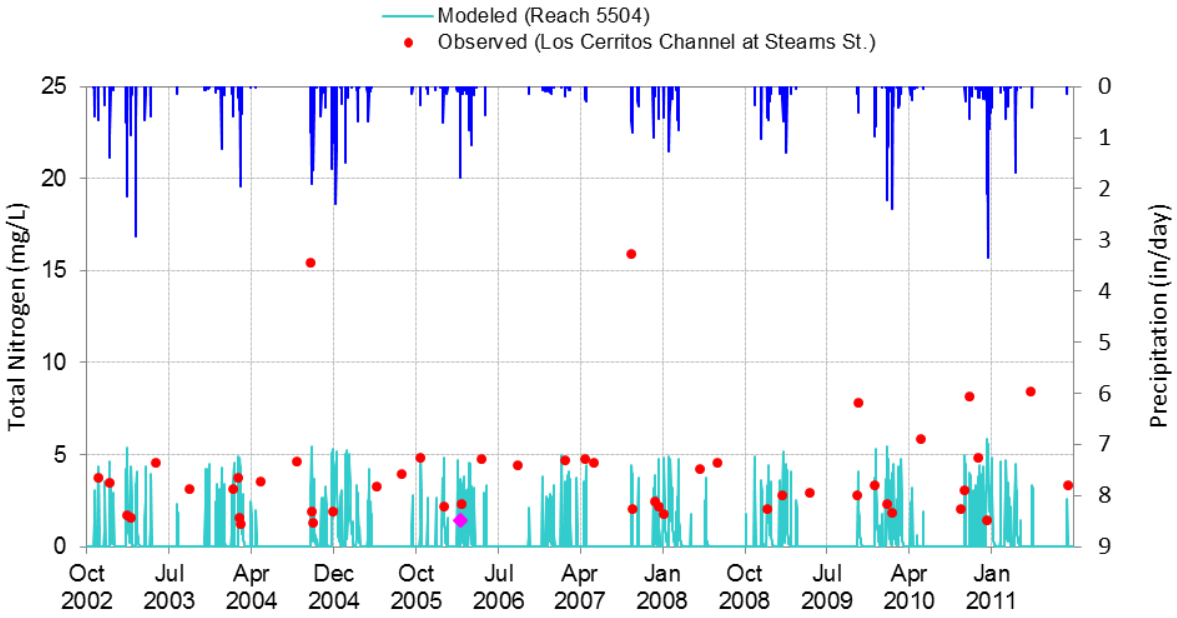


Figure 53. Simulated vs. observed time series plots for Total Nitrogen (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

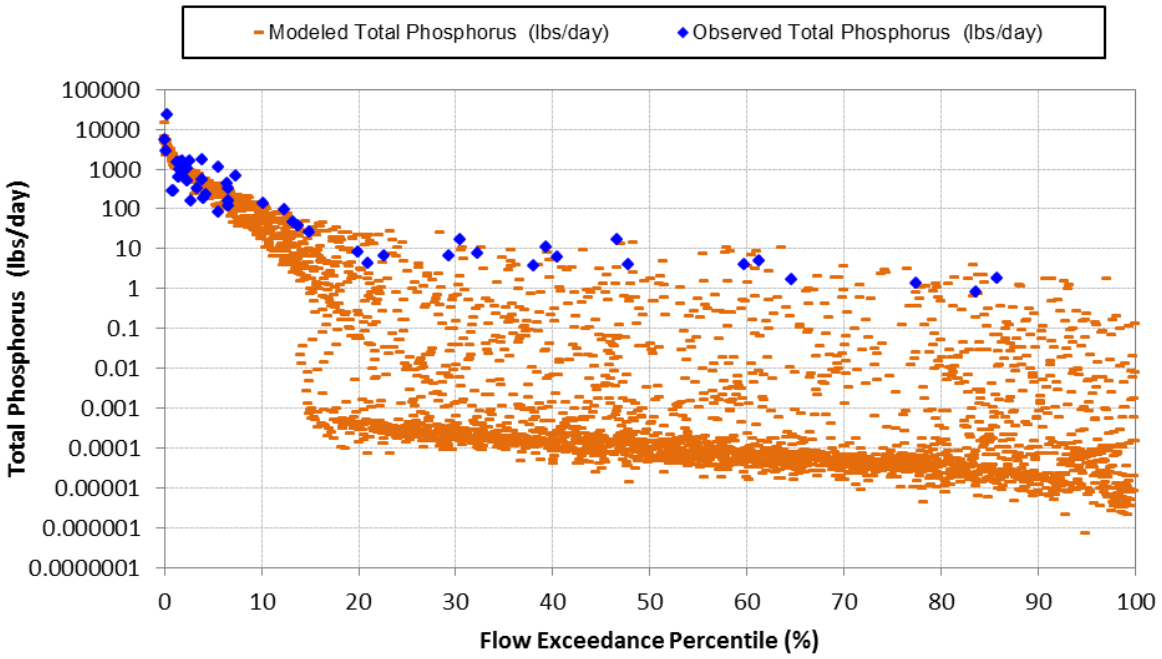


Figure 54. Simulated vs. observed load duration plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

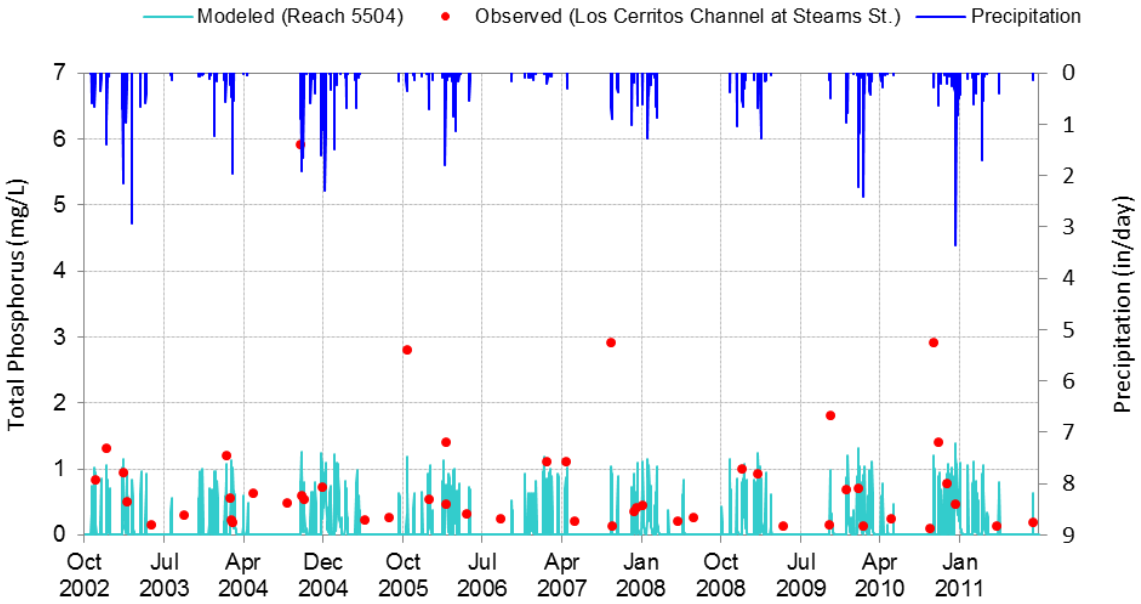


Figure 55. Simulated vs. observed time series plots for Total Phosphorous (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

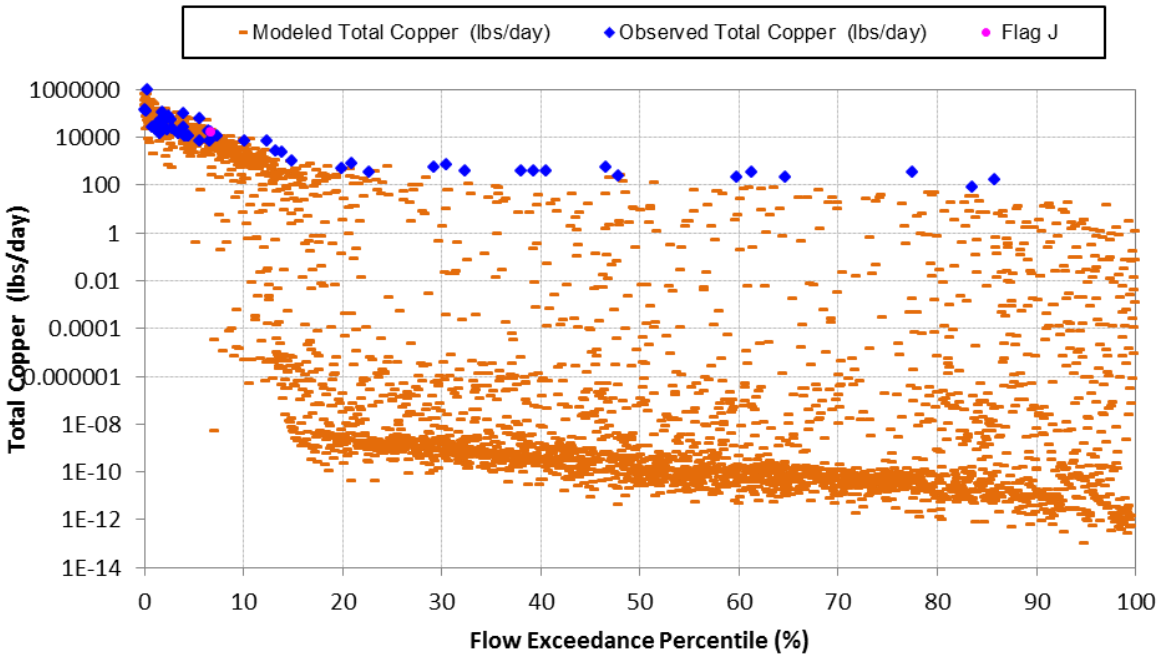


Figure 56. Simulated vs. observed load duration plots for Total Copper (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

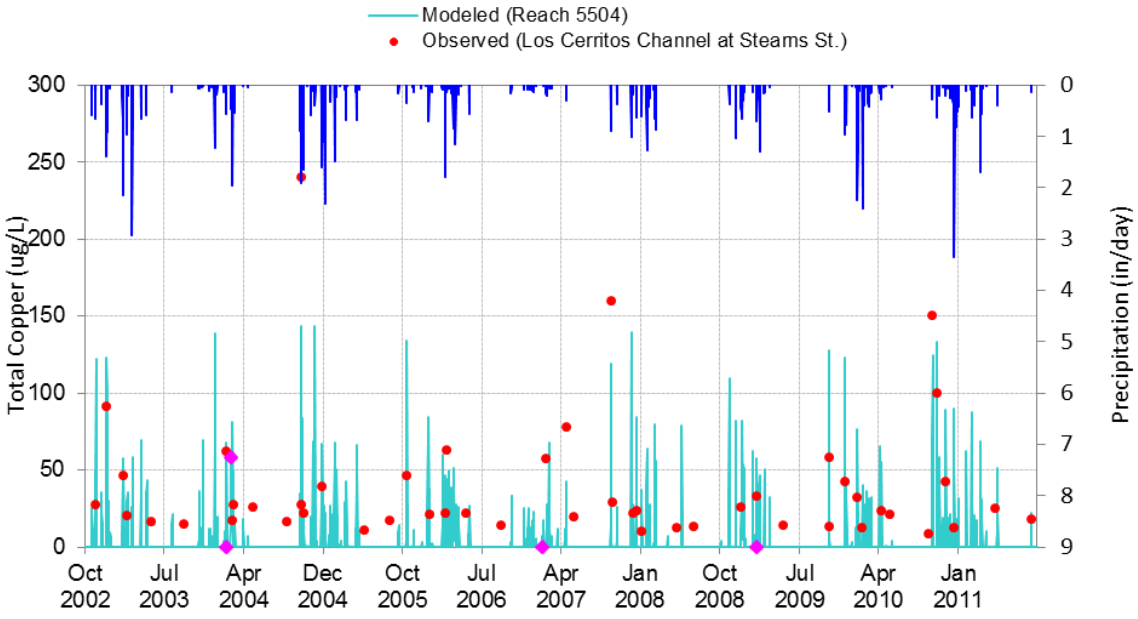


Figure 57. Simulated vs. observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

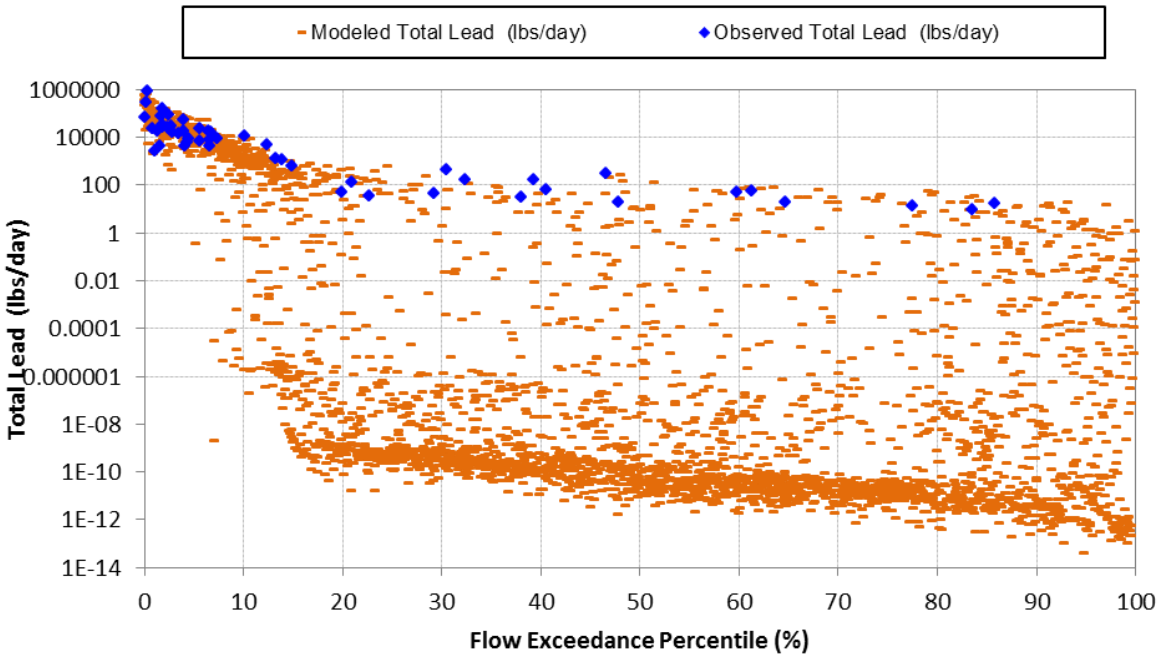


Figure 58. Simulated vs. observed load duration plots for Total Lead (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

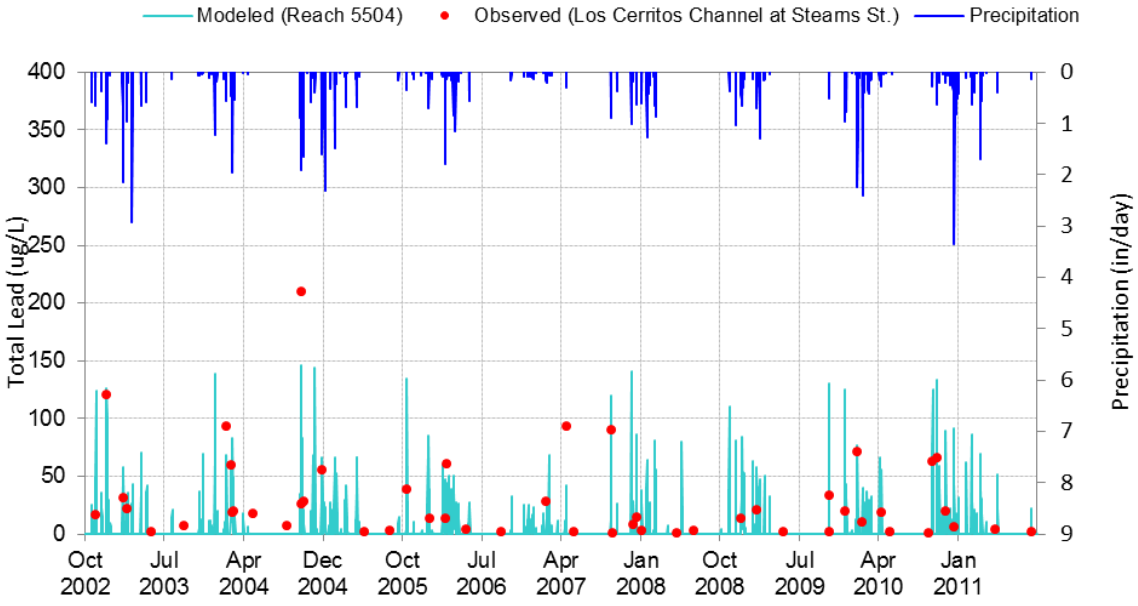


Figure 59. Simulated vs. observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

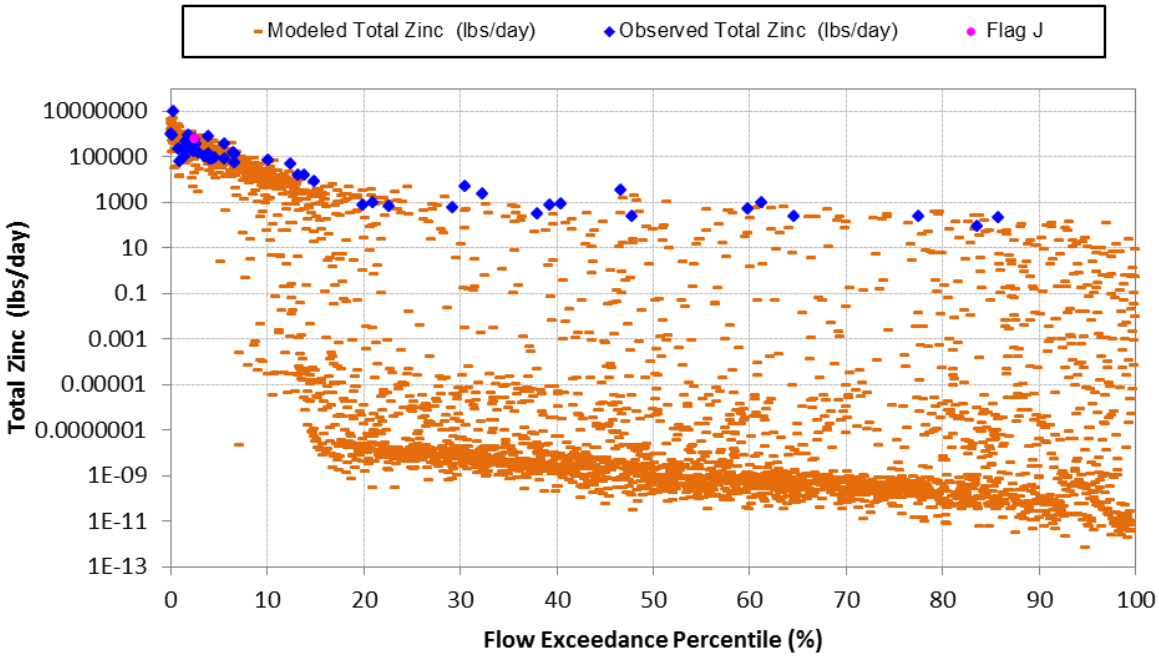


Figure 60. Simulated vs. observed load duration plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

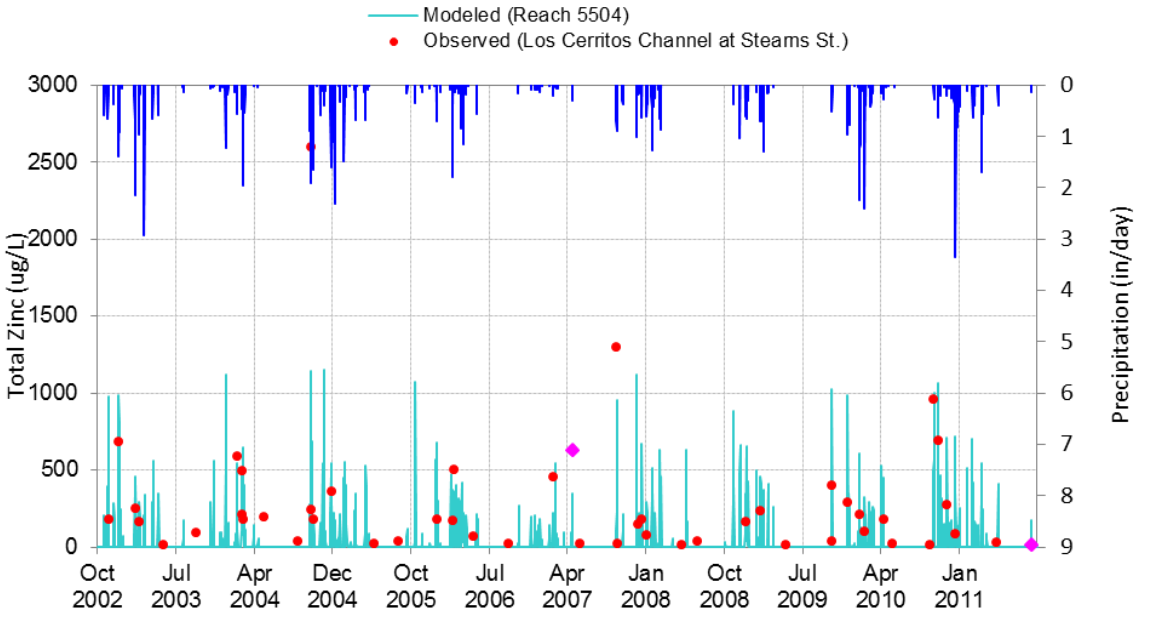


Figure 61. Simulated vs. observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

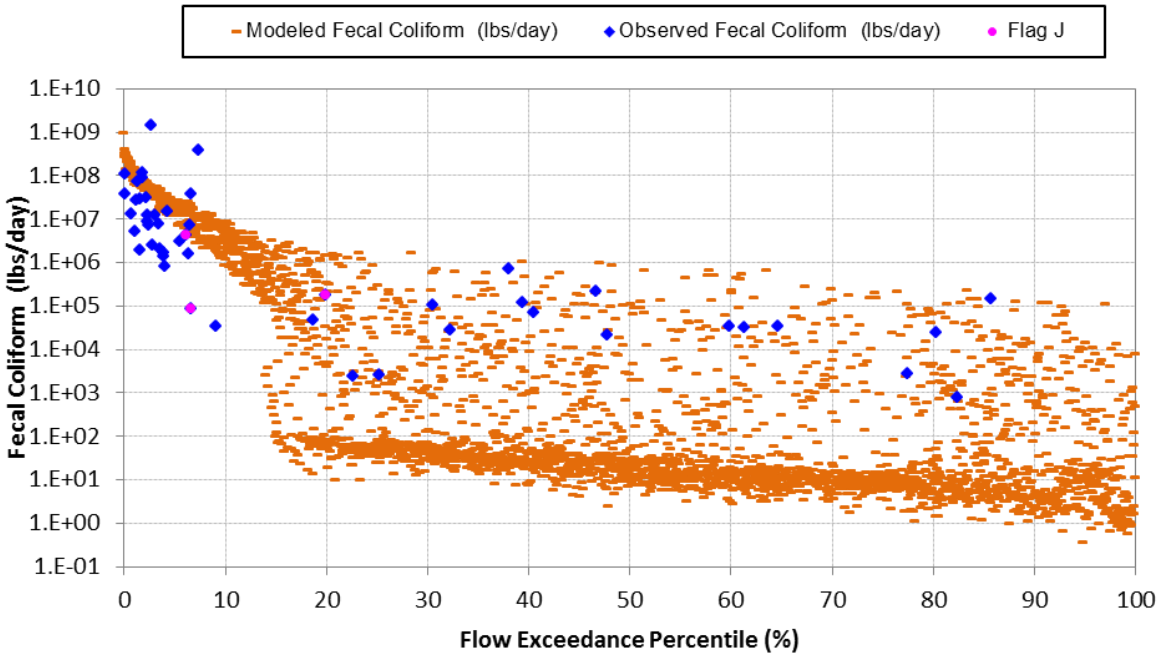


Figure 62. Simulated vs. observed load duration plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

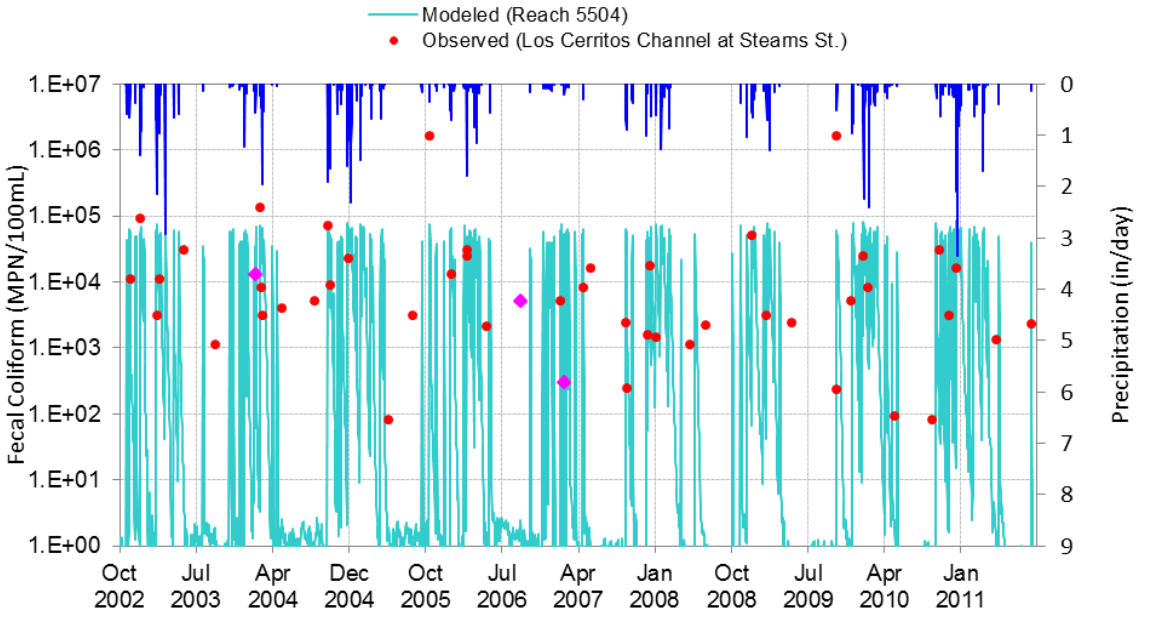


Figure 63. Simulated vs. observed timeseries plots for Fecal Coliform (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

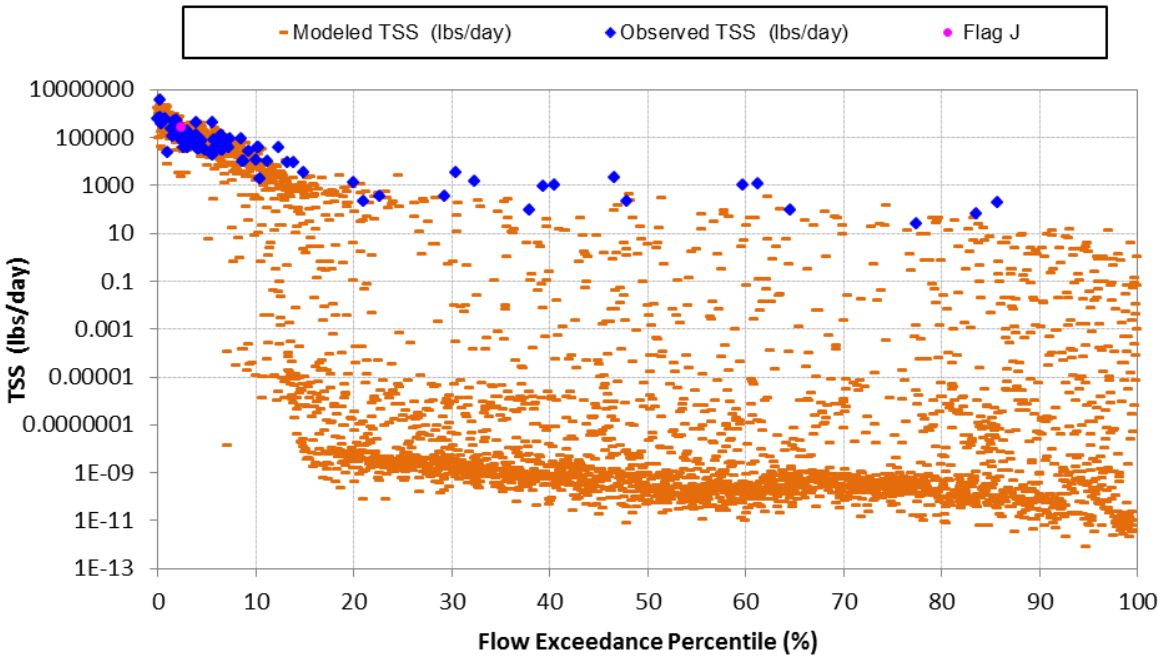


Figure 64. Simulated vs. observed load duration plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

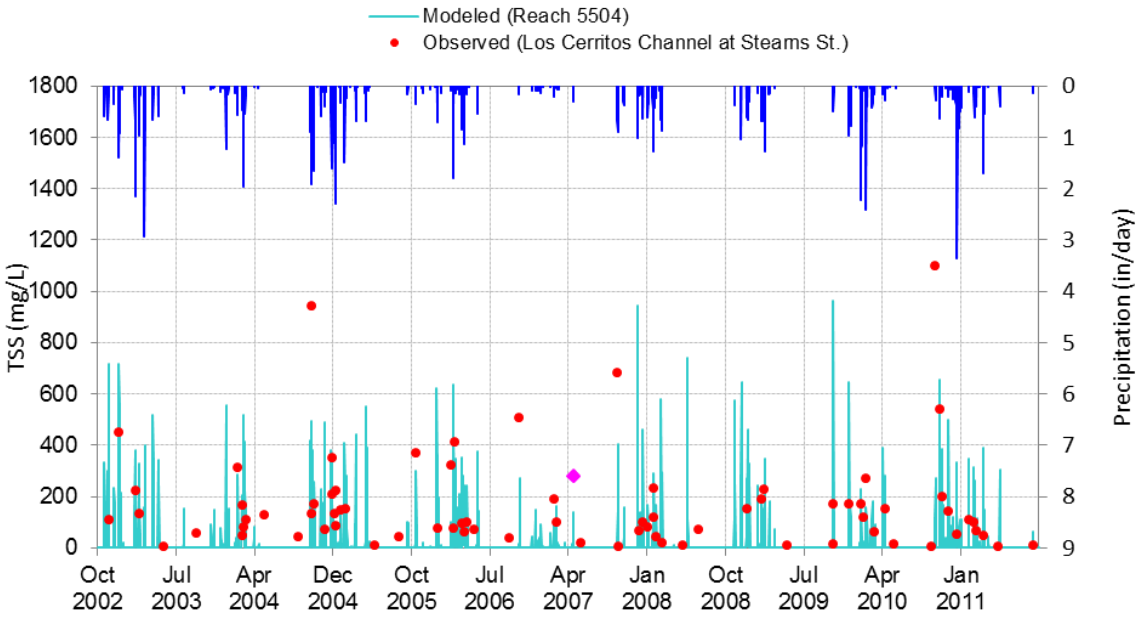


Figure 65. Simulated vs. observed time series plots for Total Sediment (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

Attachment F: Modeled Existing Versus Allowable Pollutant Loadings Plots

Submitted to:

LLAR WMP Group LCC WMP Group LSGR WMP Group

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

January 15, 2015

RB-AR12967

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1. Lower San Gabriel River

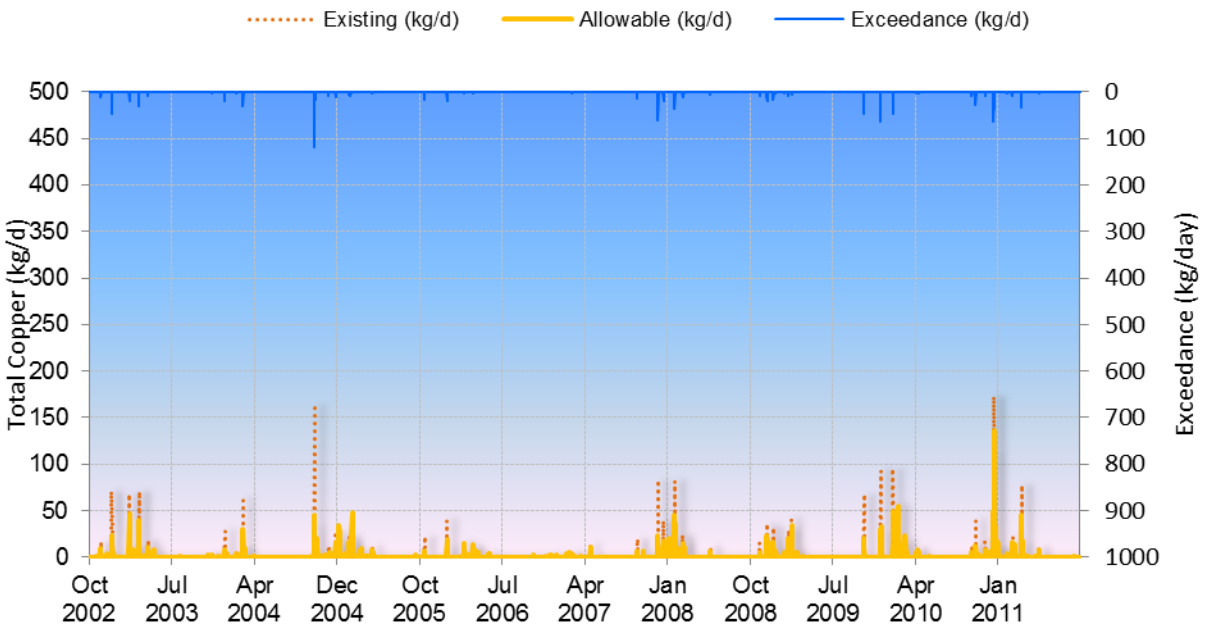


Figure 1. Modeled existing vs. allowable observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

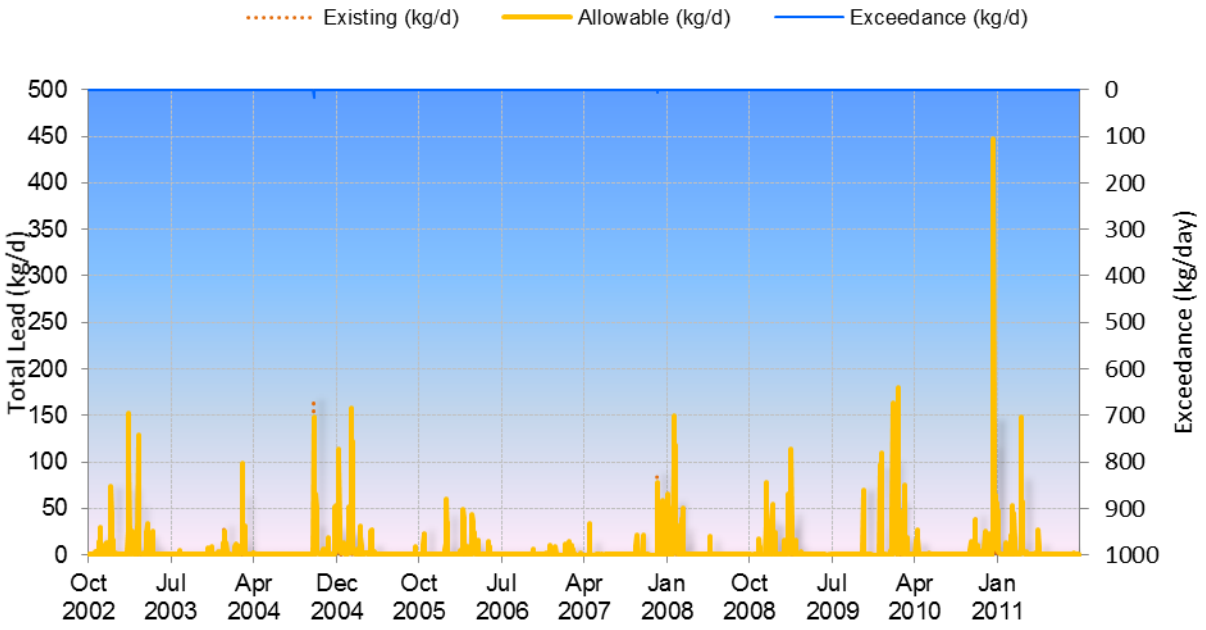


Figure 2. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

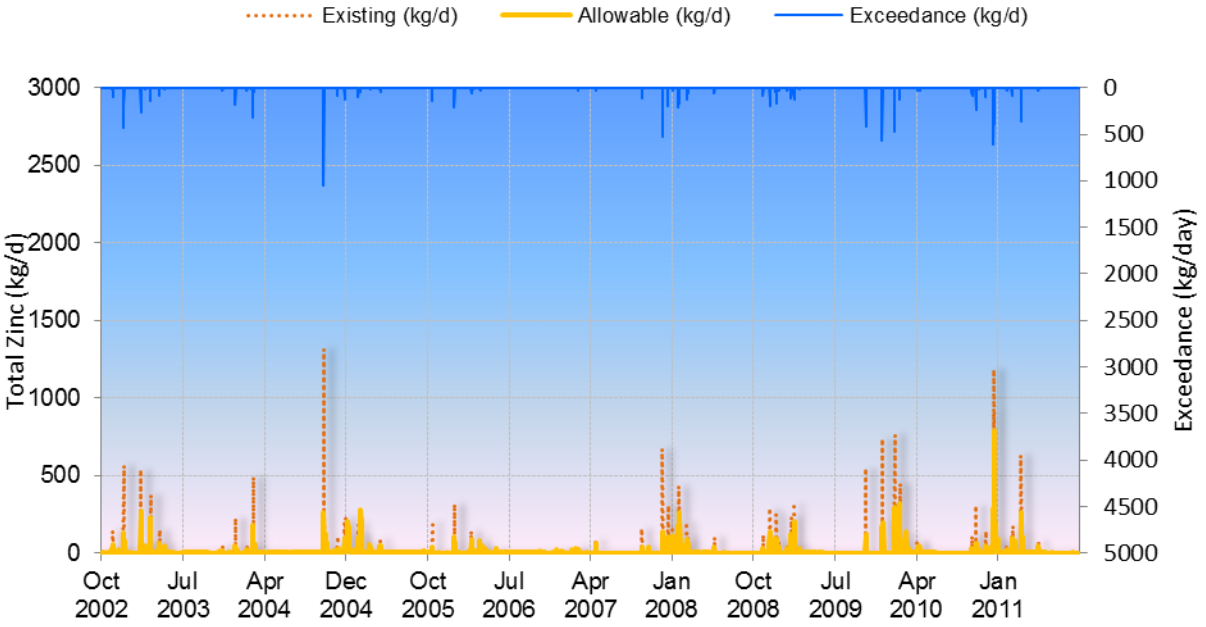


Figure 3. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at San Gabriel River mass emission station S14.

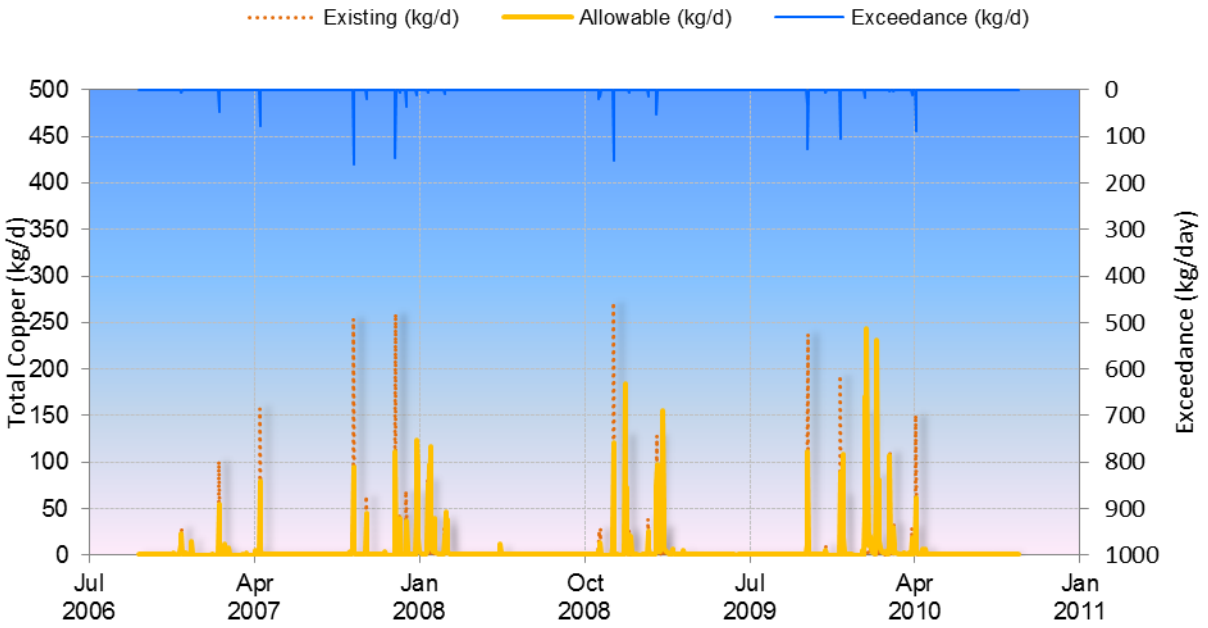


Figure 4. Modeled existing vs. allowable observed timeseries plots for Total Copper (10/1/2006 through 9/30/2011) at Coyote Creek mass emission station S13.

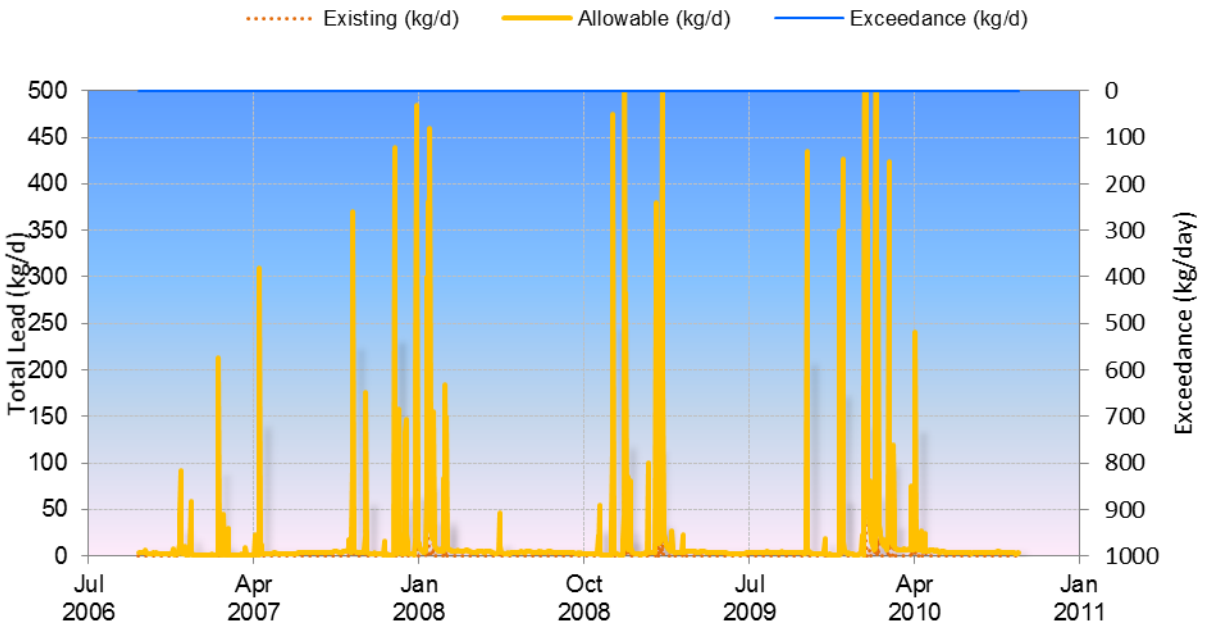


Figure 5. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2006 through 9/30/2011) at Coyote Creek mass emission station S13.

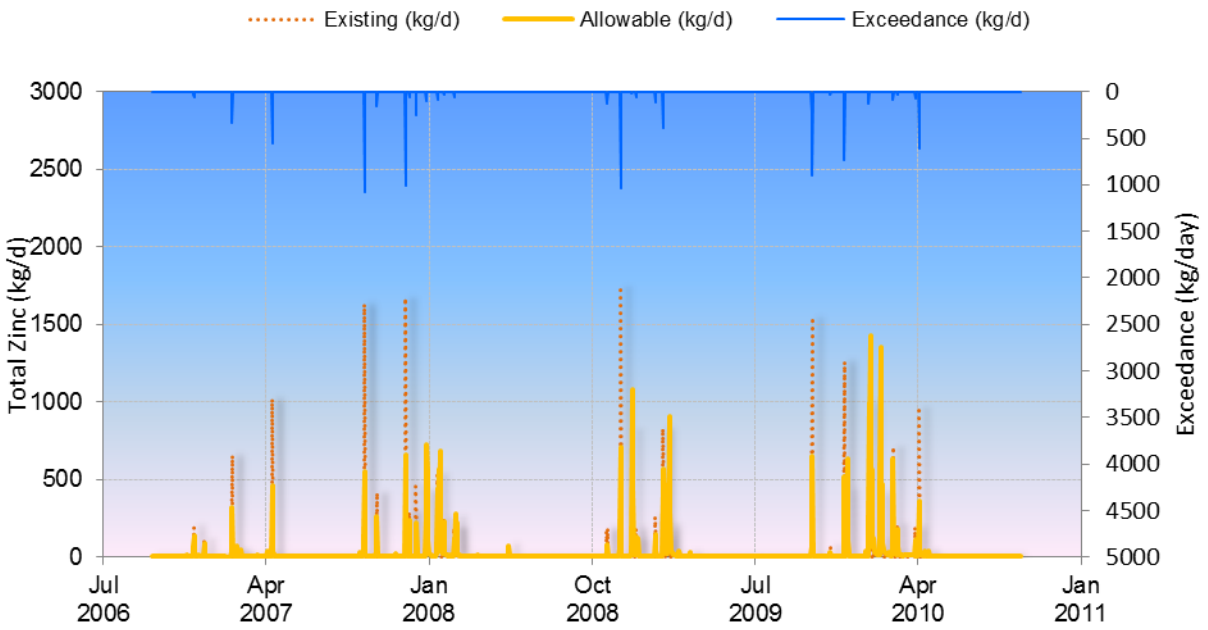


Figure 6. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2006 through 9/30/2011) at Coyote Creek mass emission station S13.

2. Lower Los Angeles River

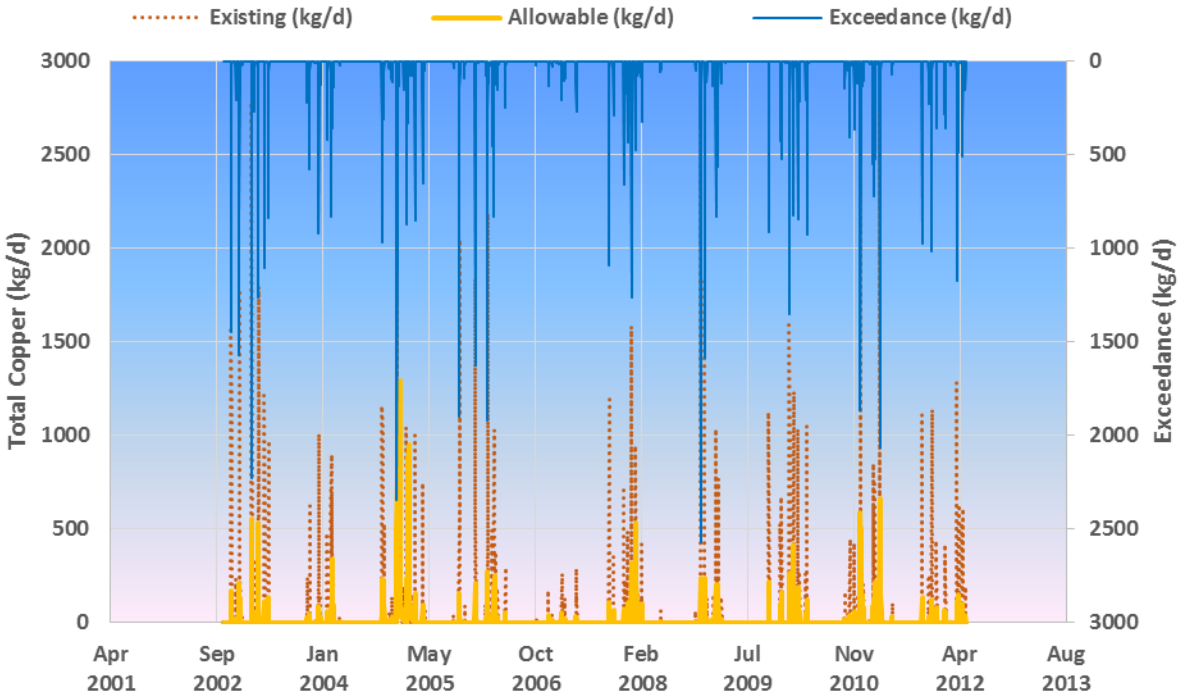


Figure 7. Modeled existing vs. allowable observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

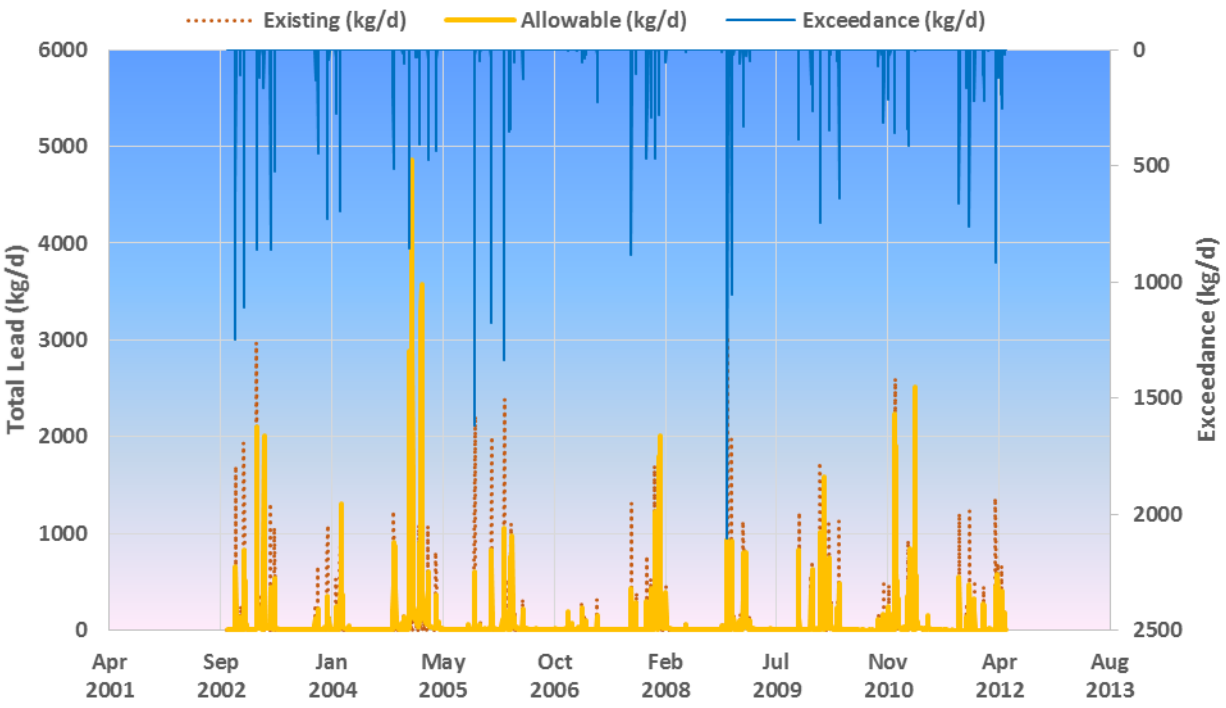


Figure 8. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

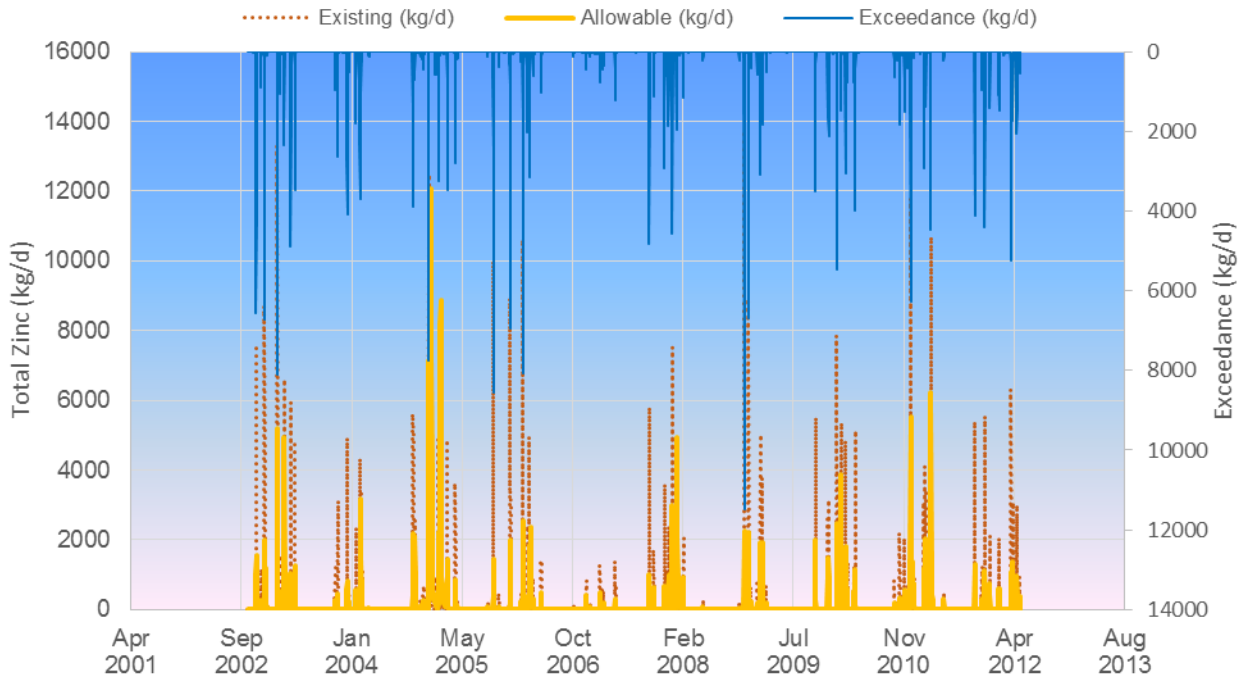


Figure 9. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Angeles River mass emission station S10.

3. Los Cerritos Channel

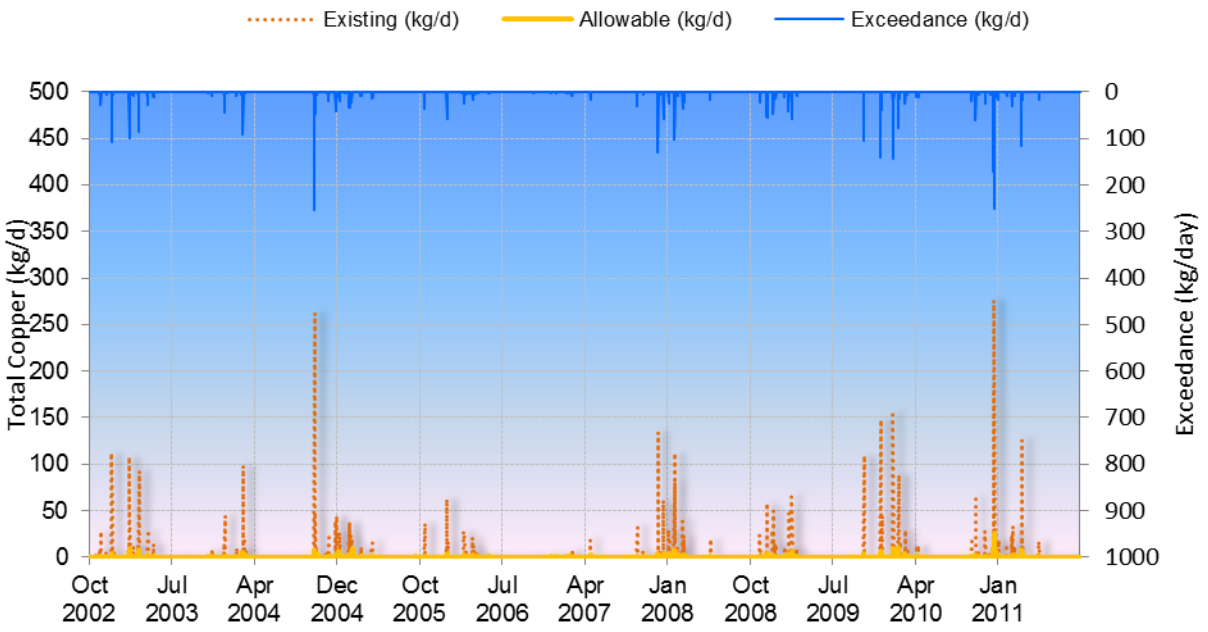


Figure 10. Modeled existing vs. allowable observed timeseries plots for Total Copper (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

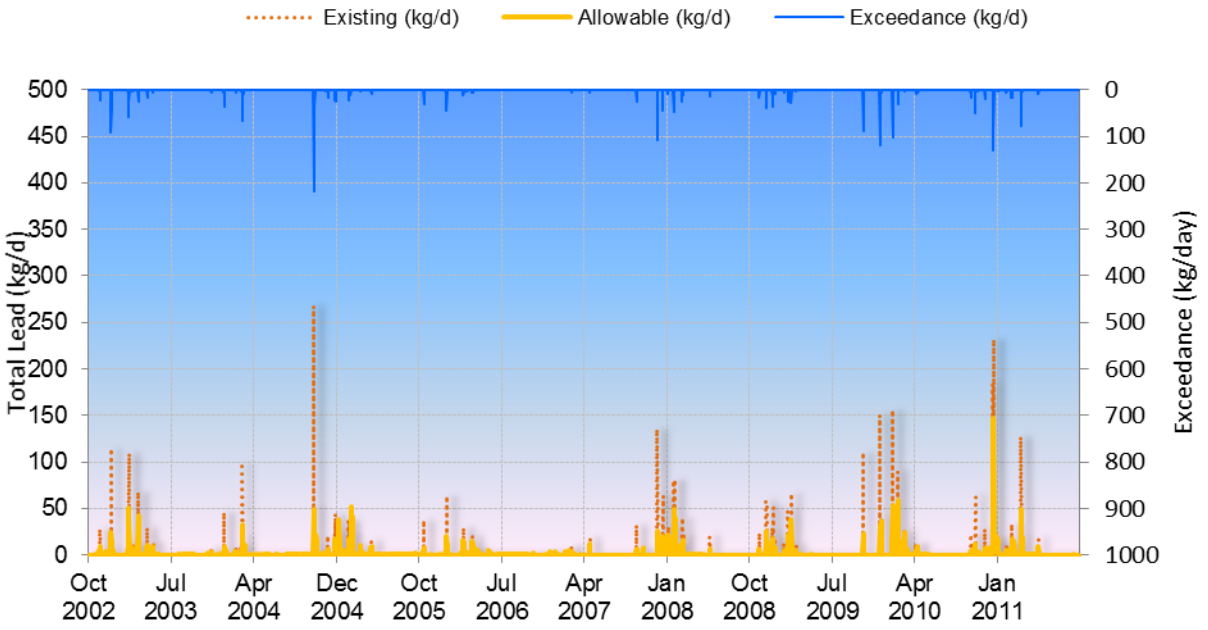


Figure 11. Modeled existing vs. allowable observed timeseries plots for Total Lead (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

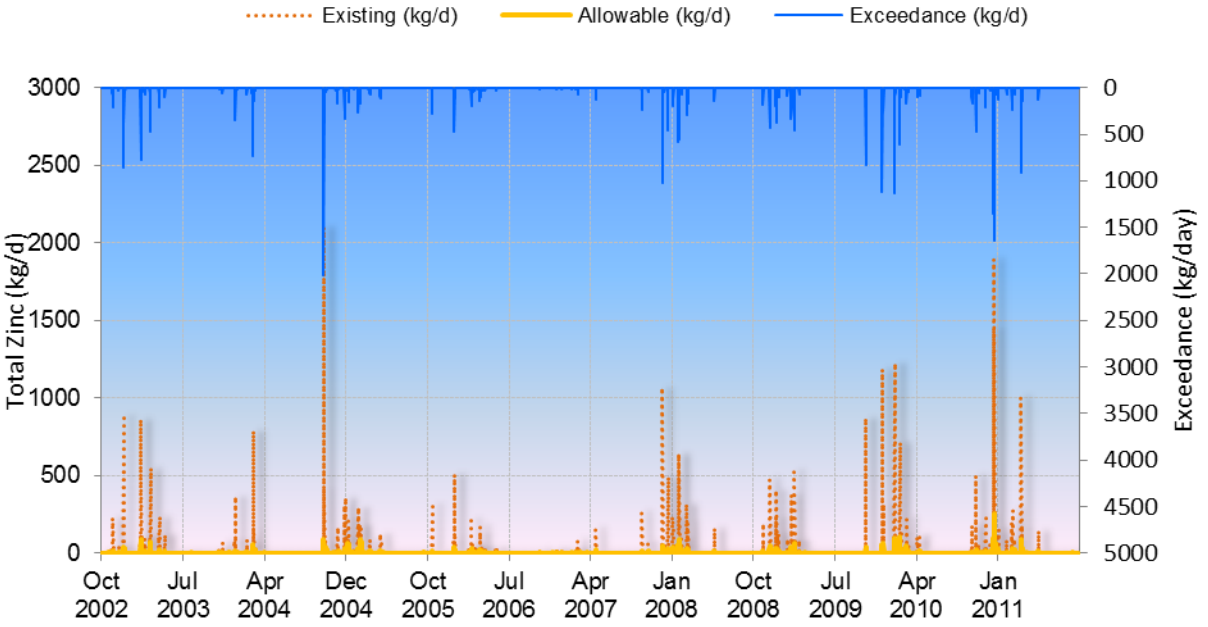


Figure 12. Modeled existing vs. allowable observed timeseries plots for Total Zinc (10/1/2002 through 9/30/2011) at Los Cerritos Channel LA DPW Stearns Street monitoring station.

Watershed Management Program Appendix 7

A-7-1 Legal Authority Letters

City of Downey

FUTURE UNLIMITED

YVETTE M. ABICH GARCIA
City Attorney

December 12, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013-1105

RE: Legal Authority Certification for the City of Downey

Dear Mr. Unger:

As the City Attorney for the City of Downey, I have reviewed the City's existing ordinances, applicable statutes, and/or applicable contracts and have determined that as of the date of this letter, the City can operate pursuant to the legal authority required in 40 CFR 122.26(d)(2)(i)(A)-(F) and Part VI.A.2 of Order No. R4-2012-0175, issued by the Regional Water Quality Control Board – Los Angeles Region ("RWQCB"), adopted on December 28, 2012 and entitled "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach (MS4)" [NPDES No. CAS004001] (the "2012 NPDES Permit"). Enforcement of the City's storm water ordinances can be completed administratively or, if necessary, through the judicial system.

This letter is limited to the matters contained herein, and should not be read as expressing any opinion on any other matter except on the matters expressly set forth herein.

Please call the undersigned if you have any questions.

Sincerely,

CITY OF DOWNEY

Yvette M. Abich Garcia
City Attorney

cc: John L. Hunter & Associates

RB-AR12979

COUNTY OF LOS ANGELES
OFFICE OF THE COUNTY COUNSEL
648 KENNETH HAHN HALL OF ADMINISTRATION
500 WEST TEMPLE STREET
LOS ANGELES, CALIFORNIA 90012-2713

TELEPHONE
(213) 974-1923
FACSIMILE
(213) 687-7337
TDD
(213) 633-0901

JOHN F. KRATTLI
County Counsel

December 16, 2013

Mr. Samuel Unger, P.E., Executive Officer
California Regional Water Quality Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-2343

Attention: Mr. Ivar Ridgeway

Re: Certification By Legal Counsel For Los Angeles County Flood Control District's Annual Report

Dear Mr. Unger:

Pursuant to the requirements of Part VI(A)(2)(b) of Order No. R4-2012-0175 (the "Order"), the Office of the County Counsel of the County of Los Angeles makes the following certification in support of the Annual Report of the Los Angeles County Flood Control District ("LACFCD"):

Certification Pursuant To Order Part VI(A)(2)(b)

"*Each Permittee must submit a statement certified by its chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and this Order.*"

LACFCD has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order.

Order Part VI(A)(2)(b)(i)

"*Citation of applicable municipal ordinances or other appropriate legal authorities and their relationship to the requirements of 40 CFR §122.26(d)(2)(i)(A-F) and this Order*"

Citations Of Applicable Ordinances Or Other Legal Authorities

Although many portions of State law, the Charter of the County of Los Angeles, the Los Angeles County Code and LACFCD's Flood Control District Code ("Code") are potentially applicable to the implementation and enforcement of these requirements, the primary applicable laws and ordinances are as follows:

Los Angeles County Code, Title 12, Chapter 12.80 STORMWATER AND RUNOFF POLLUTION CONTROL, including:

§12.80.010 - §12.80.360 Definitions

§12.80.370 Short title.

§12.80.380 Purpose and intent.

§12.80.390 Applicability of this chapter.

§12.80.400 Standards, guidelines and criteria.

§12.80.410 Illicit discharges prohibited.

§12.80.420 Installation or use of illicit connections prohibited.

§12.80.430 Removal of illicit connection from the storm drain system.

§12.80.440 Littering and other discharge of polluting or damaging substances prohibited.

§12.80.450 Stormwater and runoff pollution mitigation for construction activity.

§12.80.460 Prohibited discharges from industrial or commercial activity.

§12.80.470 Industrial/commercial facility sources required to obtain a NPDES permit.

§12.80.480 Public facility sources required to obtain a NPDES permit.

§12.80.490 Notification of uncontrolled discharges required.

§12.80.500 Good housekeeping provisions.

§12.80.510 Best management practices for construction activity.

§12.80.520 Best management practices for industrial and commercial facilities.

§12.80.530 Installation of structural BMPs.

§12.80.540 BMPs to be consistent with environmental goals.

§12.80.550 Enforcement—Director's powers and duties.

§12.80.560 Identification for inspectors and maintenance personnel.

§12.80.570 Obstructing access to facilities prohibited.

§12.80.580 Inspection to ascertain compliance—Access required.

§12.80.590 Interference with inspector prohibited.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.80.650 Conflicts with other code sections.

§12.80.660 Severability.

§12.80.700 Purpose.

§12.80.710 Applicability.

§12.80.720 Registration required.

§12.80.730 Exempt facilities.

§12.80.740 Certificate of inspection—Issuance by the director.

§12.80.750 Certificate of inspection—Suspension or revocation.

§12.80.760 Certificate of inspection—Termination.

§12.80.770 Service fees.

§12.80.780 Fee schedule.

§12.80.790 Credit for overlapping inspection programs.

§12.80.800 Annual review of fees.

Los Angeles County Code, Title 12, Chapter 12.84 LOW IMPACT DEVELOPMENT STANDARDS, including:

§12.84.410 Purpose.

§12.84.420 Definitions.

§12.84.430 Applicability.

§12.84.440 Low Impact Development Standards.

§12.84.445 Hydromodification Control.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Los Angeles County Code, Title 22 PLANNING AND ZONING, Part 6 ENFORCEMENT PROCEDURES, including:

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

Los Angeles County Code, Title 26 BUILDING CODE, including:

§26.103 Violations And Penalties

§26.104 Organization And Enforcement

§26.105 Appeals Boards

§26.106 Permits

§26.107 Fees

§26.108 Inspections

LACFCD Code Chapter 21 - STORMWATER AND RUNOFF POLLUTION CONTROL including:

§21.01 Purpose and Intent

§21.03 Definitions

§21.05 Standards, Guidelines, and Criteria

§21.07 Prohibited Discharges

§21.09 Installation or Use of Illicit Connections Prohibited

§21.11 Littering Prohibited

§21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity

§21.15 Notification of Uncontrolled Discharges Required

§21.17 Requirement to Monitor and Analyze

§21.19 Conflicts With Other Code Sections

§21.21 Severability

§21.23 Violation a Public Nuisance

California Government Code §6502

California Government Code §23004

California Water Code §8100 *et. seq.*

Relationship Of Applicable Ordinances Or Other Legal Authorities To The Requirements of 40 CFR §122.26(d)(2)(i)(A-F) And The Order

Although, depending upon the particular issue, there may be multiple ways in which particular sections of the County of Los Angeles' ordinances, LACFCD's ordinances, and statutes relate to the requirements contained in 40 CFR §122.26(d)(2)(i)(A-F) and the Order, the table below indicates the basic relationship with Part VI(A)(2)(a) of the Order:

Order Part VI(A)(2)(a) Items	**Primary Applicable Ordinance/Statute**
i. Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.450 [construction] §12.80.460 [industrial and commercial] §12.80.470 and .480 [industrial and commercial NPDES requirements] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§26.104 [enforcement] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
ii. Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited] LACFCD Code: §21.07 Prohibited Discharges
iii. Prohibit and eliminate illicit discharges and illicit connections to the MS4.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.420 [illicit connections prohibited] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.23 Violation a Public Nuisance

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
iv. Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.	Los Angeles County Code: §12.80.410 [illicit discharge prohibited]; §12.80.440 [littering and other polluting prohibited] LACFCD Code: §19.07 Interference With or Placing Obstructions, Refuse, Contaminating Substances, or Invasive Species in Facilities Prohibited §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
v. Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows).	Los Angeles County Code: §12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.620 [nuisance abatement] §12.80.635 [violation penalty]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§12.80.640 [penalties not exclusive] §12.84.440 [LID standards] §12.84.445 [hydromodification control] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.340 [violations] §22.60.350 [public nuisance] §22.60.360 [infractions] §22.60.370 [injunction] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.103 [violations and penalties] §26.104 [enforcement] §26.106 [permits] §26.108 [inspections] LACFCD Code: §19.11 Violation a Public Nuisance §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.19 Conflicts With Other Code Sections §21.23 Violation a Public Nuisance
vi. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.	Same as item v., above
vii. Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Copermittees.	California Government Code §6502 California Government Code §23004
viii. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation.	California Government Code §6502 California Government Code §23004
ix. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4.	Los Angeles County Code: §12.80.490 [notification of uncontrolled discharge] §12.80.570 [obstructing access to facilities] §12.80.580 [compliance inspection] §12.80.610 [violation a nuisance] §12.80.620 [nuisance abatement] §12.80.635 [violation penalty] §12.80.640 [penalties not exclusive] §22.60.380 [enforcement.] §26.106 [permits] §26.108 [inspections]

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
x. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations.	Los Angeles County Code: §12.80.450 [construction mitigation] §12.80.500 [good housekeeping practices] §12.80.510 [construction BMPs] §12.80.520 [industrial/commercial BMPs] §12.84.440 [LID standards] §12.84.450 [LID Plan Review] §22.60.330 [general prohibitions] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance
xi. Require that structural BMPs are properly operated and maintained.	Los Angeles County Code: §12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze

RB-AR12991

Order Part VI(A)(2)(a) Items	Primary Applicable Ordinance/Statute
	§21.23 Violation a Public Nuisance
xii. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.	Los Angeles County Code: §12.80.530 [installation of structural BMPs] §22.60.380 [enforcement.] §22.60.390 [zoning enforcement order] §26.106 [permits] §26.108 [inspections] LACFCD Code: §21.05 Standards, Guidelines, and Criteria §21.07 Prohibited Discharges §21.09 Installation or Use of Illicit Connections Prohibited §21.11 Littering Prohibited §21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity §21.15 Notification of Uncontrolled Discharges Required §21.17 Requirement to Monitor and Analyze §21.23 Violation a Public Nuisance

Order Part VI(A)(2)(b)(ii)

"*Identification of the local administrative and legal procedures available to mandate compliance with applicable municipal ordinances identified in subsection (i) above and therefore with the conditions of this Order, and a statement as to whether enforcement actions can be completed administratively or whether they must be commenced and completed in the judicial system.*"

The local administrative and legal procedures available to mandate compliance with the above ordinances are specified in those ordinances, particularly in:

Los Angeles County Code:

§12.80.550 Enforcement—Director's powers and duties.

§12.80.600 Notice to correct violations—Director may take action.

§12.80.610 Violation a public nuisance.

§12.80.620 Nuisance abatement—Director to perform work when—Costs.

§12.80.630 Violation—Penalty.

§12.80.635 Administrative fines.

§12.80.640 Penalties not exclusive.

§12.84.450 LID Plan Review.

§12.84.460 Additional Requirements.

Title 26, §103 Violations And Penalties

Title 26, §104 Organization And Enforcement

Title 26, §105 Appeals Boards

Title 26, §106 Permits

§22.60.330 General prohibitions.

§22.60.340 Violations.

§22.60.350 Public nuisance.

§22.60.360 Infractions.

§22.60.370 Injunction.

§22.60.380 Enforcement.

§22.60.390 Zoning enforcement order and noncompliance fee.

LACFCD Code:

§21.05 Standards, Guidelines, and Criteria

§21.07 Prohibited Discharges

§21.09 Installation or Use of Illicit Connections Prohibited

§21.11 Littering Prohibited

§21.13 Evidence of Compliance With Permit Requirements for Industrial or Commercial Activity

§21.15 Notification of Uncontrolled Discharges Required

§21.17 Requirement to Monitor and Analyze

§21.23 Violation a Public Nuisance

LACFCD attempts to first resolve each enforcement action administratively. However, the above cited ordinances also provide LACFCD with the authority to pursue such actions in the judicial system as necessary.

Very truly yours,

JOHN F. KRATTLI
County Counsel

By
JUDITH A. FRIES
Principal Deputy County Counsel
Public Works Division

JAF:jyj

STEVEN N. SKOLNIK

Attorney at Law
15332 Antioch Street, #436
Pacific Palisades, California 90272
Telephone: (310) 459-3418 Facsimile: (310) 606-2775
E-Mail: sskolniklaw@gmail.com

December 9, 2013

Lisa Rapp, Director of Public Works
City of Lakewood
5050 Clark Avenue
Lakewood, CA 90712

Re: Order No. R4-2012-0175
NPDES No. CAS004001

Dear Ms. Rapp:

In my capacity as City Attorney for the City of Lakewood (the "City"), I hereby confirm that the City has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR @ 122.26(d)(2)(i)(A-F) and the Order referenced above. Such legal authority is derived from Article 11, Section 7 of the California Constitution, Section 13002 of the California Water Code, and Section 5801 of the Lakewood Municipal Code, which incorporates by reference the pertinent provisions of the Los Angeles County Code.

The City is authorized to take enforcement action by administrative proceedings or in the judicial system.

Very truly yours,

Steven N. Skolnik

OFFICE OF THE CITY ATTORNEY
Long Beach, California

CHARLES PARKIN
City Attorney

MICHAEL J. MAIS
Assistant City Attorney

MONTE H. MACHIT
Assistant City Attorney

PRINCIPAL DEPUTIES
Dominic Holzhaus
Anne C. Lattime

DEPUTIES
C. Geoffrey Allred
Gary J. Anderson
Richard F. Anthony
William R. Baerg
Kendra L. Carney
LaTasha N. Corry
Charles M. Gale
Haleh R. Jenkins
Michele L. Levinson
Barbara J. McTigue
Howard D. Russell
Arturo D. Sanchez
Tiffani L. Shin
Linda T. Vu
Amy R. Webber
Theodore B. Zinger

February 26, 2015

VIA CERTIFIED MAIL AND EMAIL

RETURN RECEIPT REQUESTED

Mr. Samuel Unger, P.E., Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-2343

Attention: Mr. Ivar Ridgeway

RE: City of Long Beach Order No. R4-2014-0024/NPDES Permit No. CAS004003: City of Long Beach Statement of Legal Authority (2014-2015)

Dear Mr. Unger:

This office serves as City Attorney to the City of Long Beach. Pursuant to the requirements of Part VII.A (2)(b) of Order No. R4-2014-0024 ("Order") and NPDES Permit No. CAS004003 ("Permit"), the Long Beach City Attorney's Office submits this statement of legal authority.

The City of Long Beach ("City") has the legal authority to implement and enforce a majority of the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and the Order during the reporting period. In addition, insofar as certain legal requirements are not yet in place, the City is actively working to approve additional ordinances that will permit the City to meet all of the requirements of the Order and the Permit, resulting in a comprehensive and updated NPDES ordinance which contains provisions and remedies specifically tailored to the Order. It is anticipated that the remaining ordinances will be approved and in place prior to December 31, 2015.

The City's legal authority to implement and enforce these requirements is derived from the City's general police powers under Article XI, Section 7 of the California Constitution, and more particularly, the provisions of the Long Beach Municipal Code ("LBMC"), including Chapter 18.61 (NPDES and SUSMP Regulations) and the NPDES and SUSMP Regulations Manual, which details technical information and implementation parameters, alternative compliance for technical infeasibility, as well as other rules, requirements and procedures for implementation.

The City's legal procedures available to mandate compliance with the provisions of Chapter 18.61 include LBMC section 1.32 which deems any violation of the LBMC to be enforceable criminally as an infraction or misdemeanor, or as a public nuisance that can be abated and remedied administratively or judicially, in accordance with the enforcement procedures set forth in LBMC section 1.32.

If you have questions regarding this matter, please do not hesitate to contact this Office.

Very truly yours,

CHARLES PARKIN, City Attorney

By: AMY R. WEBBER
Deputy City Attorney

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cc: Charles Parkin, City Attorney
Patrick H. West, City Manager
John L. Hunter, Stormwater Consultant (jhunter@jlha.net)

ALESHIRE & WYNDER LLP
ATTORNEYS AT LAW

Respond to Orange County
Fred Galante
fgalante@awattorneys.com
Direct (949) 250-5410

Orange County
18881 Von Karman Ave., Suite 1700
Irvine, CA 92612
P 949.223.1170 • F 949.223.1180

Los Angeles
2361 Rosecrans Ave., Suite 475
El Segundo, CA 90245
P 310.527.6660 • F 310.532.7395

Inland Empire
3880 Lemon Street, Suite 520
Riverside, CA 92501
P 951. 241.7338 • F 951.300.0985

Central Valley
2125 Kern Street, Suite 307
Fresno, CA 93721
P 559.445.1580 • F 888.519.9160

awattorneys.com

December 6, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013-1105

Re: Statement of Legal Authority

Dear Mr. Unger:

This letter is provided to serve as the Statement of Legal Authority for the City of Lynwood (the "City") that must be submitted with its Annual Report pursuant to Part VI.A.2.b. of Order No. R4-2012-0175 for NPDES Permit No. CAS004001. As legal counsel for the City, I am of the considered legal opinion that it has all the necessary legal authority to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order during the reporting period of July 1, 2012 through June 30, 2013, to the extent permitted by State and Federal law, subject to the limitations on municipal action under the California and United States Constitutions.

Per the requirement in Part VI.A.2.b.i., here are citations to the City's Municipal Code, Chapters 14-12 Stormwater and Urban Runoff Pollution Control and 14-13 Standard Urban Storm Water Mitigation Plan for Storm Water Pollution Control Measures for Development Planning and Construction Activities, for each of the following requirements found in Part VI.A.2.a:

i. *Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.*

   Municipal Code Sections: 14-12.9 Requirements For Industrial And Commercial Discharges And Construction Activities

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ii. *Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.*

Municipal Code Section: 14-12.6 Prohibited Activities

iii. *Prohibit and eliminate illicit discharges and illicit connections to the MS4.*

Municipal Code Section: 14-12.6 Prohibited Activities

iv. *Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.*

Municipal Code Section: 14-12.6 Prohibited Activities

v. *Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);*

Municipal Code Sections: 14-12.3 Purpose And Intent and 14-12.10 Enforcement

vi. *Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.*

Municipal Code Sections: 14-12.10 Enforcement and 14-13.4 Authority To Inspect And Enforce Storm Water Pollution Control Measures

vii. *Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;*

Municipal Code Sections: 14-12.2 Findings and 14-12.6 Prohibited Activities

viii. *Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;*

Municipal Code Sections: 14-12.2 Findings and 14-12.6 Prohibited Activities

ix. *Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4;*

Municipal Code Sections: 14-12.3 Purpose And Intent, 14-12.10 Enforcement, and 14-13.4 Authority To Inspect And Enforce Storm Water Pollution Control Measures

x. *Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;*

Municipal Code Section: 14-12.8 Good Housekeeping Provisions

xi. *Require that structural BMPs are properly operated and maintained;*

Municipal Code Sections: 14-13.1 Purpose And Scope and 14-13.2 Authority

xii. *Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.*

Municipal Code Sections: 14-13.1 Purpose And Scope and 14-13.2 Authority

Per the requirement in Part VI.A.2.b.ii., the City's legal procedures available to mandate compliance with applicable municipal ordinances identified in the above section, and therefore with the conditions of the Order, can be found in Municipal Code Section 14-12.10 Enforcement. Here is the text of that provision:

14-12.10 Enforcement:

a. Violations Deemed A Public Nuisance:

1. Any condition that is caused or permitted to exist in violation of any of the provisions of this Section is hereby determined to be a threat to the public health, safety, and welfare, is deemed to be a public nuisance, and may be abated by any authorized enforcement officer. In addition, a civil or criminal action to abate, enjoin, or otherwise compel the cessation of that nuisance may be initiated by the City Attorney.

2. The cost of abatement will be borne by the owner of the property. The cost of abatement will be invoiced to the owner of the property in the manner provided by law or ordinance for the recovery of nuisance abatement costs.

3. If any violation of this Section constitutes a seasonal and recurrent nuisance, the Director of Public Works will give written notice of that nuisance. The failure of any person to take appropriate action to prevent stormwater pollution after written notice of a determination under this Subsection constitutes a public nuisance and a violation of this Section.

b. Concealment: Causing, permitting, aiding, abetting, or concealing a violation of any provision of this Section constitutes a violation of that provision.

c. Civil Actions: In addition to all other remedies provided in this Subsection, any violation of this Section may be enforced by civil action brought by the City. In any such action, the City may seek, as appropriate, any or all of the following remedies:

1. A temporary or permanent injunction, or both.

2. Assessment of the violator for the costs of any investigation, inspection, or monitoring survey that led to the determination of the violation, and for the reasonable costs of preparing and bringing legal action under this subsection.

3. Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation.

4. Compensatory damages for the loss of or destruction to water quality, wildlife, and fish and aquatic life.

d. Administrative Enforcement Powers: In addition to the other enforcement powers and remedies established by this Section, an authorized enforcement officer has the authority to use the following administrative remedies:

1. Cease And Desist Orders: When an authorized enforcement officer finds that a discharge has taken place or is likely to take place in violation of this Section, the officer may issue an order to cease and desist such discharge, or any practice or operation that is likely to cause such discharge, and direct that the responsible persons: a) comply with the requirement; b) comply with a time schedule for compliance; and c) take appropriate action to prevent the violation from recurring.

2. Notice To Clean: Whenever an authorized enforcement officer finds any oil, earth, debris, grass, weeds, dead trees, tin cans, rubbish, refuse, waste, or any other material of any kind, upon the sidewalk abutting or adjoining any parcel of land, or upon any parcel of land or grounds, that may result in pollutants entering the Municipal Stormwater System or a nonstormwater discharge to the Municipal Stormwater System, the enforcement officer may give notice to the owner or occupant of the adjacent property to remove such oil, earth, debris, grass, weeds, dead trees, tin cans, rubbish, refuse, waste or other material. The recipient of that notice must undertake the removal activities described in the notice.

e. Penalties: Violation of this Section constitutes a misdemeanor and is punishable as provided in Section 1-5 of this Code.

f. Permit Revocation: If the City makes a provision of this Section or any identified BMP a condition of approval for the issuance of a permit or license, any person in violation of that condition is subject to the permit revocation procedures set forth in this Code.

g. Remedies: Remedies under this Section are in addition to and do not supersede or limit any and all other remedies, civil or criminal. The remedies provided for in this Section are cumulative and not exclusive.

Thus, enforcement actions can be completed administratively or judicially if necessary.

Please contact the undersigned if you have any questions.

Sincerely,

ALESHIRE & WYNDER, LLP

Fred Galante
City Attorney for the City of Lynwood

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STATEMENT OF LEGAL AUTHORITY

Pursuant to Part VI.A.2.b. of Order No. R4-2012-0175, the City of Paramount has all the necessary legal authority to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order during the reporting period of July 1, 2012 through June 30, 2013. This is made evident by municipal code citation to each of the following requirements found in Part VI.A.2.a:

1. Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial or commercial activity and control the quality of storm water discharged from industrial and commercial sites. This requirement applies both to industrial and commercial sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.
   Municipal Code Section: Sec. 48-3.5. Prohibited discharges from industrial or commercial activity
2. Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited
3. Prohibit and eliminate illicit discharges and illicit connections to the MS4.
   Municipal Code Section: Sec. 48-3. Illicit discharges prohibited and Sec. 48-3.1. Installation or use of illicit connections prohibited
4. Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited
5. Require compliance with applicable Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);
   Municipal Code Section: Sec. 48-3.8. Notification of uncontrolled discharges required.
6. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.
   Municipal Code Section: Sec. 48-5. Enforcement - Director's powers and duties
7. Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited and Sec. 48-2.1. Purpose and Intent.
8. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;
   Municipal Code Section: Sec. 48-3.3. Littering and other discharge of polluting or damaging substances prohibited and Sec. 48-2.1. Purpose and Intent.

9. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4;
   Municipal Code Section: Sec. 48-5.3. Inspection to ascertain compliance - Access
10. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;
    Municipal Code Section: Sec. 48-5.4. Notice to correct violations - Director may take action
11. Require that structural BMPs are properly operated and maintained.
    Municipal Code Section: Sec. 48-4.1. Best management practices for construction activity, 48-42, best managerial practices for industrial and commercial facilities.
12. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.
    Municipal Code Section: Sec. 48-4.3. Installation of structural BMPs

The City of Paramount legal procedures available to mandate compliance with applicable municipal ordinances identified in the above section, and therefore with the conditions of the Order, can be found in Section *Sec. 48-5. Enforcement - Director's powers and duties*. Violations of this section are deemed a "Public Nuisance" in section 48-5.5, where any discharge in violation of this chapter, any illicit connection, and/or any violation of runoff management requirements shall constitute a threat to public health and safety.

Signature: John E Cavanaugh

John E. Cavanaugh, City Attorney

Date: 12-3-13

ALVAREZ-GLASMAN & COLVIN

ATTORNEYS AT LAW

13181 Crossroads Parkway North
Suite 400-West Tower
City of Industry, CA 91746
Tel: 562.699.5500
Fax: 562.692.2244
www.agclawfirm.com

December 13, 2013

Sam Unger, P.E., Executive Officer
California Regional Water Quality
Control Board -- Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-1105

Subject: Certification of Legal Authority

Dear Mr. Unger:

Alvarez-Glasman & Colvin serves as the City Attorney's Office for the City of Pico Rivera. As the City Attorney for the City of Pico Rivera (the "City"), I am aware of the following legal authority requirements specified in VI.A.2.b, of the MS4 Permit for Los Angeles County, Order No. R4-2012-0175, NPDES Permit No. CAS004001:

Each Permittee must submit a statement certified by its chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order. Each Permittee shall submit this certification annually as part of its Annual Report beginning with the first Annual Report required under this Order. These statements must include:

i. Citation of applicable municipal ordinances or other appropriate legal authorities and their relationship to the requirements of 40 CFR § 122.26(d)(2)(i)(A)-(F) and of this Order; and

ii. Identification of the local administrative and legal procedures available to mandate compliance with applicable municipal ordinances identified in subsection (i) above and therefore with the conditions of this Order, and a statement as to whether enforcement actions can be completed administratively or whether they must be commenced and completed in the judicial system.

The City has the legal authority to require compliance with the requirements associated with 40 CFR § 122.26(d)(2)(i)(A-F) and applicable provisions of the Order per Chapter 16.04 Storm Water and Urban Runoff Pollution Prevention of the City of Pico Rivera Municipal Code. The City has had such legal authority since 2002.

The City's Municipal Code provides for both administrative enforcement and legal enforcement of violations, which may result in administrative, civil, or criminal penalties. Section 16.04.140 provides that in the event the City serves a person with a notice of violation, and that person fails to comply within the given time period, the City has multiple remedies which are not listed to be exclusive or exhaustive, including: seeking prosecution of violations as a misdemeanor resulting in fines or imprisonment; seeking restitution of costs incurred by the City in the investigation and enforcement of compliance; and prosecution of violations as nuisance abatement resulting in liens and cost recovery.

Should you have any questions regarding this matter, please feel free to contact Deputy City Attorney Teresa Chen at (562) 699-5500.

Sincerely,

ALVAREZ-GLASMAN & COLVIN

Arnold M. Alvarez-Glasman
City Attorney

ALESHIRE & WYNDER LLP
ATTORNEYS AT LAW

Respond to Orange County
David J. Aleshire
daleshire@awattorneys.com
Direct (949) 250-5409

Orange County
18881 Von Karman Ave., Suite 1700
Irvine, CA 92612
P 949.223.1170 • F 949.223.1180

Los Angeles
2361 Rosecrans Ave., Suite 475
El Segundo, CA 90245
P 310.527.6660 • F 310.532.7395

Inland Empire
3880 Lemon Street, Suite 520
Riverside, CA 92501
P 951. 241.7338 • F 951.300.0985

Central Valley
2125 Kern Street, Suite 307
Fresno, CA 93721
P 559.445.1580 • F 888.519.9160

awattorneys.com

December 3, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013-1105

Re: Legal Authority Statement

Dear Mr. Unger:

This letter is provided to serve as the Statement of Legal Authority for the City of Signal Hill (the "City") that must be submitted with its Annual Report pursuant to Part VI.A.2.b. of Order No. R4-2012-0175 for NPDES Permit No. CAS004001. As legal counsel for the City, I have determined that it has all the necessary legal authority to implement and enforce the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order during the reporting period of July 1, 2012 through June 30, 2013, to the extent permitted by State and Federal law, subject to the limitations on municipal action under the California and United States Constitutions.

Per the requirement in Part VI.A.2.b.i., here are citations to the City's Municipal Code for each of the following requirements found in Part VI.A.2.a:

i. *Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.*

   Municipal Code Sections: 12.16.060 Illicit discharges, 12.16.100 Compliance with state and federal discharge requirements, and 12.16.112 Construction pollutant reduction

ii. *Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A.*

Municipal Code Section: 12.16.060 Illicit discharges

iii. *Prohibit and eliminate illicit discharges and illicit connections to the MS4.*

Municipal Code Sections: 12.16.050 Illicit connections prohibited and 12.16.060 Illicit discharges

iv. *Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4.*

Municipal Code Sections: 12.16.060 Illicit discharges and 12.16.080 Littering

v. *Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);*

Municipal Code Section: 12.16.120 Inspection and enforcement

vi. *Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders.*

Municipal Code Section: 12.16.120 Inspection and enforcement

vii. *Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;*

Municipal Code Sections: 12.16.020 Purpose and intent and 12.16.120 Inspection and enforcement

viii. *Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;*

Municipal Code Sections: 12.16.020 Purpose and intent and 12.16.120 Inspection and enforcement

ix. *Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take*

measurements, review and copy records, and require regular reports from entities discharging into its MS4;

Municipal Code Section: 12.16.120 Inspection and enforcement

x. *Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;*

Municipal Code Sections: 12.16.060 Illicit discharges, 12.16.114 New development/redevelopment pollutant reduction, and 12.16.116 Small site new development/ redevelopment pollutant reduction

xi. *Require that structural BMPs are properly operated and maintained;*

Municipal Code Sections: 12.16.114 New development/redevelopment pollutant reduction and 12.16.116 Small site new development/ redevelopment pollutant reduction

xii. *Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.*

Municipal Code Section: 12.16.114 New development/redevelopment pollutant reduction and 12.16.116 Small site new development/ redevelopment pollutant reduction

Per the requirement in Part VI.A.2.b.ii., the City's legal procedures available to mandate compliance with applicable municipal ordinances identified in the above section, and therefore with the conditions of the Order, can be found in Municipal Code Section 12.16.120 Inspection and enforcement. Here is the relevant text of that provision:

"12.16.120 Inspection and enforcement.

[...]

B. Enforcement.

1. Any violation of this chapter is a misdemeanor and shall be punishable by either a fine of up to one thousand dollars or six months in the county jail, or both.

2. Any person who may otherwise be charged with a misdemeanor as a result of a violation of this chapter may be charged, at the discretion of the prosecuting attorney, with an infraction punishable by a fine of not more than one

hundred dollars for the first violation, two hundred dollars for the second violation, and two hundred fifty dollars for each additional violation thereafter.

3. As a part of any sentence or other penalty imposed or the award of any damage, the court may also order that restitution be paid to the City or any injured person, or, in the case of a violator who is a minor, by the minor's parent or lawfully designated guardian or custodian. Restitution may include the amount of any reward.

4. Any person violating the provisions of this chapter shall reimburse the City for any and all costs incurred by the City in responding to, investigating, assessing, monitoring, treating, cleaning, removing, or remediating any Illicit Discharge or Pollutant from the municipal storm drain system; rectifying any Illicit Connection; or remediating any violation of this chapter.

Such costs to be paid to the City include all administrative expenses and all legal expenses, including costs and attorneys' fees, in obtaining compliance, and in litigation including all costs and attorneys' fees on any appeal. The costs to be recovered in this Section 12.16.120 shall be recoverable from any and all persons violating this chapter.

5. In the event any violation of this chapter constitutes an imminent danger to public health, safety, or the environment, the City Manager or Director, or any authorized agent thereof, may enter upon the premises from which the violation emanates, abate the violation and danger created to the public safety or the environment, and restore any premises affected by the alleged violation, without notice to or consent from the owner or occupant of the premises. An imminent danger shall include but is not limited to exigent circumstances created by the Discharge of Pollutants, where such Discharge presents a significant and immediate threat to the public health or safety, or the environment.

6. Violations of this chapter may further be deemed to be a public nuisance which may be abated by administrative or civil or criminal action in accordance with the terms and provisions of this code and state law.

7. All costs and fees incurred by the City as a result of any violation of this chapter which constitute a nuisance, including all administrative fees and expenses and legal fees and expenses, shall become a lien against the subject premises from which the nuisance emanated and a personal obligation against the owner, in accordance with Government Code Sections 38773.1 and 38773.5. The owner of record of the premises subject to any lien shall receive notice of the lien prior to recording, as required by Government Code Section 38773.1. The City Attorney is authorized to collect nuisance abatement costs or enforce a nuisance lien in an action brought for money judgment, or by delivery to the county

assessor of a special assessment against the premises in accordance with the conditions and requirements of Government Code Section 38773.5.

8. Any person acting in violation of this chapter may also be acting in violation of the Clean Water Act or the California Porter-Cologne Act (California Water Code Section 13000 et seq.) and the regulations thereunder, and other laws and regulations, and may be subject to damages, fines and penalties, including civil liability under such other laws. The City Attorney is authorized to file a citizen's suit pursuant to the Clean Water Act, seeking penalties, damages and orders compelling compliance and appropriate relief.

9. The City Attorney is authorized to file in a court of competent jurisdiction a civil action seeking an injunction against any violation or threatened or continuing violation of this chapter. Any temporary, preliminary or permanent injunction issued pursuant hereto may include an order for reimbursement to the City for all costs incurred in enforcing this chapter, including costs of inspection, investigation, monitoring, treatment, abatement, removal or remediation undertaken by or at the expense of the city, and may include all legal expenses and fees and any and all costs incurred relating to the restoration or remediation of the environment.

10. Each separate Discharge in violation of this chapter and each day a violation of this chapter exists, without correction, shall constitute a new and separate violation punishable as a separate infraction, misdemeanor and/or civil violation.

11. Whenever necessary, interagency coordination will be employed to enforce the provisions of this chapter.

12. The City may utilize any and all other remedies as otherwise provided by law."

Thus, enforcement actions can be completed administratively or judicially if necessary.

Please contact the undersigned if you have any questions.

Sincerely,

ALESHIRE & WYNDER, LLP

David J. Aleshire
City Attorney for the City of Signal Hill

City of South Gate

8650 CALIFORNIA AVENUE • SOUTH GATE, CA 90280-3075 • (323) 563-9538
FAX (323) 357-9643

RAUL SALINAS
CITY ATTORNEY

December 3, 2013

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013-1105

RE: Legal Authority Certification for the City of South Gate

Dear Mr. Unger:

As legal counsel for the City of South Gate, I have reviewed its existing ordinances including Title 6 (Health and Sanitation), Chapter 6.67 (Storm Drains), of the South Gate Municipal Code, and have determined that the City can operate pursuant to the legal authority required in 40 CFR 122.26(d)(2)(Storm Water discharge applicable to State NPDES programs), including subdivision 122.26(d)(2)(i)(A)-(F), and Part VI.A.2 of Order No. R4-2012-0175, issued by the Regional Water Quality Control Board – Los Angeles Region ("RWQCB"), adopted on December 28, 2012 and entitled "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County.

Enforcement of the City's stormwater ordinances can be completed administratively or, if necessary, through the judicial system.

Please call the undersigned if you have any questions.

Sincerely,

CITY OF SOUTH GATE

Raul F. Salinas, City Attorney

cc: John L. Hunter & Associates

June 18, 2015

Permittees of the Lower Los Angeles River Watershed Management Group[1]
(See Distribution List)

APPROVAL, WITH CONDITIONS, OF THE LOWER LOS ANGELES RIVER WATERSHED MANAGEMENT GROUP COORDINATED INTEGRATED MONITORING PROGRAM, PURSUANT TO ATTACHMENT E, PART IV.B OF THE LOS ANGELES COUNTY MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT (NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175) AND ATTACHMENT E, PART IV.B OF THE CITY OF LONG BEACH MS4 PERMIT (NPDES PERMIT NO. CAS004003; ORDER NO. R4-2014-0024)

Dear Permittees of the Lower Los Angeles River Watershed Management Group:

The Los Angeles Regional Water Quality Control Board (Los Angeles Water Board or Board) has reviewed the revised monitoring program submitted on February 23, 2015 by the Lower Los Angeles River Watershed Management Group (Group). This monitoring program was submitted pursuant to the provisions of NPDES Permit No. CAS004001 (Order No. R4-2012-0175), which authorizes discharges from the municipal separate storm sewer system (MS4) operated by 86 municipal Permittees within Los Angeles County (hereafter, LA County MS4 Permit), and NPDES Permit No. CAS004003 (Order No. R4-2014-0024), which authorizes MS4 discharges from the City of Long Beach (hereafter, Long Beach MS4 Permit). Both MS4 permits allow Permittees the option to develop and implement a coordinated integrated monitoring program (CIMP) that achieves the five Primary Objectives set forth in Part II.A of Attachment E and includes the elements set forth in Part II.E of Attachment E[2]. These programs must be approved by the Executive Officer of the Los Angeles Water Board.

The Los Angeles Water Board has reviewed the Group's revised CIMP and has determined that the CIMP includes the elements set forth in Part II.E of Attachment E and will achieve the Primary Objectives set forth in Part II.A of Attachment E of the LA County MS4 Permit and the equivalent sections of the Long Beach MS4 Permit.

Public Review and Comment

On July 3, 2014, the Board provided public notice and a 46-day period to allow for public review and comment on the Group's draft CIMP. A separate notice of availability regarding the draft

[1] Permittees of the Lower Los Angeles River Watershed Management Group CIMP include the Los Angeles County Flood Control District; and the cities of Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, and South Gate.

[2] Equivalent sections in the Long Beach MS4 Permit are Attachment E, Parts II.A and II.D, respectively.

CIMPs, including the Group's CIMP, was directed to State Senators and Assembly Members within the Coastal Watersheds of Los Angeles County. The Board received three comment letters that had comments applicable to the Group's draft CIMP. One joint letter was from the Natural Resources Defense Council (NRDC), Heal the Bay, and Los Angeles Waterkeeper, and the other letters were from the Construction Industry Coalition on Water Quality (CICWQ) and Ventura Countywide Stormwater Quality Management Program. During the review of the draft and revised CIMP, the Los Angeles Water Board considered those comments applicable to the Group's proposed CIMP.

Los Angeles Water Board Review

Concurrent with the public review, the Los Angeles Water Board, along with U.S. EPA Region IX staff, reviewed the draft CIMPs. On November 25, 2015, the Los Angeles Water Board sent a letter to the Group detailing the Board's comments on the draft CIMP and identifying the revisions that needed to be addressed prior to the Board's approval of the Group's CIMP. The letter directed the Group to submit a revised CIMP addressing the Los Angeles Water Board's comments. Prior to the Group's submittal of its revised CIMP, the Los Angeles Water Board staff had a meeting on January 23, 2015 and email exchanges with the Group's representatives and consultants to discuss the Board's remaining comments and necessary revisions to the draft CIMP. The Group submitted its revised CIMP on February 23, 2015 for Los Angeles Water Board review and approval.

Los Angeles River Nitrogen Compounds and Related Effects TMDL

In March 2005, the County of Los Angeles and the Cities of Los Angeles and Calabasas submitted a Monitoring Work Plan on behalf of MS4 Permittees in the Los Angeles River watershed, which addressed the requirement for MS4 Permittees to submit a Monitoring Work Plan per the Los Angeles River Nitrogen Compounds and Related Effects TMDL (LAR Nitrogen TMDL). For MS4 discharges in the Lower Los Angeles River Watershed, the Group's revised CIMP will now address MS4 monitoring requirements for the LAR Nitrogen TMDL.

CIMP Approval

The Los Angeles Water Board hereby approves, subject to the following conditions, the Group's February 23, 2015 revised CIMP. The Board may rescind this approval if all of the following conditions are not met to the satisfaction of the Board within the timeframe provided below.

1. LA River Bacteria TMDL monitoring should be conducted monthly at the LARB1, LARB2, and LARB7 sites per the Basin Plan:
    a. Amend Table 4-1 (page 26) and Section 8.3 (pages 54-57) to indicate that monitoring will be conducted monthly at these freshwater bacteria monitoring sites.
    b. Include a note in Table 4-1, Table 5-1 (page 29), and Section 8.3 that bacteria monitoring frequency will increase to weekly after completion of the first segment or tributary-specific implementation phase.
2. Figure 3-3 on page 24 is entitled "HUC 12 equivalents within the LLAR," however it incorrectly shows the LAR Upper Reach 2 WMP Group and the location of its RW monitoring location. Revise the CIMP as follows:
    a. Include a correct map of the LLAR HUC 12 equivalents;

b. Keep the map showing the LAR Upper Reach 2 monitoring location and include a reference and description in Section 3.2; and
c. Correct any additional references to these figures.

3. Include a map with land uses for the entire LLAR watershed management group area. Figure 3-2 (page 23) only shows the land uses for the stormwater outfall monitoring site drainage areas.

In separate correspondence to all Permittees developing CIMPs and Integrated Monitoring Programs (IMPs), the Los Angeles Water Board will also be providing clarification of requirements for toxicity monitoring – specifically regarding additional toxicity monitoring upstream and at outfalls where toxicity is identified during at sampling event at a receiving water monitoring site.

The Group shall submit a final CIMP to the Los Angeles Water Board that satisfies all of the above conditions no later than **July 3, 2015**. Pursuant to Attachment E, Part IV.C.6 of the LA County MS4 Permit[3], the Group must commence implementing its monitoring program within 90 days after this approval of the final CIMP (i.e. no later than September 16, 2015). Please note that the Group is responsible for complying with all reporting provisions included in Attachment E, Part XIV – XVIII and Section D of Part XIX, "Reporting Requirements for the Los Angeles River WMA TMDLs," and Attachment D, Sections IV, V, and VII.A of the LA County MS4 Permit[4]. The Group is also responsible for complying with applicable reporting provisions included in Section C of Part XIX, "Reporting Requirements for Dominguez Channel and Greater Harbors Waters WMA TMDLs."[5] Finally, the Group is also responsible for complying with the following requirements under Annual Reporting and Adaptive Management.

Annual Reporting

Within the reporting year, through its Annual Report per Attachment E, Part XVIII of the LA County MS4 Permit[6], the Group shall report on the status of the phased initiation of stormwater outfall monitoring established in the revised CIMP and specified below.

- Table 4-1 "Schedule for Implementation of Monitoring Activities in the Lower Los Angeles River Watershed": The CIMP establishes a phased approach to initiate monitoring with LLAR2 and LLAR4 to be added the first year and LLAR1 and LLAR3 to be added the second year.
- Table 8-6 "Schedule for Completion of LRS Outfall Monitoring for Bacterial Loads under the Los Angeles River Bacterial TMDL"

In addition, the Annual Report shall provide an Integrated Monitoring Report that summarizes all identified exceedances of:

- outfall-based stormwater monitoring data,

[3] Equivalent requirement in the Long Beach MS4 Permit is Attachment E, Part IV.C.5

[4] Equivalent requirements in the Long Beach MS4 Permit are: Attachment E, Parts XIV-XVIII; Attachment E, Part XIX.B, "Reporting Requirements for the Los Angeles River WMA TMDLs"; and Attachment D, Parts IV, V, and VII.A.

[5] Equivalent requirement in the Long Beach MS4 Permit is Attachment E, Part XIX, Section A.

[6] Equivalent requirement in the Long Beach MS4 Permit is Attachment E, Part XVIII.

- wet weather receiving water monitoring data,
- dry weather receiving water monitoring data, and
- non-storm water outfall monitoring data

against all applicable receiving water limitations, water quality-based effluent limitations, non-storm water action levels, and aquatic toxicity thresholds as defined in Sections XII.F and G of this MRP. All sample results that exceeded one or more applicable thresholds shall be readily identified.

The Annual Report shall also include a Municipal Action Level (MAL) Assessment Report, which shall present the stormwater outfall monitoring data in comparison to the applicable MALs, and identify those subwatersheds with a running average of twenty percent or greater of exceedances of the MALs in discharges of stormwater from the MS4. Please note that beginning in Year 3 after the effective date of the LA County MS4 Permit, each Permittee or group of Permittees shall submit a MAL Action Plan with the Annual Report (first MAL Action Plan due with December 15, 2015 Annual Report) to the Regional Water Board Executive Officer, for those subwatersheds with a running average of twenty percent or greater of exceedances of the MALs in any discharge of storm water from the MS4. Please note that implementation of an approved Watershed Management Program (WMP) or Enhanced Watershed Management Program (EWMP) per Part VI.C of the LA County MS4 Permit fulfills all requirements related to the development and implementation of the MAL Action Plan, as per Attachment G of the LA County MS4 Permit[7], for those pollutants addressed by the WMP or EWMP.

Adaptive Management

The Regional Water Board or its Executive Officer, consistent with 40 CFR section 122.41, may approve changes to the Monitoring and Reporting Program, after providing the opportunity for public comment, either:

1. By request of the Group or by an interested person after submittal of the Monitoring Report. Such request shall be in writing and filed not later than 60 days after the Monitoring Report submittal date, or
2. As deemed necessary by the Regional Water Board Executive Officer, following notice to the Group.

As part of the adaptive management process, any modifications to the CIMP must be submitted to the Los Angeles Water Board for review and approval. The Group must implement any modifications to the CIMP upon approval by the Los Angeles Water Board or its Executive Officer, or within 60 days of submittal of modifications if the Los Angeles Water Board or its Executive Officer expresses no objections. Note that the Group's Report of Waste Discharge (ROWD) is due no later than July 1, 2017[8]. To align any modifications to the CIMP proposed through the adaptive management process with permit reissuance, results of the first adaptive management cycle should be submitted in conjunction with the Group's ROWD.

[7] Equivalent sections in the Long Beach MS4 Permit are Part VII.C and Attachment G.

[8] The ROWD for the Long Beach MS4 Permit is due September 29, 2018.

If you have any questions, please contact Mr. Chris Lopez of the Storm Water Permitting Unit by electronic mail at Chris.Lopez@waterboards.ca.gov or by phone at (213) 620-2095. Alternatively, you may also contact Mr. Ivar Ridgeway, Chief of the Storm Water Permitting Unit, by electronic mail at Ivar.Ridgeway@waterboards.ca.gov or by phone at (213) 620-2150.

Sincerely,

Samuel Unger

Samuel Unger, P.E.
Executive Officer

Enclosures: Lower Los Angeles River Watershed Management Group Distribution List

Lower Los Angeles River Watershed Management Group
Distribution List (via email)

Jason Wen
City of Downey
jwen@downeyca.org

Konya Vivanti
City of Lakewood
kvivanti@lakewoodcity.org

Anthony Arevalo
City of Long Beach
Anthony.Arevalo@longbeach.gov

Emilio Murga
City of Lynwood
emurga@lynwood.ca.us

Sarah Ho
City of Paramount
sho@paramountcity.com

Gladis Deras
City of Pico Rivera
gderas@pico-rivera.org

Steve Myrter
City of Signal Hill
smyrter@cityofsignalhill.org

Arturo Cervantes
City of South Gate
acervantes@sogate.org

Keith Jones
Caltrans
kjones@dot.ca.gov

Terri Grant
Los Angeles County Flood Control District
tgrant@dpw.lacounty.gov

Watershed Management Program Appendix 8

A-8-1 Coordinated Integrated Monitoring Program

INCLUDED AS A SEPARATE SUBMITTAL

COORDINATED INTEGRATED MONITORING PROGRAM FOR THE LOWER LOS ANGELES RIVER WATERSHED MONITORING GROUP

Participants

Downey	Pico Rivera
Lakewood	Signal Hill
Long Beach	South Gate
Lynwood	Paramount

Los Angeles County Flood Control District



Prepared by:

KINNETIC LABORATORIES INCORPORATED

Revised
June 29, 2015

RB-AR13020

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ACRONYMS

ALERT	Automatic Local Evaluation in Real Time
AMEL	Average Monthly Effluent Limitation
Basin Plan	*Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand 5-day @ 20 °C
CASQA	California Stormwater Quality Association
CD	Compact Disc
CFR	Code of Federal Regulations
CIMP	Coordinated Integrated Monitoring Program
CL	Control Limit
COD	Chemical Oxygen Demand
CTR	California Toxics Rule
CV	Coefficient of Variation
CWA	Clean Water Act
CWC	California Water Code
CWP	Center for Watershed Protection
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
Discharger	Los Angeles County MS4 Permittees
DNQ	Detected But Not Quantified
EFA	Effective Filtration Area
EIA	Effective Impervious Area
ELAP	California Department of Public Health Environmental Laboratory Accreditation Program
Facility	Los Angeles County MS4s
FIB	Fecal Indicator Bacteria
GIS	Geographical Information System
gpd	gallons per day
HUC	Hydrologic Unit Code
IC50	Concentration at which the organism is 50% inhibited
IC/ID	Illicit Connection and Illicit Discharge Elimination
LA	Load Allocations
LACFCD	Los Angeles County Flood Control District
LARWQCB	Regional Water Quality Control Board, Los Angeles
LCC	Los Cerritos Channel
LID	Low Impact Development
LOEC	Lowest Observed Effect Concentration
MAL	Municipal Action Limits
MBAS	Methylene Blue Active Substances
MCM	Minimum Control Measure
ME	Mass Emission
mg/L	milligrams per Liter
MDEL	Maximum Daily Effluent Limitation
MDL	Method Detection Limit
µg/L	micrograms per Liter
MGD	Million Gallons Per Day
ML	Minimum Level
MRP	Monitoring and Reporting Program

MS4	Municipal Separate Storm Sewer System
MTBE	Methyl tertiary-butyl ether
ND	Not Detected
NOEC	No Observable Effect Concentration
NPDES	National Pollutant Discharge Elimination System
NSW	Non-Stormwater
NTR	National Toxics Rule
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
Ocean Plan	Water Quality Control Plan for Ocean Waters of California
ORI	Outfall Reconnaissance Inventory
PCB	Polychlorinated Biphenyls
PES	Polyester-reinforced polysulfone
RAP	Reasonable Assurance Program
Regional Water Board	California Regional Water Quality Control Board, Los Angeles Region
RPA	Reasonable Potential Analysis
RWL	Receiving Water Limitations
SIP	State Implementation Policy (Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California)
SMC	Stormwater Monitoring Coalition
SQO	Sediment Quality Objective
SSC	Suspended Sediment Concentration
State Water Board	California State Water Resources Control Board
SVOC	Semivolatile Organic Compounds
SWAMP	State's Water Ambient Monitoring Program
TAC	Test Acceptability Criteria
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRE	Toxicity Reduction Evaluation
TSS	Total Suspended Solid
TU_c	Chronic Toxicity Unit
USEPA	United States Environmental Protection Agency
USGS	U.S. Geological Survey
WDR	Waste Discharge Requirements
WET	Whole Effluent Toxicity
WLA	Waste Load Allocations
WMA	Watershed Management Area
WMG	Waste Management Group
WMMS	Watershed Management Modeling System
WMP	Watershed Management Program
WQBELs	Water Quality-Based Effluent Limitations
WQS	Water Quality Standards
%	Percent

COORDINATED INTEGRATED MONITORING PROGRAM (CIMP)

FOR THE

LOWER LOS ANGELES RIVER WATERSHED GROUP

1 INTRODUCTION

The Los Angeles Regional Water Quality Control Board (Regional Board) adopted a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. R4-2012-0175 (Permit) on November 8, 2012 that became effective on December 28, 2012. The purpose of the Permit is to ensure the MS4s in Los Angeles County are not causing or contributing to exceedances of water quality objectives established to protect the beneficial uses in the receiving waters. The Permit included guidance for development of a Monitoring and Reporting Program (MRP- Attachment E) to demonstrate that water quality within the permitted area is compliant with established receiving water limitations (RWLs).

The Permit allows development of a Coordinated Integrated Monitoring Program (CIMP) to specify approaches for addressing the objectives of the MRP. The Lower Los Angeles River (LLAR) Watershed Management Area (WMA) chose to develop and implement a CIMP to address the unique conditions of this region.

The entire Los Angeles River Watershed drains a watershed of 824 square miles. The Los Angeles River WMA is one of the largest in the region and is also one of the most diverse in terms of land use patterns. Approximately 324 square miles of the watershed are covered by forest or open space land including the area near the headwaters, which originate in the Santa Monica, Santa Susana, and San Gabriel Mountains. The remainder of the watershed is highly developed. The river flows through the San Fernando Valley past heavily developed residential and commercial areas. From the confluence with the Arroyo Seco, north of downtown Los Angeles, to the confluence with the Rio Hondo, the river flows through industrial and commercial areas and is bordered by rail yards, freeways, and major commercial and government buildings.

The LLAR Watershed (Figure 1-1) extends from Pico Rivera on the Rio Hondo to the Pacific Ocean. The LLAR Watershed Group encompasses approximately 43.7 square miles (27,981 acres) within Los Angeles County and comprises 5.3% of the drainage area of the Los Angeles River Watershed From the Rio Hondo to the Pacific Ocean, the river flows through industrial, residential, and commercial areas, including major refineries and petroleum products storage facilities, major freeways, rail lines, and rail yards serving the Ports of Los Angeles and Long Beach. The Los Angeles River tidal prism/estuary begins in Long Beach at Willow Street and runs approximately three miles before joining with Queensway Bay. The channel has a soft bottom in this reach with concrete-lined sides.

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The CIMP is required to integrate requirements of the current Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit (LARWQCB, 2012), the City of Long Beach MS4 permit and TMDL monitoring requirements. This new approach represents an expansion and reorganization of monitoring in order to allow better assessment of the effectiveness of control measures using a watershed-based approach. The CIMP is structured to support the WMP's adaptive management process. New information and data resulting from the monitoring program are intended to assist in evaluating the effectiveness of management actions and to regularly re-evaluate the monitoring plan to better identify sources of contaminants. This plan was developed to address five primary objectives which include:

- Assess the chemical, physical, and biological impacts of discharges from the MS4s on receiving waters.
- Assess compliance with receiving water limitations and water quality-based effluent limitations (WQBELs) established to implement TMDL wet and dry weather load allocations
- Characterize pollutant loads in MS4 discharges.
- Identify sources of pollutants in MS4 discharges.
- Measure and improve the effectiveness of pollutant controls implemented under the new MS4 permits.

The Monitoring and Reporting Plan (MRP; Sections I.C and I.D) provides for development of a CIMP to provide Permittees the flexibility to coordinate monitoring efforts on a watershed or subwatershed basis, leverage monitoring resources to increase cost-efficiency and effectiveness and to closely align monitoring required for TMDLs with monitoring required to support the Watershed Management Program.

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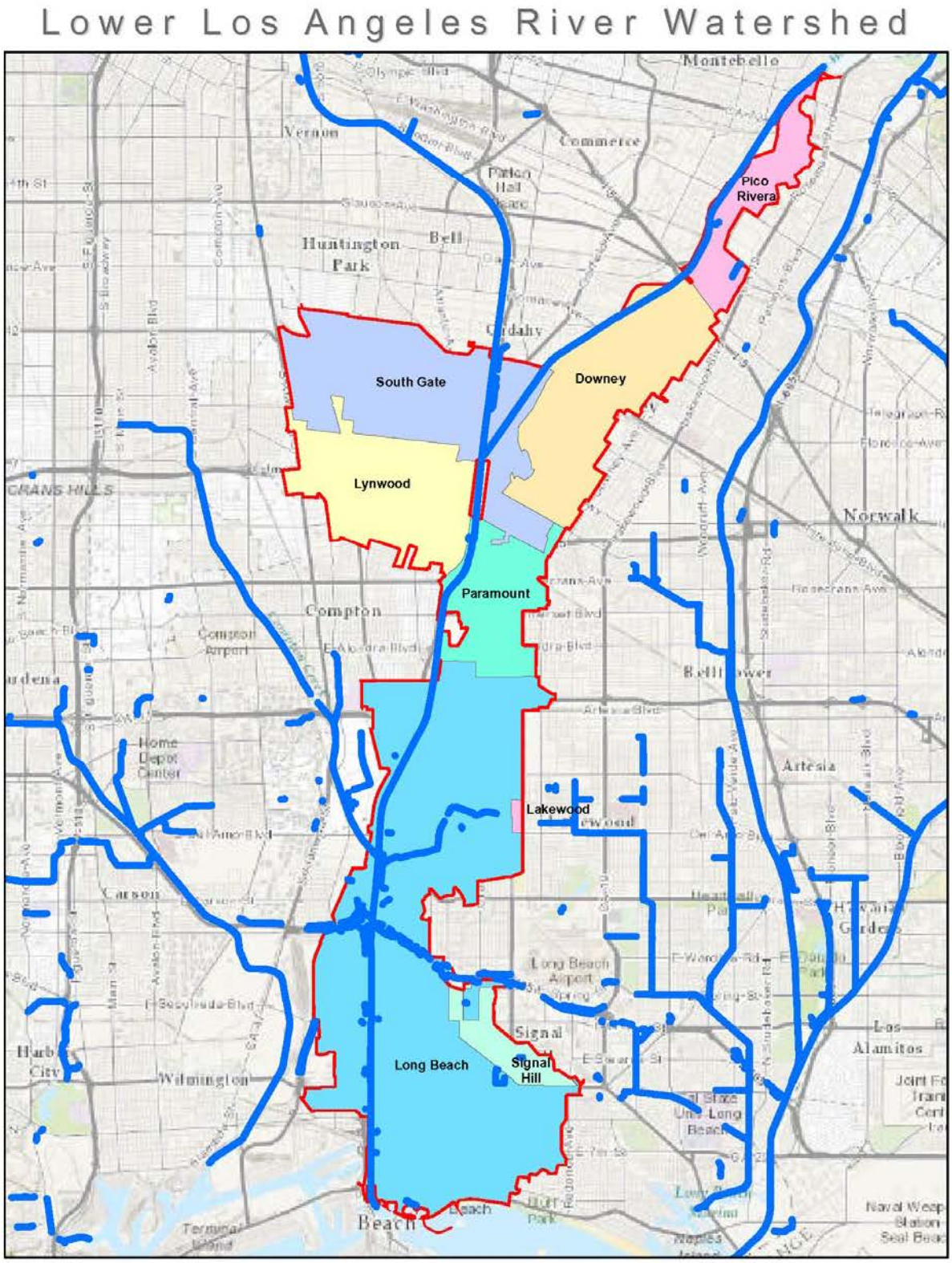


Figure 1-1. Lower Los Angeles River Watershed Group Boundaries.

2 Water Body-Pollutant Classification

Development of a Watershed Management Program (WMP) requires Permittees to develop water quality priorities within each WMA [Section C.5.a (page 58) of the Permit] that will be used assist in directing implementation of control measures and monitoring to address constituents of concern. These classifications are presented and discussed in Section 2 of the WMP.

The CIMP was developed to focus on existing water quality conditions. With more than 10 years of monitoring, data has shown that most of the constituents listed in Table E-2 of the MRP have never been detected and many more have been detected, but have not been found to exceed any RWLs. This new program is designed to target constituents that have been identified as constituents of concern in the receiving waters. Water body-pollutant combinations were used to classify segments of the LLAR WG into one of the following three categories:

- **Category 1 (Highest Priority):** Water body-pollutant combinations for which water quality-based effluent limitations and/or RWLs are established in Part VI.E and Attachments L through R of the Order.
- **Category 2 (High Priority)**: Pollutants for which data indicate water quality impairment in the receiving water according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) and for which MS4 discharges may be causing or contributing to the impairment.
- **Category 3 (Medium Priority)**: Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable RWLs contained in the Order and for which MS4 discharges may be causing or contributing to exceedances.

Five water bodies were considered for both wet and dry weather conditions while reviewing data potential impairment of the receiving waters (Table 2-1, Table 2-2). These included the Los Angeles River Estuary (LARE), Reaches 1 and 2 of the Los Angeles River (LAR1 and LAR2), Compton Creek (CC) and Reach 1 of the Rio Hondo (RH1). Each of these segments is defined in the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (Basin Plan).

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Table 2-1. Wet Weather Water Body/ Pollutant Classifications for the Lower Los Angeles River WG.

			WATER BODY				
CATEGORY	**POLLUTANT**	**CLASS**	**LARE**	**LAR1**	**LAR2**	**CC**	**RH1**
1	Cadmium	Metal		**X**	**X**	**X**	**X**
	Copper	Metal	**X**	**X**	**X**	**X**	**X**
	Lead	Metal	**X**	**X**	**X**	**X**	**X**
	Zinc	Metal	**X**	**X**	**X**	**X**	**X**
	Trash[1]	Other		**X**	**X**	**X**	**X**
	Nitrogen Compounds[2]	Nutrient		**X**	**X**	**X**	**X**
	DDT	OC Pest	**X**				
	PCBs	OC Pest	**X**				
	PAHs	SVOC	**X**				
	E. coli	Micro		**X**	**X**	**X**	**X**
	Coliform & Enterococcus	Micro	**X**				
2	Chlordane (sediment)	OC Pest	**X**				
	Coliform Bacteria	Micro		**X**	**X**	**X**	**X**
	Aluminum	Metal		**X**			
	Diazinon	OP Pest		**X**			
	Oil	General			**X**		
	Trash	Other	**X**				
	Toxicity	Bioassay					**X**
	Sediment Toxicity	Bioassay	**X**				
	Cyanide	General		**X**			
	MBAS	General		**X**	**X**		
3	Chloride	General					**X**
	Mercury	Metal		**X**			
	Diazinon	OP Pest					**X**
	PAHs	SVOC		**X**	**X**		
	Bis(2-ethylhexylphthalate	SVOC		**X**			
	Cyanide	General					**X**
	pH	General					**X**
	Dissolved Oxygen	General		**X**	**X**		

LAR1= Los Angeles River Reach 1
LAR2= Los Angeles River Reach 2
LARE= Los Angeles River Estuary
CC= Compton Creek
RH1=Rio Hondo Reach 1

Nutrients= nitrogen and phosphorus compounds
OC Pest = organochlorine pesticides
OP Pest = organophosphorus pesticides
Micro = microbiological (fecal indicator bacteria)
SVOC = semivolatile organic compounds (acid, base & neutral

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia was listed in category 2 for LAR1 and LAR2 – included in nitrogen compounds for category 1
3. Nutrients (algae) by nitrogen compounds for category 1.

Table 2-2. Dry Weather Water Body/ Pollutant Classifications for the Lower Los Angeles River WG.

			WATER BODY				
CATEGORY	**POLLUTANT**	**CLASS**	**LARE**	**LAR1**	**LAR2**	**CC**	**RH1**
1	Copper	Metal	**X**	**X**	**X**	**X**	**X**
	Lead	Metal	**X**	**X**	**X**	**X**	**X**
	Zinc	Metal	**X**				**X**
	Trash[1]	Other		**X**	**X**	**X**	**X**
	Nitrogen Compounds[2]	Nutrients		**X**	**X**	**X**	**X**
	DDT	OC Pest	**X**				
	PAHs	SVOC	**X**				
	PCBs	OC Pest	**X**				
	E. coli	Micro		**X**	**X**	**X**	**X**
	Coliform & Enterococcus	Micro	**X**				
2	Chlordane (sediment)	OC Pest	**X**				
	Coliform Bacteria	Micro		**X**	**X**	**X**	**X**
	Aluminum	Metal		**X**			
	Selenium	Metal		**X**	**X**		
	Cyanide	General		**X**			
	Oil	General			**X**		
	Trash	Other	**X**				
	Toxicity	Bioassay					**X**
	Sediment Toxicity	Bioassay	**X**				
3	Chloride	General		**X**	**X**		
	Cyanide	General					**X**
	pH	General					**X**
	Mercury	Metal		**X**			
	Nickel	Metal		**X**			
	Thallium	Metal		**X**	**X**		
	Chlorpyrifos	OP Pest				**X**	
	PAHs	SVOA		**X**	**X**		
	Bis(2-ethylhexylphthalate	SVOA		**X**			

LAR1= Los Angeles River Reach 1
LAR2= Los Angeles River Reach 2
LARE= Los Angeles River Estuary
CC= Compton Creek
RH1=Rio Hondo Reach 1

Nutrients= nitrogen and phosphorus compounds
OC Pest = organochlorine pesticides
OP Pest = organophosphorus pesticides
Micro = microbiological (fecal indicator bacteria)
SVOC = semivolatile organic compounds (acid, base & neutral

1. Trash will be addressed by Annual Reports of compliance with the installation of full capture systems.
2. Ammonia was listed in category 2 for LAR1 and LAR2 – included in nitrogen compounds for category 1
3. Nutrients (algae) by nitrogen compounds for category 1.

3 Monitoring Sites and Approach

This CIMP addresses monitoring activities required by the Monitoring and Reporting Program (MRP) - No. CI-6948 for Order R4-2012-0175, NPDES Permit No. CAS004001 for the Lower Los Angeles River (LLAR) Watershed Management Group (WMG). Development of this CIMP focused on improving the overall effectiveness of the monitoring program by coordination of sampling efforts.

Final approval of the CIMP is expected in early 2015. Existing monitoring will continue to be conducted and beginning summer of 2014, the dry weather screening of major outfalls will commence. For planning purposes, the monitoring described in this CIMP is intended to commence on July 1, 2015 or 90 days after the approval of the CIMP, whichever is later. Majority of the elements will start in the summer of 2015 and the following wet weather season, and the program will be phased in over a three-year period. Non-stormwater (NSW) outfall monitoring efforts are currently underway in order to complete an inventory of all outfalls and allow the program to meet the first major deadline established by the Permit. The Permit requires that source identification surveys be completed for at least 25% of all major outfalls found to convey significant non-stormwater discharges by December 28, 2015.

The approach presented in this CIMP is designed to address objectives of the MRP by incorporating TMDL monitoring requirements and aligning field efforts to increase cost effectiveness. Information on sampling methods, cleaning protocol and QAQC are provided in Appendices B, C and D. The following sections provide a broad overview of the monitoring program. A comprehensive list of monitoring sites (Table 3-1) and the locations of these sites within the LLAR WMG (Figure 3-1) are provided to illustrate the coverage provided for each major element. Later sections will provide detailed monitoring requirements for individual elements of the CIMP.

3.1 Receiving Water Monitoring

The MRP (Part II.E.1) specifies that receiving water monitoring is to be performed at previously designated mass emission stations as well as TMDL receiving water compliance points, as designated in approved TMDL Monitoring Plans. The objectives of the receiving water monitoring include the following:

- Determine whether the receiving water limitations are being achieved,
- Assess trends in pollutant concentrations over time, or during specified conditions,
- Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring.

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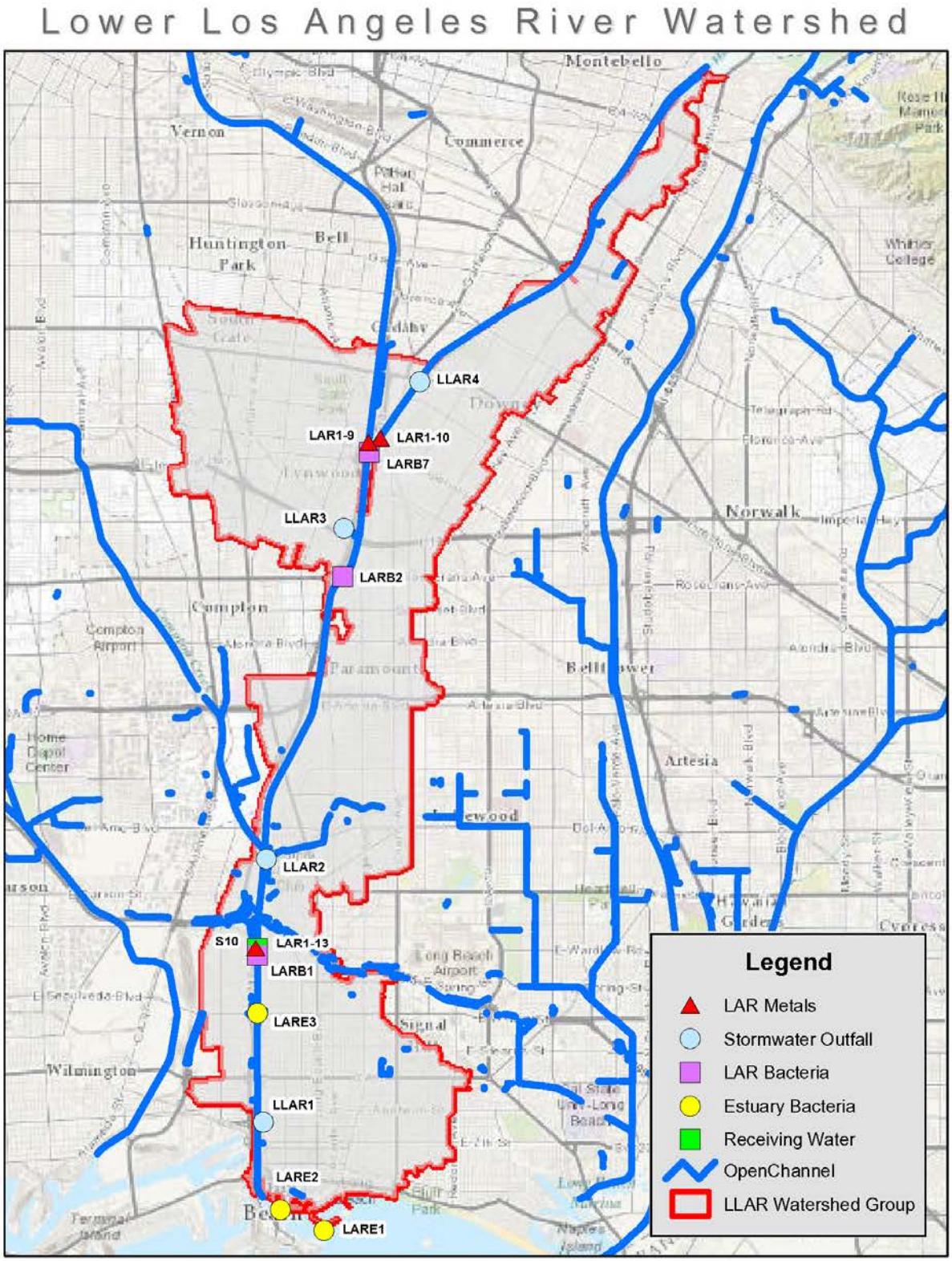


Figure 3-1. Monitoring Locations in the Lower Los Angeles River Watershed.

Table 3-1. Consolidated List of Monitoring Sites in the Lower Los Angeles River WMG.

SITE CODE	SITE TYPE/PURPOSE	NAME	PRIMARY SAMPLING[2]	LATITUDE[3] (°N)	LONGITUDE (°W)
S10[1]	Receiving Water/TMDL	Wardlow Street	Auto	33.81900	118.20556
LLAR1	Stormwater Outfall	Cerritos Pump Station	Auto	33.77951	118.20380
LLAR2	Stormwater Outfall	Dominguez Gap Pump Station	Auto	33.83945	118.20320
LLAR3	Stormwater Outfall	Lynwood	Auto	33.91469	118.18214
LLAR4	Stormwater Outfall	Firestone	Auto	33.94812	118.16146
LARB1[1]	LAR Bacteria TMDL	Segment A (Wardlow)	Grab	33.81735	118.20551
LARB2	LAR Bacteria TMDL	Segment B (Rosecrans)	Grab	33.90374	118.18240
LARB7	LAR Bacteria TMDL	Rio Hondo	Grab	33.93202	118.17523
LARE1	Estuary Bacteria TMDL	LARE Mouth of Estuary	Grab	33.75506	118.18727
LARE2	Estuary Bacteria TMDL	LARE Queensway	Grab	33.75976	118.19910
LARE3	Estuary Bacteria TMDL	LARE Willow	Grab	33.80416	118.20547
LAR1-13[1]	LAR Metals TMDL	Wardlow - Main Channel	Auto/Grab	33.81900	118.20556
LAR1-10	LAR Metals TMDL	Rio Hondo - Trib	Grab	33.93510	118.17218
LAR1-9	LAR Metals TMDL	I710 - Main Channel	Grab	33.93421	118.17548

- S10, LARB1, and LAR1-13 are all located at the same location in the Los Angeles River near Wardlow Ave. This site is the final compliance location for the Metals TMDL
- Auto=Primarily sampled with automated stormwater monitoring equipment, Grab= Samples primarily taken as grab samples.
- All site locations are based upon the NAD 83 datum.

In order to achieve these requirements, two types of receiving water monitoring sites are included in the CIMP. These include:

- Mass Emission (ME) Receiving Water Monitoring - The mass emission station will serve to provide a long-term measure of compliance with receiving water quality criteria and allow for assessment of trends in pollutant concentrations.
- TMDL Receiving Water Monitoring Sites – These sites are intended to evaluate compliance or progress towards attainment of Waste Load Allocation (WLAs) for TMDLs and ultimately provide data to evaluate when objectives are met and determine when sufficient data exist to reevaluate the 303(d) listing.

3.1.1 Mass Emission (ME) Monitoring Site

The Los Angeles River monitoring station (S10) will continue to serve as the ME monitoring station for the LLAR. This site is located in the Los Angeles River at the existing stream gauge station (i.e., Stream Gauge F319-R) between Willow Street and Wardlow Road. This site is located near the bottom of Reach 1 in the City of Long Beach and was originally selected to avoid tidal influences. This site has been monitored by the Los Angeles County Flood Control District (LACFCD) since 1998 and this site will continue to be monitored by LACFCD.

Although S10 serves as the only mass emission monitoring site within the LLAR WMG, it also serves (and has previously served) as a TMDL monitoring site since it is at the base of the watershed and is the last monitoring location for most contaminants of concern before water is discharged to the Estuary (Figure 3-1, Table 3-1).

3.1.2 Total Maximum Daily Load (TMDL) Monitoring Sites

Permittees within the LLAR WMG are required to conduct monitoring required under the Los Angeles County NPDES MS4 permit and comply with any monitoring requirements associated with six separate TMDLs (Table 3-2). TMDL monitoring sites were selected by reviewing requirements of each TMDL applicable to the LLAR and monitoring sites previously selected or recommended in two previous TMDL compliance plans:

- *Los Angeles River Metals TMDL Coordinated Monitoring Plan* (Metals CMP) – March 25, 2008
- *Coordinated Monitoring Plan for Los Angeles River Watershed Bacteria TMDL – Compliance Monitoring – Draft* (Bacteria CMP). - March 23, 2013

The Metals CMP included monitoring of four sites within the LLAR but, based upon the results of initial monitoring and the minimal distances between sites (about 2 miles), monitoring at one site (referred to as the Del Amo site, LAR1-11) will be discontinued. Further discussion is found in section 8.2. Monitoring will continue as per the initial Metals CMP at the remaining three sites within the LLAR watershed.

The Bacteria CMP was not implemented due to the fact the CIMP was anticipated to address monitoring of ambient bacteria within each WMG. Nevertheless, this document provided a comprehensive approach that addressed ambient bacteria monitoring throughout the watershed

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and monitoring approaches for ambient monitoring at 16 sites. The CMP provides the framework for bacteria monitoring at the four sites located within the LLAR.

Table 3-2. Summary of TMDLs applicable to the Lower Los Angeles River Watershed (LLAR) Management Group.

TMDL	REGIONAL BOARD RESOLUTION #	REGIONAL BOARD APPROVAL EFFECTIVE DATE
Nitrogen Compounds and Related Effects TMDL (Nutrient TMDL)	2003-009 2012-010	March 23, 2004 August 7, 2014
Los Angeles River and Tributaries Metals TMDL (Metals TMDL)	2007-014 2010-003	October 29, 2008 November 3, 2011
Los Angeles River Watershed Bacteria TMDL (LAR Bacteria TMDL)	2010-007 Monitoring Plan: March 23, 2013	March 23, 2012
Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL)	2011-008 Monitoring Plan: November 23, 2013 or the CIMP.	March 23, 2012
Los Angeles River Watershed Trash TMDL (Trash TMDL)	2007-012 Monitoring Plan not required.	September 23, 2008
Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL (Beaches/Estuary TMDL)	USEPA Established TMDL	March 26, 2012

Additional TMDL monitoring is required for the Long Beach City Beaches and Los Angeles River Estuary TMDLs for Indicator Bacteria (Estuary Bacteria TMDL). The LAR Estuary is the only portion of this TMDL addressed by this CIMP. The Long Beach City Beaches will be addressed as part of a separate WMP and IMP being developed to address portions of the City of Long Beach not addressed by the three plans being developed the Lower Los Angeles River, the freshwater portion of the Los Cerritos Channel and the Lower San Gabriel River watersheds.

Protection of the recreational beneficial uses of the City of Long Beach open beaches includes both the open waters used by wind surfers and boaters but emphasizes the shoreline and swash-zone where bathers are directly impacted by exposure to potentially contaminated water. In the Los Angeles River Estuary, swimmers do not typically access waters directly from the shoreline and therefore concerns are more directed towards assessment of bacterial concentrations in open waters of the Estuary and the potential for bacteria in this wind-driven surface plume to impinge upon the recreational beaches of the City of Long Beach after leaving the Estuary. Interim monitoring points were selected to allow determination of whether bacteria are subject to simple dilution by mixing as the water passes through the estuary or if areas within the Estuary serve as sources or sinks for indicator bacteria.

The Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL) also requires that monitoring be conducted to quantify the loads of pollutants from the Los Angeles River. This program will require additional monitoring at the S10 site to quantify metals, DDT, PCBs, and PAHs associated with suspended particulates. This program

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will complement monitoring within the Harbor waters and the Los Angeles River Estuary that is already funded by members of the LLAR group that are included in the Greater Harbor Waters Regional Monitoring Coalition. Four of the LLAR group are active participants (including funding thereof) in the Harbor RMC effort. These members ensure close coordination between the Harbor RMC's TMDL monitoring and the LLAR. In addition, the LLAR has actively been offered the opportunity for voluntary cooperation of all Los Angeles River cities and agencies in establishing a toxics monitoring station at the River/estuary interface. In accordance with Table C of Attachment E of the Permit, this CIMP fulfills the requirement for the submission of a Monitoring and Reporting Plan and Quality Assurance Project Plan.

3.2 Stormwater Outfall Monitoring

Stormwater outfall monitoring is the one element of the program that will be phased in over the course of two years. Stormwater outfall sampling sites (Table 3-3 and Figure 3-2) will be initiated at two sites during the first year of the program. Additional sites will be added in the following year to bring the total number of stormwater outfall monitoring sites up to four. A detailed implementation schedule is provided in the following Section 4.

The stormwater outfall monitoring program was designed to ensure that selected monitoring locations provided representative data by:

- Monitoring at least one major outfall per subwatershed (HUC 12) drainage area, and
- The drainage area of the selected outfalls shall be representative of the land uses within the Permitee's jurisdiction, and
- Selected outfalls must be configured to facilitate accurate flow measurements and safety of monitoring personnel.

Figure 3-2 shows the proposed sampling locations within each subwatershed and HUC 12 Equivalent Boundaries. Figure 3-3 shows the HUC 12 Equivalents within the LLAR sampled by the UR2 Group.

A significant portion of Pico Rivera drains to areas with existing significant infiltration and outfall sampling would not provide representative samples. The outfall monitoring locations account for all significant land uses in the watershed. The land uses for the individual outfall sampling are shown on Figure 3-4 and described in Table 3-4. Monitoring site designations and monitoring functions are shown in Table 3-5.

HUC units are shown in Figure 3-2. There are three HUC 12 equivalents within the LLAR. The Compton Creek-Los Angeles River is by far the largest of the three HUC units. Three of the proposed outfalls monitoring sites are within this HUC. The second largest HUC within the LLAR is the Alhambra Wash-Rio Hondo. One outfall monitoring site, LLAR 4, will be established within the Alhambra Wash-Rio Hondo HUC in the first year of monitoring so that monitoring data will be collected from both principal HUC-12 areas in the first year. The third HUC is the Chavez Ravine-Los Angeles River HUC of which the LLAR only occupies a minimal portion. It is the LLAR's understanding that the adjoining WMP group, the LA River Reach 2 Group, will be placing a monitoring station within that area, therefore the LLAR will not duplicate that effort.

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Table 3-3. Stormwater Outfall Monitoring Sites.

Stormwater Outfall Monitoring Sites	Jurisdiction Area								Land Use				HUC Equivalent		
	Long Beach	Signal Hill	Lakewood	Paramount	Lynwood	Downey	South Gate	Pico Rivera	Residential	Industrial	Commercial	Other	Cmpt Crk/LAR	Alhm/RioHondo	C R/ LAR
LLAR1 - Cerritos Pump Station	x	x							x				x		By others*
LLAR2 - Dominguez Gap	x		x						x				x		
LLAR3 - Lynwood				x	x		x		x	x			x		
LLAR4 - Firestone						x		x	x	x	x			x	
LAR1-11 Del Amo site (discontinued)															

* The Los Angeles River Upper Reach 2 Subwatershed Group.

Table 3-4. Land Use for the outfall monitoring sites for the Lower Los Angeles River Watershed.

Drainage Area	Land Use %						
	Residential	Commercial	Industrial	Mixed Use	Open Space	Other	Area occupied by LA River
LLAR 1	75.30%	2.94%	0.65%	14.72%	1.95%	4.43%	-
LLAR 2	75.49%	3.68%	0.00%	2.78%	10.88%	7.17%	-
LLAR 3	73.36%	7.59%	3.62%	9.35%	0.00%	6.08%	-
LLAR 4	66.50%	5.37%	5.51%	5.65%	11.95%	5.02%	-
Total LLAR Watershed provided for comparison	63.18%	2.86%	3.03%	20.94%	4.81%	4.87%	0.31%
Average of 4 outfalls	72.66%	4.89%	2.44%	8.13%	6.20%	5.68%	

3.3 Non-Stormwater Outfall Monitoring

NSW outfall based monitoring will be conducted for outfalls discharging to receiving waters of the LLAR Watershed. Initially, all pipes exceeding 12 inches and discharging directly into the LLAR receiving waters will be identified. During the first cycle of the permit, the database will be refined to determine which of the 12-inch to 36-inch pipes include discharges from areas with industrial land uses. Regardless of land use, all outfalls, including those between 12 and 36 inches, will be screened. A screening program will be implemented to initially document sites with persistent and significant non-stormwater flows. The screening program will utilize a combination of field tests and may incorporate limited laboratory testing to assist in determining whether flows are the result of illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows or unknown.

3.4 New Development/Redevelopment Effectiveness Tracking

Participating agencies have developed mechanisms for tracking information related to new and redevelopment projects that are subject to post-construction best management practice requirements in Part VI.D.7 of the MS4 Permit.

The MRP requires that Permittees develop a New Development/Re-Development Effectiveness tracking program. Participating agencies have developed mechanisms for tracking information related to new and redevelopment projects that are subject to post-construction best management practice requirements in Part VI.D.7 of the MS4 Permit.

3.5 Regional Studies

On behalf of the participating agencies, the LACFCD will continue to provide financial and/or monitoring resources to the Southern California Stormwater Monitoring Coalition Regional Watershed Monitoring Program, also known as the Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program (Bioassessment Program). The Bioassessment Program was initiated in 2009 and is structured to occur in cycles of five years. Sampling under the first cycle concluded in 2013. The next five-year cycle is scheduled to begin in 2015, with additional special study monitoring scheduled to occur in 2014.

Permittee representatives will also participate in the Southern California Stormwater Monitoring Coalition (SMC) meetings and assist in development and implementation of selected and appropriate regional studies designed to improve stormwater characterization and impact assessment.

RB-AR13041

Table 3-5. Monitoring Site Designation and Monitoring Function.

Site Name	Site Description	Datum NAD83		Type of Site					
		Latitude (N)	Longitude (W)	Receiving Water	Stormwater Outfall	Harbor Toxics TMDL	Metals TMDL	Bacteria TMDL	
								River	Estuary
S10	Wardlow Street	33.81900	118.20556	**X**		**X**			
LLAR1	Cerritos Pump Station	33.77951	118.20380		**X**				
LLAR2	Dominguez Gap Pump Station	33.83945	118.20320		**X**				
LLAR3	Lynwood	33.91469	118.18214		**X**				
LLAR4	Firestone	33.94812	118.16146		**X**				
LARB1	Segment A (Wardlow)	33.81900	118.20556					**X**	
LARB2	Segment B (Rosecrans)	33.90374	118.18240					**X**	
LARB7	Rio Hondo	33.93202	118.17523					**X**	
LARE1	LARE Mouth of Estuary	33.75506	118.18727						**X**
LARE2	LARE Queensway	33.75976	118.19910						**X**
LARE3	LARE Willow	33.80416	118.20547						**X**
LAR1-13	Wardlow - Main Channel	33.81900	118.20556				**X**		
LAR1-10	Rio Hondo - Trib	33.93510	118.17218				**X**		
LAR1-9	I710 - Main Channel	33.93421	118.17548				**X**		

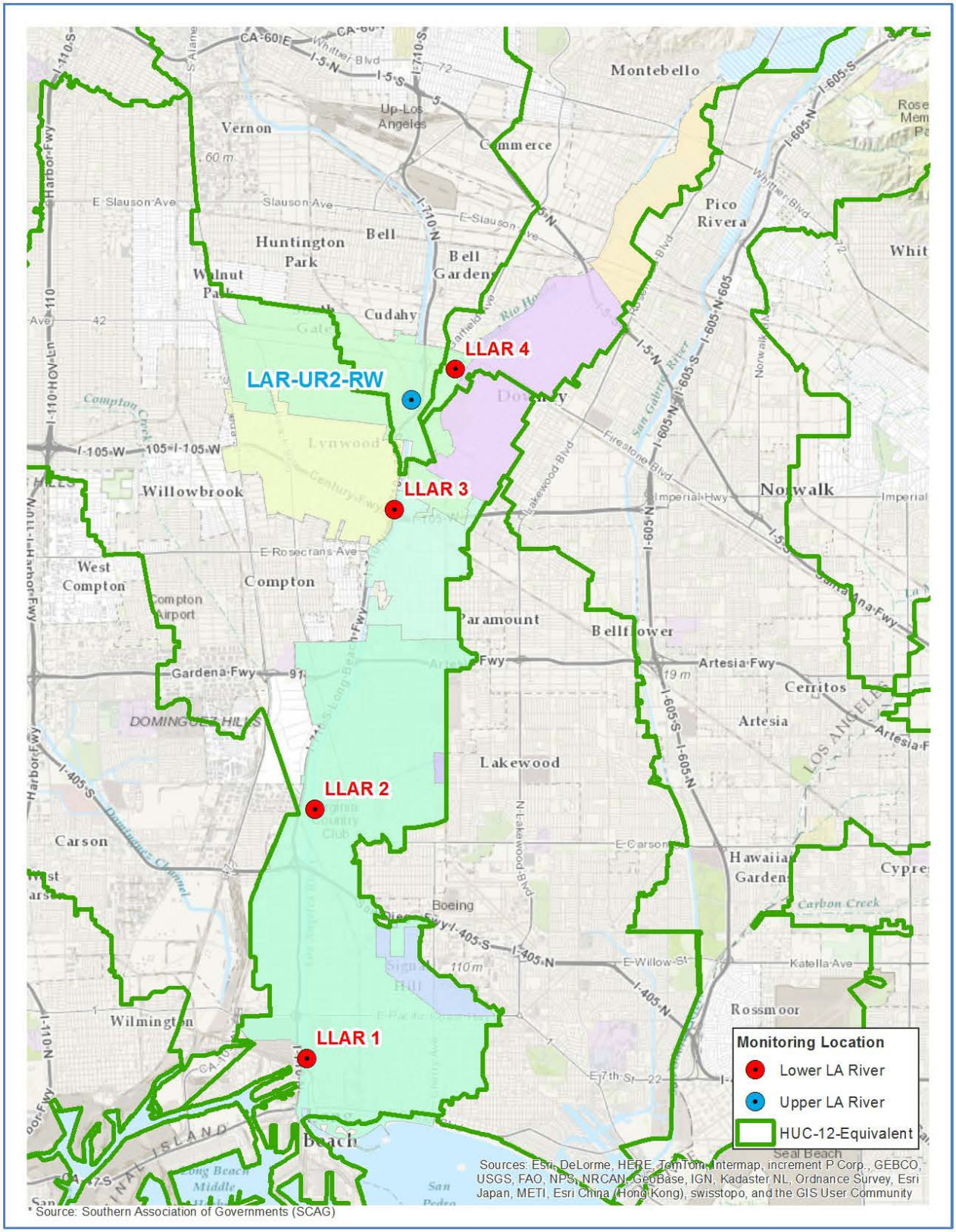


Figure 3-2. HUC 12 Equivalents within the LLAR with Sample Locations.

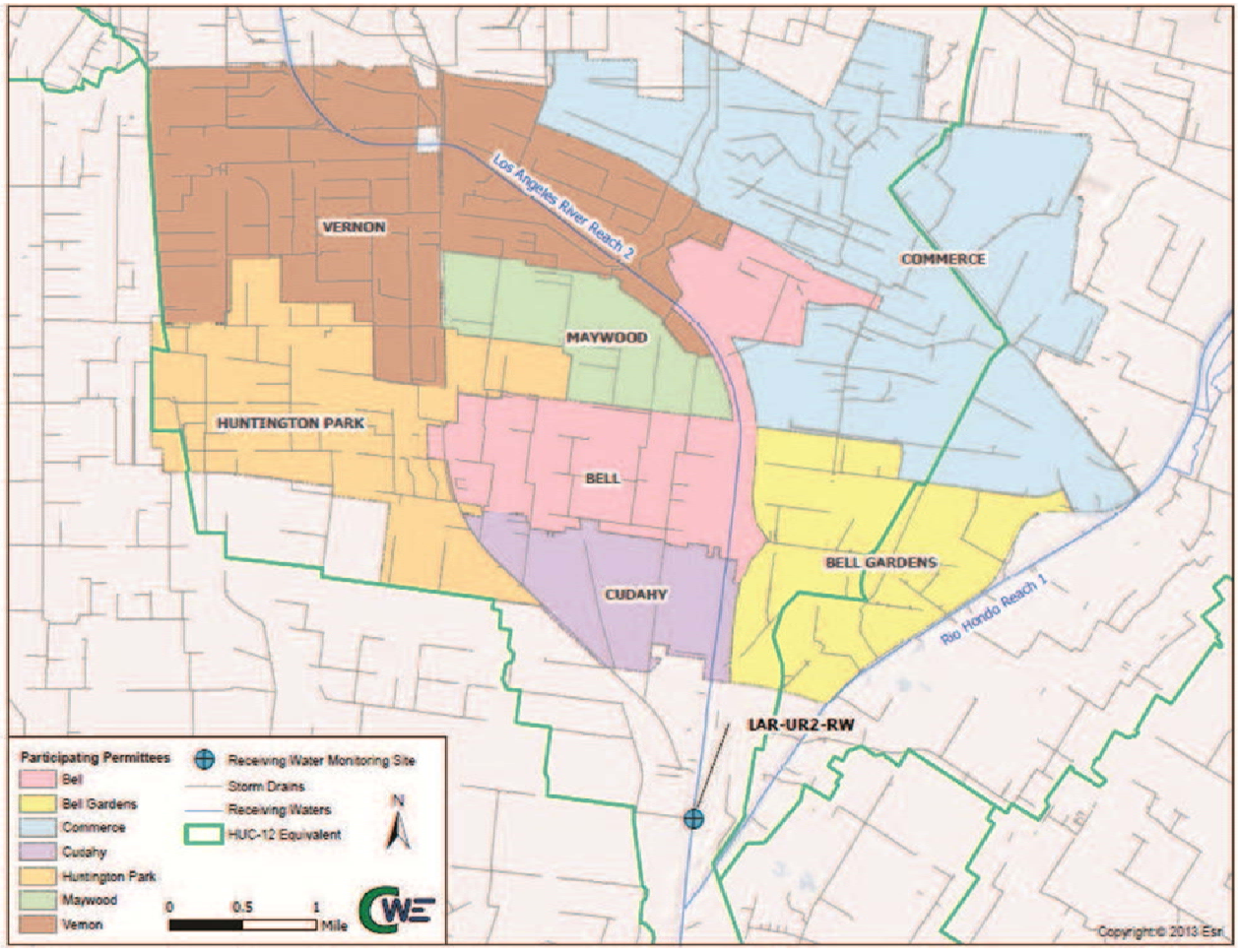


Figure 3-3. HUC 12 Equivalents within the LLAR Sampled by the UR2 Group.

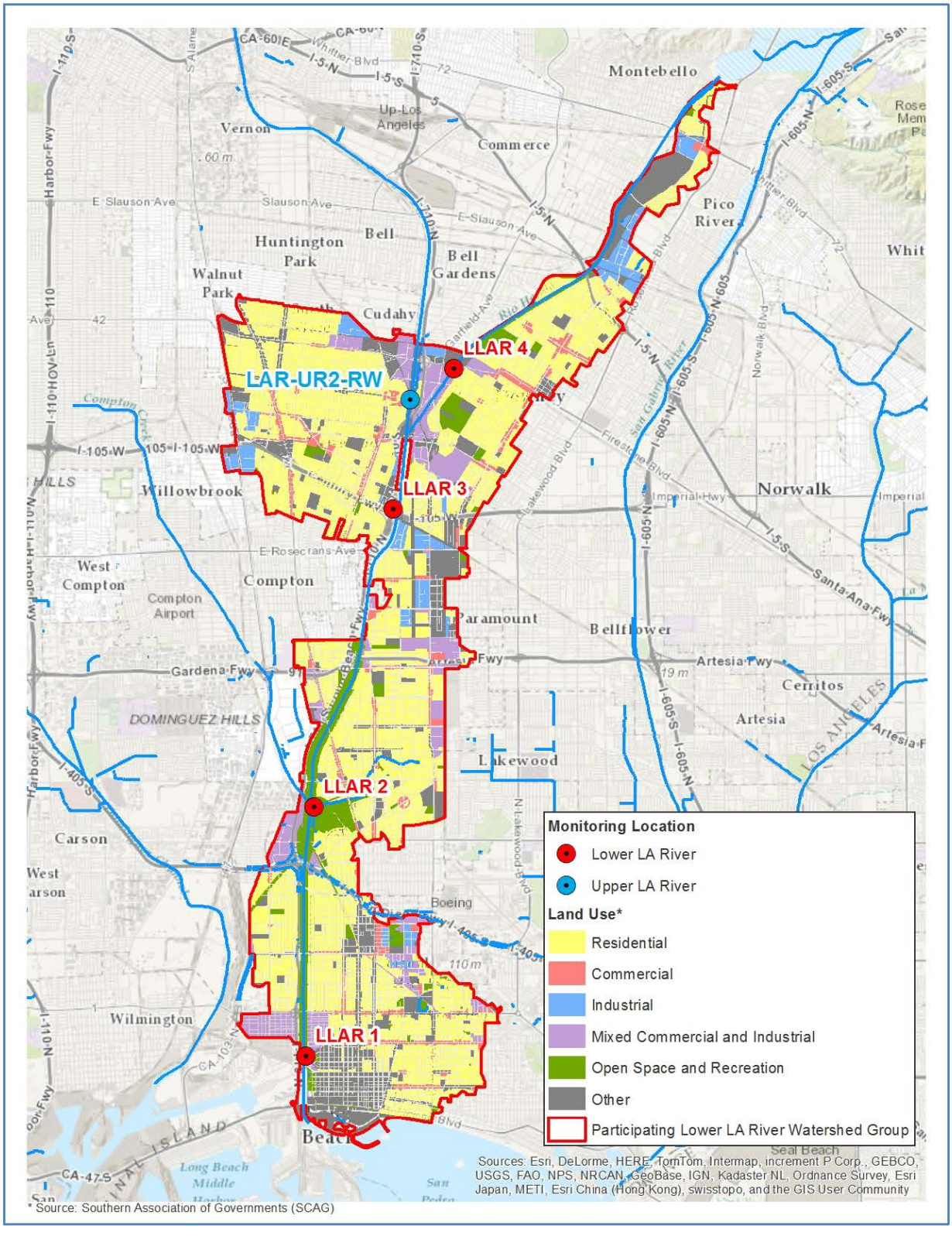


Figure 3-4. Lower Los Angeles River Land Use.

4 Summary of Sampling Frequencies for each CIMP Element

It is anticipated that the CIMP will be implemented in a phased process (Table 4-1). The Receiving Water Quality Monitoring program will start at S10 (Wardlow) during the 2015 dry season. This site will continue to be monitored by the LACFD. This site will be sampled during two dry weather events and three stormwater events each year. During two surveys, water quality testing will incorporate the comprehensive list of water quality parameters listed in Table E-2 of the Attachment E of Regional Board Orders No. R4-2012-0175 (NPDES NO. CAS004001) and R-4-2014-0024 (NPDES No. CAS004003). This full set of analytes will be analyzed in water collected during the first major storm event of the year and during a critical, low flow dry season survey. July is considered to have the lowest historical flows based upon long-term flow monitoring. If these parameters are not detected at the specified Method Detection Limit (MDL) for their respective test method or if the result is below the lowest applicable water quality objective, and is not otherwise identified as being 303(d)-listed or part of an ongoing TMDL, the analyte will not be further analyzed. Parameters exceeding the lowest applicable water quality objective (Appendix G) will continue to be analyzed for the remainder of the Order during at the receiving water monitoring station where it was detected. Acceleration of the Receiving Water Quality Monitoring Program will also include the Aquatic Toxicity Monitoring.

Two Stormwater Outfall Monitoring sites will also start sampling during the 2015/16 wet season. These will include LLAR2 (Dominguez Gap) and a new station, LLAR4 (Firestone). The remaining Stormwater Outfall Monitoring sites will be installed in the following year. LLAR3 (Lynwood) and LLAR1 (Cerritos Pump Station) will be installed and operable for the 2016/17 season. Once the Stormwater Outfall Monitoring sites are installed they will each be monitoring during three storm events each year. If running average concentrations of pollutants exceed the Municipal Action Limits (MALs – Attachment G of the MRP) by more than 20%, expanded monitoring will be required to identify the sources of the increased loads.

Monitoring in the main stem of the Los Angeles River and the Rio Hondo tributary for the Los Angeles River Bacteria TMDL, Los Angeles River Metals TMDL and the Los Angeles River Estuary Bacteria TMDL all start in the summer of 2015. Monitoring data will be collected from both principal HUC-12 areas in the first year. Sampling for these three programs is based upon collection of grab samples.

Monitoring of non-stormwater discharges to the receiving waters of the Lower Los Angeles River started in the summer of 2014 in order to meet the first target of completion of 25% of the source investigations by December 2015.

RB-AR13046

Table 4-1. Schedule for Implementation of Monitoring Activities in the Lower Los Angeles River Watershed.

Task	Dry 2014	Wet 2014-15	Dry 2015	Wet 2015-16	Dry 2016	Wet 2016-17	Dry 2017	Wet 2017-18	Dry 2018
Receiving Water/TMDL									
S10 –Wardlow									
Harbor Toxics			1	2	1	2	1	2	1
Chemistry[1]			2	3	2	3	2	3	2
Aquatic Toxicity			1	2	1	2	1	2	1
Outfall Monitoring Site									
LLAR1 (Cerritos Pump)						3		3	
LLAR2 (Dominguez Gap)				3		3		3	
LLAR3 (Lynwood)						3		3	
LLAR4 (Firestone)				3		3		3	
Los Angeles River Metals[5]									
LAR1-13 (Wardlow)			4	4	4	4	4	4	4
LAR1-10 (Rio Hondo)			4		4		4		4
LAR1-9 (I710-LA River)			4		4		4		4
Los Angeles River Bacteria									
Pre-LRS – all Segment A outfalls			6						
LARB1 (Wardlow)[6]			6	6	6	6	6	6	6
LARB2 (Rosecrans) [6]			6	6	6	6	6	6	6
LARB7 (Rio Hondo) [6]			6	6	6	6	6	6	6
Los Angeles RiverEstuary (bacteria only)									
LARE1 (Mouth of Estuary)			4		4		4		4
LARE2 (Queensway Br.)			4		4		4		4
LARE3 (Willow)			4		4		4		4
Non-Stormwater Outfall									
Inventory & Screen[2]	3								
Source ID[3]		Ongoing	Ongoing		Ongoing		Ongoing		Ongoing
Monitoring[4]					2		2		2

1. Table E-2 chemical analyses will be performed once during the first wet weather event and once during the first critical dry weather monitoring event. Constituents that exceed MDLs and available water quality objectives will continue to be monitored along with all constituents with TMDLs or 303(d) listing. Wet and dry weather chemical constituents will be separately assessed for purposes of continued monitoring.
2. Initial Inventory and Screening will be completed in three surveys before the end of 2014. One re-assessment of the Non-Stormwater Outfall Monitoring Program will be conducted prior to December 2017.
3. Investigations designed to track and classify discharges will start during the 2015 dry season. Source tracking and classification work depend upon the number of sites categorized as Suspect outfalls with evidence of significant flow.
4. Monitoring will be implemented if significant dry weather flows are identified at discharge points that are cannot be identified, are non-essential exempt flows, or identified as illicit flows that are not yet controlled. These sites will be initially monitored twice a year in conjunction with dry weather monitoring of the receiving water site.
5. Currently serviced by the City of Los Angeles, but transition to the LLAR watershed Group is expected prior to June 30, 2016
6. Bacterial monitoring frequency in freshwater will increase to weekly after completion of the first segment or tributary-specific implementation phase.

RB-AR13047

5 Chemical/Physical Parameters

This section provides a summary of chemical parameters required to be analyzed at the receiving water mass emission monitoring station a minimum of two times during the first year of the monitoring program and once during the critical dry weather period. Results of this screening process will be used to initially determine constituents that will continue to be analyzed at the mass emission site and those that will be further considered for inclusion as part of ongoing monitoring at stormwater outfall sites (Table 5-1). The full set of analytical requirements discussed below is based upon Table E-2 of the Monitoring and Reporting Program and summarized in Table 5-2 through Table 5-8 below.

Analytical requirements for the program are broken out by analytical test requirements since many are associated with an analytical test suite. This is most evident with the semivolatile organic compounds analyzed by EPA Method 625. Although this section identifies recommended methods for each analyte, many of the target constituents can be addressed by alternative methods. Selection of analytical methods is intended to be performance-based to allow laboratories flexibility to utilize methods that meet or exceed MLs listed in the MRP.

The lists of Table E-2 constituents only show minimum levels required for each analyte under the monitoring program since Method Detection Limits (MDLs) will vary among laboratories. Reporting limits are required to meet the established MLs unless matrix or other interferences are encountered that cannot be eliminated by additional cleanup procedures.

The critical dry weather event is defined as the period when historical in-stream flow records are lowest or during the historically driest month. The Reasonable Assurance Analysis (RAA)[1] conducted an assessment of long-term rainfall records and found that the least amount of rainfall occurs in August yet very little difference exists between May and September.

Initial monitoring of Table E-2 constituents during one wet and one dry weather event is intended to serve as a cross-check and/or verification that these pollutants have not become an issue in the receiving waters since the last time they were measured. This screening process is intended to be conducted one time at the receiving water mass emission site during each five-year permit cycle. If a parameter is not detected at the Method Detection Limit (MDL) for its respective test method or the result is below the lowest applicable water quality objective, and is not otherwise identified as a basic monitoring requirement, a TMDL analyte or a 303(d) listing, it is not required to be analyzed again during the current five-year permit cycle. If, during either the wet or dry weather screening, a parameter is detected exceeding the lowest applicable water quality objective then the parameter is to be analyzed for the remainder of the five-year cycle at the receiving water monitoring station where it was detected during the respective conditions (wet or dry).

[1] Draft Reasonable Assurance Analysis for Lower Los Angeles River, Los Cerritos Channel, and Lower San Gabriel River. May 2014.

RB-AR13048

In addition, any additional constituents found to commonly exceed receiving water limitations at the ME site will also be incorporated into stormwater outfall monitoring program in order to help identify watershed sources of the pollutants.

Justification for adding and deleting constituents from the stormwater outfall monitoring program will follow the process established in the Los Angeles River Metals CMP. Any Table E-2 constituents incorporated into ongoing monitoring program at the ME receiving water monitoring site will be added to the stormwater outfall monitoring requirements after two consecutive exceedances of wet weather receiving water quality limitations. Similarly, it is not intended that constituents continue to be monitored at stormwater outfall sites if they are not detected on a regular basis and/or are not found at concentrations that would contribute to exceedances of water quality criteria in the receiving waters. Constituents will be removed from the list if they are not detected at levels of concern for two consecutive stormwater monitoring events.

Comprehensive monitoring of priority pollutants in the receiving waters at the ME site is intended to assure that all constituents with potential to impact water quality are incorporated into the monitoring program. In addition, any Table E-2 constituents incorporated into the ongoing monitoring program at the ME receiving water monitoring site, will also be added to the stormwater outfall monitoring requirements if they exceed RWLs at the ME site after two consecutive wet weather monitoring events.

RB-AR13049

Table 5-1. Summary of Constituents to be Monitored on a Regular Basis at the S10 Mass Emission Monitoring Site.

CLASS OF MEASUREMENTS	MASS EMISSION SITE (S10)	
	Wet[2]	Dry
Flow	4	2
Field Measurements Dissolved oxygen, pH, temperature, and specific conductivity	4	2
MRP Table E-2 Constituents[1] (other than those specifically listed below)	1	1
Aquatic Toxicity	2	1
General and Conventional Pollutants (Table 5-2) All <u>except</u> total phenols, turbidity, BOD_5, MTBE, and perchlorate, and fluoride.	4	2
Microbiological Constituents[3] (Table 5-3) *E. coli*	6	6
Nutrients (Table 5-4) Nitrogen compounds only	3	2
Metals (Table 5-6) Al**,** Cd, Cu, Pb, Ni, Sb, Zn, Total Se & Hg	4	2
Organophosphate Pesticides (Table 5-7) Diazinon	3	2
Semivolatile Organic Compounds (Table 5-8) Bis(2-ethlyhexylyphthalate	3	2

1. All Table E-2 constituents will be measured during the first major storm event of the season and the critical, low flow dry weather event during the first year of the CIMP. The Los Angeles County Flood Control District owns and operates S10. Upon concurrence of the Executive Office of the Regional Board, the Flood Control District may reduce testing for pollutants listed on E2 if past monitoring has shown a history of non-detects or detection well below applicable WQO.
2. The fourth storm event is only for the purpose of fulfilling the TMDL requirements. Only metals, TSS, SSC, and hardness will be analyzed.
3. The wet and dry weather sampling frequency in freshwater will increase to weekly after completion of the first segment or tributary-specific implementation phase.

RB-AR13050

5.1 General and Conventional Pollutants

Many of the general and conventional pollutants listed in Table 5-2 will continue to be analyzed as part of the base monitoring requirements. Total phenols, turbidity, BOD_5, fluoride, perchlorate, and MTBE will not be part of the base monitoring requirements unless these constituents are identified as constituents of concern during the first monitored storm event of the season and/or in association with monitoring conducted during the critical low flow event.

Table 5-2. Conventional Constituents, Analytical Methods and Quantitation Limits.

CONSTITUENTS CONVENTIONAL POLLUTANTS	METHOD	Target Reporting Limits mg/L
Oil and Grease	EPA1664	5
Total Petroleum Hydrocarbon	EPA 418.1	5
Total Phenols	EPA 420.1	0.1
Cyanide	EPA 335.2,SM 4500-CNE	0.003
Turbidity	EPA 180.1, SM2130B	1
Total Suspended Solids	EPA 160.2, SM2540D	1
Total Dissolved Solids	EPA 160.1, SM2540C	1
Volatile Suspended Solids	EPA 160.4, SM2540E	1
Total Organic Carbon	EPA 415.1, SM 5310B	1
Biochemical Oxygen Demand	EPA 405.1, SM 5210B	3
Chemical Oxygen Demand	EPA 410.1, SM5220D	4
Alkalinity	EPA 310.1, SM2320B	5
Specific Conductance	EPA 120.1, SM2510 B	1
Total Hardness	EPA 130.2, SM2340C	1
MBAS	EPA 425.1, SM5540-C	0.02
Chloride	EPA300.0, SM4110B	2
Fluoride	EPA300.0, SM4110B	0.1
Perchlorate	EPA314.0	4 ug/L
Volatile Organics	**METHOD**	**mg/L**
Methyl tertiary butyl ether (MTBE)	EPA624	1
Field Measurements[1]	**METHOD**	**mg/L**
pH-field instrumentation	*In-situ*, EPA 150.1	0 – 14
Temperature-field	*In-situ*	N/A
Dissolved Oxygen- field [1]	*In-situ*, SM4500 (OG)	Sensitivity to 5 mg/L

[1]Field measurements will be taken *In-situ* during dry weather surveys and in grab samples during wet weather monitoring.

[2]Dissolved Oxygen will only be measured during dry weather surveys.

5.2 Microbiological Constituents

All four microbiological constituents used as fecal indicator bacteria (FIB) will continue to be monitored at the S10 (Wardlow) Receiving Water monitoring site. Bacteria used as fecal indicators in marine waters will continue to be analyzed during wet and dry weather surveys due to being situated just above the Los Angeles River Estuary.

All four FIBs will also be analyzed during stormwater outfall monitoring at the only site (LAR1) that discharges to the Estuary. Only *E. coli* will be monitored at the remaining three stormwater outfall sites (LAR2, LAR3, and LAR4) since each located in freshwater portion of the watershed.

Escherichia coli will also be analyzed at the three Bacteria TMDL monitoring sites in the LLAR WG and will be measured as part of the bacteria load assessment required for in all dry discharges to Segment A of the Los Angeles River. Table 5-3 provides both upper and lower quantification limits for each FIB established to assure that quantifiable results are obtained. Upper quantification limits are only identified to assure that measurements result in quantitative values.

Table 5-3. Microbiological Constituents, Analytical Methods and Quantitation Limits.

BACTERIA[1]	Method	Lower Limits MPN/100ml	Upper Limits MPN/100ml
Total coliform (marine waters)	SM 9221B	<20	>2,400,000
Fecal coliform (marine waters)	SM 9221B	<20	>2,400,000
Enterococcus (marine waters)	SM 9230C	<20	>2,400,000
E. coli (fresh waters)	SM 9223 COLt	<10	>2,400,000

[1]Microbiological constituents will vary based upon sampling point. Total and fecal coliform and enterococcus will be measured only in marine waters or at locations where either the discharge point or receiving water body will impact marine waters. These includes the mass emission site, S10, and LLAR1, the only stormwater outfall site discharging to the Estuary. *E. coli* will be analyzed at sites within the freshwater portion of the watershed.

5.3 Nutrients

Nitrogen compounds (Table 5-1 and Table 5-4) are required as part of the base requirements for both the ME (S10) and stormwater outfall monitoring sites (LAR1 through LAR4). Analysis of nitrogen compounds is required due to the Nitrogen TMDL. Phosphorus compounds have not been identified as constituents of concern in the watershed and will therefore only be analyzed during the two events where all Table E-2 constituents are analyzed.

Table 5-4. Nutrients, Analytical Methods, and Quantitation Limits.

CONSTITUENT	METHOD	REPORTING LIMIT (mg/L)
Total Kjeldahl Nitrogen (TKN)[1]	EPA 351.1	0.50
Nitrate as Nitrogen (NO3-N)[1,2]	EPA 300.0	0.10
Nitrite as Nitrogen (NO2-N)[1,2]	EPA 300.0	0.05
Total Nitrogen[1]	calculation	NA
Ammonia as Nitrogen (NH3-N)	EPA 350.1	0.10
Total Phosphorus	SM 4500-P E or F	0.1
Dissolved Phosphorus	SM 4500-P E or F	0.1

1. Total Nitrogen is the sum of TKN, nitrate, and nitrite.
2. Nitrate –N and Nitrite-N may be analyzed together using EPA 300

5.4 Organochlorine Pesticides and PCBs

Organochlorine pesticides (OC pesticides) and PCBs have been analyzed in both stormwater and dry weather water samples collected at S10 between 2006 and 2013. None of these compounds were detected in any samples taken during this time period. In recognition of this issue, the Harbor Toxics TMDL required testing to be conducted by analyzing these compounds on suspended sediment transported during storm events. A special monitoring program has been proposed to allow better assessment of these compounds while also providing data to support the Harbor Toxics TMDL. Monitoring for these constituents will be conducted at S10 using the same frequency as sampling being conducted in the Harbor waters and in the Los Angeles River Estuary.

The Harbor Toxics TMDL requires monitoring during two storm events and one dry weather event. Monitoring during the two storm events will use methods detailed in Section 8.5. Monitoring during dry weather will utilize conventional methods (Table 5-5) being used in the Harbor receiving waters and the estuary. During dry weather flows, suspended sediment concentrations will be too low to allow for direct assessment of chlorinated pesticides and PCBs in the suspended particulate fraction. Sampling will be coordinated with the "*Coordinated Compliance Monitoring, and Reporting Plan Incorporating Quality Assurance Project Plan Components: Greater Los Angeles and Long Beach Harbor Waters*", (Anchor QEA, 2013).

Monitoring for PCBs will be reported as the summation of aroclors and a minimum of 50 congeners, using EPA Method 8270 without the use of High Resolution Mass Spectrometry for routine monitoring, due to the extreme high cost involved.

RB-AR13053

Table 5-5. Chlorinated Pesticides and PCB Analytical Methods, and Quantitation Limits.

CHLORINATED PESTICIDES	METHOD	Reporting Limit ug/L
Aldrin	EPA 608	0.005
alpha-BHC	EPA 608	0.01
beta-BHC	EPA 608	0.005
delta-BHC	EPA 608	0.005
gamma-BHC (lindane)	EPA 608	0.02
alpha-chlordane	EPA 608	0.1
gamma-chlordane	EPA 608	0.1
4,4'-DDD	EPA 608	0.05
4,4'-DDE	EPA 608	0.05
4,4'-DDT	EPA 608	0.01
Dieldrin	EPA 608	0.01
alpha-Endosulfan	EPA 608	0.02
beta-Endosulfan	EPA 608	0.01
Endosulfan sulfate	EPA 608	0.05
Endrin	EPA 608	0.01
Endrin aldehyde	EPA 608	0.01
Heptachlor	EPA 608	0.01
Heptachlor Epoxide	EPA 608	0.01
Toxaphene	EPA 608	0.5
POLYCHLORINATED BIPHENYLS[1]	**EPA 8270**	**0.005**
Aroclor-1016	EPA 608	0.5
Aroclor-1221	EPA 608	0.5
Aroclor-1232	EPA 608	0.5
Aroclor-1242	EPA 608	0.5
Aroclor-1248	EPA 608	0.5
Aroclor-1254	EPA 608	0.5
Aroclor-1260	EPA 608	0.5

1. Monitoring for PCBs will be reported as the summation of aroclors and a minimum of 50 congeners, without the use of High Resolution Mass Spectrometry for routine monitoring.. 54 PCB congeners include: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209. These include all 41 congeners analyzed in the SCCWRP Bight Program and dominant congeners used to identify the aroclors.

5.5 Total and Dissolved Trace Metals

A total of 16 trace metals are listed in Table E-2 of the MRP. Analytical methods and reporting limits for these elements are summarized in Table 5-6. Most metals will be analyzed by EPA Method 200.8 using ICP-MS to provide appropriate detection limits. Hexavalent chromium and mercury both require alternative methods. Hexavalent chromium has been analyzed at TMDL compliance monitoring sites in both the Los Angeles River (S10) and the San Gabriel River (S14) for the past eight to ten years. Analytical methods and detection limits used for the monitoring have been consistent with those required in Table E-2 of the MRP. Hexavalent chromium will be analyzed with all Table E-2 constituents but this trace metal has never been detected a levels greater than the reporting limit so it will not likely be monitored on a regular basis.

RB-AR13054

Dissolved mercury has not been detected in any wet or dry weather sampling conducted at the Los Angeles River Mass Emission Site (S10) since 2006 and total mercury has only been detected on two occasions. Total mercury will be analyzed as part of the base program since it was detected during two wet weather events approximately 10 years ago and it remains one of the municipal action limits (MALs) included in the MRP. Automated stormwater samplers are not suitable for sampling stormwater at the low mercury detection limits (0.5 nanograms/liter). Grab samples will be taken for analysis of mercury in order to augment composite samples, which will be analyzed by EPA method 245.1. These grab samples will be analyzed by Method 1631E since this method is less subject to interferences and will be collected at the same time that monitoring crews pull the other grab samples required by the monitoring program. Additional QA/QC will be specified to support the extremely low detection limits required by the program.

Table 5-6. Metals Analytical Methods, and Quantitation Limits.

METALS (Dissolved & Total)	METHOD	Reporting Limit *ug/L*
Aluminum	EPA200.8	100
Antimony	EPA200.8	0.5
Arsenic	EPA200.8	0.5
Beryllium	EPA200.8	0.5
Cadmium	EPA200.8	0.25
Chromium (total)	EPA200.8	0.5
Chromium (Hexavalent)[1]	EPA218.6	5
Copper	EPA200.8	0.5
Iron	EPA200.8	25
Lead	EPA200.8	0.5
Mercury[1]	EPA245.1	0.2
Mercury (Low level)	1631E	0.0005
Nickel	EPA200.8	1
Selenium	EPA200.8	1
Silver	EPA200.8	0.25
Thallium	EPA200.8	0.5
Zinc	EPA200.8	1

1. Only total hexavalent chromium and mercury will be analyzed during the initial wet and dry weather screening of Table E-2 constituents.

5.6 Organophosphate Pesticides and Herbicides

Organophosphate pesticides, triamine pesticides and herbicides list in Table E-2 of the MRP are summarized in Table 5-7. Due to the fact that diazinon and chlorpyrifos are no longer available for residential use, these constituents are now rarely detected and none of the organophosphate pesticides/herbicides have been detected at the Los Angeles River Mass Emission monitoring site in the past 10 years.

Two compounds in this list, atrazine and simazine, are not organophosphate pesticides, they can be analyzed by EPA Method 8141a. Both are triazine herbicides which are used for control of broadleaf weeds. Based upon historical data, herbicides such as these and the three additional separately listed compounds are unlikely to require continued analysis after completion of initial screening of Table E-2 constituents. Alternative analytical methods may be used as long as the established reporting limits can be met.

Diazinon remains on the 303(d) list but has detected at much lower frequencies and concentrations. Although this analyte remains on the list to be analyzed at the ME station, we recommend reevaluation after the first year of monitoring. If concentrations remain below the updated California Department of Fish and Game criteria, this analyte should be removed from the list for the ME site.

Table 5-7. Organophosphate Pesticides and Herbicides Analytical Methods, and Quantitation Limits.

ORGANOPHOSPHATE PESTICIDES	METHOD	Reporting Limit ug/L
Atrazine	EPA507,8141A	1
Chlorpyrifos	EPA8141A	0.05
Cyanazine	EPA8141A	1
Diazinon	EPA8141A	0.01
Malathion	EPA8141A	1
Prometryn	EPA8141A	1
Simazine	EPA8141A	1
HERBICIDES		
Glyphosate	EPA547	5
2,4-D	EPA515.3	0.02
2,4,5-TP-SILVEX	EPA515.3	0.2

5.7 Semivolatile Organic Compounds (Acid, Base/Neutral)

Semivolatile organic compounds from Table E-2 of the MRP are listed in Table 5-8 below. Acids consist mostly of phenolic compounds which are uncommon in stormwater samples. Base/neutrals include polynuclear aromatic hydrocarbons (PAHs) which are the only semivolatile organic compounds considered to be constituents of concern. PAHs are included as part of the Harbor Toxics TMDL and will be part of the base program at S10.

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Table 5-8. Semivolatile Organic Compounds Analytical Methods, and Quantitation Limits.

SEMIVOLATILE ORGANIC COMPOUNDS	METHOD	Reporting Limit
ACIDS		**ug/L**
2-Chlorophenol	EPA625	2
4-Chloro-3-methylphenol	EPA625	1
2,4-Dichlorophenol	EPA625	1
2,4-Dimethylphenol	EPA625	2
2,4-Dinitrophenol	EPA625	5
2-Nitrophenol	EPA625	10
4-Nitrophenol	EPA625	5
Pentachlorophenol	EPA625	2
Phenol	EPA625	1
2,4,6-Trichlorophenol	EPA625	10
BASE/NEUTRAL		**ug/L**
Acenaphthene	EPA625	1
Acenaphthylene	EPA625	2
Anthracene	EPA625	2
Benzidine	EPA625	5
1,2 Benzanthracene	EPA625	5
Benzo(a)pyrene	EPA625	2
Benzo(g,h,i)perylene	EPA625	5
3,4 Benzofluoranthene	EPA625	10
Benzo(k)fluoranthene	EPA625	2
Bis(2-Chloroethoxy) methane	EPA625	5
Bis(2-Chloroisopropyl) ether	EPA625	2
Bis(2-Chloroethyl) ether	EPA625	1
Bis(2-Ethylhexl) phthalate	EPA625	5
4-Bromophenyl phenyl ether	EPA625	5
Butyl benzyl phthalate	EPA625	10
2-Chloroethyl vinyl ether	EPA625	1
2-Chloronaphthalene	EPA625	10
4-Chlorophenyl phenyl ether	EPA625	5
Chrysene	EPA625	5
Dibenzo(a,h)anthracene	EPA625	0.1
1,3-Dichlorobenzene	EPA625	1
1,4-Dichlorobenzene	EPA625	1
1,2-Dichlorobenzene	EPA625	1
3,3-Dichlorobenzidine	EPA625	5
Diethyl phthalate	EPA625	2
Dimethyl phthalate	EPA625	2
di-n-Butyl phthalate	EPA625	10
2,4-Dinitrotoluene	EPA625	5
2,6-Dinitrotoluene	EPA625	5
4,6 Dinitro-2-methylphenol	EPA625	5
1,2-Diphenylhydrazine	EPA625	1
di-n-Octyl phthalate	EPA625	10

SEMIVOLATILE ORGANIC COMPOUNDS	METHOD	Reporting Limit
Fluoranthene	EPA625	0.05
Fluorene	EPA625	0.1
Hexachlorobenzene	EPA625	1
Hexachlorobutadiene	EPA625	1
Hexachloro-cyclopentadiene	EPA625	5
Hexachloroethane	EPA625	1
Indeno(1,2,3-cd)pyrene	EPA625	0.05
Isophorone	EPA625	1
Naphthalene	EPA625	0.2
Nitrobenzene	EPA625	1
N-Nitroso-dimethyl amine	EPA625	5
N-Nitroso-diphenyl amine	EPA625	1
N-Nitroso-di-n-propyl amine	EPA625	5
Phenanthrene	EPA625	0.05
Pyrene	EPA625	0.05
1,2,4-Trichlorobenzene	EPA625	1

6 Aquatic Toxicity Testing and Toxicity Identification Evaluations

Aquatic toxicity testing supports the identification of best management practices (BMPs) to address sources of toxicity in urban runoff. Monitoring begins in the receiving water and the information gained is used to identify constituents for monitoring at outfalls to support the identification of pollutants that need to be addressed in the WMP. The sub-sections below describe the detailed process for conducting aquatic toxicity monitoring, evaluating results, and the technical and logistical rationale. Control measures and management actions to address confirmed toxicity caused by urban runoff are addressed by the WMP, either via currently identified management actions or those that are identified via adaptive management of the WMP.

6.1 Sensitive Species Selection

The Permit Monitoring and Reporting Program (MRP) (page E-32) states that sensitivity screening to select the most sensitive test species should be conducted unless "a sensitive test species has already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s), then monitoring shall be conducted using only that test species." Previous relevant studies conducted in the watershed should be considered. Such studies may have been completed via previous MS4 sampling, wastewater NPDES sampling, or special studies conducted within the watershed.

As described in the MRP (page E-31), if samples are collected in receiving waters with salinity less than 1 part per thousand (ppt), or from outfalls discharging to receiving waters with salinity less than 1 ppt, toxicity tests should be conducted on the most sensitive test species in accordance with species and short-term test methods in *Short-term Methods for Estimating the Chronic Toxicity of*

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Effluents and Receiving Waters to Freshwater Organisms (EPA/821/R-02/013, 2002; Table IA, 40 CFR Part 136). Salinities of both dry and wet weather discharges from the Lower Los Angeles River are considered to meet the freshwater criteria. The freshwater test species identified in the MRP are:

- A static renewal toxicity test with the fathead minnow, *Pimephales promelas* (Larval Survival and Growth Test Method 1000.04).
- A static renewal toxicity test with the daphnid, *Ceriodaphnia dubia* (Survival and Reproduction Test Method 1002.05).
- A static renewal toxicity test with the green alga, *Selenastrum capricornutum* (also named *Raphidocelis subcapitata*) (Growth Test Method 1003.0).

The three test species were evaluated to determine if either a sensitive test species had already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s). In reviewing the available data in the Los Angeles River, Los Cerritos Channel, and the San Gabriel River watersheds, organophosphate pesticides and/or metals have been identified as problematic and are generally considered the primary aquatic life toxicants of concern found in urban runoff. Pyrethroid pesticides are known to be present in urban runoff and potentially contribute to toxicity in these waters. Tests specific to pyrethroid pesticides are simply less common. Given the knowledge of the presence of these potential toxicants in the watershed, the sensitivities of each of the three species were considered to evaluate which is the most sensitive to the potential toxicants in the watersheds.

Ceriodaphnia dubia has been reported as a sensitive test species for historical and current use of pesticides and metals, and studies indicate that it is more sensitive to the toxicants of concern than *P. promelas* or *S. capricornutum*. In its aquatic life copper criteria document, the USEPA reports greater sensitivity of *C. dubia* to copper (species mean acute value of 5.93 µg/l) compared to *Pimephales promelas* (species mean acute value of 69.93 µg/l; EPA, 2007). *C. dubia's* relatively higher sensitive to metals is common across multiple metals. Researchers at the University of California, Davis also reviewed available species sensitivity values in developing pesticide criteria for the Central Valley Regional Water Quality Control Board. The UC Davis researchers reported higher sensitivity of *C. dubia* to diazinon and bifenthrin (species mean acute value of 0.34 µg/l and 0.105 µg/l) compared to *P. promelas* (species mean acute value of 7804 µg/l and 0.405 µg/l; Palumbo et al., 2010a, b). Additionally, a study of the City of Stockton urban stormwater runoff found acute and chronic toxicity to *C. dubia*, with no toxicity to *S. capricornutum* or *P. promelas* (Lee and Lee, 2001). The toxicity was attributed to organophosphate pesticides, indicating a higher sensitivity of *C. dubia* compared to *S. capricornutum* or *P. promelas*. *P. promelas* is generally less sensitive to metals and pesticides but has been found to be more sensitive to ammonia than *C. dubia*. However, as ammonia is not typically a constituent of concern for urban runoff and ammonia is not consistently observed above the toxic thresholds in the watershed, *P. promelas* is not considered a particularly sensitive species for evaluating the impacts of urban runoff in receiving waters in the watershed.

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Selenastrum capricornutum is a species that is sensitive to herbicides; however, while sometimes present in urban runoff, measured concentrations are typically very low. Herbicides have not been identified as a potential toxicant in the watershed. *S. capricornutum* is also not considered the most sensitive species as it is not sensitive to either pyrethroids or organophosphate pesticides and is not as sensitive to metals as *C. dubia*. The *S. capricornutum* growth test can also be affected by high concentrations of suspended and dissolved solids, color and pH extremes, which can interfere with the determination of sample toxicity. As a result, it is common to manipulate the sample by centrifugation and filtration to remove solids in order to conduct the test. This process may affect the toxicity of the sample. In a study of urban highway stormwater runoff (Kayhanian et. al, 2008), the green alga response to the stormwater samples was more variable than both the *C. dubia* and the *P. promelas* and in some cases the alga growth was considered to be potentially enhanced due to the presence of stimulatory nutrients.

As *C. dubia* is identified as the most sensitive to known potential toxicant(s) typically found in receiving waters and urban runoff in the freshwater potions of the watershed and has demonstrated toxicity in programs within the watershed (CWH and ABC Laboratories, 2013), *C. dubia* is selected as the most sensitive species. The species also has the advantage of being easily maintained in in-house mass cultures. The simplicity of the test, the ease of interpreting results, and the smaller volume necessary to run the test, make the test a valuable screening tool. The ease of sample collection and higher sensitivity will support assessing the presence of ambient receiving water toxicity or long term effects of toxic stormwater over time. As such, toxicity testing will be conducted using *C. dubia*.

An alternative species of water fleas, *Daphnia magna*, may be used if the water being tested has elevated hardness. *C. dubia* test organisms are typically cultured in moderately hard waters (80-100 mg/L CaCO3) and can have increased sensitivity to elevated water hardness greater than 400 mg/L CaCO3), which is beyond their typical habitat range. Because of this, *Daphnia magna* may be substituted in instances where hardness in site waters exceeds 400 mg/L ($CaCO_3$). *Daphnia magna* is more tolerant to high hardness levels and is a suitable substitution for *C. dubia* in these instances (Cowgill and Milazzo, 1990).

6.2 Testing Period

The following describes the testing periods to assess toxicity in samples collected in the LCC WMP area during dry and wet weather conditions. Short-term chronic tests will be used to assess both survival and reproductive/growth endpoints for *C. dubia* for both wet and dry weather sampling efforts. Although wet weather conditions in the region generally persist for less than the chronic testing periods (7 days), the *C. dubia* chronic test will be used for wet weather toxicity testing in accordance with *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (EPA, 2002a). Utilization of standard chronic tests on wet weather samples are not expected to generate results representative of the typical conditions found in the receiving water intended to be simulated by toxicity testing.

6.3 Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

Per the MRP, toxicity test endpoints will be analyzed using the Test of Significant Toxicity (TST) t-test approach specified by the USEPA (USEPA, 2010). The Permit specifies that the chronic in-stream waste concentration (IWC) is set at 100% receiving water for receiving water samples and 100% effluent for outfall samples. Using the TST approach, a t-value is calculated for a test result and compared with a critical t-value from USEPA's TST Implementation Document (USEPA, 2010). Follow-up triggers are generally based on the Permit specified statistical assessment as described below.

For chronic *C. dubia* toxicity testing, if a ≥50% reduction in survival or reproduction is observed between the sample and laboratory control that is statistically significant, a toxicity identification evaluation (TIE) will be performed.

TIE procedures will be initiated as soon as possible after the toxicity trigger threshold is observed to reduce the potential for loss of toxicity due to extended sample storage. If the cause of toxicity is readily apparent or is caused by pathogen related mortality or epibiont interference with the test, the result will be rejected, if necessary, a modified testing procedure will be developed for future testing.

In cases where significant endpoint toxicity effects greater than 50% are observed in the original sample, but the follow-up TIE positive control "signal" is found to not be statistically significant, the cause of toxicity will be considered non-persistent. No immediate follow-up testing is required on the sample. However, future test results will be evaluated to determine if implementation of concurrent TIE treatments are needed to provide an opportunity to identify the cause of toxicity.

6.4 Toxicity Identification Evaluation Approach

The results of toxicity testing will be used to trigger further investigations to determine the cause of observed laboratory toxicity. The primary purpose of conducting TIEs is to support the identification of management actions that will result in the removal of pollutants causing toxicity in receiving waters. Successful TIEs will direct monitoring at outfall sampling sites to inform management actions. As such, the goal of conducting TIEs is to identify pollutant(s) that should be sampled during outfall monitoring so that management actions can be identified to address the pollutant(s).

The TIE approach as described in USEPA's 1991 Methods for Aquatic Toxicity Identification is divided into three phases although some elements of the first two phases are often combined. Each of the three phases is briefly summarized below:

- Phase I utilizes methods to characterize the physical/chemical nature of the constituents which cause toxicity. Such characteristics as solubility, volatility and filterability are determined without specifically identifying the toxicants. Phase I results

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are intended as a first step in specifically identifying the toxicants but the data generated can also be used to develop treatment methods to remove toxicity without specific identification of the toxicants.

- Phase II utilizes methods to specifically identify toxicants.
- Phase III utilizes methods to confirm the suspected toxicants.

A Phase I TIE will be conducted on samples that exceed a TIE trigger described in Section6.4. Water quality data will be reviewed to future support evaluation of potential toxicants. A range of sample manipulations may be conducted as part of the TIE process. The most common manipulations are described in Table 6-1. Information from previous chemical testing and/or TIE efforts will be used to determine which of these (or other) sample manipulations are most likely to provide useful information for identification of primary toxicants. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b).

Table 6-1. Phase I and II Toxicity Identification Evaluation Sample Manipulations.

TIE Sample Manipulation	Expected Response
pH Adjustment (pH 7 and 8.5)	Alters toxicity in pH sensitive compounds (i.e., ammonia and some trace metals)
Filtration or centrifugation*	Removes particulates and associated toxicants
Ethylenediamine-Tetraacetic Acid (EDTA) or Cation Exchange Column*	Chelates trace metals, particularly divalent cationic metals
Sodium thiosulfate (STS) addition	Reduces toxicants attributable to oxidants (i.e., chlorine) and some trace metals
Piperonyl Butoxide (PBO)*	Reduces toxicity from organophosphate pesticides such as diazinon, chlorpyrifos and malathion, and enhances pyrethroid toxicity
Carboxylesterase addition(1)	Hydrolyzes pyrethroids
Temperature adjustments(2)	Pyrethroids become more toxic when test temperatures are decreased
Solid Phase Extraction (SPE) with C18 column*	Removes non-polar organics (including pesticides) and some relatively non-polar metal chelates
Sequential Solvent Extraction of C18 column	Further resolution of SPE-extracted compounds for chemical analyses
No Manipulation*	Baseline test for comparing the relative effectiveness of other manipulations

* Denotes treatments that will be conducted during the initiation of toxicity monitoring, but may be revised as the program is implemented. These treatments were recommended for initial stormwater testing in Appendix E (Toxicity Testing Tool for Stormwater Discharges) of the State Water Resources Control Board's June 2012 Public Review Draft "Policy for Toxicity Assessment and Control".

1 Carboxylesterase addition has been used in recent studies to help identify pyrethroid-associated toxicity (Wheelock et al., 2004; Weston and Amweg, 2007). However, this treatment is experimental in nature and should be used along with other pyrethroid-targeted TIE treatments (e.g., PBO addition).

2 Temperature adjustments are another recent manipulation used to evaluate pyrethroid-associated toxicity. Lower temperatures increase the lethality of pyrethroid pesticides. (Harwood, You and Lydy, 2009)

The Watershed Group will identify the cause(s) of toxicity using a selection of treatments in Table 6-1 and, if possible, using the results of water column chemistry analyses. After any initial assessments of the cause of toxicity, the information may be used during future events to modify the targeted treatments to more closely target the expected toxicant or class of toxicants.

Moreover, if the toxicant or toxicant class is not initially identified, toxicity monitoring during subsequent events will confirm if the toxicant is persistent or a short-term episodic occurrence.

As the primary goals of conducting TIEs is to identify pollutants for incorporation into outfall monitoring, narrowing the list of toxicants following Phase I TIEs via Phase II/III TIEs is not necessary if the toxicant class determined during the Phase I TIE is sufficient for 1) identifying additional pollutants for outfall monitoring and/or 2) identifying control measures. Thus, if the specific pollutant(s) or classes of pollutants (e.g., metals that are analyzed via EPA Method 200.8) are identified then sufficient information is available to incorporate the additional pollutants into outfall monitoring and to start implementation of control measures to target the additional pollutants.

Phase II TIEs may be utilized to identify specific constituents causing toxicity in a given sample if the results of Phase I TIE testing and a review of available chemistry data fails to provide information necessary to identify constituents that warrant additional monitoring activities or management actions to identify likely sources of the toxicants and lead to elimination of the sources of these contaminants. Phase III TIEs will be conducted following any Phase II TIEs.

For the purposes of determining whether a TIE is inconclusive, TIEs will be considered inconclusive if:

- The toxicity is persistent (i.e., observed in the baseline), and
- The cause of toxicity cannot be attributed to a class of constituents (e.g., insecticides, metals, etc.) that can be targeted for monitoring.

If (1) a combination of causes that act in a synergistic or additive manner are identified; (2) the toxicity can be removed with a treatment or via a combination of the TIE treatments; or (3) the analysis of water quality data collected during the same event identify the pollutant or analytical class of pollutants, the result of a TIE is considered conclusive.

Note that the MRP (page E-33) allows a TIE Prioritization Metric (as described in Appendix E of the Stormwater Monitoring Coalition's Model Monitoring Program) for use in ranking sites for TIEs. However, as the extent to which TIEs will be conducted is unknown, prioritization cannot be conducted at this time. However, prioritization may be utilized in the future based on the results of toxicity monitoring and an approach to prioritization will be developed through the CIMP adaptive management process and will be described in future versions of the CIMP.

6.5 Follow Up on Toxicity Testing Results

Per Parts VIII.B.c.vi and XI.G.1.d of the MRP, if the results of two TIEs on separate receiving samples collected during the same conditions (i.e., wet or dry weather) are inconclusive, a toxicity test conducted during the same conditions (i.e., wet or dry weather), using the same test species, will be conducted at applicable upstream outfalls as soon as feasible (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of an inconclusive

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TIE). The same TIE evaluation triggers and TIE approach presented in Section 6.3 and 6.4, respectively will be followed based on the results of the outfall sample.

The MRP (page E-33) indicates the following actions should be taken when a toxicant or class of toxicants is identified through a TIE:

1. Group Members shall analyze for the toxicant(s) during the next scheduled sampling event in the discharge from the outfall(s) upstream of the receiving water location.
2. If the toxicant is present in the discharge from the outfall at levels above the applicable receiving water limitation, a toxicity reduction evaluation (TRE) will be performed for that toxicant.

The list of constituents monitored at outfalls identified in the CIMP will be modified based on the results of the TIEs. Similarly, upon completion of a successful dry weather TIE, additional constituents identified in the TIE will be added to monitoring requirements at outfalls with significant non-stormwater flows. Monitoring for those constituents will occur as soon as feasible following the completion of a successful TIE (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of a successful TIE).

The requirements of the TREs will be met as part of the adaptive management process in the WMPs rather than the CIMP. The identification and implementation of control measures to address the causes of toxicity are tied to management of the stormwater program, not the CIMP. It is expected that the requirements of TREs will only be conducted for toxicants that are not already addressed by an existing Permit requirement (i.e., TMDLs) or existing or planned management actions.

The Water Boards' TMDL Roundtable is currently evaluating options to streamline and consistently respond to urban-use pesticide impairment listings throughout the State including a statewide urban-use pesticide TMDL modeled after the San Francisco Bay Area Urban Creeks Pesticides TMDL. In Addition to toxicity testing, statewide efforts will be monitored to study these pesticides being discussed by the California Stormwater Quality Association (CASQA) Pesticides sub-committee and other Regional Water Boards.

6.6 Summary of Aquatic Toxicity Monitoring

The approach to conducting aquatic toxicity monitoring as described in the previous sections is summarized in detail in Figure 6-1. The intent of the approach is to identify the cause of toxicity observed in receiving water to the extent possible with the toxicity testing tools available, thereby directing outfall monitoring for the pollutants causing toxicity with the ultimate goal of supporting the development and implementation of management actions. The toxicity approach is subject to modifications based on discussions with the Regional Board.

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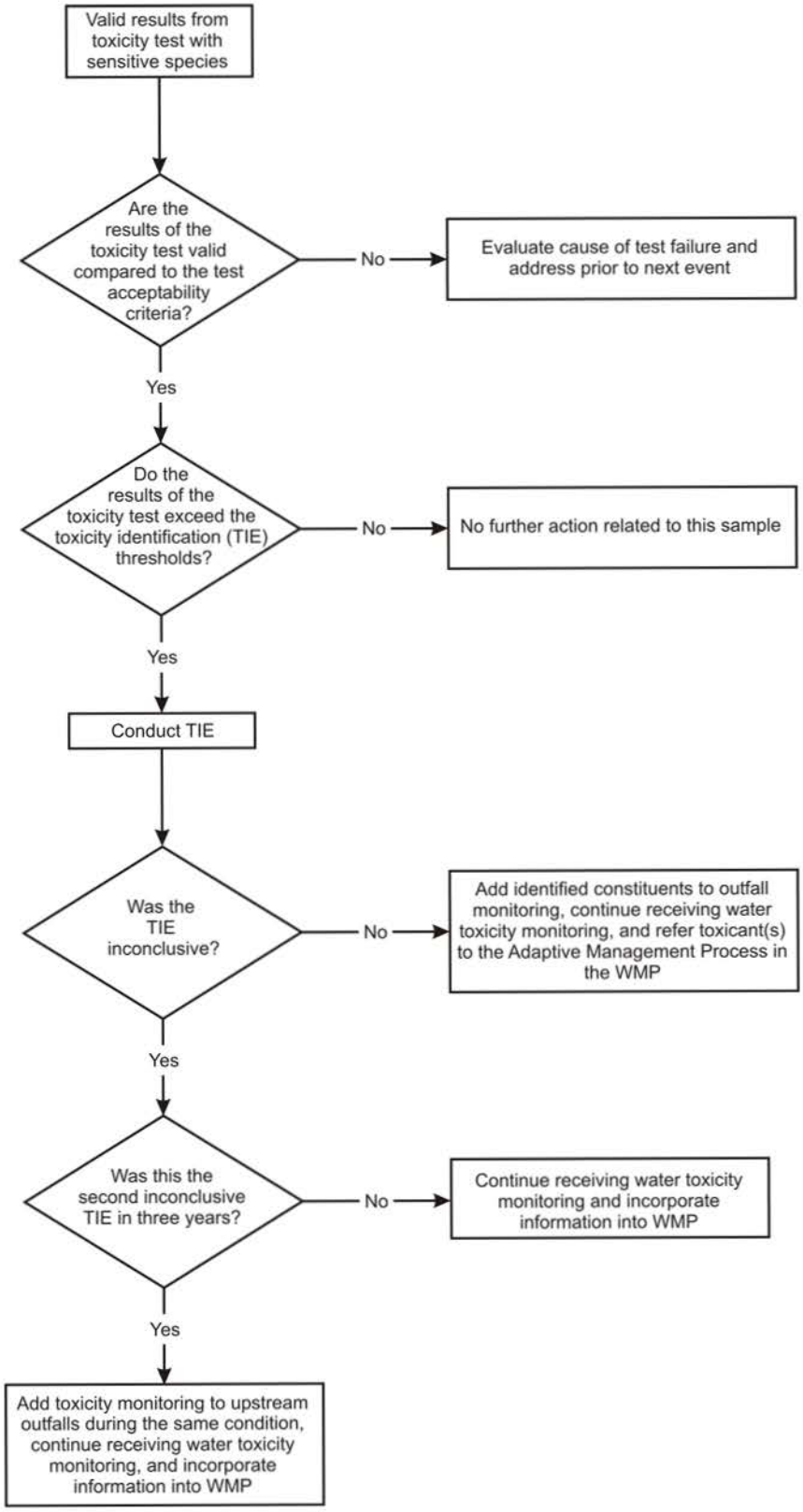


Figure 6-1. Detailed Aquatic Toxicity Assessment Process.

7 Receiving Water Monitoring Mass Emission Monitoring

All receiving water quality monitoring at the Los Angeles River mass emission monitoring site, S10 (Figure 7-1), will continue to be conducted by the Los Angeles County Flood Control District (LACFCD). Flow-weighted composite samples will be collected during each monitoring event and will be analyzed for analytes in Table 5-1.

7.1 Sampling Frequency and Mobilization Requirements

Monitoring of receiving water quality at S10 will be performed three times a year during the wet season and two times a year during dry weather conditions. Screening for Table E-2 constituents listed in the MRP will be conducted during the first significant storm of the year and during a critically dry weather period. Larger sampling volumes are required to incorporate all analytical tests and associated QA/QC needed for Table E-2 constituents, bioassay tests and to provide sufficient volumes should TIEs be required.

Wet weather conditions are defined in the MRP as when the receiving waterbody has flow that is at least 20 percent greater than its base flow or, in the case of an estuary, during a storm event of greater than or equal to 0.1 inch of precipitation.

These include:

- Wet Season defined as October 1 through April 15
- Events preceded by less than 0.1 inches of rainfall within the watershed over a three day period.
- Rainfall of at least 0.25 inches and
- Maximum flow rates greater than 500 cfs measured at the Wardlow Road gaging station associated with the S10 mass emission monitoring site.

The MRP provides defines dry weather as (for rivers, streams or creeks) as periods when flow is no more than 20% greater than base flow conditions. In the case of the Estuary, dry weather conditions are further defined by rainfall being less than 0.1 inches of rain on the day of the sampling and having experienced no less than three days of dry weather after a rain event of 0.1 inches or greater within the watershed, as measured from at least 50 percent of Los Angeles County controlled rain gauges within the watershed.

7.2 Sampling Constituents

Chemical analysis are scheduled to be conducted for all analytes listed in Table 5-2 through Table 5-8 during the first significant rainfall of the season and again during a period of critical low flow. Chemical constituents not detected in excess of their respective Method Detection Limits (MDLs) or that do not exceed available water quality standards will be considered for removal during subsequent surveys. Adjustments to the list of analytical tests will be assessed separately for wet and dry weather sampling requirements.

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Constituents to be sampled at the ME site during all other sampling events are listed in Table 5-1. Sampling requires focus on constituents that are currently part of a TMDL, are 303(d) listed or that have exceeded RWL but data are not sufficient for listing. This approach is designed to target constituents of concern in the watershed. In addition, an extensive sampling of all constituents is scheduled for two time periods during the first year of the permit when contaminants are expected to have the greatest potential for being detected. Additional constituents from the Table E-2 list that are detected at levels of concern during those two time periods will be added to the monitoring list at the ME site.

As noted in the previous section, it has been determined that adequate data exist to determine which of the three freshwater species are considered to be most sensitive during both storm events and dry weather periods. Available literature and local data indicate that the most sensitive bioassay test species is *Ceriodaphnia dubia*. The prior section on Aquatic Toxicity Testing and TIEs goes into detail as to species selection and the overall approach recommended for measuring toxicity in the receiving waters and strategies to eliminate any sources of toxicity. During wet weather conditions, bioassay tests will be performed based upon exposure to 100 percent test waters over a 48-hour time period since this time exposure is deemed to be more consistent with the duration of typical storm events. Since exposure times during the dry season are much long, dry weather testing will utilize 7-day chronic toxicity tests that assess both survival and reproductive endpoints for *C. dubia*. Chronic testing will also be conducted on 100 percent undiluted samples. Table 7-1 provides sample volumes necessary for toxicity tests (both wet and dry weather) as well as minimum volumes necessary to fulfill Phase I TIE testing if necessary. As detailed in the previous section, the sublethal endpoints will be assessed using EPA's TST procedure to determine if there is a statistically significant 50% difference between sample controls and the test waters and ultimately determine if further testing should be is necessary.

Table 7-1. Toxicity Test Volume Requirements for Aquatic Toxicity Testing as Part of the Lower Los Angeles River Coordinated Integrated Monitoring Program.

Test Organism	Toxicity Test Type	Test Concentration	Volume Required for Initial Screen (L)	Minimum Volume Required for TIE (L)[1]
Freshwater Tests for Samples with Salinity < 1.0 ppt				
Daphnid Water Flea *(Ceriodaphnia dubia*)	48-Hour Acute Survival 7-day Chronic Survival and Reproduction	100% only	1.5	10
Sample Receipt Water Quality	--	--	1.0	--
Total volume required per event for samples with salinity < 1.0 ppt;			2.5	a

[1] Minimum volumes for TIE are for Phase 1 characterization testing only. The additional volume collected for potential TIE testing can be held in refrigeration (4°C in the dark, no head space) and shipped to the laboratory at a later date if needed.

Note: The NPDES permit targets a 36-hr holding time for initiation of testing but allows a maximum holding time of 72-hr if necessary.

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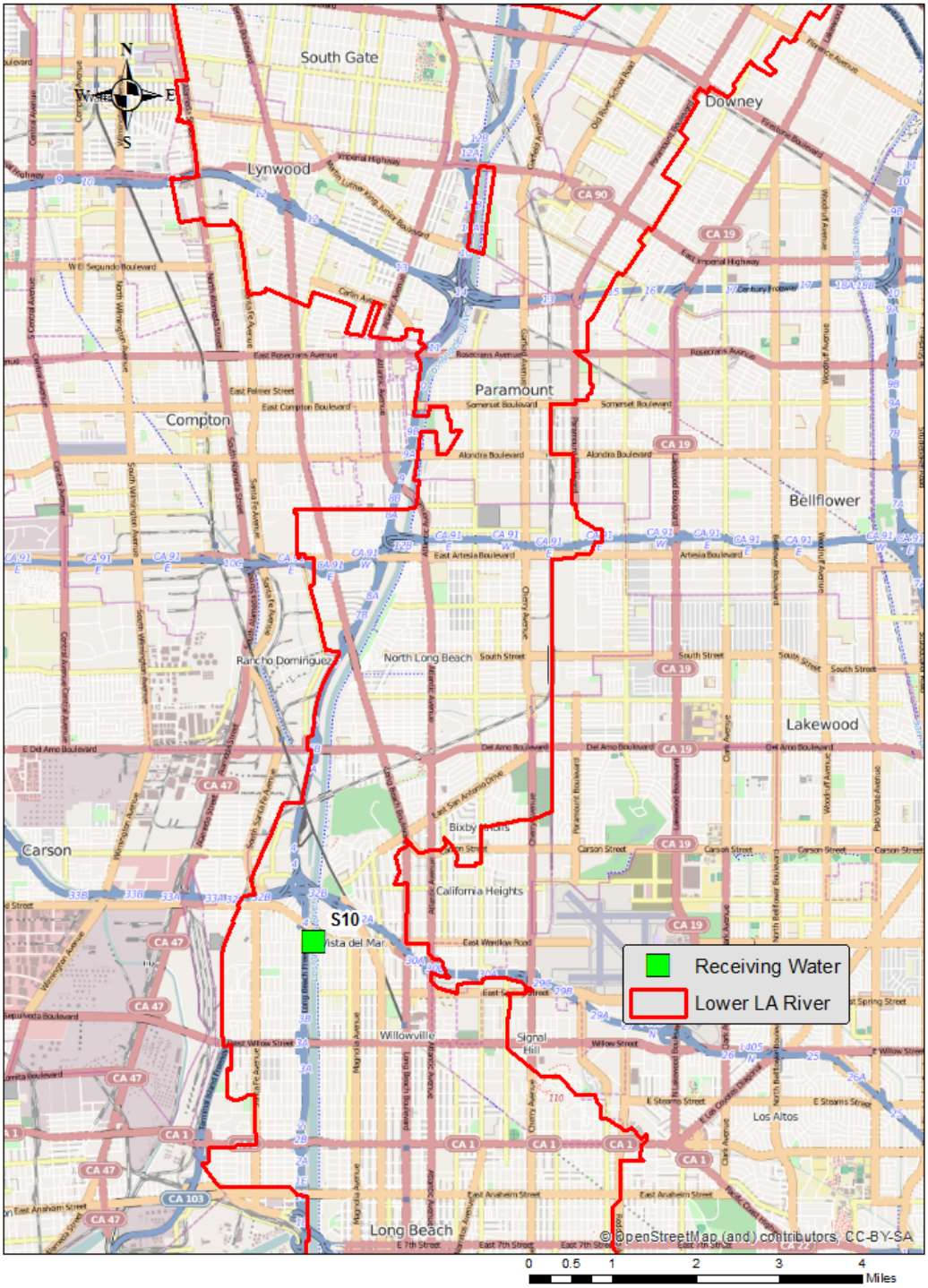


Figure 7-1. Lower Los Angeles River Receiving Water Monitoring and TMDL Compliance Site.

8 Receiving Water TMDL Monitoring

The following sections provide a summary of TMDLs applicable to the LLAR, any interim or final Waste Load Allocations applicable to each TMDL, and monitoring requirements required to evaluate compliance.

8.1 Nitrogen Compounds and Related Effects TMDL

Attachment A to Resolution No. R12-010

This TMDL identifies Water Reclamation Plants (WRP) as the major sources of nitrogen compounds to the Los Angeles River. These facilities include the Donald C. Tillman Water Reclamation Plant, the Los Angeles-Glendale WRP, and the Burbank WRP. All are located upstream of the LLAR WMG. During dry weather periods, these major POTWs contribute 84.1% of the total dry weather nitrogen load. Urban runoff, stormwater, and groundwater discharges also contribute nitrogen loads. The TMDL classifies discharges from MS4s as minor point sources of nitrogen compounds.

Waste Load Allocations (WLAs) are established for segments of the Lower LAR watershed (Table 8-1). A review of water quality measurements taken at the Wardlow (S10) Mass Emission monitoring site between 2006 and 2013 indicated that individual nitrate and nitrite-nitrogen concentrations never exceeded the 30-day WLAs. In addition, three single sample ammonia-nitrogen measurements taken in late 2006 and 2007 were found to exceed the 30-day geometric mean standard of 2.4 mg/L for ammonia-nitrogen.

Low concentrations of nitrogen compounds have been consistently reported in both wet and dry weather discharges monitored at the City of Long Beach Dominguez Gap Mass Emission Monitoring Site between 2008 and 2013 (Kinnetic Laboratories, Inc., 2013). Concentrations of ammonia-nitrogen are reported to be less than 0.7 mg/L during both dry and wet weather monitoring. Concentrations of nitrate-N in dry weather discharges have never exceeded 1.9 mg/L and all wet weather discharges have had concentrations of less than 1.4 mg/L.

Based upon the low concentrations of nitrogen reported in receiving waters of the Los Angeles River and recognition that POTWs are the major contributors of nitrogen to the River during dry weather, the existing mass emission monitoring site located at Wardlow Road (S10) will be used to assess compliance with the Nitrogen Compounds and Related Effects TMDL for the LLAR WMG. Monitoring of nitrogen compounds will be included with each of the three wet weather events and for two dry weather events.

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Table 8-1. Summary of 30-day WLAs for Nitrogen Compounds in the Lower Los Angeles River Watershed Management Group.

Segment	Ammonia-N (mg/L)	Nitrate-N (mg/L)	Nitrite-N (mg/L)	Nitrate+Nitrite-N (mg/L)
Los Angeles River Reach 1	2.4	8.0	1.0	8.0
Los Angeles River Reach 2	2.4	8.0	1.0	8.0
Los Angeles River Tributaries excluding the Whittier Narrows	2.3	8.0	1.0	8.0

In addition, the highest four-day average within the 30-day period shall not exceed 2.5 times the 30-day average waste load allocation.

8.2 Los Angeles River and Tributaries Metals TMDL

Attachment A to Resolution No. R2007-014

The Los Angeles River Metals TMDL became effective on October 29, 2008. In order to address compliance with this TMDL (Table 8-3), a Coordinated Monitoring Plan (CMP) was developed and implemented jointly by the responsible Los Angeles River Watershed MS4 permittees in October 2008. Wet and dry weather monitoring began at 13 locations in the LA River and major tributaries. Four of the monitoring sites were located within the LLAR WMG area. Grab sampling was conducted at all four monitoring sites on a monthly basis during dry weather conditions. Two sites were equipped with autosamplers which were used to collect stormwater runoff samples. A summary of the results of this monitoring effort is presented in Section 2 of the WMP.

Automated sampling equipment was used at LAR 1-13[2] near Wardlow Rd. and at LAR 1-11 located just north of Del Amo Blvd. The LAR 1-13 site is located at the same site as the Los Angeles River mass emission monitoring site S10. Both are associated with at Los Angeles County gaging station F319-R. This location has been used as the final compliance point for the Metals TMDL and is also effectively the lower end of Reach 1 of the Los Angeles River. LAR 1-11 is located just 3300 meters (just over two miles) to the north. This site is also north of the location where Compton Creek discharges to the Los Angeles River and marks the lower end of Reach 2. Monitoring results from these two closely spaced sites were typically difficult to differentiate. The location of LAR 1-11 is an artifact of the prior Reach 1/Reach 2 segmenting under the TMDL, which is now being superseded by the watershed approach. The location of site LAR 1-11 was well suited for differentiating Reach 2 and Reach 1, but does not provide significant information for watershed implementation activities.

[2] LAR1-13 is located at the same site as S-10.

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The river segment between stations LAR1-11 and LAR1-13 is nearly an order of magnitude less than any of the other stations.

Table 8-2. Approximate Percentage of River Length Served by Automated Sampling Stations.

Monitoring Site	Percent* (%)
LLAR1-1	16.4
LLAR1-4	16.0
LARB1-7	21.4
LAR1-11	35.3
LAR1-13	02.6

* Percentage does not add to 100 due to the length of the estuary not being included

Historical monitoring at LAR1-11 and LAR1-13 do not show significant differences in pollutant trends (When a pollutant increases or decreases at one station, it also increases or decreases at the other stations) as is shown in in Figures 8-1 and 8-2 using copper and zinc levels for the 2013-14 CMP sampling results. The zinc levels parallel each other, the copper level are almost indistinguishable at the two monitoring stations.

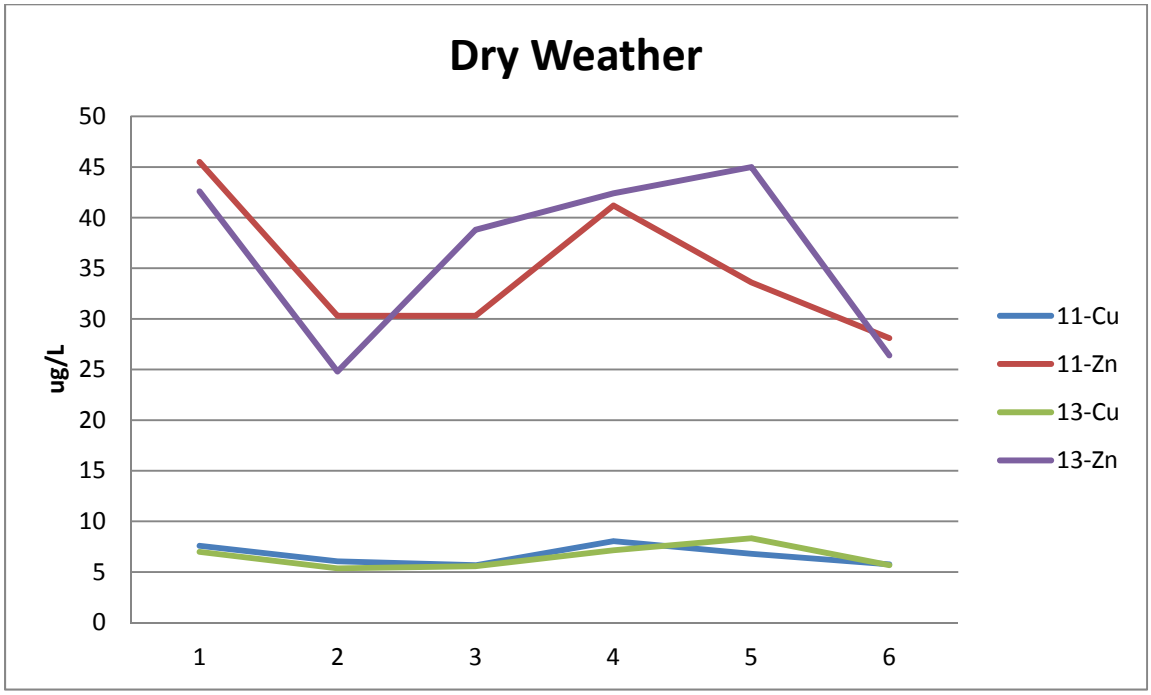


Figure 8-1. Comparison of Copper and Zinc Levels for Monitoring Stations LAR1-11 and LAR1-13 in Dry Weather.

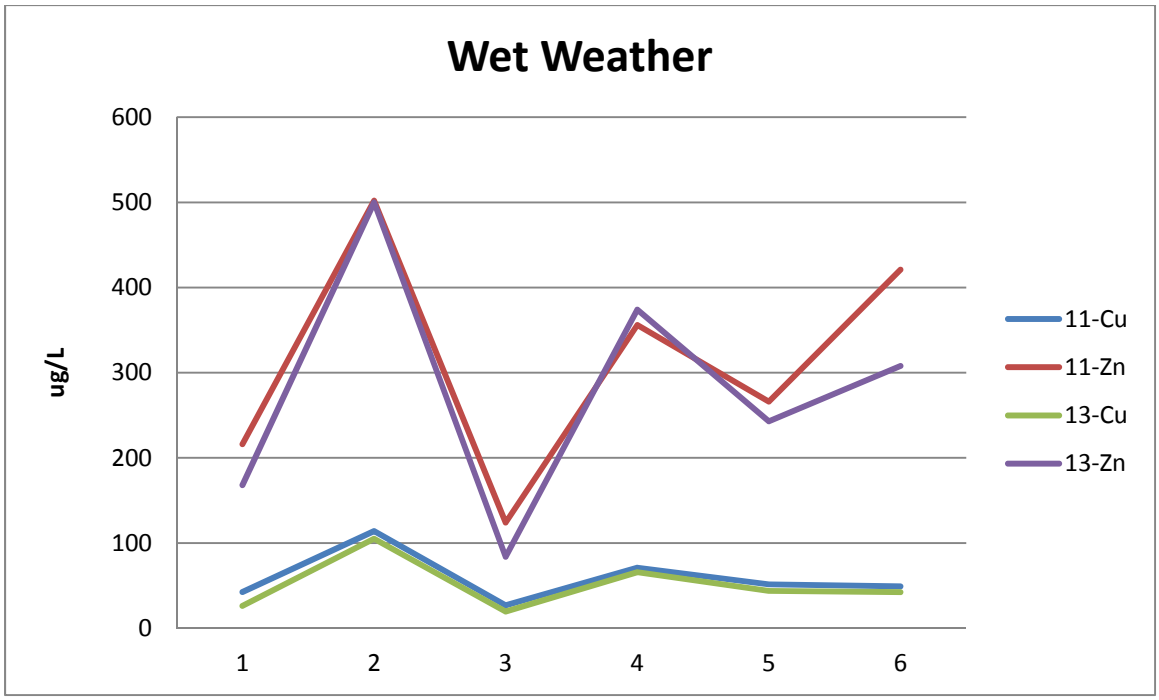


Figure 8-2. Comparison of Copper and Zinc Levels for Monitoring Stations LAR1-11 and LAR1-13 in Wet Weather.

For the past several years, the CMP Metals TMDL monitoring programs and the mass emission station have represented the only structural monitoring stations in the Los Angeles River. With the advent of the CIMP and IMPs, the number of sampling locations for the Los Angeles River and its tributaries, including Compton Creek is markedly increasing.

As a result, continued monitoring at LAR1-11 was redundant and not providing useful information for wet and dry weather monitoring. Thus three sites (Figure 8-3) will continue to be monitored for the LAR metals TMDL.

The LAR1-13 monitoring site will continue to be used for collection of flow-weighted stormwater composite samples since (1) this site also serves as the final compliance point for the metals TMDL, (2) is the furthest downstream and is near the interface of the river/estuary interface and (3) the LLAR groups has already indicated the Harbor Toxics TMDL would be situated at this site. Three storm events will be monitored at this location to be consistent with receiving water quality monitoring requirements at this site.

Dry weather monitoring data from the Los Angeles River Metals CMP has shown metals to be in compliance during dry weather. As a result of the high level of compliance, dry weather monitoring at each of the three sites (Figure 8-3) is scheduled be conducted on a quarterly basis. No dry weather sampling will be conducted during months when a storm event is sampled at LAR1-13. Scheduling of monitoring activities will be coordinated with the Upper Los Angeles River Watershed Management Group (ULARWMG).

Table 8-3. Numeric Targets for Trace Metal in the Lower Los Angeles River WG.

TMDL Target	Waterbody	Metal (µg/L)			
		Cadmium	Copper [3,5,6]	Lead [3,5,6]	Zinc [4,5]
Dry Weather Total Recoverable Metals Targets[1,2]	Reach 1	-	23	12	-
	Tributary - Compton Cr.		19	8.9	
	Reach 2	-	22	11	-
	Arroyo Seco	-	22	11	-
	Tributary - Rio Hondo Reach 1	-	13	5	131
Wet Weather Total Recoverable Metals Target [7,8]	Reach 1 and 2, Compton Creek, Arroyo Seco, Rio Hondo Reach 1	3.1	17	62	159

Notes:

1. Dry weather targets apply to days when maximum daily flow in the river is less than 500 cfs at Wardlow gage.
2. Dry weather conversion factors used to convert total recoverable to dissolved fraction: copper = 0.96; lead = 0.79; zinc = 0.61
3. Dry weather targets for copper and lead are based on chronic California Toxic Rule (CTR) criteria.
4. Dry weather targets for zinc are based on acute CTR criteria using the 10 percentile hardness value.
5. Copper, lead and zinc targets dependent on water hardness.
6. Copper and lead targets based on 50th percentile hardness values.
7. CF Wet weather conversion factors for copper, lead, and zinc to convert total recoverable to dissolved based on regression of data collected at Wardlow gage: copper = 0.65; lead = 0.82; zinc = 0.61. Conversion factor for cadmium taken from CTR = 0.94.
8. Wet weather targets for cadmium, copper, lead and zinc based on acute CTR criteria and the 50th percentile hardness values for stormwater collected at Wardlow gage station.

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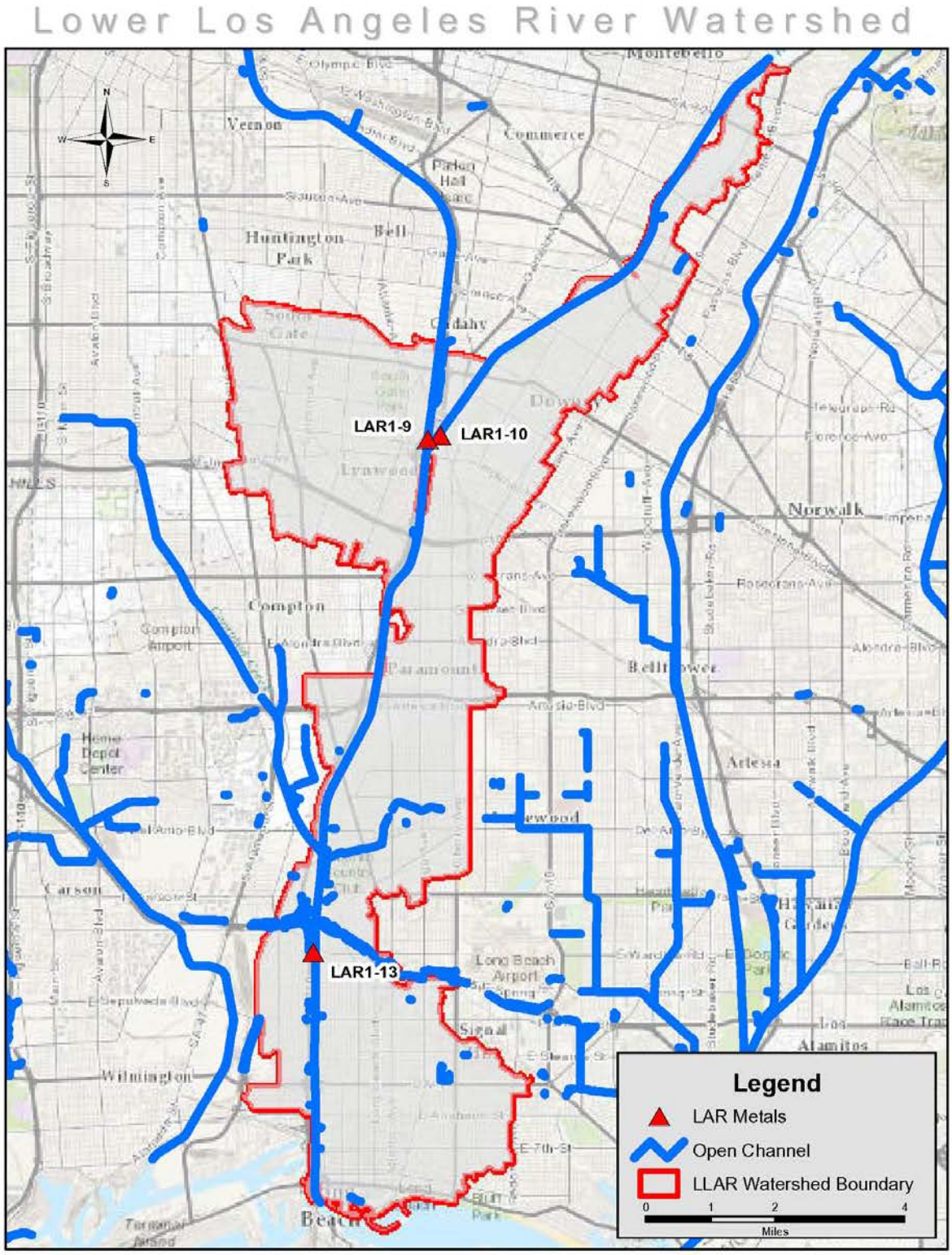


Figure 8-3. Monitoring Sites for the Los Angeles River Metals TMDL.

8.3 Los Angeles River Watershed Bacteria TMDL

Attachment A to Resolution No. R10-007

The Basin Plan Amendment (Resolution No. R10-007) describes three categories of compliance monitoring:

> 1) ***Ambient (River) Monitoring*** is to occur on a monthly basis in each river segment and tributary addressed under the TMDL, until the subject river segment or tributary is at the end of the execution part of its first implementation phase, at which time, it will transition to weekly monitoring.
>
> 2) ***Load Reduction Strategy*** (LRS) Monitoring is required for parties pursing an LRS, in which intensive outfall monitoring will be conducted before and after implementation of the LRS. Pre-LRS monitoring will be used to estimate bacteria loading from MS4 Outfalls and to identify appropriate implementation actions to meet Waste Load Allocation (WLAs). Post-LRS monitoring will be used to evaluate compliance with interim WLAs and to plan for additional implementation actions to meet final WLAs during a second implementation phase, if necessary.
>
> 3) Wet Weather monitoring is to be addressed by Wet Weather Implementation Plans due in 2022.

This Coordinated Integrated Monitoring Plan (CIMP) is limited to 1) quarterly surveys necessary for the Ambient Monitoring program and 2) LRS surveys needed to first develop LRS Plans and later evaluate effectiveness of BMP implementation actions in meeting WLAs within defined reaches and tributaries within the LLAR WMG. Weekly Ambient Monitoring of receiving waters is not scheduled to occur until 7 years after a given reach or tributary has begun the first implementation phase. Given that timeline, it is expected that weekly ambient monitoring will be addressed by a future addendum to the CIMP.

River monitoring will be conducted quarterly at each of the three monitoring sites located within the LLAR WMG (Figure 8-4). Monitoring will be conducted during dry weather conditions and will consist of collection of water samples for analysis of *E. coli* and concurrent flow measurements to allow for calculation of loads. The timing of each survey will be coordinated with the upper Los Angeles River WMGs. Sampling methods are detailed in Appendix C.

LRS Monitoring will be conducted to support development of the Phase 1 LRS Plans and evaluate compliance with interim dry weather WLAs (Table 8-4). LRS monitoring for the first phase will require six synoptic surveys of all MS4 storm drains within a targeted River Segment or Tributary. Water samples will be collected from all flowing storm drains and analyzed for *Escherichia coli* (*E. coli*). Concurrent flow measurements will be necessary to allow for load calculations. The LLAR WMG includes all of Los Angeles River Segment A but only portions of River Segment B, Compton Creek and Rio Hondo. In cases where a segment or defined tributary is not fully encompassed within the LLAR WMG, the group plans to work cooperatively with adjoining WMGs to develop both

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the initial bacterial loading data and to later evaluate compliance with interim dry weather WLAs after implementation. LRS monitoring will not be conducted for the initial LRS planning effort for Segment B since data were previously collected as part of the CREST program. The first LRS surveys will be conducted for River Segment A and Rio Hondo Reach 1 since the LRS plan is due by September 30, 2016 and March 23, 2016 (Table 8-6).

The LRS process is outlined in Figure 8-5. LRS monitoring is required as part of **Step 1** to provide the data necessary to develop the LRS plan and again in **Step 6** when it is necessary to evaluate effectiveness of the strategy.

8.3.1 Interim Dry Weather Limits for Bacteria

The Basin Plan Amendment (Resolution No. R10-007) established Interim Dry Weather WLAs for all segments of the Los Angeles River and the major tributaries. Table 8-4 summarizes WLAs for segments and tributaries located within the LLAR WMG.

Table 8-4. Interim Dry Weather Waste Load Allocations for LLAR Segments and Tributaries (Expressed as Load, 10^9 MPN/day).

River Segment or Tributary	*E. coli* Load (10^9 MPN/day)
Los Angeles River Segment A	301
Los Angeles River Segment B	518
Compton Creek	7
Rio Hondo	2

Source: Resolution No. R10-007, Amendment to the *Water Quality Control Plan for the Los Angeles* Region

8.3.2 Final In-stream Targets and Allowable Exceedances

The final in-stream numeric targets for this TMDL are as follows:

- Geometric Mean Target: *E. coli* density shall not exceed 126 MPN/100 mL.
- Single Sample Target: *E. coli* density shall not exceed 235 MPN/100 mL.

It is important to note that these Final In-stream Targets *do not* apply to monthly ambient monitoring results. They are included here for reference only. These targets only apply to weekly monitoring results, which will be initiated after a given river segment or tributary has completed the first phase of implementation of its Load Reduction Strategy. The single sample targets are assigned an allowable number of exceedance days for dry weather and wet weather. If the Regional Board adopts new bacterial standards, the CIMP, including any monitoring reports, shall be updated to incorporate the changes.

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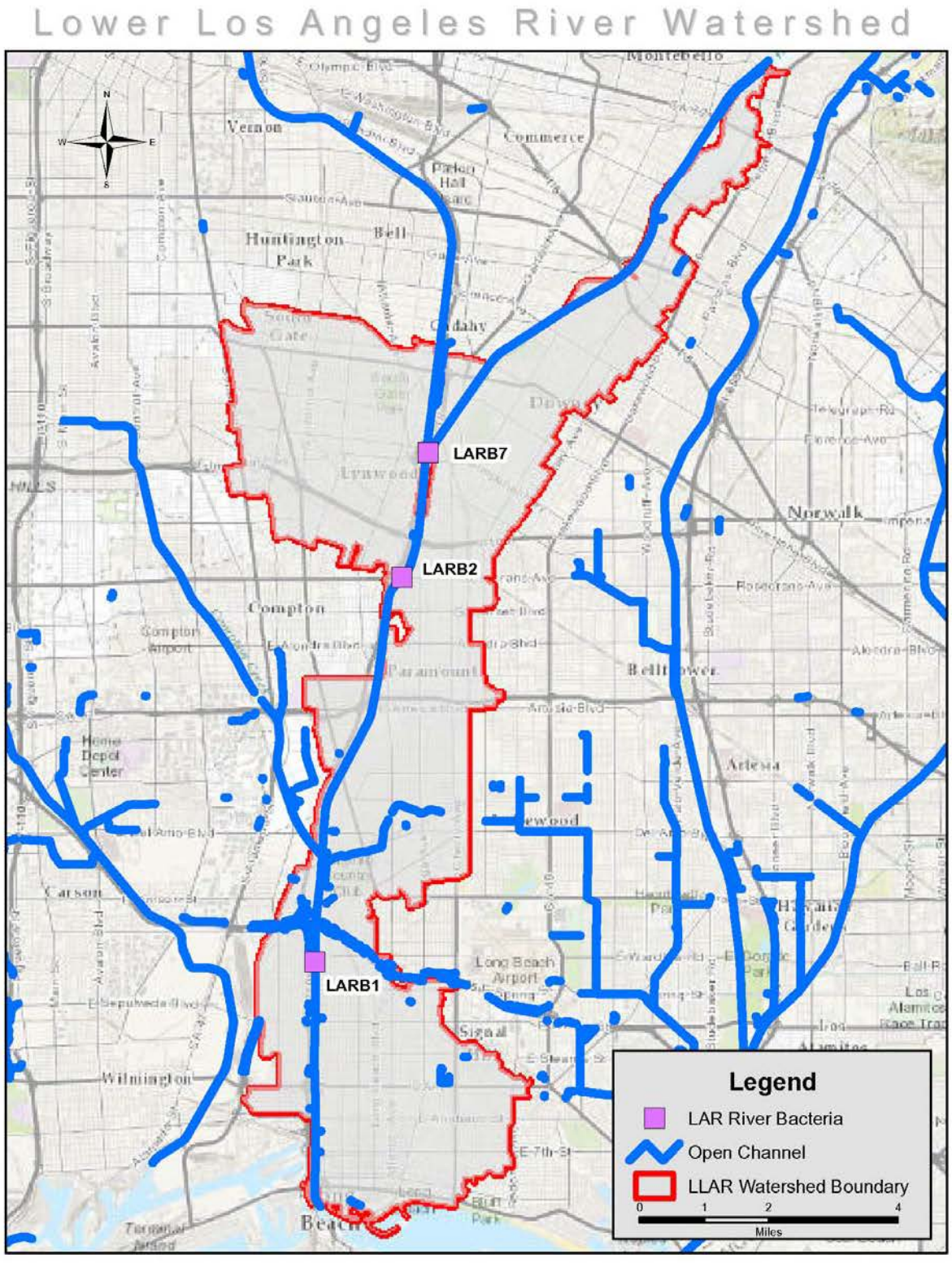
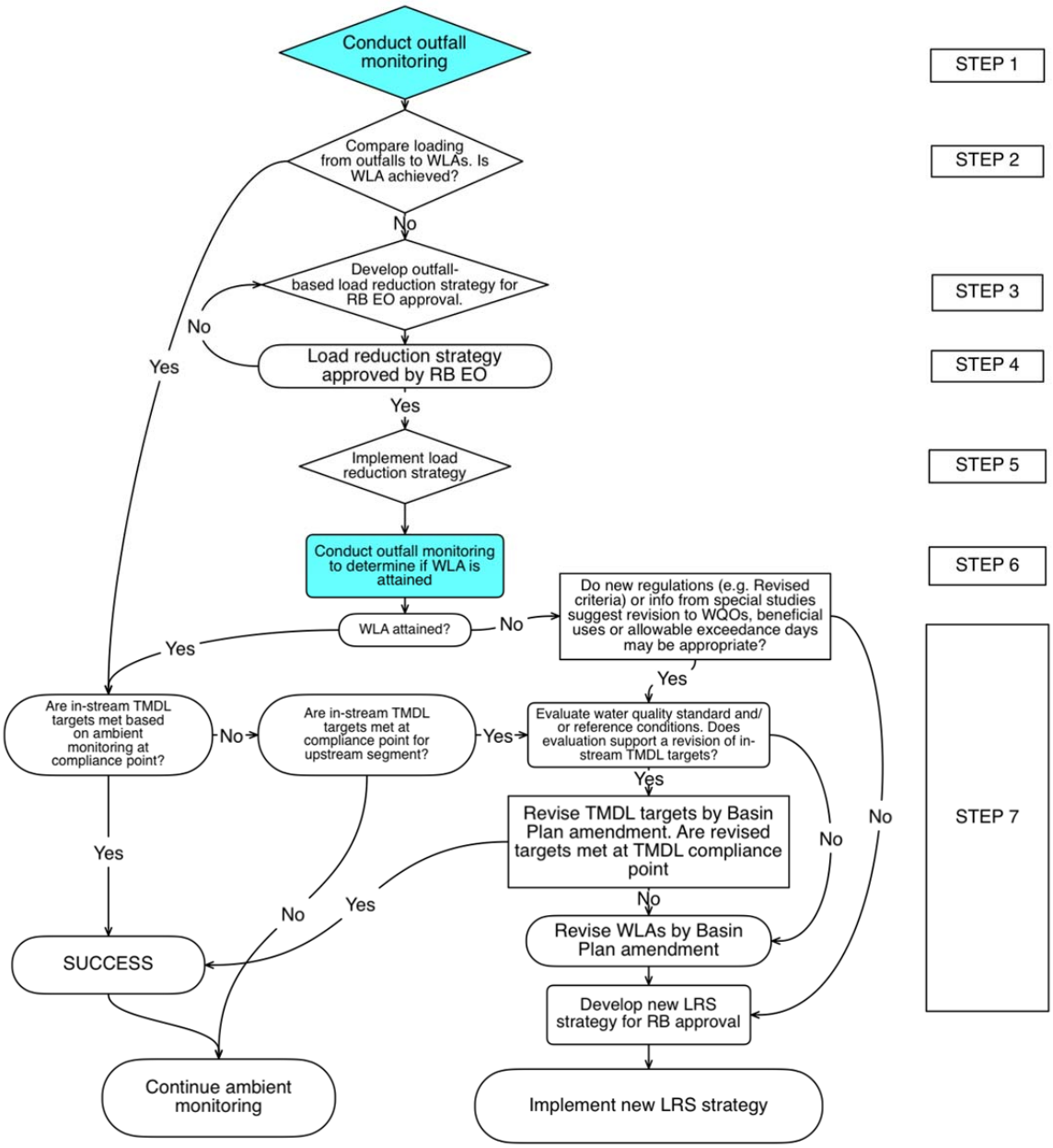


Figure 8-4. River Monitoring Sites for the Los Angeles River Bacteria TMDL.



Based Upon the Los Angeles River Bacteria TMDL Staff Report.

Figure 8-5. Outline of LRS Sampling and Assessment Process.

8.3.3 High Flow Suspension

Certain reaches and tributaries of the Los Angeles River are subject to a High Flow Suspension (HFS) of the recreational beneficial uses. All segments and tributaries located within the LLAR WMG would be subject to suspension of recreational beneficial uses for time periods when rainfall is greater than or equal to 0.5 inches over a 24-hour time period and a 24-hour time period following the event (Board Resolution No. 2003-010). Since this CIMP only includes sampling scheduled to be conducted during dry weather, HFS days are not likely to apply to the results obtained through this monitoring program and are included here for reference purposes only. Table 8-5 shows the final dry and wet weather allowable exceedances based on daily and weekly sampling.

Table 8-5. Allowable Number of Exceedances of Final In-stream Numeric Targets in Dry and Wet Weather Conditions.

Allowable Number of Exceedance Days	Daily Sampling	Weekly Sampling
Dry Weather	5	1
Wet Weather(Non-HFS[1] Water bodies)	15	2
Wet Weather (HFS Water bodies)	10 (not including HFS days)	2 (not including HFS days)

1. HFS= High Flow Suspension

The River Bacteria sampling program will be based upon the March 2013 *Coordinated Monitoring Plan for Los Angeles River Watershed Bacteria TMDL – Compliance Monitoring* developed by the LA River Watershed Bacteria TMDL Technical Committee with the exception that monitoring in the estuary will be conducted quarterly rather than monthly and freshwater bacteria monitoring will be conducted monthly. The bacteria monitoring frequency will increase to weekly after completion of the first segment or tributary-specific implementation phase. This plan established 16 sites throughout the Los Angeles River Watershed to characterize ambient water quality conditions. Four of these sites are located in the LLAR WMG. Quarterly water samples will be collected at each site for analysis of the fecal indicator, *Escherichia coli (E. coli).* Quarterly monitoring is considered to initially be sufficient to determine a segment or tributary is in compliance with interim WLAs. Since interim WLAs are expressed as a load, flow measurements will be taken at or near the time of each sample collection so that the *E. coli* MPN/day can be calculated. Quarterly monitoring will only be conducted during dry weather conditions. Sampling must be preceded by a minimum of 72 hours without rainfall within the watershed.

LRS sampling is initially required to evaluate bacterial loads associated with each defined River Segment or Tributary in the LAR Bacteria TMDL. Sampling conducted to support development of bacteria reduction plan requires six sampling events where water samples and flow measurements are taken in all outfalls discharging to the defined area. Effectiveness monitoring is scheduled to be conducted after all actions have been taken to control bacterial loads to levels below established

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Waste Load Allocations (WLAs). Effectiveness monitoring is expected to require three additional synoptic surveys of the target segment. If this monitoring does not demonstrate that WLAs are being met, a second phase of testing is required to evaluate further actions necessary to meet the dry weather WLAs. Initial LRS monitoring was completed for Segment B of the Los Angeles River as part of the CREST studies (CREST 2010a, b). Appendix 1 of the CREST report provided example calculations and recommendations for reducing dry weather loads. A final LRS plan is required to be submitted by September 30, 2014. This plan may utilize recommendations provided in the CREST report or recommend alternative strategies for reducing bacterial loads.

Table 8-6 provides a schedule for the first two cycles of the Permit for development of initial LRS plans and completing effectiveness monitoring River Segments A and B and tributaries that discharge to these River Segments. It is currently intended that an LRS plan be completed for outfalls discharging to the Los Angeles Estuary (LAR). In order to provide consistency with the Los Angeles River Bacteria TMDL, an LRS plan for the LAR is scheduled to be completed by September 2021 when LRS plans are due for River Segments C and D.

Table 8-6. Schedule for Completion of LRS Outfall Monitoring for Bacterial Loads under the Los Angeles River Bacterial TMDL.

	Segment B	**Segment A**	**Segment B Tributaries Rio Hondo**	**Segment A Tributaries Compton Creek**
First Phase				
Monitoring for Development of LRS – 6 outfall surveys	***Sept 23, 2014***, 2.5 years after effective date of the TMDL	***Sept 23, 2016,*** 4.5 years after effective date of the TMDL	***March 23, 2016,*** , 4 years after effective date of the TMDL	***March 23, 2018***, 6 years after effective date of the TMDL
Monitoring for Effectiveness of LRS – 3 outfall surveys	***March 23, 2022***, 10 years after effective date of the TMDL	***March 23, 2024***, 12 years after effective date of the TMDL	***September 23, 2023***, 11.5 years after effective date of the TMDL	***Sept 23, 2025,*** 13.5 years after effective date of the TMDL
Second Phase				
Submit a new LRS -6 new outfall surveys	***March 23, 2023***, 11 years after effective date of the TMDL	***March 23, 2025***, 13 years after effective date of the TMDL	***March 23, 2024***, 12.5 years after effective date of the TMDL	***September 23, 2026,***, 14.5 years after effective date of the TMDL

1. This schedule is limited to activities during the first two permit cycles (10 years) that require data collection efforts.

8.4 Long Beach City Beaches and Los Angeles River Estuary TMDLs for Indicator Bacteria

The Lower LAR Watershed Group includes drainages to the Los Angeles River Estuary, but not Long Beach City Beaches. A robust monitoring program was to be developed for the LAR Estuary. Existing data includes bi-weekly monitoring from May through September of 2009, and 2010. Monitoring was to be expanded to include year round monitoring requirements, and at least three monitoring locations within the Estuary. It was recognized that adequate data to establish a reference estuary approach was not available at the time when TMDLs were developed for indicator bacteria along the City beaches and in the Los Angeles River Estuary. It was also recognized that, as adequate data from reference estuary studies becomes available, it may be appropriate to consider a reference estuary approach to evaluate compliance with these TMDLs.

The Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL was developed by USEPA and therefore did not incorporate an Implementation Plan. The Regional Board developed a separate TMDL for bacteria in the Los Angeles River that has been incorporated into the Basin Plan Amendment with a schedule to meet compliance in 25 years (Resolution Number R10-007, approved by the State Board on November 1, 2011). The USEPA recognized that waste load allocations and load allocations (expressed as allowable exceedance days) were appropriate to implement in a timeline consistent with the lower segments of the Los Angeles River Bacteria TMDL, and that the Regional Board should consider options that provide time to comply, absent a state-adopted implementation schedule, and consistent with the State Water Board's compliance schedule policy. Interim milestones were recommended to be linked to localized efforts to reduce bacteria loading in the direct drainage areas included in these TMDLs, and should consider the influence of upstream bacteria sources to the LAR Estuary and the LBC Beaches.

The LLAR WMG only includes the LAR Estuary portion of this TMDL but the salinities can be expected to range from a freshwater to a marine environment. Receiving water quality objectives for the LAR Estuary for REC-1[3] beneficial uses are summarized in Table 8-7. . The TMDL estimated direct loads to the Estuary during dry weather solely on the basis of *E. coli.* While they recognized that the different indicator bacteria were not directly comparable, it was assumed that sources were similar for indicator bacteria applicable to the marine environment. Due to the transition from a freshwater to a marine environment, all four indicator bacteria will be considered.

[3] uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing or use of natural hot springs.

RB-AR13081

Table 8-7. Marine and Freshwater Receiving Water Quality Objectives applicable to the Los Angeles River Estuary.

Water Quality Objectives	Marine REC-1	Freshwater REC-1
SINGLE SAMPLE		
E. coli	NA	235 CFU/100 mL
Fecal coliform	400 CFU/100 mL	
Enterococcus	104 CFU/100 mL	
Total Coliform[1]	10,000 CFU/100 mL	
30-DAY GEOMETRIC MEAN		
E. coli	NA	126 CFU/100 mL
Fecal coliform	200 CFU/100 mL	
Enterococcus	35 CFU/100 mL	
Total Coliform	1,000 CFU/100 mL	

1. Total coliform shall not exceed 1,000/100 mL, if the ratio of fecal to total coliform exceeds 0.1 (this is an additional single sample limit for REC-1 marine waters; presented in the Basin Plan).

The purpose of conducting a monitoring program in the Los Angeles River Estuary is to:

- develop an understanding of bacterial loading rates to the estuary and
- determine if bacteria undergo simple dilution as the freshwater passes through the estuary mixing with marine waters or if areas of the estuary serve as either sources or sinks for bacteria that can ultimately be transported to Long Beach City Beaches.

Three monitoring sites (Figure 8-6) will be monitored within the estuary. Sampling locations are located at the upstream and downstream limits of the estuary, and near the Queensway Bridge. During each survey, samples will be taken for each of the marine and freshwater bacteria indicators in due to the range of conditions within the estuary. In addition, *in-situ* measurements will be taken for salinity, temperature and turbidity using field instrumentation. Sampling points will be selected at the center of the brackish surface plume (lowest salinity) resulting from freshwater flows from the Los Angeles River. This will assure that conditions reflect the center of surface flows passing through the estuary. Sampling is intended to be completed in the morning within a 2-hour interval in order to assure that sampling represents a synoptic view of conditions within the estuary that is unimpacted by differential exposure to sunlight.

Table 8-8. Ambient Monitoring Sites within the LLAR WMG for the Los Angeles River Watershed Bacterial TMDL.

Site ID	Site Name	Water Body	GPS Coordinates		Description
			Latitude (N)	Longitude (W)	
LARB1	Segment A (Wardlow)	Los Angeles River(Reach 1)	33.81735	118.20551	Located at Wardlow Rd Mass Emission station (S10)
LARB2	Segment B (Rosecrans)	Los Angeles River (Reach 2)	33.90374	118.18240	Located at Rosecrans Ave
LARB7	Rio Hondo	Tributary: Rio Hondo	33.93202	118.17523	Located above with Confluence with the LA River

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Based upon a simple estuarine mixing model, a linear change in bacteria concentrations in response to changes in salinity would indicate that the Los Angeles River is either the only bacterial source or at least the dominant source of bacteria to the Estuary. Increasing concentrations of bacteria relative to a linear dilution line will be indicative of a source along the Estuary. If measured concentrations of bacteria decrease faster than expected based upon simple dilution of the River water would indicate that the estuary serves as a sink. The latter case would occur if estuarine mixing creates conditions where bacteria would tend to be removed by coagulation and settling of particulate matter.

This monitoring is expected to provide information to assess the major sources of bacteria to the estuary and assist in determining where efforts would be best directed to reduce bacteria within recreational waters of the Los Angeles River Estuary and at beaches impacted by the freshwater plume as it leaves the mouth of the Estuary.

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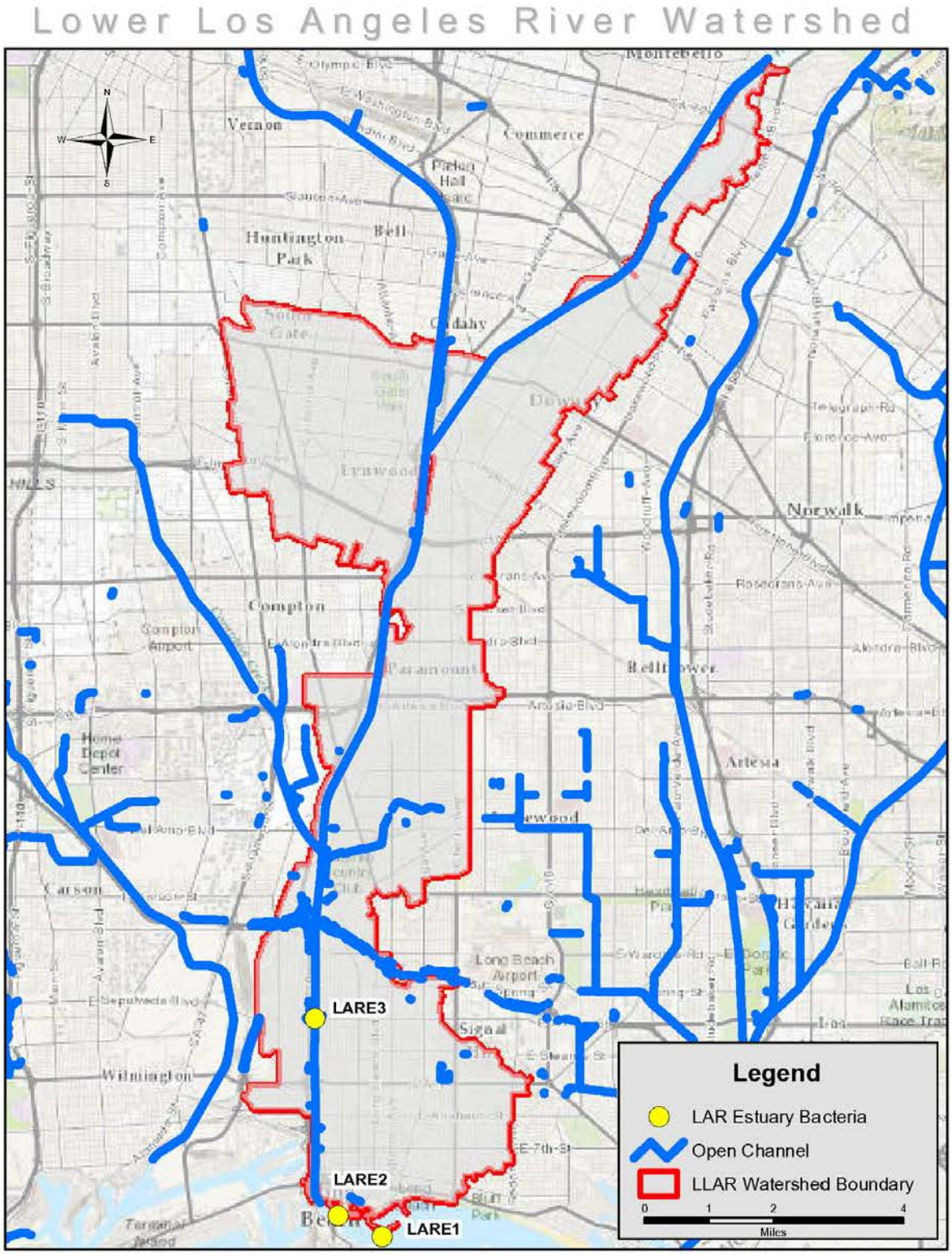


Figure 8-6. Monitoring Sites for Bacteria in the Los Angeles River Estuary.

8.5 Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL)

Attachment A to Resolution No. R11-008

The Basin Plan Amendment (Resolution No. R11-008) indicates that responsible parties identified in the existing metals TMDLs for Los Angeles River Watershed are responsible for conducting water and sediment monitoring above the Los Angeles River Estuary to determine the Rivers' contribution to the impairments in the Greater Harbor waters.

- **Water Column Monitoring**

The Basin Plan Amendment indicates that water samples and total suspended solids samples are to be collected from at least one site during two wet weather events and one dry weather event each year. The first large storm event of the season is to be included as one of the wet weather monitoring events. Water samples and total suspended solid samples are to be analyzed for metals, DDT, PCBs, and PAHs. Sampling is intended to collect sufficient volumes of water to allow for filtration of suspended solids for analysis of the listed pollutants in the bulk sediment. General water chemistry (temperature, dissolved oxygen, pH, and electrical conductivity) and a flow measurement are also required at each sampling event. General chemistry measurements may be taken in the laboratory immediately following sample collection if auto samplers are used for sample collection or if weather conditions are unsuitable for field measurements.

- **Sediment Monitoring**

The Basin Plan Amendment also requires collection of sediment samples from at least one site every two years for analysis of general sediment quality constituents and the full chemical suite as specified in SQO Part 1. Sediment monitoring has been incorporated into the Coordinated Compliance, Monitoring, and Reporting Plan for the Greater Los Angeles and Long Beach Harbor Waters (Anchor QEA, 2013) and therefore will not be addressed in this CIMP.

The Harbor Toxics Monitoring Program includes two monitoring sites within the Queensway Bay portion of the Los Angeles River Estuary that will be monitored every two years for both general sediment quality and all chemical constituents specified for SQO Part 1 testing. Permittees located in the nearshore areas as defined by the Harbor Toxics TMDL are contributing to Harbor Toxics monitoring performed in both receiving waters and sediments of the Los Angeles River Estuary, San Pedro Bay and the Port of Long Beach.

8.5.1 Sampling Approach

A number of different approaches have been attempted to enable collection of stormwater samples based upon flow-weighted composites and then extract the suspended sediments for analysis. The various approaches have met with varied level of success and typically require extensive labor to extract the sediment for analysis. Regardless of the approach used, none are based upon standard methods.

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We are recommending an alternative approach for assessing the loads of toxic contaminants being discharged to the Harbor environment that will substantially reduce the amount of sample handling and potential for introduction of error. This approach will utilize High Resolution Mass Spectrometry (HRMS) to analyze for organochlorine pesticides (EPA1699), PCBs (EPA 1668) and PAHs (CARB429m). Test methods for these organic toxic compounds target the required analytes, but also enable assessment of each compound included in the Part 1 Sediment Quality Objectives (SQOs). These compounds include chlordane which is 303(d) listed in both the Los Angeles River Estuary sediments and in San Pedro Bay sediments.

The frequency of monitoring for the Harbor Toxics TMDL (Table 8-9.) will be consistent for dry and wet weather monitoring requirements specified in the TMDL however, the HRMS method will be used for the two wet weather monitoring events and conventional analytical methods will be used for the dry weather monitoring event.

During the first three years of Harbor Toxics monitoring, analyses will be conducted on whole water samples. These test methods provide detection limits that are roughly 100 times more sensitive than conventional low resolution tests. In addition, these extremely low detection limits can be achieved with as little as 3-6 liters of stormwater from each monitoring location.

Use of this approach is expected to greatly enhance the ability to consistently obtain appropriate samples for measuring and comparing loads of toxic pollutants associated with each major stormwater discharge. This will assure that all key toxics can be quantified at levels suitable for estimation of mass loads to the Harbor waters. For purposes of load calculations, it would be assumed that 100% of these toxics were associated with suspended solids. Separate analyses of TSS/SSC would be used to normalize the data. After three years (six storm events) the data will be reevaluated to assess whether direct analysis of the filtered suspended sediments are necessary to improve load assessments. If deemed necessary, a modified approach will be evaluated based upon use of HRMS methods for analysis of filtered suspended sediments. Use of HRMS for analysis of the filtered sediment will reduce sediment mass requirements down to one gram per analytical method, but this still requires collection and transport of large volumes of water for laboratory filtration. It is currently not clear whether the process of filtering large samples and direct analyzing target toxics in suspended sediments will result in any significant improvements in our ability to assess loads of the toxics being addressed in the Harbor TMDL. In fact, collecting, transporting and processing the high volumes of stormwater necessary for this approach may result in a decrease in our ability to obtain useful data and will likely result in a decrease in our ability to assess pollutant loads from all watersheds.

Similar approaches have been used by the San Francisco Estuary Institute (SFEI) staff (Gilbreath, Pearce and McKee, 2012) to measure the performance of a rain garden. Autosamplers were used to collect stormwater influent and treated effluent to assess removal efficiency for pesticides, PCBs, mercury, and copper subject to TMDLs. HRMS was used to quantify PCB removal. HRMS methods are also being used in Virginia to assist in identification of sources of PCBs in MS4 and industrial stormwater discharges (Gilinsky, 2009).

RB-AR13086

Table 8-9. Summary of Constituents to be Monitored at the S10 Mass Emission for the Harbor Toxics Monitoring Program.

CLASS OF MEASUREMENTS	MASS EMISSION SITE (S10)	
	Wet[5]	Dry
Flow	4	2
Field Measurements Dissolved oxygen, pH, temperature, and specific conductivity	4	2
Organochlorine Pesticides and PCBs (Table 5-5) Chlordane[1], DDTs[2], PCBs[3]	2	1
Metals (Table 5-6) Al**,** Cd, Cu, Pb, Ni, Sb, Zn, Total Se & Hg	4	1
Semivolatile Organic Compounds (Table 5-8) PAHs[4]	2	1

1. Chlordane components are based upon sum of chlordane-alpha, chlordane-gamma, nonachlor-alpha, nonachlor-gamma, and oxychlordane consistent with the Harbor Toxics TMDL.
2. DDT compounds include: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT. Only the 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT are included in routine monitor as part of Table E-2 constituents.
3. PCBs includes the seven aroclors listed in Table 5-5 or the following 54 PCB congeners: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209.
4. PAHs include the 18 compounds used to evaluate sediment quality ERLs and ERMs: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene. PAHs will be quantified as part of the Harbor Toxics Monitoring requirements –two wet season and one dry season event. Methods in the referenced table will only be used for dry weather testing.
5. The fourth storm event is only for the purpose of fulfilling the TMDL requirements. Only metals, TSS, SSC, and hardness will be analyzed.

8.5.2 Sampling and Analytical Procedures-Wet Weather

Stormwater samples for the Harbor Toxics Monitoring Program will be collected using automated stormwater sampling methods specified in Appendix B. A separate autosampler and intake hose will be installed at each site. Existing flow metering equipment at each site will be used to pace the sampler to obtain a flow-weighted composite sample.

Based on TSS measurements at four mass emission sites in LA County (Table 8-10. and 8-11), use of a TSS concentration of 100 mg/L is expected to provide a conservative basis for estimating reporting limits for OC pesticides, PCBs, and PAHs in suspended sediments based upon 2-liter samples. However, an additional liter of stormwater will be provided for each organic analytical suite for a total of nine liters. An accurate measure of suspended sediments is critical to this sampling approach. TSS will be analyzed; however, SSC will be used as the standard for calculating the concentrations of target constituents in suspended sediments and total contaminant loads associated with those sediments. Each of the measures of suspended solids will require 1-liter samples. Any additional water (up to another six liters) will be provided to the laboratory in 2.5-L amber glass bottles.

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This approach requires a maximum of 17 liters of stormwater for analysis of organic constituents and sediment tests required for the Harbor Toxics TMDL. Analyses could be performed on a minimum of eight liters of water but field duplicates would need to be provided from another site. The following configuration of sample containers and sample volumes will provide the laboratory with the maximum degree of flexibility to assure that detection limits are met and suitable water volumes are available to complete analysis of field duplicates for each analytical suite.

- Six 2.5-L amber glass containers (filled to two liters)
- Three 1-L amber glass containers
- Two 1-L HDPE containers for suspended sediment

Since detection limits will depend upon the concentration of suspended sediment in the sample, the laboratory analyzing the suspended sediment concentrations will be asked to provide a rush analysis to provide information that can be used to direct processing of the samples for the organic compounds. Processing of sample waters provided to the laboratory will depend upon the results of the SSC analysis.

- If Suspended Sediment Concentrations (SSC) are less than 150 mg/L, an additional liter of water will be extracted for each subsequent HRMS analysis. If TSS concentrations are between 150 and 200 mg/L, one of the additional liter samples may be used to increase the volume of sample water for just PAHs or the two additional liters may be used as a field duplicate for one of the analyses.

- If SSC concentrations are greater than 200 mg/L, two of the three additional liters may be used as a field duplicate for one analysis. If available, the additional water provided in 2.5 L containers will also be considered for use as field replicates.

- If the initial SSC sample indicates that sediment content is less than 50 mg/L, additional measures will be taken to improve PAH reporting limits with respect to suspended sediment loads. This would include use of extra sample water to bring up the total sample volume (up to a maximum of 4 liters) or reduction the final extract volume.

- Given adequate sample volumes and normal levels of suspended sediment, a field duplicate will be analyzed for each analysis. Field duplicates for the three HRMS analyses may come from different monitoring sites in the Los Angeles and San Gabriel River watersheds depending on available volumes. Parties conducting the testing at each site will coordinate testing to enhance the opportunity to incorporate at least one field duplicate sample for each test.

Target reporting limits (Table 8-12. and Table 8-13.) were established based upon bed sediment reporting limits listed in the *Coordinated Compliance and Reporting Plan for the Greater Los Angeles and Long Beach Harbor Waters* (Anchor QEA, 2013). Table 8-12. and Table 8-13. provide a summary of the detection limits attainable in water samples using HRMS analytical methods. Estimated detection limits are provided for concentrations of the target constituents in suspended sediments given the assumption that 2-liter sample volumes will be used for each test,

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suspended sediment content is 100 mg/L and that 100 percent of the target constituents are associated with the suspended sediment. This provides a conservative assumption with respect to evaluating the potential impacts of concentrations of OC pesticides, PCBs, and PAHs in suspended sediment on concentrations in bed sediment. Additionally, Table 8-12. and Table 8-13. present relevant TMDL targets and reporting limits suggested in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009). The following is a comparison between the estimated detection limits for OC pesticides, PCBs, and PAHs in the suspended sediments. The approach used to assess concentrations of trace metals in suspended sediments is based upon use of the routine monitoring information. Table 8-14. examines the possible limitations of this approach if trace metal concentrations are extremely low, approaching detection limits.

- For OC pesticides (Table 8-12), estimated detection limits in the suspended sediment are comparable or lower than Harbor Toxics TMDL targets limits for bed sediments

- For PCBs (Table 8-12), estimated detection limits in the suspended sediment are below TMDL targets limits for bed sediments. Additionally, estimated detection limits in the suspended sediment are at or below target bed sediment reporting limits for the Harbor Toxics sediment monitoring program and below target reporting limits presented in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009).

- Most PAH compounds (Table 8-13), are expected to be detectable in the suspended sediment at concentrations similar to target bed sediment reporting limits for the Harbor Toxics monitoring program, target reporting limits presented in the SWAMP QAPP (SWRCB, 2008), and maximum reporting limits cited in the SQO technical Support Manual (SCCWRP, 2009). Only two compounds, naphthalene and phenanthrene, are expected to have detection limits roughly three times the target bed sediment reporting limits for the Harbor Toxics TMDL. Both of these analytes are light weight PAHs that are not considered to be major analytes of concern in stormwater.

- Table 8-14 summarizes the reporting limits applicable to total recoverable metals. Estimated equivalent concentrations in suspended solids are very conservatively estimated based upon 100 percent of the metals being associated with suspended particulates as measured values approach project detection limits. In reality, this is not a likely condition. When concentrations of total recoverable metals approach the very low detection limits used in this program, sediment loads will also be extremely low and the concentrations of metals in the dissolved phase will become a more significant fraction of the total metals concentrations. If concentrations of total cadmium and mercury are extremely low, comparison with TMDL targets in bed sediments could be limited

Initial monitoring results will be compared against interim sediment Waste Load Allocations (WLAs) established for the respective receiving waters (Table 8-15). For the Los Angeles River, interim WLAs for the Los Angeles River Estuary would apply and for the San Gabriel River watershed, interim allocations for the Nearshore Waters of San Pedro Bay will apply.

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8.5.3 Sampling and Analytical Procedures-Dry Weather

Suspended sediment concentrations during periods of dry weather are extremely low and not suitable for use of methods intended to quantify the concentrations of toxics associated with particulates. Dry weather samples will be collected as surface grab samples. Each sample will be collected directly into the laboratory sample containers using clean sampling techniques outlined in the section of grab sampling. Dry weather sampling will be scheduled to be conducted during a time period when flows are historically at the minimum levels.

Water samples will be collected and submitted for the following parameters:

- Total Suspended Solids (TSS) and Suspended Sediment Concentrations (SSC)
- Dissolved and total metals
- Organochlorine pesticides (including DDT and its derivatives, chlordane compounds, dieldrin, and toxaphene)
- Polychlorinated biphenyl (PCB) congeners

Analytical methods for each of these constituents will be consistent with methods listed in Section 5 for Table E-2 constituents. Analytical methods will also be consistent with methods used in the Harbor waters with the exception of metals which require chelation/extraction methods in saline waters.

In situ measurements will include temperature, dissolved oxygen, pH and salinity. *In situ* measurements will be taken with a calibrated water quality sonde (Hach Quanta or equivalent).

8.5.4 Quality Control Measures

Quality control measures for all HRMS analyses will include field equipment blanks to assess background contamination due to the field equipment and sample handling. One field equipment blank will be analyzed from one set of field equipment prior each monitoring event during the first year. Data will be evaluated at the end of the year to determine if field equipment blanks should be reduced to one per season. For the field blank, two liters of HPLC grade water provided by the laboratory will be pumped through the entire autosampler and intake hose for each analytical test (OC pesticides, PCBs and PAHs). The blank water will be pumped into precleaned sample containers and refrigerated until the stormwater sampling is completed. If the storm does not occur immediately after blanking, the equipment blank will be transmitted under Chain of Custody to the laboratory in order the meet the requirement for extraction of aqueous samples within 7 days of collection. Extracts will be held until stormwater samples are received unless storm does not develop within a period of 30 days after extraction (samples are required to be analyzed within 40 days of extraction). If a successful storm event is monitored immediately after the equipment blank is taken, the equipment blank and stormwater samples will be submitted to the laboratory together. Given adequate sample volumes, field duplicates will also be analyzed to assess variability associated with the sampling and subsampling processes.

Laboratory quality control measures will include analysis of method blanks, initial calibrations, analysis of Ongoing Precision and Recovery (OPR) samples and use of labeled compounds to assess

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recoveries and matrix interferences. Method blanks will be based upon processing of laboratory water volumes identical to those used for the field samples. Initial calibrations are run periodically but daily calibration checks are conducted to verify stability of the calibration. OPR tests will be conducted with each batch of samples. OPR samples are blanks spiked with labelled isotopes that are used to monitoring continued performance of the test. Labelled isotopes are added to each field sample and analyzed to measure recovery in the sample matrix. Estimated Detection Limits (EDLs) will be calculated for each analyte associated with each field sample. For each analyte 'x', the EDL is calculated by the following formula:

$$EDL_x = 2.5 * \frac{(Na)*(Qis)*(Rah)}{(Ais)*(RRF)*(wv)}$$

Where:
- Na = Analyte peak to peak noise height.
- Qis = Concentration of internal standard.
- Rah = Area of Height Ratio
- Ais = Area of internal standard
- RRF = initial calibration average relative response factor for the congener of interest.
- wv = sample weight/volume.
- 2.5 = Minimum signal to noise ratio.

Quality control measures for water samples taken during dry weather periods will be consistent with all measures applied for sampling suspended sediment, trace metals, organochlorine pesticides and PCBs as part of the Receiving Water Monitoring Program.

8.5.5 Summary

In summary, target reporting limits for all but one of the organic compounds of interest are below or comparable to relevant TMDL targets and the overwhelming majority are below bed sediment reporting limits identified in the Harbor Toxics Monitoring Program (Anchor, 2013), the SWAMP QAPP (SWRCB, 2008), the SQO Technical Support Manual (SCCWRP, 2009) and available Effects Range Low (ERL) values used to assess direct effects on Harbor sediments. In the case of metals, some limitations may exist for two elements, cadmium and mercury, in extreme conditions. However, neither sediments in both eastern San Pedro Bay nor the Los Angeles River Estuary are cited as being impaired by these two metals.

The sampling approach is based upon collection and analysis of whole water samples to estimate concentrations of target pollutants associated with suspended sediments in flow-rated composite samples of stormwater. Use of this approach is expected to result in very low detection limits that will allow for quantification of total contaminant loads for each constituent of concern. It will also allow for reasonable estimates of the concentrations of target compounds in the suspended sediment and provide for direct comparisons with targets established in the receiving waters for bed sediments. This approach meets the overall objectives of the program while also enhancing the chances of successfully monitoring multiple storm events in the targeted watersheds and providing data necessary to evaluate relative loads from each watershed during multiple storms each year. The proposed methods are also expected to allow incorporation of quality control measures

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necessary to evaluate potential sources of contamination and evaluate variability associated with both field sampling and analytical processes.

Sampling of dry weather discharges from the Los Angeles River and at the mouth of the Lower San Gabriel River Estuary will be based upon surface grab samples. Samples will be analyzed for suspended sediment, trace metals, organochlorine pesticides and PCBs as part of the Receiving Water Monitoring Program

Table 8-10. Measurements of Suspended Sediments for Calculation of Harbor Toxics Pollutant Loads.

SAMPLE MEDIUM	CONSTITUENT	METHOD	TARGET REPORTING LIMIT
Water	Total Suspended Solids (TSS)	SM 2540D	1.0 mg/L
	Suspended Sediment Concentration (SSC)	ASTMD 3977, Method B	1.0 mg/L

Table 8-11. Summary of TSS Measurements (mg/L) at Four Mass Emission Monitoring Sites in Los Angeles County.

Site	Site ID	2nd Quartile	Median	3rd Quartile
Los Angeles River - Wardlow	S10	65	143	291
Coyote Creek	S14	33	55	117
Ballona Creek	S01	NA	158	NA
Los Cerritos Channel	LCC1	96	155	260

NA = not available

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Table 8-12. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Organochlorine Pesticides and Total PCBs.

Constituent and Analytical Method	Water Detection Limit [1]	Equivalent Suspended Sediment Detection Limit [2]	Harbor Toxics Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009) Reporting Limit	Harbors Toxics TMDL Sediment Target (Indirect Effects)	Harbors Toxics TMDL Sediment Target (Direct Effects)
	pg/L	ng/g – dry wt					
Chlordane Compounds (EPA 1699)							
alpha-Chlordane	40	0.2	2	1	0.5	1.3 (Total Chlordane)	0.5 (Total Chlordane)
gamma-Chlordane	40	0.2	2	1	0.54		
Oxychlordane	40	0.2	1	1	NA		
trans-Nonachlor	40	0.2	2	1	4.6		
cis-Nonachlor	40	0.2	1	2	NA		
Other OC Pesticides (EPA 1699)							
2,4'-DDD	40	0.2	2	2	0.5	1.3 (Total DDT)	1.58 Total DDT)
2,4'-DDE	80	0.4	2	2	0.5		
2,4'-DDT	80	0.4	3	3	0.5		
4,4'-DDD	40	0.2	2	2	0.5		
4,4'-DDE	80	0.4	2	2	0.5		
4,4'-DDT	80	0.4	5	5	0.5		
Total DDT	80	0.4	---	---	0.5		
Total PCBs (EPA 1668)	5-20	0.025-0.1	0.2[3]	0.2	3.0	3.2	22.7

1. Water EDLs based upon 2 liters of water.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.
3. Harbor Toxics high resolution analytical methods include a target of 0.2 ng/g for all congeners except PCB-189 which has a target of 10 ng/g.

Table 8-13. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for PAHs.

Constituent	Water Detection Limit [1]	Equivalent Suspended Sediment Detection Limit [2]	Harbor Toxics Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009)Reporting Limit	Harbors Toxics TMDL Sediment Target (Direct Effects)
	pg/L	ng/g – dry wt				
Low Molecular Weight PAHs						
1-Methylnaphthalene	5	25	20	20	20	
1-Methylphenanthrene	5	25	20	20	20	
2-Methylnaphthalene	5	25	20	20	20	201
2,6-Dimethylnaphthalene	5	25	20	20	20	
Acenaphthene	5	25	20	20	20	
Anthracene	5	25	20	20	20	
Biphenyl	5	25	20	20	20	
Fluorene	5	25	20	20	20	
Phenanthrene	12.5	62.5	20	20	20	240
Naphthalene	12.5	62.5	20	20	20	
					LOW MOLECULAR WT PAHS	**552**
High Molecular Weight PAHs						
Benzo(a)anthracene	5	25	20	20	80	261
Benzo(a)pyrene	5	25	20	20	80	430
Benzo(e)pyrene	5	25	20	20	NA	
Chrysene	5	25	20	20	80	384
Dibenz(a,h)anthracene	5	25	20	20	80	260
Fluoranthene	5	25	20	20	80	
Perylene	5	25	20	20	80	
Pyrene	5	25	20	20	80	665
					HIGH MOLECULAR WT PAHS	**1700**
					TOTAL PAHs	**4700**

1. Water EDLs based upon 2 liter of water and CARB 429m. Detection limits are based upon a final extract of 500 µL. If the SSC is low, either an additional liter of water can be extracted to decrease the detection limit by 1/3 or the final extract volume can be reduced. Depending on sample characteristics, the extract volume can be reduced to as little as 50-100 µL which would drop EDLs by a factor of 0.1 to 0.2 times the listed EDLs.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.

Table 8-14. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Metals.

Constituent and Analytical Method	Water Detection Limit (ML)	Equivalent Suspended Sediment Detection Limit [1]	Harbor Toxics Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009) Reporting Limit	Harbors Toxics TMDL Sediment Target (Direct Effects)
	ug/L	µg/g – dry wt				
Total Metals						
Cadmium	0.25	2.5	0.01	0.01	0.09	1.2
Copper	0.50	5.0	0.01	0.01	52.8	34
Lead	0.50	5.0	0.01	0.01	25.0	46.7
Mercury	0.20	2.0	0.03	0.03	0.09	0.15
Zinc	1	10	0.1	0.1	60	150

1. Suspended Sediment EDLs based upon estimate of 100 mg/L suspended solids.

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Table 8-15. Interim Concentration-Based Sediment Waste Load Allocations.

Waterbody	Pollutant (µg/g – dry wt)					
	Copper	Lead	Zinc	DDT	PAHs	PCBs
Los Angeles River Estuary	53.0	**46.7**	183.5	0.254	4.36	0.683
San Pedro Bay Near/Off Shore Zones	76.9	66.6	263.1	0.057	**4.022**	0.193

BOLDED values indicate cases where the interim allocations are equal to the final allocations

9 Stormwater Outfall Monitoring

Four outfall monitoring sites (Figure 9-1) have been assessed and selected for monitoring within the LLAR Watershed Management Group in order to meet the requirements of the Order for stormwater outfall monitoring. Appendix A provides a summary of the selected sites and two alternative monitoring sites. These sites were selected to provide good spatial representation of the watershed in terms of HUC12 boundaries, jurisdictional boundaries and land uses within the WMG. The Dominguez Gap Pump Station (LLAR2) and the Firestone (LLAR4) stormwater outfall monitoring sites will be the first sites to be monitored. These will be followed by the Lynwood (LLAR3) outfall and the Cerritos Pump Station (LLAR1) outfalls that will be installed in the following year (Table 4-1). Detailed information on the monitoring equipment, field sampling procedures, protocol for cleaning all materials that come into contact with the water samples, and quality assurance/quality control procedures are provided in Appendices B through E.

Constituents monitored at each stormwater outfall monitoring site are outlined in Table 9-1 and include water body/pollutant priorities under Categories 1, 2 and 3. These include all constituents with established TMDLs, that are 303(d) listed or that have been found to exceed receiving water limitations on at least one occasion. Constituents monitored at each stormwater outfall monitoring site will include analytes measured at S10 with the exception of Aquatic Toxicity. Any constituents detected at levels of concern from Table E-2 will be considered for addition to monitoring requirements for the stormwater outfall sites after being detected twice during storm events monitored at S10.

Monitoring data will be reviewed annually to determine if adjustments to the water body/pollutant categories. Category 3 constituents will be considered for removal from the monitoring program if no exceedances are identified over a period of two consecutive years. Constituents currently classified as category 2 priorities will be considered for removal from the monitoring requirements when sufficient data are available to support delisting under the State's listing/delisting policy. Any adjustments to the monitoring requirements will be implemented during the subsequent monitoring year.

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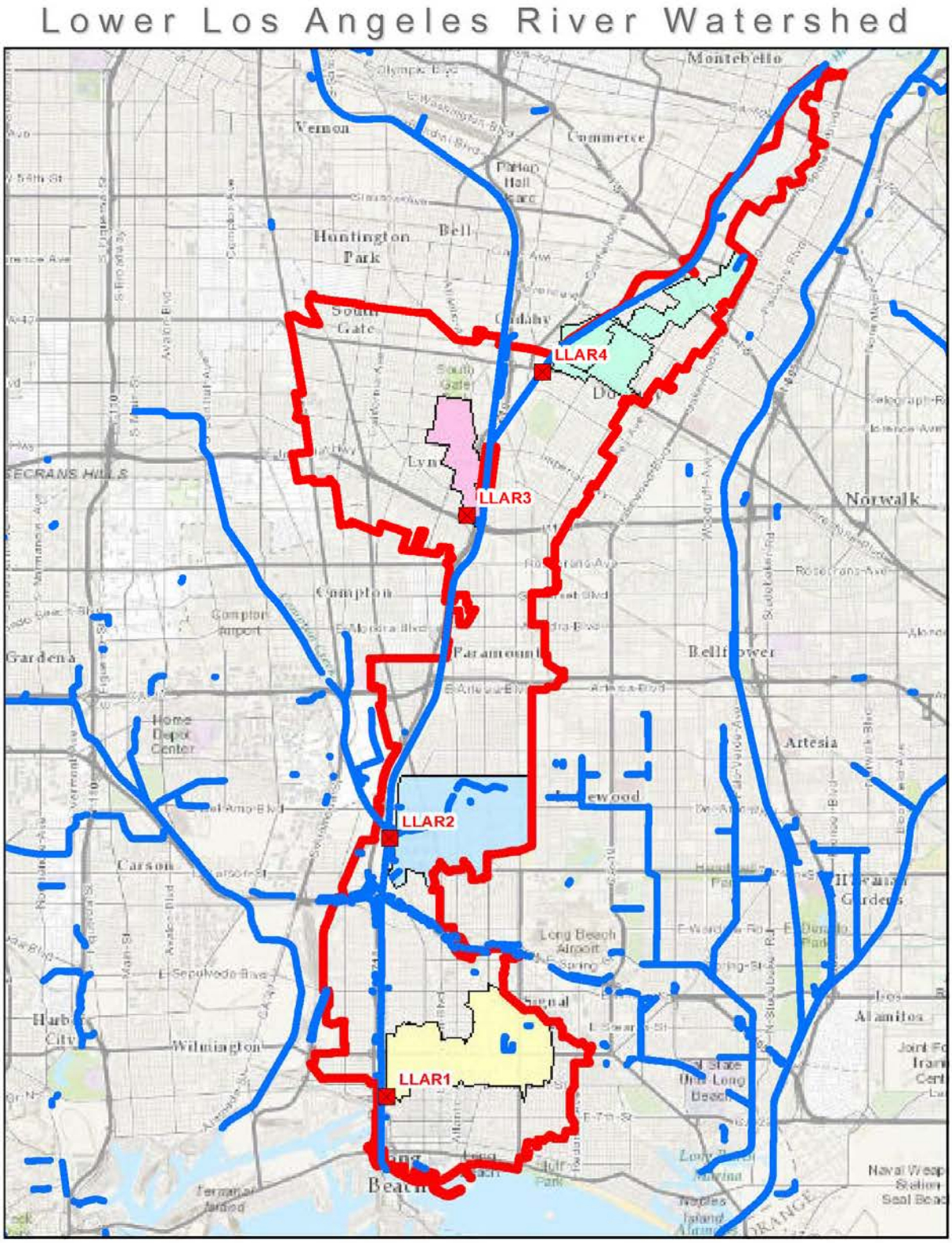


Figure 9-1. Locations of the Four Stormwater Outfall Monitoring Sites in the LLAR WMG.

Table 9-1. Summary of Constituents to be Monitored on a Regular Basis at Stormwater Outfall Monitoring Sites.

CLASS OF MEASUREMENTS	STORMWATER OUTFALL SITES Wet Only[2]			
	LAR1	LAR2	LAR3	LAR4
Flow	4	4	4	4
Field Measurements Dissolved oxygen, pH, temperature, and specific conductivity	4	4	4	4
General and Conventional Pollutants (Table 5-2) All except total phenols, turbidity, BOD_5, MTBE, and perchlorate, and fluoride.	4	4	4	4
Microbiological Constituents[3] (Table 5-3) *E. coli,* Total & Fecal Coliform, enterococcus *E. coli*	4[1] 4	4	4	4
Nutrients (Table 5-4) Nitrogen compounds only	3	3	3	3
Metals (Table 5-6) Al**,** Cd, Cu, Pb, Ni, Sb, Zn, Total Se & Hg	4	4	4	4
Semivolatile Organic Compounds (Table 5-8) Bis(2-ethlyhexylyphthalate	3	3	3	3

1. Analysis of all FIBs will only be included for LLAR1 that discharges directly to the Los Angeles River Estuary.
2. The fourth storm event is only for the purpose of fulfilling the TMDL requirements. Only metals, TSS, SSC, and hardness will be analyzed.
3. The wet and dry weather sampling frequency may change so long as one sample per month is collected in freshwater.

9.1 Sampling Frequency and Mobilization Requirements

The sampling frequency and mobilization requirements for Stormwater Outfall Monitoring sites will be consistent with monitoring conducted at the S10 (Wardlow) Receiving Water Monitoring Site. A total of three events will be monitored at each outfall site once they are installed. Monitoring will be concurrent with S10 monitoring in order to allow for comparison of pollutant loading rates associated with each segment relative to ultimate pollutant loads measured at the S10 site.

Stormwater monitoring at the Stormwater Outfall Monitoring Sites will be conducted by LLAR staff while monitoring at S10 will be performed by LACFCD staff. Monitoring will require coordination among both groups to increase the likelihood of sampling being conducted concurrently at both the ME site in receiving waters and at the stormwater outfalls. Although this may not always be possible due to equipment failures or other factors, concurrent sampling will enhance the ability to interpret the data.

Monitoring at the outfalls will therefore be restricted to the same wet weather definitions as used for the S10 mass emission station. These include:

- Wet Season defined as October 1 through April 15

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- Events preceded by less than 0.1 inches of rainfall within the watershed over a three day period.
- Rainfall of at least 0.25 inches and
- Maximum flow rates greater than 500 cfs measured at the Wardlow Road gaging station associated with the S10 mass emission monitoring site.

Because a significant storm event is based on predicted rainfall, it is recognized that this monitoring may be triggered without 0.25 inches of rainfall actually occurring. In this case, the monitoring event will still qualify as meeting this requirement provided that sufficient sample volume is collected to perform all required analyses. Documentation will be provided showing data used to determine that a storm event was expected to yield sufficient rain to be considered a significant storm event that justified mobilizing field crews and preparation of autosamplers for collection of water samples.

10 Non-Stormwater (NSW) Outfall Monitoring

Ultimately, the NSW program is intended to establish a process for identifying outfalls that serve as potential sources of contaminants. Sites where initial screening indicates the potential for discharges of a magnitude considered to have the potential to cause or contribute to exceedances of receiving water limitations will require further efforts to classify the discharges and determine appropriate actions, if any.

Detailed objectives of the screening and monitoring process (Section IX.A, page E-23 of the MRP) include the following:

1. Develop criteria or other means to ensure that all outfalls with significant non-stormwater discharges are identified and assessed during the term of this Order.
2. For outfalls determined to have significant non-stormwater flow, determine whether flows are the result of illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows, or from unknown sources.
3. Refer information related to identified IC/IDs to the IC/ID Elimination Program (Part VI.D.10 of the Order) for appropriate action.
4. Based on existing screening or monitoring data or other institutional knowledge, assess the impact of non-stormwater discharges (other than identified IC/IDs) on the receiving water.
5. Prioritize monitoring of outfalls considering the potential threat to the receiving water and applicable TMDL compliance schedules.
6. Conduct monitoring or assess existing monitoring data to determine the impact of non-stormwater discharges on the receiving water.
7. Conduct monitoring or other investigations to identify the source of pollutants in non-stormwater discharges.
8. Use results of the screening process to evaluate the conditionally exempt non-stormwater discharges identified in Parts III.A.2 and III.A.3 of the Order and take appropriate actions pursuant to Part III.A.4.d of the Order for those discharges that have been found to be a source of pollutants. Any future reclassification will occur per the conditions in Parts III.A.2 or III.A.6 of the Order.
9. Maximize the use of Permittee resources by integrating the screening and monitoring process into existing or planned CIMP efforts.

Specific methods given in the MRP will be followed. In cases where flow is determined to be significant, the program will take further action to determine if the flows are illicit, exempt, conditionally exempt, conditionally exempt but non-essential, or if the source(s) of the discharge cannot be identified (unknown). Illicit discharges require immediate action and, if they cannot be eliminated, monitoring will be implemented until such time that the illicit discharge can be

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eliminated. Discharges classified as conditionally exempt but non-essential or unknown also require ongoing monitoring.

The Lower Los Angeles River Watershed group will reassess non-stormwater outfall- based screening and monitoring once during the permit term, likely during the 2016-2017 period, and follow MRP methods for sampling of non-stormwater discharges.

The following sections summarize the elements of the program and processes to ultimately eliminate major sources of non-stormwater discharges.

10.1 Non-Stormwater Outfall Screening and Monitoring Program

The NSW Outfall Screening and Monitoring Program will begin with three screening surveys starting in the summer of 2014 to identify outfalls or other discharges that are considered to be significant and persistent sources of non-stormwater flow to either the open channels or receiving waters.

The initial survey will focus on completing an inventory of all outfalls to receiving waters. Outfalls greater than 12-inches in diameter (or equivalent) will be photographed and documented. Only major outfalls, including outfalls 12-inch-diameter or greater within industrial areas will be evaluated for significant flows. Regardless of land use, all outfalls, including those between 12 and 36 inches, will be screened. Information from all three screening surveys will be consolidated to assist in the identification and ranking of outfalls considered to have significant NSW discharges. Multiple lines of evidence will be considered when assessing the significance of a discharge. The relative magnitude of the discharges, persistence of the flow, visual and physical characteristics recorded at each site, and land uses associated with the drainage will be primary consideration for determination of significant flows.

A combination of field observations, flow measurements and field water quality measurements will be used to classify outfalls into one of the following three categories that will determine further actions (Figure 10-1):

1. **Suspect Discharge** – Outfalls with persistent high flows during at least two out of three visits and with high severity on one or more physical indicators (odors, oil deposits, etc.). Outfalls in this category require prioritization and further investigation.

2. **Potential Discharge** - Flowing or non-flowing outfalls with presence of two or more physical indicators. Outfalls in this category are considered to be low priority but will be continue to be monitored periodically to determine if the sites are subject to less frequent, discharges or determine if actions can be taken to reduce or eliminate the factors that lead to the site being considered a potential source of contaminants.

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3**. Unlikely Discharge** - Non-flowing outfalls with no physical indicators of an illicit discharge. Outfalls within this classification would be not be subject to any further screening.

Subsequent source investigations conducted for discharges with significant flow may utilize field water quality instrumentation and/or simple field test kits to assist in further classifying discharges. Collection of water samples for limited laboratory testing may be incorporated into the program as requirements for more complex, accurate and scientifically supportable data become necessary to characterize non-stormwater discharges and provide scientifically supportable data to track the source of these discharges. The Center for Watershed Protection and Pitt (2004) provide an evaluation of twelve analytes for assistance in determining the source of NSW discharges (Table 10-2). Three of the analytes can be measured with *in-situ* instrumentation. Others can be analyzed relatively inexpensively by use of field test kits or can be analyzed in an ELAP-certified laboratory. In addition, three to five of the listed tests are often considered sufficient to screen for illicit discharges. Ammonia, MBAS, fluoride (assuming tap water is fluorinated), and potassium are considered to confidently differentiate between sewage, wash water, tap water and industrial wastes. Incorporation of *in-situ* measurement of temperature, pH, TDS/salinity, turbidity and dissolved oxygen can further assist in characterizing and tracking the source(s) of an NSW discharge.

Table 10-1. Outline of the NSW Outfall Screening and Monitoring Program.

Element	Description	Timing of Completion
1. Outfall Screening	The Permittees will implement a screening process to determine which outfalls exhibit significant NSW discharges and those that do not require further investigation. Data will be recorded on Outfall Reconnaissance Investigation (ORI) forms and in the associated database (Appendix F).	Commencing in the summer of 2014 and completing by 2015.
2. Identification of outfalls with significant NSW discharge (Part IX.C of the MRP)	Data from the Outfall Screening process will be used to categorize MS4 outfalls on the basis of discharge flow rates, field water quality and physical observations.	Concurrent with Outfall Screening December 28, 2014 with Annual CIMP Report
3. Inventory of Outfalls with NSW discharge (Part IX.D of the MRP)	Develop an inventory of all major MS4 outfalls, identify outfalls with known NSW discharges and identify outfalls with no flow requiring no further assessment.	Concurrent with Outfall Screening December 28, 2014 with Annual CIMP Report
4. Prioritized source investigation (Part IX.E of the MRP)	Use the data collected during the Outfall Screening process to further prioritize outfalls for source investigations.	Prioritization for Source Investigation will be occur after completion of Outfall Screening
5. Identify sources of significant NSW discharges (Part IX.F of the MRP)	For outfalls exhibiting significant NSW discharges, Permittees will perform source investigations per the established prioritization.	Complete source investigations for 25% of the outfalls with significant NSW discharges by December 28, 2015 and 100% by December 28, 2017..
6. Monitoring NSW discharges exceeding criteria (Part IX.G of the MRP)	Monitor outfalls determined to convey significant NSW discharges comprised of either unknown or conditionally exempt non-essential discharges, or illicit discharges that cannot be abated.	Monitoring will commence within 90 days of completing the source investigations or after the Executive Officer approves this CIMP, whichever is later

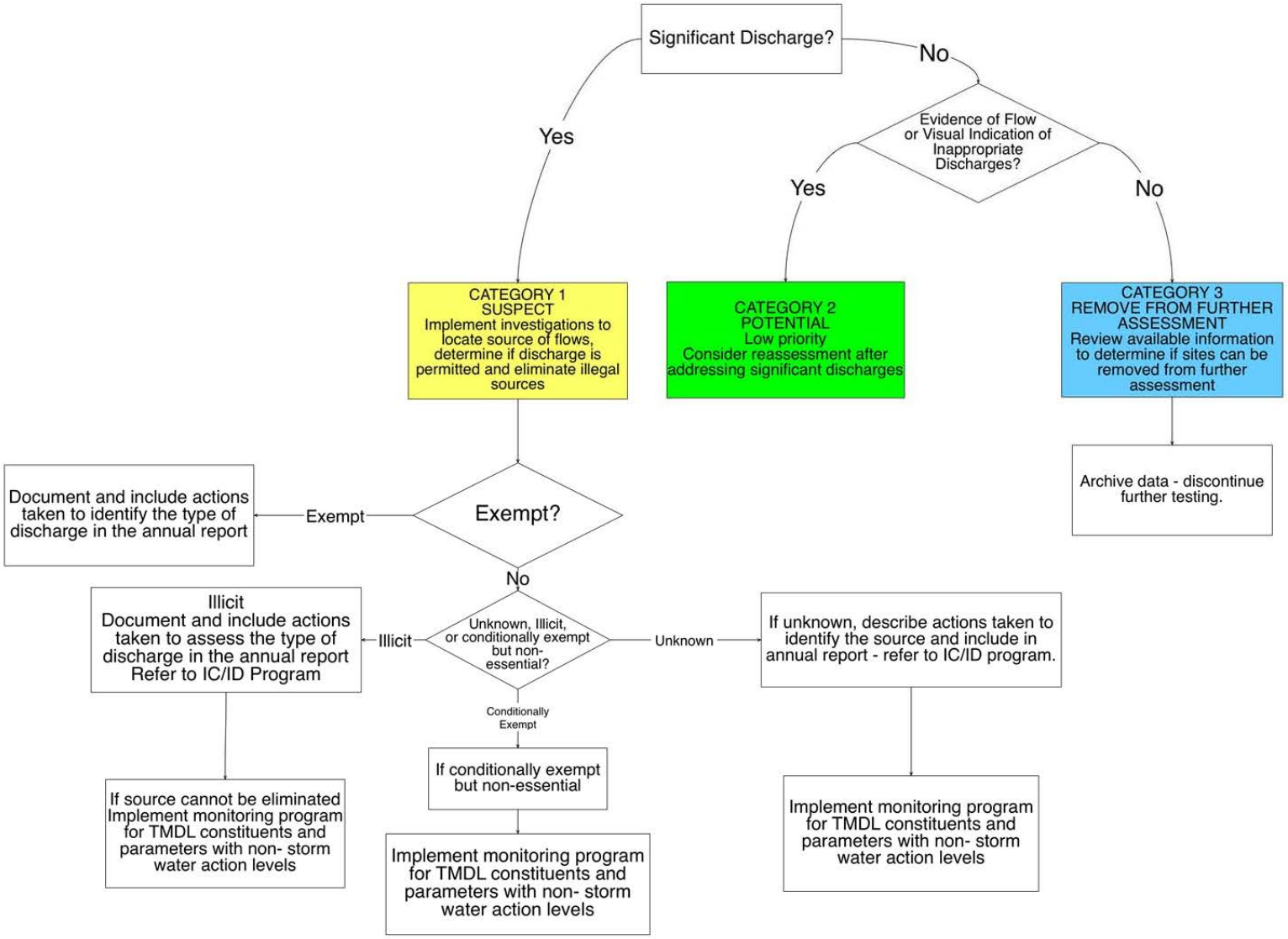


Figure 10-1. Flow Diagram of NSW Outfall Program after Classifying Outfalls during Initial Screening.

Table 10-2. Potential Indicator Parameters for Identification of Sources of NSW Discharges.

Indicator Parameters	
Ammonia	*E. coli*
Boron	Fluoride
Chlorine	Hardness
Color	pH - Field
Conductivity-Field	Potassium
Detergents – Surfactants (MBAS or fluorescence)	Turbidity

Based upon CWP and Pitt 2004. *Illicit Discharge Detection and Elimination A Guidance Manual for Program Development and Technical Assessments*

10.2 Identification of Outfalls with Significant Non-Stormwater Discharges

The screening program is necessary to collect information necessary to identify outfalls with potentially significant NSW discharges. The outfall screening includes collection of information necessary to provide an accurate inventory of the major outfalls, assess flow from each outfall and in the receiving waters, determine the general characteristics of the receiving waters (e.g. is flow present, does the flow from the outfall represent a large proportion of the flow, is it an earthen or lined channel), and record general observations indicative of possible illicit discharges. The initial screening survey(s) will also be used to refine the inventory information required in Section 10.3

The outfall screening process has already been initiated in order to meet the established schedule for completion of 25% of the source identification work. Once the screening process is completed Permittees are required to identify MS4 outfalls with "significant" NSW discharges. The MRP (Section IX.C.1) indicates that significant NSW discharges may be determined based upon one or more of the following characteristics:

a. Discharges from major outfalls subject to dry weather TMDLs.

b. Discharges for which existing monitoring data exceeds Non-Stormwater Action Levels (NALs) identified in Attachment G of the Order.

c. Non-stormwater discharges that have caused or have the potential to cause overtopping of downstream diversions.

d. Discharges exceeding a proposed threshold discharge rate as determined by the Permittee.

The relative magnitude of the discharges, persistence of the flow, visual and physical characteristics recorded at each site, and land uses associated with the drainage will be the primary factors used to determine if flows are significant. Characteristics of the receiving waters (flow, channel characteristics –hard or soft-bottom, etc.) at the discharge location will also be considered when determining the relative significance of NSW discharges. The most important consideration is whether the discharge has the potential to cause or contribute to exceedance of receiving water quality limitations. Factors that provide the best insight with respect to these impacts will receive the greatest weight when establishing the list of "significant" NSW discharges.

10.3 Inventory of MS4 Outfalls with Non-Stormwater Discharges

Part VII.A of the MRP requires that the CIMP plan(s) include a map(s) and/or database of the MS4 that includes the elements listed in Table 10-3. Most required elements are complete and being submitted with this CIMP. Elements requiring further development include the Effective Impervious Area, information on the length of open channels and underground pipes equal to or greater than 18 inches, and the drainage areas associated with each outfall. Subbasins used for the WMMS model are currently associated with each outfall within that subbasin. If an outfall is identified as a significant source of NSW discharges, drainage areas for each targeted outfall will be refined and updated in the database. Additional information such as documenting presence of significant NSW discharges, links to a database documenting water quality measurements at sites with significant NSW discharges will be updated annually and submitted with the CIMP annual report. The agencies of LLAR are committed to updating the inventory of outfalls with significant non-storm water discharges. Maps of existing stormwater outfalls are attached as Appendix H.

Table 10-3. Basic Database and Mapping Information for the Watershed.

Database Element	Status	
	Complete	Schedule
1. Surface water bodies within the Permittee(s) jurisdiction	**X**	
2. Sub-watershed (HUC 12) boundaries	**X**	
3. Land use overlay	**X**	
4. Effective Impervious Area (EIA) overlay (if available)		Will provide if available
5. Jurisdictional boundaries	**X**	
6. The location and length of all open channel and underground pipes 18 inches in diameter or greater (with the exception of catch basin connector pipes)	**X**[1]	
7. The location of all dry weather diversions	**X**	
8. The location of all major MS4 outfalls within the Permittee's jurisdictional boundary. Each major outfall shall be assigned an alphanumeric identifier, which must be noted on the map	**X**[2]	
9. Notation of outfalls with significant non-stormwater discharges (to be updated annually)	**X**	ongoing
10. Storm drain outfall catchment areas for each major outfall within the Permittee(s) jurisdiction	**X**[3]	ongoing
11. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:[4]		
a. Ownership	**X**	
b. Coordinates	**X**	
c. Physical description	**X**	
d. Photographs of the outfall, where possible to provide baseline information to track operation and maintenance needs over time	**X**	
e. Determination of whether the outfall conveys significant non-stormwater discharges		ongoing
f. Stormwater and non-stormwater monitoring data		ongoing

1. Locations are identified but the length of all open channel and underground pipes are not fully documented.
2. Attributes in the shapefile contain a Unique ID for all outfalls greater than 12" in diameter.
3. Catchments for each outfall are included as the area of the subbasins associated with each outfall. Several outfalls may drain these subbasins. Data will be developed as needed to resolve the drainage areas specific to each outfall.
4. Efforts are ongoing to define ownership and maintenance responsibility. As data become available, information regarding the conveyance of NSW and associated water quality data will be added to the database. Information will be updated based upon the three screening surveys.

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As a component of the inventory and screening process, Permittees are required to document the physical attributes of MS4 outfalls determined to have significant non-stormwater discharges. Table 10-4 summarizes the minimum physical attributes required to be recorded and linked to the outfall database. These data will be maintained using the Outfall Reconnaissance Inventory (ORI) field form and associated database (Appendix F) developed by CWP and Pitt (2004). Data entry can be accomplished by completing the ORI form while conducting the screening survey. Current forms are shown in the Appendix F but may be modified as the parameters and database are modified to provide different information more relevant to the NSW program. Maps of existing stormwater outfalls are attached in Appendix H.

Table 10-4. Minimum Physical Attributes Recorded during the Outfall Screening Process.

Database Element
a. Date and time of last visual observation or inspection
b. Outfall alpha-numeric identifier
c. Description of outfall structure including size (e.g., diameter and shape)
d. Description of receiving water at the point of discharge (e.g., natural, soft-bottom with armored sides, trapezoidal, concrete channel)
e. Latitude/longitude coordinates
f. Nearest street address
g. Parking, access, and safety considerations
h. Photographs of outfall condition
i. Photographs of significant non-stormwater discharge (or indicators of discharge) unless safety considerations preclude obtaining photographs
j. Estimation of discharge rate
k. All diversions either upstream or downstream of the outfall
l. Observations regarding discharge characteristics such as turbidity, odor, color, presence of debris, floatables, or characteristics that could aid in pollutant source identification
m. Observations regarding the receiving water such as flow, channel type, hard/soft bottom. (added minimum attribute.

10.4 Prioritized Source Identification

After completion of the initial reconnaissance survey and the two additional screening surveys, sites will be ranked based upon both initial flow observations from the reconnaissance inventory and the classifications assigned during each of the screening surveys. Source investigations will be scheduled to be conducted at sites categorized as Potential Illicit discharges.

The MRP (IX.E.1) states that prioritization of source investigations should be based upon the following items in order of importance.

a. Outfalls discharging directly to receiving waters with WQBELs or receiving water limitations in the TMDL provisions for which final compliance deadlines have passed.

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b. All major outfalls and other outfalls that discharge to a receiving water subject to a TMDL shall be prioritized according to TMDL compliance schedules.

c. Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the Action Levels identified in Attachment G of this Order.

d. All other major outfalls identified to have significant non-stormwater discharges.

Additional information from the screening process will be used to refine priorities. Sites with evidence of higher, more frequent flow, presence of odors or stains will be assigned higher priorities for source investigations.

10.5 Identify Source(s) of Significant Non-Stormwater Discharges

The screening and source identification component of the program is intended to identify the source or sources of contaminants contributing to an NSW discharge. The prioritized list of major outfalls with significant NSW discharges will be used to direct investigations starting with outfalls deemed to present the greatest risk to the receiving water body.

The Order requires the WMG to develop a source identification schedule based on the prioritized list of outfalls exhibiting significant NSW discharges. Source investigations will be conducted for no less than 25% of the outfalls in the inventory by December 2015 and 100% of the outfalls in the inventory by December 2017.

Part IX.A.2 of the MRP requires Permittees to classify the source investigation results into one of four endpoints: illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt non-stormwater flows, natural flows, or from unknown sources. If source investigations indicate the source is illicit or unknown, the Permittee will document actions to eliminate the discharge and implement monitoring if the discharge cannot be eliminated.

If the source of a discharge is found to be attributable to natural flows or authorized conditionally exempt NSW discharge, the Permittee must identify the basis for the determination (natural flows) and identify the NPDES permitted discharger. If the source is found to be a conditionally exempt but non-essential discharge, monitoring is required to determine whether the discharge should remain conditionally exempt or be prohibited.

Source investigations will be conducted using a variety of different approaches depending upon the initial screening results, land use within the area drained by the discharge point, and the availability of drainage maps. Any additional water quality sampling may be conducted as necessary.

- Tracking of dry weather flows from the location where they are first observed in an upstream direction along the conveyance system.
- Collection of additional water samples for analysis of NWS indicators for assistance in differentiating major categories of discharges such as tap water, groundwater, wash waters and industrial wastewaters.
- Compiling and reviewing available resources including past monitoring and investigation data, land use/MS4 maps, aerial photography, existing NPDES discharge permits and property ownership information.

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If source tracking efforts indicate that the discharge originates from a jurisdiction upstream of the boundaries of the LCC WMP, the appropriate jurisdiction and the Regional Board will be notified in writing of the discharge within 30 days of the determination. All existing information regarding documentation and characterization of the data, contribution determination efforts, and efforts taken to identify its source will be included.

Investigations will be concluded if authorized, natural, or essential conditionally exempt flows are found to be the source of the discharge. If the discharge is determined to be due to non-essential conditionally exempt, illicit, or unknown discharges, further investigations will be considered to assess whether the discharge can be eliminated. Alternatively, if the discharges are either non-essential conditionally exempt or of an unknown source, additional investigations may be conducted to demonstrate that it is not causing or contributing to receiving water impairments.

10.6 Monitor Non-Stormwater Discharges Exceeding Criteria

As required in the MRP (Part II.3.3), outfalls with significant NSW discharges that remain unaddressed after source identification will be monitored. The objectives of the non-stormwater outfall based monitoring program include the following:

a. Determine whether a Permittee's discharge is in compliance with applicable NSW WQBELs derived from TMDL WLAs,

b. Determine whether a Permittee's discharge exceeds NSW action levels, as described in Attachment G of the Order,

c. Determine whether a Permittee's discharge contributes to or causes an exceedance of receiving water limitations

d. Assist a Permittee in identifying illicit discharges as described in Part VI.D.10 of the Order.

After completion of source investigations, outfalls found to convey NSW discharges that could not be abated and were identified as illicit, conditionally exempt, but non-essential or unknown will be monitored. Monitoring will be initiated within 90 days of completing the source investigations or as soon as the first scheduled dry weather survey. Conducting NSW monitoring at the same time as receiving water dry weather monitoring will be more cost effective and allow evaluation of whether the NSW discharges are causing or contributing to any observed exceedances of water quality objectives in the receiving water.

Monitoring of NSW discharges is expected to undergo substantial changes from year to year as the result of ongoing actions taken to control or eliminate these discharges. As NSW discharges are addressed, monitoring of the discharges will no longer be required. In addition, if monitoring demonstrates that discharges do not exceed any WQBELs, non-stormwater action levels, or water quality standards for pollutants identified on the 303(d) list after the first year, monitoring of the pollutants meeting all receiving water limitations will be no longer be necessary. Due to potential frequent adjustments in the number and location of outfalls requiring monitoring and pollutants requiring monitoring, the annual CIMP report is expected to communicate adjustments in the

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number and locations of monitored discharges, pollutants being monitored and justifications for any adjustments.

10.7 Monitoring Parameters and Frequency

The MRP (Section IX.G.1) specifies the minimum parameters for monitoring of NSW discharges. Determination of monitoring parameters at each site requires consideration of a number of factors applicable to each site. Monitoring parameters will include:

a. Flow,

b. Pollutants assigned a WQBEL or receiving water limitation to implement TMDL Provisions for the respective receiving water, as identified in Attachments L - R of the Order,

c. Other pollutants identified on the CWA section 303(d) List for the receiving water or downstream receiving waters,

d. Pollutants identified in a TIE conducted in response to observed aquatic toxicity during dry weather at the nearest downstream receiving water monitoring station (LCC1) during the last sample event or, where the TIE conducted on the receiving water sample was inconclusive, aquatic toxicity. If the discharge exhibits aquatic toxicity, then a TIE shall be conducted.

e. Other parameters in Table E-2 identified as exceeding the lowest applicable water quality objective at LCC1 (the nearest downstream receiving water station) per Part VI.D.1.d.

The MRP (Part IX.G.2-4) specifies the following monitoring frequency for NSW outfall monitoring:

- For outfalls subject to a dry weather TMDL, the monitoring frequency shall be per the approved TMDL monitoring plan or as otherwise specified in the TMDL or as specified in an approved CIMP.
- For outfalls not subject to dry weather TMDLs, approximately quarterly for first year.
- Monitoring can be eliminated or reduced to twice per year, beginning in the second year of monitoring if pollutant concentrations measured during the first year do not exceed WQBELs, NALs or water quality standards for pollutants identified on the 303(d) List.

While a monitoring frequency of four times per year is specified in the Permit, it is inconsistent with the dry weather receiving water monitoring requirements. The receiving water monitoring requires two dry weather monitoring events per year. Additionally, during the term of the current Permit, outfalls are required to be screened at least once and those with significant NSW discharges will be subject to a source investigation. As a result, the LCC WMG recommends that NSW outfall monitoring events be conducted twice per year. The NSW outfall monitoring events will be coordinated with the dry weather receiving water monitoring events to provide better opportunities to determine if the NSW discharges are causing or contributing to any observed exceedances of water quality objectives in the receiving water.

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Any monitoring required will be performed using grab samples (refer to Appendix A for field sampling procedures) rather than automated samplers. Bacteria, which are expected to be the limiting factor at many sites during dry weather, require collection by grab methods and delivery to the laboratory within 6 hours. Based upon the much reduced variability experienced in measurements of dry weather flows associated with ongoing monitoring programs, measured concentrations of other analytes are not expected to vary significantly over a 24-hour period.

11 New Development/Re-Development Effectiveness Tracking

Each permittee will maintain an electronic database to track qualifying new development and redevelopment projects which are subject to the Planning and Land Development Program of the Permit (Section VI.D.7.d.iv). The electronic database contains the information listed in Table 11-1, which includes details about the project and the design of onsite and offsite best management practices (BMPs). Table 11-1 also provides a description of the required information.

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Table 11-1. Information Required in the New Development/Redevelopment Tracking Database.

	Required Information	Description
General Site Information	Project Name and Developer Name	Brief name of project and developer information (e.g. name, address, and phone number).
	Project Location and Map	Coordinates and map of the project location. The map should be linked to the GIS storm-drain map required in part VII.A of the Permit.
	Documentation of issuance of requirements to the developer	Date that the project developer was issued the Permit requirements for the project (e.g. conditions of approval).
	Date of Certificate of Occupancy	Date that the Certificate of Occupancy was issued.
On-site BMP Sizing Information	85th percentile storm event (inches per 24 hours)	85th percentile storm depth for the project location calculated using the *Analysis of 85th Percentile 24-hour Rainfall Depths Within the County of Los Angeles.*
	95th percentile storm event (inches per 24 hours)	95th percentile storm depth for the project location calculated using the *Analysis of 85th Percentile 24-hour Rainfall Depths Within the County of Los Angeles*. Only applies if the project drains directly to a natural drainage system[5] and is subject to hydromodification control measures.
	Project design storm (inches per 24 hours)	The design storm for each BMP as calculated using the *Analysis of 85th Percentile 24-hour Rainfall Depths Within the County of Los Angeles*.
	Projects design volume (gallons or MGD)	The design storm volume (design storm multiplied by tributary area and runoff coefficient) for each BMP.
	Percent of design storm volume to be retained on site	The percentage of the design volume which on-site BMPs will retain.
	Other design criteria required to meet hydromodification requirements for projects that directly drain to natural water bodies	Information relevant to determine if the project meets hydromodification requirements as described in the Permit e.g., peak flow and velocity in natural water body, peak flow from project area in mitigated and unmitigated condition, etc.). Only applies if the project drains directly to a natural drainage system.
	One -year, one-hour storm intensity as depicted on the most recently issued isohyetal map published by the Los Angeles County Hydrologist for flow-through BMPs	If flow-through BMPs (e.g., sand filters, media filters) for water quality are used at the project, provide the one-year, one-hour storm intensity at the project site from the most recent isohyetal map issued by LA County.
Off-site BMP Information	Location and maps of off-site mitigation, groundwater replenishment, or retrofit sites	If any off-site mitigation is used, provide locations and maps linked to the GIS storm-drain map required in part VII.A of the Permit.
	Design volume for water quality mitigation treatment BMPs	The calculated design volume, If water quality mitigation is required.
	Percent of design storm volume to be infiltrated at an off-site mitigation or groundwater replenishment project site	The percentage of the design volume which off-site mitigation or groundwater replenishment will retain.
	Percent of design storm volume to be retained or treated with biofiltration at an off-site retrofit project	The percentage of the design volume which off-site biofiltration will retain or treat.

[5] A natural drainage system is defined as a drainage system that has not been improved (e.g., channelized or armored). The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

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12 Reporting

Reporting will normally consist of Annual CIMP Reports and semi-annual data reports. Discharge Assessment Plans will be only submitted if TIEs are found to produce inconsistent results during two consecutive tests. These include the following reports:

Annual CIMP Reports

Annual CIMP monitoring reports are required to be submitted to the Regional Water Board Executive Officer by December 15th of each year in the form of three compact disks (CD) The annual reporting process is intended to meet the following objectives.

Summary information allowing the Regional Board to assess:

a. Each Permittee's participation in one or more Watershed Management Programs.
b. The impact of each Permittee(s) stormwater and non-stormwater discharges on the receiving water.
c. Each Permittee's compliance with receiving water limitations, numeric water quality-based effluent limitations, and non-stormwater action levels.
d. The effectiveness of each Permittee(s) control measures in reducing discharges of pollutants from the MS4 to receiving waters.
e. Whether the quality of MS4 discharges and the health of receiving waters is improving, staying the same, or declining as a result watershed management program efforts, and/or TMDL implementation measures, or other Minimum Control Measures.
f. Whether changes in water quality can be attributed to pollutant controls imposed on new development, re-development, or retrofit projects.

Data Submittals – CEDEN Files

Analytical data reports are required to be submitted on a semi-annual basis in formats consistent with CEDEN. These reports are required to be subject to verification and validation prior to submittal. They are to cover monitoring periods of July 1 through December 30 for the mid-year report and July 1- June 30 for the end of year report. These data reports should include verification of having be submitted and accepted through the SCWRPP Regional Data Center. These data reports should summarize:

- Exceedances of applicable WQBELs, receiving water limitations, or any available interim action levels or other aquatic toxicity thresholds.
- Basic information regarding sampling dates, locations, or other pertinent documentation.

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RB-AR13116

July 21, 2015

Permittees of the Lower Los Angeles River Watershed Management Group[1]

FINAL APPROVED LOWER LOS ANGELES RIVER WATERSHED MANAGEMENT PROGRAM (WMP), PURSUANT TO THE LOS ANGELES COUNTY MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT (NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175) AND THE CITY OF LONG BEACH MS4 PERMIT (NPDES PERMIT NO. CAS004003; ORDER NO. R4-2014-0024)

Dear Permittees of the Lower Los Angeles River Watershed Management Group:

On November 8, 2012, the California Regional Water Quality Control Board, Los Angeles Region (Los Angeles Water Board) adopted Order No. R4-2012-0175, *Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4* (hereafter, LA County MS4 Permit). On February 6, 2014, the Board adopted Order No. R4-2014-0024, *Waste Discharge Requirements for Municipal Separate Storm Sewer System Discharges from the City of Long Beach* (hereafter, Long Beach MS4 Permit). The LA County MS4 Permit and the Long Beach MS4 Permit allow Permittees the option to develop either a Watershed Management Program (WMP) or an Enhanced Watershed Management Program (EWMP) to implement permit requirements on a watershed scale through customized strategies, control measures, and best management practices (BMPs). Development of a WMP or EWMP is voluntary and allows a Permittee to address the highest watershed priorities, including complying with the requirements of Part V.A (Receiving Water Limitations), Part VI.E and Attachments L through R (Total Maximum Daily Load Provisions), by customizing the control measures in Parts III.A (Prohibitions – Non-Storm Water Discharges) and VI.D (Minimum Control Measures), except the Planning and Land Development Program[2].

On April 28, 2015, on behalf of the Los Angeles Water Board, I approved, with conditions, the Lower Los Angeles River (LLAR) Group's WMP. My approval letter directed the LLAR Group to

[1] Permittees of the Lower Los Angeles River Watershed Management Group include the Los Angeles County Flood Control District; and the cities of Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, and South Gate.

[2] The cited permit sections are from the LA County MS4 Permit. Equivalent requirements in the Long Beach MS4 Permit are as follows: Part VI.A (Receiving Water Limitations), Part VIII (Total Maximum Daily Load Provisions), Part IV.B (Prohibitions – Non-Storm Water Discharges), and Part VII.D-VII.M (Minimum Control Measures).

submit a final WMP that satisfies all the conditions listed in the letter no later than June 12, 2015. On June 12, 2015 the LLAR Group submitted its final WMP, as directed.

After review of the final LLAR WMP submitted on June 12, 2015, I have determined that the LLAR Group's WMP satisfies all of the conditions identified in my April 28, 2015 approval letter. The WMP dated June 12, 2015 hereby constitutes the final approved WMP for the LLAR Group.

The Los Angeles Water Board appreciates the participation and cooperation of the LLAR Group in the implementation of the LA County MS4 Permit and the Long Beach MS4 Permit. If you have any questions, please contact Ivar Ridgeway, Storm Water Permitting, at Ivar.Ridgeway@waterboards.ca.gov or by phone at (213) 620-2150.

Sincerely,

Samuel Unger

Samuel Unger, P.E.
Executive Officer

July 28, 2015

Permittees of the Lower Los Angeles River Watershed Management Group[1]
(See Distribution List)

FINAL APPROVED LOWER LOS ANGELES RIVER WATERSHED MANAGEMENT GROUP COORDINATED INTEGRATED MONITORING PROGRAM, PURSUANT TO ATTACHMENT E, PART IV.B OF THE LOS ANGELES COUNTY MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT (NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175) AND ATTACHMENT E, PART IV.B OF THE CITY OF LONG BEACH MS4 PERMIT (NPDES PERMIT NO. CAS004003; ORDER NO. R4-2014-0024)

Dear Permittees of the Lower Los Angeles River Watershed Management Group:

The Los Angeles Regional Water Quality Control Board (Los Angeles Water Board or Board) has reviewed the final monitoring program submitted on July 2, 2015 by the Lower Los Angeles River Watershed Management Group (Group). This monitoring program was submitted pursuant to the provisions of NPDES Permit No. CAS004001 (Order No. R4-2012-0175), which authorizes discharges from the municipal separate storm sewer system (MS4) operated by 86 municipal Permittees within Los Angeles County (hereafter, LA County MS4 Permit), and NPDES Permit No. CAS004003 (Order No. R4-2014-0024), which authorizes MS4 discharges from the MS4 operated by the City of Long Beach (hereafter, Long Beach MS4 Permit). Both MS4 permits allow Permittees the option to develop and implement a coordinated integrated monitoring program (CIMP) that achieves the five Primary Objectives set forth in Part II.A of Attachment E and includes the elements set forth in Part II.E of Attachment E[2]. These programs must be approved by the Executive Officer of the Los Angeles Water Board.

On June 18, 2015, on behalf of the Los Angeles Water Board, I approved, with conditions, the Group's CIMP. My approval letter directed the Group to submit a final CIMP that satisfies all the conditions listed in the letter no later than July 3, 2015. On July 2, 2015 the Group submitted its final CIMP, as directed.

[1] Permittees of the Lower Los Angeles River Watershed Management Group CIMP include the Los Angeles County Flood Control District; and the cities of Downey, Lakewood, Long Beach, Lynwood, Paramount, Pico Rivera, Signal Hill, and South Gate.

[2] Equivalent sections in the Long Beach MS4 Permit are Attachment E, Parts II.A and II.D, respectively.

After review of the Group's final CIMP submitted on July 2, 2015, I have determined that the Group's CIMP satisfies all of the conditions identified in my June 18, 2015 approval letter. The CIMP submitted on July 2, 2015 hereby constitutes the final approved CIMP for the Group. Additional direction on requirements for follow-up monitoring when aquatic toxicity is present in downstream receiving waters will be provided in separate correspondence, and must be followed as part of the Group's final approved CIMP.

The Los Angeles Water Board appreciates the participation and cooperation of the Group in the implementation of the LA County MS4 Permit. If you have any questions, please contact Mr. Chris Lopez of the Storm Water Permitting Unit by electronic mail at Chris.Lopez@waterboards.ca.gov or by phone at (213) 576-6674. Alternatively, you may also contact Mr. Ivar Ridgeway, Storm Water Permitting, at Ivar.Ridgeway@waterboards.ca.gov or by phone at (213) 620-2150.

Sincerely,

Samuel Unger

Samuel Unger, P.E.
Executive Officer

Enclosures: Lower Los Angeles River Watershed Management Group Distribution List

Lower Los Angeles River Watershed Management Group Distribution List

Name	City	Email Address
Jason Wen	Downey	JWen@downeyca.org
Konya Vivanti	Lakewood	kvivanti@lakewoodcity.org
Anthony Arevalo	Long Beach	Anthony.Arevalo@longbeach.gov
J. Arnoldo Beltran	Lynwood	abeltran@lynwood.ca.us
Sarah Ho	Paramount	sho@paramountcity.com
Gladis Deras	Pico Rivera	gderas@pico-rivera.org
Steve Myrter	Signal Hill	SteveMyrter@cityofsignalhill.org
Arturo Cervantes	South Gate	acervantes@sogate.org
Terri Grant	Los Angeles County Flood Control District	tgrant@dpw.lacounty.gov
Keith Jones	Caltrans	kjones@dot.ca.gov