CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2015-XXXX

NPDES PERMIT NO. CAS083526

FACT SHEET

CITY OF MODESTO
MUNICIPAL SEPARATE STORM SEWER SYSTEM
STANISLAUS COUNTY

I. PURPOSE

The Regional Water Quality Control Board, Central Valley Region (Regional Water Board) will be considering adoption of a renewal of the City of Modesto's Municipal Separate Storm Sewer System NPDES Permit. The purpose of this Fact Sheet is to provide the Discharger and interested parties an overview of the proposed permit and to provide the technical basis for the permit requirements. Sections I through IV describe water quality problems from storm water and urban runoff, and permit conditions designed to address these problems. Sections V and VI discuss each major element of the Discharger's Storm Water Management Plan (SWMP), that was adopted by the Regional Water Board and is considered and integral and enforceable component of the proposed permit.

The proposed permit specifies requirements necessary for the Discharger to reduce the discharge of pollutants in urban runoff to the maximum extent practicable (MEP). However, since compliance with the MEP standard is an iterative process, the Discharger's storm water program must continually be assessed and modified as urban runoff management knowledge increases, to incorporate improved programs, control measures, best management practices (BMPs), etc. in order to achieve the MEP standard. This continual assessment, revision, and improvement of storm water management program implementation is expected to achieve compliance with water quality standards.

II. THE NEED TO REGULATE STORM WATER DISCHARGES

A. Impacts

The quality of storm water and urban runoff are fundamentally important to the health of the environment and the quality of life in the Central Valley Region. Polluted storm water runoff is a leading cause of water quality impairment in the Modesto Area. Other potential sources of pollutants include aerial deposition and runoff from agricultural areas upstream of the Modesto Urbanized Area. Storm water and urban runoff (during dry and wet weather) are often polluted with pesticides, fertilizers, animal droppings,

trash, food wastes, automotive byproducts, and many other toxic substances generated by urban environments. Water that flows over streets, parking lots, construction sites, and industrial, commercial, residential, and municipal areas carries these pollutants through the storm drain systems directly into the receiving waters.

The Natural Resources Defense Council (NRDC) 1999 report, *Stormwater Strategies, Community Responses to Runoff Pollution*[1] identifies two main causes of the storm water pollution problem in urban areas. Both causes are directly related to development in urban and urbanizing areas:

1. Increased volume and velocity of surface runoff. There are three types of human-made impervious covers that increase the volume and velocity of runoff: (i) rooftop, (ii) transportation imperviousness, and (iii) non-porous (impervious) surfaces. As these impervious surfaces increase, infiltration will decrease, forcing more water to run off the surface, picking up speed and pollutants.

2. The concentration of pollutants in the runoff**.** Certain activities, such as those from industrial sites, are large contributors of pollutant concentrations to the storm water system.

The report also identified several activities causing storm water pollution from urban areas, practices of homeowners, businesses, and government agencies.

Studies conducted by United States Geological Survey (USGS)[2] confirm the link between urbanization and water quality impairments in urban watersheds due to contaminated storm water runoff. Furthermore, the water quality impacts of urbanization and urban storm water discharges have been summarized by several other recent U.S. EPA reports.[3] Urbanization causes changes in hydrology and increases pollutant loads, which adversely impact water quality and impairs the beneficial uses of receiving waters.

Increases in population density and imperviousness result in changes to stream hydrology including:

1. Increased peak discharges compared to predevelopment levels;

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[1] *Clean Water & Oceans: Water Pollution: In Depth Report Stormwater Strategies, Community Responses to Runoff Pollution*. Natural Resources Defense Council (NRDC), 1999.
[2] *Water Quality in the Puget Sound Basin, Washington and British Columbia, 1996-98,*Circular 1216 - USGS 2000; *Water Quality in the Long Island-New Jersey Coastal Drainages, New Jersey and New York, 1996-98,* Circular 1201 - USGS 2000
[3] *Storm Water Phase II Report to Congress* (U.S. EPA 1995); Report to Congress on the Phase II Storm Water Regulations (U.S. EPA1999); Coastal Zone Management Measures Guidance (U.S. EPA 1992)

2. Increased volume of storm water runoff with each storm compared to pre-development levels;
3. Decreased travel time to reach receiving water; increased frequency and severity of floods;

4. Reduced stream flow during prolonged periods of dry weather due to reduced levels of infiltration;

5. Increased runoff velocity during storms due to a combination of effects of higher discharge peaks, rapid time of concentration, and smoother hydraulic surfaces from channelization; and

6. Decreased infiltration and groundwater recharge.

B. **Benefits of Permit Program Implementation**

Implementation of Best Management Practices (BMPs) should also reduce pollutant discharges, and improve surface water quality. The expected benefits of implementing the provisions of the City of Modesto MS4 National Pollutant Discharge Elimination System (NPDES) permit include:

1. **Enhanced Aesthetic Value**: Storm water affects the appearance and quality of a water body, and the desirability of working, living, traveling, or owning property near that water body. Reducing storm water pollution will increase benefits as these water bodies recover and become more desirable.

2. **Enhanced Opportunities for Boating**: reducing sediment and other pollutants, and increasing water clarity, which enhances the boating experience for users, offer additional benefits.

3. **Enhanced Commercial Fishing**: Important because commercial fisheries are a significant part of the nation's economy, and 28% of estuaries in the 305 (b) Report were impacted by storm water/urban runoff.

4. **Enhanced Recreational and Subsistence Fishing**: Pollutants in storm water can eliminate or decrease the numbers, or size, of sport fish and shellfish in receiving waters.

5. **Reduced Flood Damage**: Storm water runoff controls may mitigate flood damage by addressing problems due to the diversion of runoff, insufficient storage capacity, and reduced channel capacity from sedimentation.

6. **Reduced Illness from Consuming Contaminated Fish**: Storm water controls may reduce the presence of pathogens in fish caught by

commercial or recreational anglers.

7. **Reduced Illness from Swimming in Contaminated Water**: Epidemiological studies indicate that swimmers in water contaminated by storm water runoff are more likely to experience illness than those who swim farther away from a storm water outfall.

8. **Enhanced Opportunities for Non-contact Recreation**: Storm water controls reduce turbidity, odors, floating trash, and other pollutants, which then allow waters to be used as focal point for recreation, and enhance the experience of the users.

9. **Drinking Water Benefits**: Pollutants from storm water runoff, such as solids, toxic pollutants, and bacteria may pose additional costs for treatment, or render the water unusable for drinking.

10. **Water Storage Benefits**: Storm water is a major source of impairment for reservoirs. The heavy load of solids deposited by storm water runoff can lead to rapid sedimentation of reservoirs and the loss of needed water storage capacity.[4]

III. STATUTORY AND REGULATORY HISTORY AND OTHER CONSIDERATIONS OF THE STORM WATER PROGRAM

A. Basis for Permit Conditions

In the 15 years following the introduction of the Clean Water Act in 1972, water pollution control efforts have focused primarily on certain process wastewater discharges from facilities such as factories and sewage treatment plants, with less emphasis on diffuse sources. The federal Clean Water Act (CWA) prohibit the discharge of any pollutant to waters from a point source, unless a NPDES permit authorizes the discharge. Because the focus on reducing pollutants was centered on industrial and sewage treatment discharges, the U.S. Congress amended the CWA in 1987, requiring the U.S. EPA to create phased NPDES requirements for storm water discharges.

In response to the 1987 Amendments to the CWA, the U.S. EPA developed Phase I of the NPDES Storm Water Program in 1990. Phase I requires NPDES permits for storm water discharges from: (i) "medium" and "large" MS4s generally serving, or located in incorporated places or counties with, populations of 100,000 or more people; and (ii) eleven categories of industrial activity (including construction activity that disturbs five acres or greater of land).

[4] *Report to Congress on Phase II Storm Water Regulations*. U.S. EPA, Office of Water. EPA-833-R-99-001, Oct. 1999.

Phase II, adopted in December 2000 and became effective in March 2003, requires operators of small MS4s and small construction sites (construction activity disturbing greater than or equal to 1 acre or if part of a larger common plan of development or sale) in urban areas to control storm water runoff discharges.

B. Statutory Basis for Permit Conditions

The intent of the permit conditions is to meet the statutory mandate of the CWA. The conditions established by this permit are based on Section 402(p)(3)(B) of the CWA which mandates that a permit for discharges from MS4s must: (1) effectively prohibit the discharges of non-storm water to the MS4; and (2) require controls to reduce pollutants in discharges from MS4 to the maximum extent practicable (MEP) including best management practices, control techniques, and system design and engineering methods, and such other provisions determined to be appropriate. Compliance with water quality standards is to be achieved over time, through an iterative approach requiring improved BMPs.

The permit requires the implementation of a comprehensive SWMP through a selection of BMPs [see 40 Code of Federal Regulations (CFR) 122.44(k)] as the mechanism to achieving the reduction of pollutants in storm water to the maximum extent practicable (MEP) [see CWA. § 402(p)(3)(B)(iii)].

C. Regulatory Basis for Permit Conditions

As a result of the statutory requirements of the CWA, the U.S. EPA promulgated the MS4 Permit application regulations set forth in 40 CFR 122.26(d). These federal regulations described in detail the permit application requirements for MS4s operators. The information in the Report of Waste Discharge (ROWD)[5] was utilized to develop the permit conditions and determine the Discharger's status in relationship to these conditions.

Portions of the City include agricultural, rural and open space land uses. It is not the intent of the federal storm water regulations to regulate storm water discharges from land uses of these types. Therefore, these areas are exempt from the requirements of this Order.

D. Discharge Limitations

No numeric effluent limitations are proposed at this time. In accordance with 40 CFR 122.44(k), the U.S. EPA has required a series of increasingly more

[5] City of Modesto, National Pollutant Discharge Elimination System, Municipal Stormwater Program, *Report of Waste Discharge & Proposed Stormwater Management Plan*, April 2007, Larry Walker Associates.

effective BMPs[6], in the form of a comprehensive SWMP and performance standards, in lieu of numeric limitations.[7]

The State Water Resources Control Board (SWRCB) convened a Storm Water Panel (Blue Ribbon Panel) of experts to address the issue of numeric effluent limits.[8] The study, finalized in June 2006, also concludes that it is not feasible at this time to set enforceable numeric effluent limits for storm water and non-storm water discharges from MS4s.

E. Permitting Approach

The 1987 amendments to the Clean Water Act required municipalities to apply for MS4 permits that would reduce the pollutants in discharges to the maximum extent practicable. EPA Phase I Final Rule and Regulations then established the regulations for NPDES permit application requirements. EPA discussed how the language of CWA section 402(p)(3) contemplated fundamentally different characteristics of many municipalities and that municipalities would have permits tailored to meet particular geographical, hydrological, and climatic conditions. EPA continued to discuss that if MS4 permit conditions required storm water management programs to be developed and implemented, the program elements were enforceable in accordance with the terms of the permit. EPA further pointed out that the permit goal for MS4 discharges is to avoid inflexibility in the types and levels of control. EPA stated that if mandatory requirements were appropriate, these requirements should be established under the authority of Section 402(p)(6), which addresses permit application requirements.

The SWMP is required as part of the application pursuant to 40 CFR 122.26(2)(d)(iv); therefore it is an integral and enforceable component of the MS4 permit. In addition, the California Superior Court ruled, *"Because the Stormwater Management Plan is incorporated and is deemed an integral part of the Permits…any changes to the Plan are actually changes to the Permits. Because these are changes to the Permits, the notice and comment requirements must be complied with."* (*San Francisco Baykeeper vs. Regional Water Quality Control Board, San Francisco Bay Region,* Consolidated Case No. 500527, California Superior Court, 14 November 2003).

F. Policy

The State Water Resources Control Board adopted Resolution 68-16 ("Statement of Policy with Respect to Maintaining High Quality of Waters in

[6] *Interpretative Policy Memorandum on Reapplication Requirements* of MS4s issued by U.S. EPA (61 Fed. Reg. 41697)
[7] *Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits* (61 Fed. Reg. 43761)
[8] Recommendations of the Blue Ribbon Panel were finalized as *The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities,* dated 19 June 2006.

California") (Antidegradation Policy), which requires the Regional Water Board to assure maintenance of the high quality of waters of the State unless the Regional Water Board makes certain findings. Under this policy, water quality degradation may be allowed if the following conditions are met: 1) any change in water quality must be consistent with maximum benefit to people of the State; 2) will not unreasonably affect present and anticipated beneficial uses; 3) will not result in water quality less than prescribed in the Basin Plan; and 4) the discharge is required to meet waste discharge requirements, discharges that result in the best practicable treatment or control necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the state will be maintained.

An antidegradation analysis was submitted in October 2007[9]. The water quality impacts presented in the analysis show that storm water runoff emanating from new urban development projected to occur in the Modesto Urbanized Area during the next five years will generally produce minor changes in loadings and concentrations of the five pollutants evaluated. The pollutants evaluated include: Copper, Diazinon, *E. Coli*, total dissolved solids (TDS) and total suspended solids (TSS). Constituents selected for evaluation include those identified by the Discharger as pollutants of concern (POC) in the Report of Waste Discharge[10], constituents for which the Regional Water Board is developing Total Maximum Daily Loads (TMDLs), or constituents considered particularly relevant to the water quality of the Lower Tuolumne River which is a tributary to the San Joaquin River and Delta. The list of POCs identified in the ROWD was narrowed to this subset because surrogates (copper for aluminum, iron, and lead and E. Coli for fecal coliform) are assumed to be representative of pollutant loadings.

The section of the analysis entitled "Assessment of Stormwater Program and SWMP"[11] provides an assessment of the Storm Water Management Program. The program elements include new development standards that were developed and implemented during the last permit term. This Order requires the implementation of the development standards (*Guidance Manual for Development Stormwater Quality Control Measures*,[12] as part of the SWMP, which states that all new urban development and significant redevelopment projects are subject to the source control measures, runoff reduction control measures, and treatment control measures. Site design and site-specific source controls are generally the most effective means to

[9] City of Modesto, *Antidegradation Analysis*-Stormwater Management Program, October 2007, Larry Walker and Associates.
[10] City of Modesto, National Pollutant Discharge Elimination System, Municipal Stormwater Program, *Report of Waste Discharge & Proposed Stormwater Management Plan*, April 2007, Larry Walker Associates.
[11] City of Modesto, *Antidegradation Analysis*-Stormwater Management Program, October 2007, Larry Walker and Associates.
[12] City of Modesto, *Guidance Manual for Development Stormwater Quality Control Measures, 2011, approved by the Regional Water Board on 31 May 2013 (Resolution No. R5-2013-0079)*

control urban runoff pollution because they minimize the need for treatment and are required for all applicable projects. Treatment controls are required in addition to source controls to minimize the discharge of pollutants to the storm water conveyance system.

The Water Quality Impacts Assessment Methodology, found in the antidegradation analysis section entitled *"Assessment of Water Quality Impacts",* includes rainfall-runoff mass balance model that estimates a reduction in pollutants by the conversion of agricultural land use to new urban development. The model shows that the estimated pollutant loading attributable to new urban development show both increases and decreases depending on the constituent. The constituent-by-constituent evaluation of modeled impacts due to new urban development is presented in the "*Stormwater Discharge Quality"* section. The analysis reports that the estimated pollutant reductions for existing and new development range from 5% to 10%, with the exception of reductions assumed for diazinon. Diazinon has been phased out of both urban and agricultural use, but a conservative estimate of 75% rather than 100% pollutant reduction was chosen to account for stockpiling and continued allowable use of products containing the pesticide. The percent reductions shown in Table 14[13] reflect a very conservative estimate for pollutant reduction due to implementation of Storm Water Management Plan best management practices. Additionally, implementation of best management practices (primarily, extended detention basins) for new urban development, along with elements of low impact development, such as onsite infiltration, are expected to further reduce pollutant concentrations and flows attributable to new urban development runoff. Specific elements of the Discharger's Storm Water Management Plan are discussed in the section of the analysis entitled *"Assessment of Stormwater Program and SWMP"* and outlined in Appendix B.

Based on the antidegradation analysis: 1) some degradation for a limited number of constituents is consistent with the maximum benefit to the people of the state; 2) the activity is necessary to accommodate important economic or social development in the area; 3) resulting water quality is adequate to fully protect and maintain existing beneficial uses; and 4) the discharge will not cause measurable changes in the receiving waters to fall below applicable water quality objectives.

The analysis included an examination of: 1) existing applicable water quality standards; 2) ambient conditions in receiving waters compared to standards; 3) incremental changes in constituent loading, both concentration and mass; 4) treatability and levels of treatment or controls to be used and whether increased treatment is proposed to offset any increased volume or mass of discharge; 5) reduction of the discharge of pollutants from the urban areas to

[13] *Antidegradation Analysis,* page 36.

the maximum extent practicable (MEP); 6) comparison of the proposed increased volume or mass of pollutants relative to the volume or mass of pollutants that existed when the current permit was adopted; 7) an assessment of the significance of changes in ambient water quality compared to historic conditions; and 8) an analysis of alternatives to the discharge and treatment or control methods that would reduce water quality impacts.

The discharge from continued urban development will result in some minimal degradation of waters of the state and navigable waters of the United States, but in this case, such degradation is consistent with the maximum benefit to the people of the state. Limited degradation that does not cause exceedance of water quality objectives is warranted to allow for the economic benefit stemming from local growth. There is also a need in Modesto to accommodate growth. The Regional Water Board does not have the jurisdiction to control growth in the City of Modesto, but is required to assure that the receiving waters are adequately protected as a result of urban discharges. The proposed Order allows storm water utility service necessary to accommodate housing and economic expansion in the area, and is considered to be a benefit to the people of the State. Compliance with these requirements will result in the reduction of discharge pollutants from the urban areas to the MEP. Reducing pollutants in the discharge to MEP will result in an insignificant impact on existing water quality.

IV. BACKGROUND- CITY OF MODESTO MS4

A. City of Modesto MS4 Permit History

The City of Modesto (hereafter City) is defined as a medium municipality (serving between 100,000 and 250,000 people) in the Code of Federal Regulations (CFR). As such, the City must obtain an NPDES municipal storm water permit. The City is currently regulated by Waste Discharge Requirements Order No. R5-2008-0092, NPDES No. CAS083526, adopted on 12 June 2008 by the Regional Water Board.

The Discharger's SWMP was adopted by the Regional Water Board on 10 December 2009 (Resolution No. R5-2009-0119). On 14 December 2013, the City submitted a ROWD with proposed amendments to the SWMP that contained a program effectiveness evaluation to the Regional Water Board requesting permit re-issuance.

<u>City of Modesto Statistics</u>

The Environmental Services Section of the Utilities Department administers the City's Storm Water Program. The Storm Water Program is funded from an enterprise fund established by City Council resolution. In 2001, the City passed Resolution No. 2001-433, which established sewer service charges and storm drainage surcharges. The following is a list of these fees:

1. Storm Sewer Fees: Non-residential properties are based on intensity of development and parcel lot size. Residential plots are charged based on lot size. A typical commercial storm drainage surcharge for a property size of 20,000 square feet is $37.73/month. The current residential charge is $3.23/month for a property lot between 3,501 and 7,000 square feet.

2. Connection Fees: There are no storm drainage connection fees.

3. Population: The population of Modesto is approximately 204,933 based on 2013 U.S. Census Bureau estimates.

4. Grants/Loans: The City of Modesto does not receive grant/loan funds for the operation of the storm water program.

B. Storm Drain System

The City of Modesto is located in Stanislaus County at the confluence of Dry Creek and the Tuolumne River (tributaries of the San Joaquin River). The storm drain system has approximately 77 miles of storm drain lines and 25 storm pump stations within the City. Storm water discharges from the City drain to 24 drainage basins, approximately 12 major outfalls (greater than 24" in diameter) to receiving waters (Tuolumne River or Dry Creek), Modesto Irrigation District (MID) laterals/drains, or rock wells (approximately 10,500).[14]

Surface water discharges occur generally in the older areas of the City or those areas immediately adjacent to the Tuolumne River, Dry Creek or irrigation canals. Forty percent of storm water discharges to detention/retention basins, twenty percent to receiving waters (Tuolumne River or Dry Creek), ten percent direct to MID laterals/drains, and thirty percent to rock wells.[15]

C. Storm Water Discharge to Shallow Groundwater

The Discharger uses approximately 10,500 wells, which represents approximately thirty percent of the city, to dispose of storm water. These disposal wells are lined with rock for structural safety and additional treatment. The wells are known as "rock wells."

The rock wells pose a potential threat to the shallow groundwater. In its third permit term, the Discharger was required to address this threat through a monitoring program, new development program, public education and

[14] Draft Storm Drainage Master Plan, City of Modesto, 2008.
[15] Draft Storm Drainage Master Plan, City of Modesto, 2008

outreach program and through the illicit discharges program element. An Assessment Plan was submitted in Feburary 2003 to address the rock well assessment and a subsequent assessment was submitted July 2012. Monitoring of the groundwater was conducted to evaluate the effectiveness of BMPs and the impact of the discharge on shallow groundwater. The assessment program is complex and additional investigation is necessary to address pollution concerns. These Waste Discharge Requirements address this threat by requiring the Discharger to continue to implement rock well monitoring and shallow groundwater monitoring as outlined in the attached Provisions.

D. **Total Maximum Daily Loads (TMDLs)**

In compliance with the current second permit term requirements, the Discharger submitted a Pesticide Plan. The proposed Order requires the Discharger to continue or initiate implementation of control programs for pollutants that have been identified to cause or contribute to exceedances of water quality standards and potential impairment of beneficial uses. The proposed permit requires the Discharger to begin sampling for Sediment Toxicity for pesticides (e.g., pyrethroids). The proposed permit requires continued sampling, implementation of BMPs, and assessment of the effectiveness of the BMPs to ensure that they are performing to the MEP.

The Regional Water Board is currently in the process of developing TMDLs for listed water bodies within the Region. The proposed Order includes: Provisions consistent with the TMDL waste load allocations, the need to develop TMDLs for impaired waterbodies, and the Basin Plan implementation program. Prior to TMDL's being adopted and approved, the Discharger should implement actions and/or assessments to address water quality impairments. Once the Regional Water Board and U.S. EPA approve TMDLs, the proposed Order may be reopened to incorporate provisions to be consistent with waste load allocations established under the TMDLs.

The Regional Water Board considers storm water discharges from the Modesto Urbanized Area to be significant sources of pollutants.

The 2010 CWA Section 303(d) Listed Waterbodies in the Modesto urbanized area include the following.

Waterbody	Reach	Estimated Size affected	Pollutant/Stressor(s)
San Joaquin River	Tuolumne River to Stanislaus River	8.4 miles	Chlorpyrifos DDT Electrical Conductivity Escherichia coli (E. coli)

Waterbody	Reach	Estimated Size affected	Pollutant/Stressor(s)
			Group A Pesticides Mercury Diazinon Chlorpyrifos Temperature, water Unknown Toxicity
San Joaquin River	Stanislaus River to Delta Boundary	3 miles	Chlorpyrifos DDE DDT Diuron Electrical Conductivity Escherichia coli (E. coli) Group A Pesticides Mercury Temperature, water Toxaphene Unknown Toxicity
Tuolumne River, Lower	Don Pedro Reservoir to San Joaquin River	60 miles	Chlorpyrifos Diazinon Group A Pesticides Mercury Temperature, water Unknown Toxicity
Dry Creek	tributary to Tuolumne River at Modesto, E. Stanislaus County	34 miles	Chlorpyrifos Diazinon Escherichia coli (E. coli) Unknown toxicity

These impairments are based on identified exceedances of water quality standards.

The Basin Plan includes control programs for electrical conductivity, chlorpyrifos, and diazinon in the San Joaquin River. These control programs include the TMDL waste load allocations applicable to this discharger. This Order is consistent with the Basin Plan.

The California Water Code allows the Regional Water Board to require dischargers submit technical and monitoring reports where the burden of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. The Regional Water Board may require the monitoring and technical reports that are identified specifically in this Order or in a separate Order under authority of the California Water Code.

V. **STORM** WATER MANAGEMENT PROGRAM ELEMENTS

Federal regulations (40 CFR 122.26(d)(2)(iv)) provide that, "*A proposed management program covers the duration of the permit. It shall include a*

comprehensive planning process which involves public participation and where necessary intergovernmental coordination, to reduce the discharge of pollutants to the maximum extent practicable using management practices, control techniques and system, design and engineering methods, and such other provisions which are appropriate. The program shall also include a description of staff and equipment available to implement the program."

The Discharger submitted a ROWD and proposed amendments to the SWMP describing the framework for management of storm water discharges during the term of this permit. The SWMP provides the goals and objectives, legal authorities, source identification process, funding sources, best management practices (BMPs) evaluation and improvement process, approach for effectiveness assessments of the programs, and a monitoring plan. The overall goals of the Discharger's SWMP are to a) Identify and control those pollutants in urban runoff that pose significant threats to the waters of the State and waters of the U.S. and their beneficial uses; b) comply with the federal regulations to eliminate or control, to MEP, the discharge of pollutants from urban runoff associated with the storm drain system; c) Achieve compliance with water quality standards; d) develop a cost-effective program which focuses on pollution prevention of urban storm water; e) seek cost effective alternative solutions where prevention is not a practical solution for significant problems; and f) coordinate implementation of control measures with other agencies. The SWMP and modifications or revisions to the SWMP that are approved are an integral and enforceable component of the proposed permit.

The SWMP includes the following major program components:

- Program Management (legal and fiscal)
- SWMP Development
  - Construction Element
  - Commercial/Industrial Business Element
  - Municipal Operations and Facilities Element
  - Illicit Connection and Illegal Discharge Elimination Element
  - Public Outreach Element
  - Planning and New Development Element
  - Performance and Effectiveness Evaluations
- Monitoring Program
- Water Quality Based Programs
- Special Studies

Some of these program elements and the corresponding order requirements under those elements are discussed below.

A. **Program Management**

The Order requires submission of an Annual Work Plan by 1 April of each year. The Annual Work Plan provides proposed activities for the Discharger's program and SWMP for the upcoming year beginning 1 July of the current

year and ending 30 June the following year. The Order also requires submission of an Annual Report by 1 September of each year. The Annual Report documents the status of the SWMP and the Discharger's activities during the previous fiscal year, including the results of a qualitative and quantitative field level assessment of activities implemented by the Dischargers, and the performance of tasks contained in the SWMP. The Annual Report includes a compilation of deliverables and milestones completed during the previous 12-month period, as described in the SWMP and Annual Work Plan.

B. Construction Program

Legal Authority

Federal regulations [40 CFR 122.26(d)(2)(iv)(D)] provide that a proposed management program must include "*a description of a program to implement and maintain structural and non-structural best management practices to reduce pollutants in storm water runoff from construction sites to the municipal storm sewer system*."

Background

As stated in the *California Storm Water Best Management Practice Handbook for Construction Activity* (BMP Handbook), "Construction usually increases the amount of impervious area causing more of the rainfall to run off, and increasing the speed at which runoff occurs. Unless properly managed, this increased runoff will erode natural and/or unprotected watercourses causing the watercourse to widen…Sedimentation can also contribute to accelerated filling of reservoirs, harbors, and drainage systems."[16]

C. Industrial and Commercial Program

Legal Authority

Federal regulations [40 CFR 122.26(d)(2)(iv)(C)] require the following, "*A description of a program to monitor and control pollutants in storm water discharges to municipal systems from municipal landfills, hazardous waste*

[16] *California Storm Water Best Management Practice Handbook for Construction Activity*

treatment, disposal and recovery facilities, industrial facilities that are subject to section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), and industrial facilities that the municipal permit applicant determines are contributing a substantial pollutant loading to the municipal storm sewer system."

The program shall:

1. Identify priorities and procedures for inspections and establishing and implementing control measures for such discharges;

2. Describe a monitoring program for storm water discharges associated with industrial facilities…"

Background

The municipality is ultimately responsible for discharges from the MS4. Because industrial awareness of the program may not be complete, there may be facilities within the MS4 area that should be permitted but are not (non-filers). The Phase I regulations requirement for industries to obtain permit coverage for storm water discharges is largely based on Standard Industrial Classification Code. This has been shown to be incomplete in identifying industries (which include commercial businesses) that may be significant sources of storm water pollution. In addition, the permitting authority may not have adequate resources to provide the necessary oversight of permitted facilities. Therefore, it is in the municipality's best interest to assess the specific situation and implement an industrial/ commercial inspection and enforcement program to control the contribution of pollutants to the MS4 from all these potential sources.

In the preamble to the 1990 regulations, the U.S. EPA clearly states the intended strategy for discharges of storm water associated with industrial activity:

"Municipal operators of large and medium municipal separate storm sewer systems are responsible for obtaining system-wide or area permits for their system's discharges. These permits are expected to require that controls be placed on storm water discharges associated with industrial activity which discharge through the municipal system." The U.S. EPA also notes in the preamble *"municipalities will be required to meet the terms of their permits related to industrial dischargers*."

Similarly, in the U.S. EPA's Guidance Manual[17] (Chapter 3.0), it is specified that MS4 applicants must demonstrate that they possess adequate legal authority to:

- Control construction site and other industrial discharges to MS4s;
- Prohibit illicit discharges and control spills and dumping;
- Carry out inspection, surveillance, and monitoring procedures.

The document goes on to explain that *"control"*, in this context means not only to require disclosure of information, but also to *limit, discourage, or terminate* a storm water discharge to the MS4. Further, to satisfy its permit conditions, a municipality may need to impose additional requirements on discharges from permitted industrial facilities, as well as discharges from industrial facilities and construction sites *not* required to obtain permits.

In the same Guidance Manual[18] (Chapter 6.3.3), it is stated that the municipality is ultimately responsible for discharges from their MS4. Consequently, the MS4 applicant must describe how the municipality will help the U.S. EPA and authorized NPDES States to:

- Identify priority industries discharging to their systems;
- Review and evaluate storm water pollution prevention plans (SWPPPs) and other procedures that industrial facilities must develop under general or individual permits;
- Establish and implement BMPs to reduce pollutants from these industrial facilities (or require industry to implement them); and
- Inspect and monitor industrial facilities discharging storm water to the municipal systems to ensure these facilities are in compliance with their NPDES storm water permit, if required.

Discussion

Recognizing that the municipality is ultimately responsible for the quality of storm water discharges from the MS4, the municipalities are required to evaluate the industrial/commercial facilities and determine their compliance with the permit requirements, as well as their contribution to the MS4 and potential impacts to the receiving waters. The proposed permit requires the Discharger to maintain existing ordinances/standards/specifications if they do not provide sufficient legal authority to implement the Industrial and Commercial Program components as required by the regulations.

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[17] *Guidance Manual For the Preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems* - U.S. EPA -November 1992
[18] *Id.*

Integration of NPDES Program for MS4 with NPDES Program for Industrial Activities

Recognizing the dual coverage envisioned by the federal regulations[19], and suggested partnership between local and State authorities, this Order requires the Discharger to coordinate with State activities for the implementation of the General Industrial Activities Storm Water Permit (General Industrial Permit). The goal is to control industrial sources and other sources not specifically covered under Phase I storm water regulations but identified as significant contributors of pollutants by the municipalities through their identification and prioritization studies. The net result should be a better and improved coordinated program with greater impact on limiting and eliminating (as a final goal) the contribution of pollutants to the receiving water while maintaining and/or restoring the capacity of the receiving water to sustain the beneficial uses without impairments.

Based on the dual coverage and partnership approach between the permitting authority and municipalities that the U.S. EPA envisioned in the storm water regulations[20,21], and in order to best use limited resources at the State and local levels, the proposed permit requires the Discharger to:
(i) Control the storm water discharges associated with industrial activities and other commercial facilities identified as significant contributors of pollutants; and (ii) Assist the Regional Water Board in implementing the general permit for industrial activities. This approach is consistent with the nationwide approach used by the U.S. EPA in issuing MS4 permits.[22] The education and outreach should be continued under the auspices of the Public Education program.

The strategy, as outlined in the draft permit, builds on the State/ municipality's partnership by focusing their limited resources on the following activities:

- The Discharger will take a lead role in inspecting restaurants, automotive service facilities, retail gasoline outlets, and industrial facilities not covered by the General Industrial Permit;

- The Regional Water Board will be the lead agency for inspections of facilities covered or in need of coverage under General Industrial Permit;

[19] Federal Register Vol. 55, No 222, pp. 48000; U.S. EPA Storm Water Phase II Compliance Assistance Guide, 2000, pp. 4-32 and 5-11, where it clarifies the dual responsibility
[20] Letter dated December 19, 2000, from Alexis Strauss, Director, Water Division, U.S. EPA Region IX, to Dennis Dickerson, Executive Officer, Regional Water Quality Control Board-Los Angeles Region.
[21] Letter dated April 30, 2001, from Alexis Strauss, Director, Water Division, U.S. EPA Region IX, to Honorable Stephen Horn, U.S. House of Representatives
[22] MS4 NPDES Permits issued to Palm Beach County, Broward County, Sarasota County, Florida, Tulsa, Oklahoma, Denver, Colorado.

- The Discharger will assist the Regional Water Board in its activities to fully enforce the General Industrial Permit through spot check inspections, referrals, data information research, joint inspections; and

- The Regional Water Board and Discharger will coordinate their information systems and task scheduling to avoid duplication and strengthen their inspections activities.

D. Municipal Operations Program

Legal Authority

Federal regulations [40 CFR 122.26(d)(2)(iv)(A)(1,3,4,5, and 6)] require that the Discharger must develop a program to reduce the discharge of pollutants from the MS4 to the maximum extent practicable for all urban land uses and activities, including municipal areas and activities.

Background

Many dischargers provide services that ultimately result in the enhancement of the lives of the residents. Some examples of services include the prevention of sanitary sewer overflows; implementation of standard protocols for storage, usage, and disposal of pesticides, herbicides and fertilizers; conducting street sweeping activities; and annually determine the effectiveness of these services and identify necessary modifications to improve services.

The Discharger is required to continue to implement a Municipal Program in its SWMP to effectively prohibit non-storm water discharges and prevent or reduce pollutants in runoff from all municipal land use areas, facilities, and activities to the MEP.

E. Illicit Connection/Illegal Discharge Program

Legal Authority

Federal regulations [40 CFR 122.26(d)(2)(iv)(B)] state that a proposed management program shall be based on a description of a program, including a schedule, to detect and remove (or require the discharger to the municipal storm sewer to obtain a separate NPDES permit for) illicit discharges and improper disposal into the storm sewer. It states further that a Discharger must include in its proposed management program, a program, including inspections, to implement and enforce an ordinance, orders or similar means

to prevent illicit discharges to the municipal storm sewer system.

Background

During dry weather, much of the discharge to storm drain systems consists of non-storm water sources. A significant amount of such discharges may be from illicit discharges or connections, or both. Illicit discharges may occur either through direct connections, such as deliberate or mistaken piping, or through indirect connections, such as dumping, spillage, subsurface infiltration, and washdown.

The Discharger is required to continue to implement an Illicit Discharge Detection and Elimination Program component of the SWMP to actively seek and eliminate illicit discharges and connections to the MEP.

F. **Public Outreach Public Education Program (Collectively Public Outreach Program)**

Legal Authority

Federal regulations [40 CFR 122.26(d)(2)(iv)(A)(6)] provide that the proposed management program include, “A description of a program to reduce to the maximum extent practicable, pollutants in discharges from municipal separate storm sewer system associated with the application of pesticides, herbicides, and fertilizer which will include, as appropriate, controls such as educational activities, permits, certifications, and other measures for commercial applicators and distributors, and controls for application in public right-of-ways and at municipal facilities.” These regulations [40 CFR 122.26(d)(2)(iv)(B)(6)] also provide that the proposed management program include, “A description of education activities, public information activities, and other appropriate activities to facilitate the proper management and disposal of used oil and toxic materials.”

To satisfy the Public Outreach Program, the Discharger needs to (i) Implement a public education program to distribute educational materials to the community, or conduct equivalent outreach activities about the impacts of storm water discharges on local water bodies and the steps that can be taken to reduce storm water pollution; and (ii) Determine the appropriate BMPs and measurable goals for this minimum control measure.

Background

Implementation of a Public Outreach Program is a critical BMP and a necessary component of a storm water management program. The State Board Technical Advisory Committee “recognizes that education with an emphasis on pollution prevention is the fundamental basis for solving nonpoint source pollution problems.” The U.S. EPA Phase II Fact Sheet 2.3 finds that “An informed and knowledgeable community is critical to the

success of a storm water management program since it helps insure the following: (i) greater support for the program as the public gains a greater understanding of the reasons why it is necessary and important, and (ii) greater compliance with the program as the public becomes aware of the personal responsibilities expected of them and others in the community, including the individual actions they can take to protect or improve the quality of area waters."[23]

Furthermore, the public can provide valuable input and assistance to a municipal storm water management program and should play an active role in the development and implementation of the program. An active and involved community is essential to the success of a storm water management program.

Discussion of Requirements

Based on the background information, the Discharger should continue their educational storm water and urban runoff outreach programs. According to the U.S. EPA, materials and activities should be relevant to local situations and issues, and incorporate a variety of strategies to ensure maximum coverage.[24] To help address local situations and sources of specific pollutants, the Public Outreach Program requires specific programs for targeted communities, for example, ethnic groups, retail gasoline outlets (RGOs), and restaurants, that may not be reached by or understand existing storm water educational materials. In an effort to reach these groups the Public Outreach Program must require the development of a strategy to provide outreach information including bilingual materials to target ethnic communities. The U.S. EPA encourages partnerships and cooperation.[25] The proposed permit requires coordination between the Discharger and other MS4 Dischargers. This requirement will ensure that the Discharger is apprised of the most efficient and effective program. It is generally more cost-effective to have numerous operators coordinate to use an existing program than all developing their own local programs. Furthermore, directing materials or outreach programs toward specific groups of commercial, industrial, and institutional entities likely to have significant storm water impacts is recommended.[26] The next step in this targeted outreach program is education of specific businesses to facilitate employee compliance. Therefore, the permit requires implementation of a business outreach program to educate management and employees at prioritized businesses about storm water regulations. Also, a non-regulatory business assistance program would encourage small businesses that lack access to the expertise

[23] *Storm Water Phase II Final Rule - Public Education and Outreach Minimum Control Measure.* U.S. EPA Fact Sheet 2.3, January 2000 (Revised December 2005).
[24] *Ibid.*
[25] *Ibid.*
[26] *ibid.*

necessary to comply with storm water regulations and to implement pollution prevention measures. The business assistance program is not a requirement, however, its implementation is encouraged.

Program Performance Measures

The Discharger shall implement a Public Outreach Program using all media as appropriate to (1) measurably increase the knowledge of target communities regarding MS4s, impacts of urban runoff on receiving waters, and potential BMP solutions for the target audience; and (2) to change the behavior of target communities and thereby reduce pollutant releases to MS4s and the environment.

The Discharger will be required to continue to implement the Public Outreach Component of its SWMP to educate the public and encourage their participation in the implementation of the SWMP to the MEP. In addition, the Discharger will be required to continue to incorporate a mechanism for **public participation** in the implementation of the SWMP (i.e., programs that engage the public in cleaning up creeks, removal of litter in river embankments, stenciling of storm drains, etc.).

G. Water Quality-Based Programs

Section 303(d)(1)(A) of the CWA requires that "Each state shall identify those waters within its boundaries for which the effluent limitations…are not stringent enough to implement any water quality standard (WQS) applicable to such waters." A TMDL is a quantitative assessment of the total pollutant load that can be discharged from all sources each day while still meeting water quality objectives. The CWA also requires states to establish a priority ranking of impaired waterbodies known as Water Quality Limited Segments and to establish Total Maximum Daily Loads (TMDLs) for such waters. This priority list of impaired waterbodies is called the Section 303(d) List. The current Section 303(d) List was approved by the SWRCB on 25 October 2010. The City of Modesto's discharge of storm water into an impaired water body will be subject to load allocations and implementation plans established under the TMDLs.

As discussed previously under Section D. "TMDLs," the Modesto Urbanized Area has listed impaired water bodies pursuant to Section 303(d) of the CWA.

H. Planning and Land Development Program

Legal Authority

Federal regulations (40 CFR 122.26) require that pollutants in storm water be reduced to MEP. The U.S. EPA's definition is intentionally broad to provide

maximum flexibility in MS4 permitting and to give municipalities the opportunity to optimize pollutant reductions on a program-to-program basis.[27] The definition of MEP has generally been applied to mean implementation of economically achievable management practices. Because storm water runoff rates can vary from storm to storm, the statistical probabilities of rainfall or runoff events become economically significant and are central to the control of pollutants through cost effective BMPs. Further, it is recommended that storm water BMPs be designed to manage both flows and water quality for best performance.[28] It is equally important that treatment BMPs, once implemented, be routinely maintained.

Background

On a national level, the U.S. EPA is planning to standardize minimum BMP design and performance criteria for post-construction BMPs, and will likely build from the experience of effective state and local programs to establish national criteria.[29] The U.S. EPA, based on the NURP, supports the first half-inch of rainfall as generating first flush runoff.[30] First flush runoff is associated with the highest pollutant concentrations, and not pollutant load. The U.S. EPA considers the first flush treatment method, the rainfall volume method, and the runoff capture volume method as common approaches for sizing of water quality BMPs.

On 5 October 2000, the State Water Board adopted Order WQ 2000-11[31] concerning the use of Standard Urban Storm Water Mitigation Plans (SUSMPs) in municipal storm water permits for new developments and significant redevelopments by the private sector. The precedent setting decision largely sustained the LA Regional Water Board SUSMPs. The State Board amended the SUSMP to limit its application to discretionary projects as defined by CEQA, eliminated the category for projects in environmentally sensitive areas, and set aside the requirement for retail gasoline outlets to treat storm water until a threshold is developed in the future. In addition, the State Water Board articulated its support for regional solutions and the mitigation banking. The State Water Board recognized that the decision includes significant legal or policy determinations that are likely to recur (Gov. Code §11425.60). Due to the precedent setting nature of Order WQ 2000-11, the proposed permit must be consistent with applicable portions of the State Water Board's decision and include SUSMPs, which the proposed

[27] *Storm Water Phase II Final Rule* – Pre-Federal Register Version, p 87 (U.S. EPA 1999). See U.S. EPA's discussion in response to challenges that the definition is sufficiently vague to be deemed adequate notice for purposes of compliance with the regulation.
[28] *Urban Runoff Pollution – Summary Thoughts* – The State of Practice Today and For the 21st Century. Wat. Sci. Tech. 39(2) pp. 353-360. L.A. Roesner (1999)
[29] *Storm Water Phase II Final Rule* – 64 Fed. Reg. 68759. See U.S. EPA's discussion on construction and post-construction BMP requirements for Phase II.
[30] *A Watershed Approach to Urban Runoff: Handbook for Decisionmakers*, Terrene Institute and U.S. EPA Region 5 (1996). See discussion on sizing rules for water quality purposes, p 36.
[31] *State Water Board Order WQ 2000-11*: SUSMP; Memorandum from Chief Counsel to Regional Board Executive Officers, (December 26, 2000) discusses statewide policy implications of the decision.

permit refers to as Development Standards.

Discussion of Requirements

This component of the Phase I program requires the discharger update and continue to implement the Planning and Land Development Component of its SWMP to minimize the short and long-term impacts on receiving water quality from new development and redevelopment.

New/Revised Development Standards - Impacts from New Development

Treatment control BMP requirements on new development and redevelopment offer the most cost-effective strategy to reduce pollutant loads to surface waters. Retrofit of existing development will be expensive and may be considered on a targeted basis. Studies on the economic impacts of watershed protection indicate that storm water quality management has a positive or at least neutral economic effect while greatly improving the quality of surface waters.[32]

Financing the MS4 program offers a considerable challenge for municipalities. A proven successful financing mechanism is the establishment of a storm water utility.[33] Utility fees, which are assessed on the property owner based on some estimate of storm water runoff generated for the site, are a predictable and dedicated source of funds. Utility fees can also provide a mechanism to provide incentives to commercial and industrial property owners to reduce impervious surface areas. Such incentives offer flexibility to property owners to choose the better economic option – paying more fees or making improvements to reduce runoff from the site.

Low Impact Development (LID) and Hydromodification

Further revisions of the Discharger's Development Standards will not be required under this permit. The Discharger has been required to update their Development Standards under previous permits. Most recently, the Discharger revised their Development Standards (also known as the *Guidance Manual for New Development Stormwater Quality Control Measures*) which was approved by the Regional Water Board on 31 May 2013 (Resolution No. R5-2013-0079).The Discharger is required to maintain applicable ordinances/standards/specifications consistent with the most recent revision of the Development Standards.

[32] *The Economics of Watershed Protection*, T. Schueler (1999), Center for Watershed Protection, Endicott, MD. The article summarizes nationwide studies to support the statement that watershed planning and storm water management provides positive economic benefits.
[33] *Preliminary Data Summary of Urban Storm Water Best Management Practices* (1999), Report No. U.S. EPA-821-R-99-012, U.S. EPA. The document reviews municipal financing mechanisms and summarizes experience in the U.S. to date.

VI. MONITORING PROGRAM

Legal Authority

Federal regulations (40 CFR 122.26 (d) (2)) require the following: (1) quantitative data from representative outfalls designated by the permitting authority, which shall designate between five and ten outfalls or field screening points as representative of the commercial, residential, and industrial land use activities of the drainage area contributing to the MS4; (2) estimates of the annual pollutant load of the cumulative discharges to waters of the United States from all identified municipal outfalls and the event mean concentration of the cumulative discharges for constituents of concern; (3) estimated reductions in loadings of pollutants from discharges of municipal storm sewer constituents from municipal storm sewer systems expected as the result of SWMP implementation; and (4) the Discharger to submit an annual report that identifies, among other things, water quality improvements or degradation.

Using data collected from a monitoring program, storm water management efforts can be prioritized, helping limited resources be most effective in improving receiving water quality. For example, a monitoring program can provide data that can allow for specific receiving waters and watersheds to be targeted for urban runoff management and education efforts based on their need. Particular pollutants and their sources can also be identified and targeted using monitoring data. In addition, monitoring data can be useful in assessing the effectiveness of an urban runoff management program. Successful efforts that have resulted in receiving water quality improvements can be analyzed for application elsewhere, while areas that need greater efforts can also be identified. In general, a comprehensive monitoring program can supply a wealth of data that can be used in a wide range of applications for improving water quality.

The Modesto storm drainage system is unique since only twenty percent of the city area drains directly to surface waters (positive storm drain system). The other eighty percent of the city area drains into detention/retention basins, MID laterals/drains and rock wells. The positive storm drain system covers approximately 6,650 acres of the urban area with 33-percent draining to the Tuolumne River (0.9 percent of the Tuolumne River's total drainage area at that location), 54-percent to Dry Creek, and 13-percent to Modesto Irrigation Canals (MID Canals).

At a minimum, in order to meet the above referenced objectives, the Discharger shall conduct the following monitoring:

(a) Urban Discharge Monitoring;
(b) Receiving Water Monitoring;
(c) Urban and Water Column Toxicity Monitoring;
(d) Dry Weather Characterization;
(e) Sediment Toxicity Monitoring;

(f) Bioassessment Monitoring;
(g) Targeted Pollutant Reduction Program;
(h) Rock Well and Groundwater Monitoring; and
(i) Peak Discharge Impact Study.

A. **Urban Discharge Monitoring**

Based on the land usage, the Discharger has identified the following two locations for monitoring:

Scenic Drive - receives runoff from the Sonoma neighborhood, an entirely residential neighborhood.

Bodem Street - receives runoff from the McHenry Avenue Corridor, a mixed residential/commercial land use.

The Discharger monitored the same stations during the prior permit term. Using the same location will allow the Discharger to maintain consistency and compare the data obtained during the previous discharge monitoring studies. The Discharger shall monitor storm water discharges for every year during the five-year term of the permit starting with the 2008/09 wet season. The proposed monitoring will allow Modesto to continue to characterize storm water discharges and track water quality constituent levels.

If additional sample station locations are needed, they shall be established under the direction of Regional Water Board staff, and a description of the location shall be attached to this MRP. Sample collection and analysis shall follow standard EPA protocol. Each year, samples shall be collected **during two storm events** and **once during the dry season.**

B. **Receiving Water Monitoring**

Regional Monitoring Program

The Regional Water Board requires individual Permittees and Permittee groups to conduct local water quality monitoring. The purpose of this local water quality monitoring is to provide information regarding the impacts of discharges on local receiving waters, and on the extant condition of those waterbodies. However, the equivalent funds spent on current local water quality monitoring efforts could be used more efficiently and productively to better characterize the spatial and temporal distribution of contaminants and physical conditions of Central Valley waterbodies on a regional scale or other regional water quality issues, if those funds were used for a coordinated monitoring effort, rather than continue to be used in individual, uncoordinated local water quality monitoring programs. Regional Monitoring Programs

(RMPs), such as the Delta RMP,[34] provide data to better inform management and policy decisions regarding Central Valley region waterbodies.

With this Order, the Regional Water Board is authorizing Permittees that elect to participate in a RMP to reduce some of the local water quality monitoring required in the Monitoring and Reporting Program (MRP) and related monitoring described in the SWMP. If the Permittee elects to reduce local water quality monitoring and participate in a RMP, the Permittee shall submit a letter signed by an authorized representative to the Executive Officer informing the Board that the Permittee will participate in a RMP and the date on which local water quality monitoring, would be modified. To ensure consistency with this Order and the MRP, reductions in local water quality monitoring require the Executive Officer's prior written approval as well as RMP Steering Committee action on a forthcoming Regional Monitoring Program monitoring plan.

RMP data is not intended to be used directly to represent receiving water quality for purposes of determining if a discharge is causing or contributing to an exceedance of any applicable water quality standards. RMP monitoring stations are established generally as "integrator sites" to evaluate the combined impacts on water quality of multiple discharges into Central Valley region waterbodies; RMP monitoring stations would not normally be able to identify the source of any specific constituent, but would be used to identify water quality issues needing further evaluation. RMP monitoring data may be used to help establish receiving water quality for a water quality data analysis after evaluation of the applicability of the data for that purpose. In general, monitoring data from samples collected in the immediate vicinity of the discharge will be given greater weight in permitting decisions than receiving water monitoring data collected at greater distances from the discharge point. RMP data, as with all environmental monitoring data, can provide an assessment of water quality at a specific location and time that can be used in conjunction with other information, such as other receiving water monitoring data, spatial and temporal distribution and trends of receiving water data, point and non-point source discharges, receiving water flow rate and velocity, and to determine potential source or sources of a constituent that contributed to an exceedance of any applicable water quality standards.

If the Permittee participates in a RMP and reduce some local water quality monitoring, the Permittees shall continue to participate in the RMP until such time as the Permittees inform the Regional Water Board that participation in the RMP will cease and all local water quality monitoring is reinstituted. Some monitoring under Provisions II, Monitoring and Reporting Program, is not required under this Order so long as the Permittee adequately support the RMP. Participation in the RMP by a Permittee shall consist of providing funds

[34] Specific information regarding the Delta RMP is available at http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/index.shtml.

and/or in-kind services to a RMP at least equivalent to discontinued local water quality monitoring efforts. If the Permittees fail to maintain adequate participation in a RMP, as determined through criteria to be developed by an RMP, the RMP will recommend to the Regional Water Board that a local water quality monitoring program be reinstated for that Permittee.

Data from a RMP may be utilized to characterize the receiving water in the permit renewal. The Permittee may, however, conduct any site-specific monitoring deemed appropriate by the Permittee and submit that monitoring data to the Regional Water Board provided the modified monitoring program approved by the Executive Officer is conducted at a minimum. Historic receiving water monitoring data taken by the Permittees and from other sources may also be evaluated to determine whether or not that data is representative of current receiving water conditions. If found to be representative of current conditions, then that historic data may be used in characterizing receiving water quality.

Receiving water monitoring shall be conducted on Dry Creek and the Tuolumne River every year of the permit term. The purpose of receiving water monitoring will be to develop baseline water quality data on the receiving water and to assess any impacts from Modesto's urban runoff on the beneficial uses of the receiving water. Receiving water monitoring shall include water chemistry monitoring and bio-assessment monitoring.
The receiving water chemistry monitoring will be performed in the Tuolumne River and Dry Creek, the two major water bodies, which receive Modesto's urban runoff. Monitoring shall be conducted at two sites (upstream and downstream) for each receiving water location. If additional sample station locations are needed, they shall be established under the direction of Regional Water Board staff, and a description of the location shall be attached to the Monitoring and Reporting Program. Sample collection and analysis shall follow standard EPA protocol. Receiving water monitoring shall be conducted **during two storm events and once during the dry season**.

At a minimum the discharger will monitor the constituents listed in Table 1 as part of the discharge monitoring and the receiving water monitoring. However, additional constituents may be added to the list if new water quality issues develop over the course of this permit term.

C. Urban and Water Column Toxicity Monitoring

Toxicity testing is used to assess the impact of storm water pollutants on the overall quality of aquatic systems.[35] It can be a very useful tool for storm water managers. The Center for Watershed Protection rated toxicity testing as a "very useful" indicator for assessing municipal storm water programs.

[35] Center for Watershed Protection, Environmental Indicators to Assess Stormwater Control Programs and Practices (1996).

Toxicity testing can also be used to evaluate the effectiveness of storm water BMPs and other storm water pollution reduction measures.[36] Managers can use the results of toxicity testing to identify areas of high concern and to establish priority locations for BMPs. Furthermore, Toxicity Identification Evaluations (TIEs) and Toxicity Reduction Evaluations (TREs) can be used to identify specific pollutants and their sources so that management actions can be more specifically prioritized.

Toxicity testing using multiple species is needed to provide a more complete assessment of the causes of toxicity in storm water.[37] Reliance on single species tests may not provide an accurate assessment of toxicity.[38] Because different species vary in their sensitivity to contaminants, tests with multiple species are needed to determine if other contaminants are present at toxic concentrations.[39] Specifically, an organism that is sensitive to pesticides, which have been found to be important factors in the toxicity of storm water from other watersheds, should be used.[40] U.S. EPA recommends the use of the Ceriodaphnia dubia (water flea) reproduction and survival test for the measurement of receiving water toxicity.

Furthermore, the toxicity component of the Monitoring Program should include toxicity identification procedures so that potential constituents of concern can be confirmed and others can be discounted. TIEs are needed to prioritize management actions.

Two wet weather and one dry weather sample will be analyzed for toxicity from each urban discharge monitoring station and corresponding receiving water discharge monitoring station every other year. When a sample is substantially toxic to either test species, a Phase I TIE will begin immediately. Substantial toxicity means the amount of toxicity necessary to successfully conduct a Phase I TIE. For example, Ceriodaphnia TIEs require at least 50% mortality in undiluted sample at any time during the 7-day duration of the initial chronic bioassay.[41] If enough toxicity is not present at the beginning of a TIE, it cannot be successfully completed.

After a toxic pollutant or class of pollutants is identified as causing at least 50% of the toxic responses in at least 3 samples at a sampling location, Toxicity Reduction Evaluations (TRE) will be conducted. If a Phase I TIE only identifies a broad category of toxicants (i.e., nonpolar organics), additional TIE analysis, to the extent possible, will be conducted until the source of toxicity is identified.

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[36] Ibid.
[37] Bay, Jones, Schiff. Study of the Impact of Stormwater Discharge on Santa Monica Bay (1999).
[38] Center for Watershed Protection
[39] Bay, et al.
[40] Bay, et al.
[41] SCCWRP

Overall, the toxicity monitoring program will assess the impact of storm water on the overall quality of aquatic systems and implement measures to ensure that those impacts are eliminated or reduced. Chemical monitoring does not necessarily reveal the impacts of storm water on aquatic life or beneficial uses of water bodies. Therefore, toxicity monitoring is a necessary component of a storm water monitoring program.

D. **Dry Weather Characterization**

The Discharger shall conduct dry weather monitoring to characterize dry weather urban discharge entering the storm drain system, rock wells and retention/detention basins.

The Discharger shall conduct dry weather urban run-off monitoring that screens 20% of the Discharger's outfalls each year for five years. Dry weather sampling sites for the positive storm drain system will be located at storm drain outfalls greater then 24 inches in diameter or at the nearest manhole upstream of the outfall.

To characterize the impact of dry weather flows on groundwater, the Discharger shall monitor at least 20 representative rock wells and/or retention/detention basins (residential, industrial, commercial, and/or mixed use) during this Permit term.

Sites with sufficient flow will be analyzed in the field for temperature, pH, specific conductance (EC), methyl blue activated substances (MBAs, which are detergents/ surfactants), oil and grease, and turbidity. Grab samples shall be collected and analyzed by a certified laboratory for total dissolved solids, fecal coliform, Escherichia coli, phenols, chlorine, total copper, lead, iron, aluminum and diazinon.

The Discharger shall provide follow-up investigation to verify presence of an illicit connection and perform additional sampling to confirm absence or presence of the constituent if action levels are exceeded.

E. **Sediment Toxicity**

Ambient water and sediment quality monitoring by the Surface Water Ambient Monitoring Program (SWAMP - Sacramento Basin) identified a high incidence of sediment toxicity in several urban creeks that drain the suburbs of Roseville (Weston et al., 2005).[42] Nearly all creek sediments sampled caused toxicity to the resident aquatic amphipod *Hyalella azteca*, and about half the samples (10 of 21) caused nearly complete mortality (>90%). Another study by the Sacramento River Watershed Program (SRWP) observed

[42] Weston, D.P., R.W. Holmes, J. You, and M.J. Lydy. 2005. Aquatic toxicity due to residential use of pyrethroid insecticides. *Environ. Sci. & Technol*. 39: 9778-9784.

sediment toxicity in almost every Sacramento area urban creek that was tested (Amweg et al., 2006).[43] Several pyrethroid pesticides were present in sediment samples from both studies at acutely toxic concentrations. Pyrethroid pesticides are persistent, hydrophobic, and rapidly sorb to sediments in aquatic environments. The sediment toxicity observed was localized to within tens to hundreds of meters downstream of storm water outfalls draining residential areas.

The phase-out of the sale of diazinon and chlorpyrifos for most residential and commercial uses resulted in an increase in the use of pyrethroid pesticide use in urban and residential areas. Monitoring of sediment quality and urban runoff/discharges is needed to characterize sediment/water quality conditions, determine the significance of the increase in urban pyrethroid usage, and assess management practice effectiveness.

F. Rock Well Monitoring

Further rockwell and groundwater assessments will not be required under this permit. In the third permit term, the Discharger was required to update and submit a Rock Well Assessment Plan (RWAP) in the revised SWMP. The RWAP study was designed to evaluate the effectiveness of the Discharger's rockwells in pollutant removal from urban runoff and protecting groundwater quality. The RWAP study is based on the previous assessment conducted during the second permit term and will be coordinated with groundwater assessment studies conducted by the U.S. Geological Survey. The RWAP expands the study area to include a broader set of rockwells serving different land use types and includes collection shallow groundwater samples for other constituents (e.g., nitrates and pesticides). The *Rockwell Assessment: Summary Report* was submitted to the Regional Water Board on 30 July 2012.

G. Method Detection Limits

The Minimum Levels (MLs) listed in Appendix 4 of the State Board Policy for Implementation of Toxics Standards for Inland Surface Water, Enclosed Bays, and Estuaries of California, 2000 (SIP) represent the lowest quantifiable concentration in a sample based on the proper application of all method-based analytical procedures and the absence of any matrix interferences.[44] These MLs must be incorporated into all water quality monitoring programs to detect priority toxic pollutants. The MLs are the only established criteria that take into consideration recent improvements in chemical analytical methods. If they are not used in the storm water

[43] Amweg, E.L., D.P. Weston, J. You, and M.J. Lydy. 2006. Pyrethroid insecticides and sediment toxicity in urban creeks from California and Tennessee. *Environ. Sci. & Technol*. Published on web 1/31/2006.
[44] SIP

program, concentrations of concern of priority toxic pollutants may not be detected. Detection and control of toxic pollutants in surface waters is necessary to achieve the CWA's goals and objectives.[45] Numeric criteria for toxic pollutants are necessary to evaluate the adequacy of existing and potential control measures to protect aquatic ecosystems and human health.[46] Also, using MLs will provide quantifiable data that is necessary to better assess water quality and to develop Waste Load Allocations and Load Allocations for TMDLs. Furthermore, non-detects cannot be used to accurately determine mass loadings. The criteria established in the CTR are legally applicable in the State of California for inland surface waters, enclosed bays and estuaries for all purposes and programs under the CWA.[47] Section 402(p)(3)(B)(iii) gives U.S. EPA and states the authority to incorporate appropriate water quality-based effluent limitations in NPDES permits for discharges from MS4s.[48]

H. Bio-assessment

Further bioassessment monitoring activities will not be required under this permit, but was required under previous permit terms Data collected between 2006 and 2007 along two reaches of Dry Creek were evaluated in an assessment provided in the Discharger's 2008-2009 Annual Report. Bioassessment data collected in 2005 were not included in the evaluation due to differences in habitat and biological metrics between the 2005, 2006, and 2007 sampling seasons. Results may be useful in meeting the Surface Water Ambient Monitoring Program's (SWAMP's) long term goal of utilizing bioassessment to develop biocriteria for a variety of eco-regions and land-use dominated areas in California.

I. Peak Discharge Impact Study

Under this permit, the Discharger shall continue to monitor areas of erosion along Dry Creek and the Tuolumne River to assess if urban runoff is a contributing factor as proposed in its 2012-2013 Annual Report. During the third permit term, the Discharger was required to continue a study to determine the extent of erosion of natural stream channels and banks caused by urbanization. If appropriate, the Discharger was required to evaluate peak flow control and determine numeric criteria to prevent or minimize erosion of natural stream channels and banks cause by urbanization.[49] A work plan for the Peak Discharge Impact study is in the Discharger's SWMP approved by the Regional Water Board. Study objectives included determining the extent of erosion of natural stream channels and banks resulting from storm water

[45] 65 Fed. Reg. 31683
[46] *Ibid.*
[47] 65 Fed. Reg. 31682
[48] 65 Fed. Reg. 31703
[49] Development Standards require the development of numerical criteria for peak flow control in natural drainage systems.

runoff, evaluating peak flow control, and determining numeric criteria to prevent or minimize erosion. The study was scheduled to be implemented in 2009-2010. In its 2012-2013 Annual Report, the Discharger reported that the study had been initiated in Dry Creek. The Discharger performed a limited qualitative assessment based on analysis of aerial photographs from 2001-2010, field notes, and historical observations rather than a quantitative evaluation. Based on the qualitative evaluation, the Discharger determined that there had been no large scale changes in Dry Creek for the time period studied, although local erosion resulting from peak flows were observed at Dry Creek. [50]

VII. Program Effectiveness Assessment

The proposed permit requires the Discharger provide an analysis of the effectiveness of their SWMP in their Annual Reports. The assessment shall identify the direct and indirect measurements that the Discharger used to track the effectiveness of their programs as well as the outcome levels at which the assessment is occurring consistent with the proposed permit. Direct and indirect measurements shall include, but not be limited to, conformance with established Performance Standards, quantitative monitoring to assess the effectiveness of Program Elements, measurements or estimates of pollutant load reductions or increases from identified sources, raising awareness of the public, and/or detailed accounting/ documentation of SWMP accomplishments.

a. The Discharger will be required to track the long-term progress of their SWMP towards achieving improvements in receiving water quality.

b. The Discharger will be required to use the information gained from the program effectiveness assessment to improve their SWMPs and identify new BMPs, or modification of existing BMPs. This information shall be reported within the Annual Reports consistent with this Order.