California Regional Water Quality Control Board
San Francisco Bay Region
Municipal Regional Stormwater NPDES Permit

ORDER NO. R2-2011-0083
NPDES PERMIT NO. CAS612008

AMENDMENT REVISING ORDER NO. R2-2009-0074 for the following jurisdictions and entities:

The cities of Alameda, Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, and Union City, Alameda County, the Alameda County Flood Control and Water Conservation District, and Zone 7 of the Alameda County Flood Control and Water Conservation District, which have joined together to form the Alameda Countywide Clean Water Program (Alameda Permittees)

The cities of Clayton, Concord, El Cerrito, Hercules, Lafayette, Martinez, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, and Walnut Creek, the towns of Danville and Moraga, Contra Costa County, the Contra Costa County Flood Control and Water Conservation District, which have joined together to form the Contra Costa Clean Water Program (Contra Costa Permittees)

The cities of Campbell, Cupertino, Los Altos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale, the towns of Los Altos Hills and Los Gatos, the Santa Clara Valley Water District, and Santa Clara County, which have joined together to form the Santa Clara Valley Urban Runoff Pollution Prevention Program (Santa Clara Permittees)

The cities of Belmont, Brisbane, Burlingame, Daly City, East Palo Alto, Foster City, Half Moon Bay, Menlo Park, Millbrae, Pacifica, Redwood City, San Bruno, San Carlos, San Mateo, and South San Francisco, the towns of Atherton, Colma, Hillsborough, Portola Valley, and Woodside, the San Mateo County Flood Control District, and San Mateo County, which have joined together to form the San Mateo Countywide Water Pollution Prevention Program (San Mateo Permittees)

The cities of Fairfield and Suisun City, which have joined together to form the Fairfield-Suisun Urban Runoff Management Program (Fairfield-Suisun Permittees)

The City of Vallejo and the Vallejo Sanitation and Flood Control District (Vallejo Permittees)

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter referred to as the Water Board) finds that:

Findings:

1. On October 14, 2009, the Water Board adopted Order No. R2-2009-0074, NPDES No. CAS612008, prescribing Waste Discharge Requirements under the San Francisco Bay Municipal Regional Stormwater Permit for the discharge of stormwater runoff from the municipal separate storm sewer systems (MS4s) of the named Permittees.
2. Provision C.3.b. of Order No. R2-2009-0074 establishes the scope of development projects that must implement post-construction stormwater treatment and defines them as Regulated Projects.
3. Provision C.3.c. of Order No. R2-2009-0074 requires Permittees to implement Low Impact Development (LID) requirements by December 1, 2011. Under Provision C.3.c., Permittees must require all Regulated Projects to implement source control and site design measures and to treat 100% of the amount of runoff identified in Provision C.3.d. for the Regulated Project's drainage area with LID treatment measures onsite or at a joint stormwater treatment facility.
4. Provision C.3.e.ii.(1) of Order No. R2-2009-0074 acknowledges that certain types of smart growth, high density, and transit-oriented development can either reduce existing impervious surfaces, or create less "accessory" impervious areas and auto-related pollutant impacts. This Provision further states that incentive LID Treatment Reduction Credits approved by the Water Board may be applied to these types of Regulated Projects that are considered "Special Projects."
5. Provision C.3.e.ii.(2) of Order No. R2-2009-0074 requires the Permittees to submit a proposal by December 1, 2010, to the Water Board identifying the types of projects proposed as Special Projects and therefore eligible for LID Treatment Reduction Credit. The proposal was required to include specific criteria for each type of Special Project proposed, including size, location, minimum densities, minimum floor area ratios, other appropriate limitations, and the proposed LID Treatment Reduction Credit.
6. On December 1, 2010, the Bay Area Stormwater Management Agencies Association (BASMAA) submitted a Special Projects proposal on behalf of the Permittees, which defined the types of Special Project Categories and their corresponding LID Treatment Reduction Credits.
7. BASMAA's stormwater proposal was posted on the Water Board's website and circulated for public comment on December 10, 2010. Comments on the proposal were received from USEPA, NRDC, San Francisco Baykeeper, the Building Industry Association, other building industry groups, and developers.
8. Water Board staff has met on a regular basis with representatives of BASMAA and within these negotiations, revisions of the December 10, 2010, proposal have been made and considered. Representatives of USEPA, the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) have participated in some of these meetings. Water Board staff has also met separately with representatives of NRDC and San Francisco Baykeeper.

9. This Order amends Order No. R2-2009-0074 to add criteria for determining which types of Regulated Projects may be considered Special Projects. This Order establishes different categories of Special Projects based on size, land use type, and density.

10. For each category of Special Projects, this Order establishes corresponding LID Treatment Reduction Credits that may be used to reduce the amount of stormwater runoff that must be treated with LID stormwater treatment systems.

11. This Order requires that when LID Treatment Reduction Credits are applied, the percentage of stormwater runoff not treated by LID treatment systems to be treated with specific non-LID treatment systems.

12. Provisions C.3.c.i.(2)(vi) and C.3.c.iii.(3) of Order No. R2-2009-0074 require Permittees to submit to the Water Board by May 1, 2011, a proposed set of model biotreatment soil media specifications and soil infiltration testing methods to verify a long-term infiltration rate of 5 to 10 inches/hour.

13. The Permittees submitted a proposal for the soil media specifications and soil infiltration testing methods on December 1, 2010, which was distributed for public comment on December 15, 2010. Comments were received on January 28, 2011, from Roger James of Resources Management and from the Natural Resources Defense Council.

14. Provisions C.3.c.i.(2)(vii) C.3.c.iii.(4) of Order No. R2-2009-0074 require Permittees to submit to the Water Board by December 1, 2011, proposed minimum specifications for green roofs to be considered biotreatment systems.

15. The Permittees submitted a proposal for the minimum green roof specifications on April 29, 2011, which was distributed for public comment on May 4, 2011. No comments were received.

16. This Order approves the model biotreatment soil media specifications, soil infiltration testing methods, and minimum green roof specifications submitted by the Permittees.

17. Provision C.3.g.ii.(5) of Order No. R2-2009-0074 requires the Santa Clara Permittees to comply with all the requirements in Attachment F of the same Order. Requirement 4. of Attachment F (pages F-3 and F-4 of Order No. R2-2009-0074) defines geographical areas where applicable Regulated Projects are required to meet the HM Standard and associated requirements. These areas of HM applicability described in Requirement 4. are shown in the Santa Clara Permittees' HM Map available at http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/muni/mrp/Final%20TO%20HM%20Maps.pdf).

18. Requirement 4.c. of Attachment F states that Pink areas on the HM Map are under review by the Permittees for accuracy of the imperviousness data. The HM Standard and associated requirements apply to projects in areas designated as pink on the map until such time as a Permittee presents new data that indicates that the actual level of imperviousness of a particular area is greater than or equal to 65% impervious. Any new data is to be submitted to the Water Board in one coordinated submittal within one year of permit adoption.

19. The Santa Clara Permittees submitted new impervious data and a revised HM Map that reflects the new data to the Water Board on October 14, 2010. On March 11, 2011, the Santa Clara Permittees submitted a revised HM Map to correct a small error in the October 2010 HM Map, and to provide additional information per Water Board staff request. The revised HM Map shows that in the majority of the Pink area of the original, approved, Santa Clara Permittees' HM

Map, the HM Standard and associated requirements do apply. In the revised HM Map, these areas are now shown in green to represent the applicability of the HM Standard and associated requirements. The remaining small portion of the Pink area in the original HM Map is now shown in red to represent areas where the HM Standard and associated requirements do not apply.

20. This Order approves the revised Santa Clara Permittees' HM Map and replaces the HM Map originally adopted by Order No. R2-2009-0074.
21. The Fact Sheet attached to this Order as Appendix III contains background information and rationale for this Order's requirements. It is hereby incorporated into this Order and therefore constitutes part of the findings for this Order
22. This Order is exempt from the provisions of the California Environmental Quality Act pursuant to California Water Code Section 13389
23. The Water Board notified the Permittees named in this Order and interested agencies and persons of its intent to consider adoption of this Order, and provided an opportunity to submit written comments.
24. In a public meeting, the Water Board heard and considered all comments pertaining to this Order.

IT IS HEREBY ORDERED, pursuant to the provisions of California Water Code Division 7 and regulations adopted thereunder, and the provisions of the federal Clean Water Act and regulations and guidelines adopted thereunder, that the Permittees shall comply with the following:

1. Provision C.3. and Attachment F of Order No. R2-2009-0074, are hereby modified and amended as shown in Appendix I. Additions to Provision C.3. and Attachment F are displayed as underlined type and deletions of text are displayed as ~~strikeout~~ format.
2. Attachments L and M as shown in Appendix II are hereby added to Order No. R2-2009-0074.
3. This Order shall become effective on December 1, 2011.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on November 28, 2011.

Digitally signed by Bruce Wolfe
Date: 2011.11.30 13:53:13 -08'00'

Bruce H. Wolfe
Executive Officer

Appendix I: Revisions to Provision C.3. and Attachment F of Order No. R2-2009-0074
Appendix II: Attachments L and M to be added to Order No. R2-2009-0074
Appendix III: Fact Sheet

APPENDIX I

Revisions to Provision C.3. and Attachment F
of
Water Board Order No. R2-2009-0074

November 28, 2011

C.3. New Development and Redevelopment

C.3.c. Low Impact Development (LID)

The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treats stormwater as a resource, rather than a waste product. Practices used to adhere to these LID principles include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes.

Task Description

i. The Permittees shall, at a minimum, implement the following LID requirements:

(1) **Source Control Requirements**

Require all Regulated Projects to implement source control measures onsite that at a minimum, shall include the following:

(a) Minimization of stormwater pollutants of concern in urban runoff through measures that may include plumbing of the following discharges to the sanitary sewer, subject to the local sanitary sewer agency's authority and standards:

- Discharges from indoor floor mat/equipment/hood filter wash racks or covered outdoor wash racks for restaurants;
- Dumpster drips from covered trash, food waste and compactor enclosures;
- Discharges from covered outdoor wash areas for vehicles, equipment, and accessories;
- Swimming pool water, if discharge to onsite vegetated areas is not a feasible option; and
- Fire sprinkler test water, if discharge to onsite vegetated areas is not a feasible option;

(b) Properly designed covers, drains, and storage precautions for outdoor material storage areas, loading docks, repair/maintenance bays, and fueling areas;

(c) Properly designed trash storage areas;

(d) Landscaping that minimizes irrigation and runoff, promotes surface infiltration, minimizes the use of pesticides and fertilizers, and incorporates other appropriate sustainable landscaping practices and programs such as Bay-Friendly Landscaping;

(e) Efficient irrigation systems; and

(f) Storm drain system stenciling or signage.

(2) **Site Design and Stormwater Treatment Requirements**

(a) Require each Regulated Project to implement at least the following design strategies onsite:

(i) Limit disturbance of natural water bodies and drainage systems; minimize compaction of highly permeable soils; protect slopes and channels; and minimize impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies;

(ii) Conserve natural areas, including existing trees, other vegetation, and soils;

(iii) Minimize impervious surfaces;

(iv) Minimize disturbances to natural drainages; and

(v) Minimize stormwater runoff by implementing one or more of the following site design measures:

- Direct roof runoff into cisterns or rain barrels for reuse.
- Direct roof runoff onto vegetated areas.
- Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas.
- Direct runoff from driveways and/or uncovered parking lots onto vegetated areas.
- Construct sidewalks, walkways, and/or patios with permeable surfaces.[3]
- Construct driveways, bike lanes, and/or uncovered parking lots with permeable surfaces.[3]

(b) Require each Regulated Project to treat 100% of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures onsite or with LID treatment measures at a joint stormwater treatment facility.

(i) LID treatment measures are harvesting and re-use, infiltration, evapotranspiration, or biotreatment.

(ii) A properly engineered and maintained biotreatment system may be considered only if it is infeasible to implement harvesting and re-use, infiltration, or evapotranspiration at a project site.

(iii) Infeasibility to implement harvesting and re-use, infiltration, or evapotranspiration at a project site may result from conditions including the following:

- Locations where seasonal high groundwater would be within 10 feet of the base of the LID treatment measure.
- Locations within 100 feet of a groundwater well used for drinking water.

- Development sites where pollutant mobilization in the soil or groundwater is a documented concern.
- Locations with potential geotechnical hazards.
- Smart growth and infill or redevelopment sites where the density and/or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.
- Locations with tight clay soils that significantly limit the infiltration of stormwater.

(iv) By May 1, 2011, the Permittees, collaboratively or individually, shall submit a report on the criteria and procedures the Permittees shall employ to determine when harvesting and re-use, infiltration, or evapotranspiration is feasible and infeasible at a Regulated Project site. This report shall, at a minimum, contain the information required in Provision C.3.c.iii.(1).

(v) By December 1, 2013, the Permittees, collaboratively or individually, shall submit a report on their experience with determining infeasibility of harvesting and re-use, infiltration, or evapotranspiration at Regulated Project sites. This report shall, at a minimum, contain the information required in Provision C.3.iii.(2).

(vi) Biotreatment (or bioretention) systems shall be designed to have a surface area no smaller than what is required to accommodate a 5 inches/hour stormwater runoff surface loading rate, and infiltrate runoff at a minimum of 5 inches per hour during the life of the facility. The ~~planting and~~ soil media for biotreatment (or bioretention) systems shall be designed to sustain healthy, vigorous plant growth and maximize stormwater runoff retention and pollutant removal. Permittees shall ensure that Regulated Projects use biotreatment soil media that meet the minimum specifications set forth in Attachment L.

~~By December 1, 2010, the Permittees, working collaboratively or individually, shall submit for Water Board approval, a proposed set of model biotreatment soil media specifications and soil infiltration testing methods to verify a long-term infiltration rate of 5 to 10 inches/hour. This submittal to the Water Board shall, at a minimum, contain the information required in Provision C.3.c.iii.(3). Once the Water Board approves biotreatment soil media specifications and soil infiltration testing methods, the Permittees shall ensure that biotreatment systems installed to meet the requirements of Provision C.3.c and d comply with the Water Board-approved minimum specifications and soil infiltration testing methods.~~

(vii) Green roofs may be considered biotreatment systems that treat roof runoff only if they meet certain minimum specifications. ~~By May 1, 2011, the Permittees shall submit for Water Board~~

~~approval, proposed minimum specifications for green roofs. This submittal to the Water Board shall, at a minimum, contain the information required in Provision C.3.c.iii.(4). Once the Water Board approves green roof minimum specifications, the~~ Permittees shall ensure that green roofs installed at Regulated Projects ~~to~~ meet the following ~~requirements of Provision C.3.c and d comply with the Water Board approved~~minimum specifications~~.~~:

- The green roof system planting media shall be sufficiently deep to provide capacity within the pore space of the media for the required runoff volume specified by Provision C.3.d.i.(1).
- The green roof system planting media shall be sufficiently deep to support the long term health of the vegetation selected for the green roof, as specified by a landscape architect or other knowledgeable professional.

(c) Require any Regulated Project that does not comply with Provision C.3.c.i.(2)(b) above to meet the requirements established in Provision C.3.e for alternative compliance.

ii. Implementation Level – All elements of the tasks described in Provision C.3.c.i shall be fully implemented.

Due Date for Full Implementation – December 1, 2011

(1) For any private development project for which a planning application has been deemed complete by a Permittee on or before the Permit effective date, Provision C.3.c.i shall not apply so long as the project applicant is diligently pursuing the project. Diligent pursuance may be demonstrated by the project applicant's submittal of supplemental information to the original application, plans, or other documents required for any necessary approvals of the project by the Permittee. If during the time period between the Permit effective date and the required implementation date of December 1, 2011, the project applicant has not taken any action to obtain the necessary approvals from the Permittee, the project will then be subject to the requirements of Provision C.3.c.i.

(2) For any private development project with an application deemed complete after the Permit effective date, the requirements of Provision C.3.c.i shall not apply if the project applicant has received final discretionary approval for the project before the required implementation date of December 1, 2011.

(3) For public projects for which funding has been committed and construction is scheduled to begin by December 1, 2012, the requirements of Provision C.3.c.i shall not apply.

iii. Reporting

(1) Feasibility/Infeasibility Criteria Report - By May 1, 2011, the Permittees, collaboratively or individually, shall submit a report to the Water Board containing the following information:

- Literature review and discussion of documented cases/sites, particularly in the Bay Area and California, where infiltration, harvesting and reuse, or evapotranspiration have been demonstrated to be feasible and/or infeasible.
- Discussion of proposed feasibility and infeasibility criteria and procedures the Permittees shall employ to make a determination of when biotreatment will be allowed at a Regulated Project site.

(2) Status Report on Application of Feasibility/Infeasibility Criteria – By December 1, 2013, the Permittees shall submit a report to the Water Board containing the following information:

- Discussion of the most common feasibility and infeasibility criteria employed since implementation of Provision C.3.c requirements, including site-specific examples;
- Discussion of barriers, including institutional and technical site specific constraints, to implementation of harvesting and reuse, infiltration, or evapotranspiration, and proposed strategies for removing these identified barriers;
- If applicable, discussion of proposed changes to feasibility and infeasibility criteria and rationale for the changes; and
- Guidance for the Permittees to make a consistent and appropriate determination of the feasibility of harvesting and reuse, infiltration, or evapotranspiration for each Regulated Project.

~~(3) Model Biotreatment Soil Media Specifications - By December 1, 2010, the Permittees, collaboratively or individually, shall submit a report to the Water Board containing the following information:~~

- ~~Proposed soil media specifications for biotreatment systems;~~
- ~~Proposed soil testing methods to verify a long-term infiltration rate of 5-10 inches/hour;~~
- ~~Relevant literature and field data showing the feasibility of the minimum design specifications;~~
- ~~Relevant literature, field, and analytical data showing adequate pollutant removal and compliance with the Provision C.3.d hydraulic sizing criteria; and~~
- ~~Guidance for the Permittees to apply the minimum specifications in a consistent and appropriate manner.~~

~~(4) Green Roof Minimum Specifications - By May 1, 2011, the Permittees, collaboratively or individually, shall submit a report to the Water Board containing the following information:~~

- ~~Proposed minimum design specifications for green roofs;~~

- ~~Relevant literature and field data showing the feasibility of the minimum design specifications;~~
- ~~Relevant literature, field, and analytical data showing adequate pollutant removal and compliance with the Provision C.3.d hydraulic sizing criteria;~~
- ~~Discussion of data and lessons learned from already installed green roofs;~~
- ~~Discussion of barriers, including institutional and technical site specific constraints, to installation of green roofs and proposed strategies for removing these identified barriers; and~~
- ~~Guidance for the Permittees to apply the minimum specifications in a consistent and appropriate manner.~~

(3) Report the method(s) of implementation of Provisions C.3.c.i above in the 2012 Annual Report. For specific tasks listed above that are reported using the reporting tables required for Provision C.3.b.v, a reference to those tables will suffice.

C.3.d. Numeric Sizing Criteria for Stormwater Treatment Systems

i. Task Description – The Permittees shall require that stormwater treatment systems constructed for Regulated Projects meet at least one of the following hydraulic sizing design criteria:

(1) **Volume Hydraulic Design Basis** – Treatment systems whose primary mode of action depends on volume capacity shall be designed to treat stormwater runoff equal to:

(a) The maximized stormwater capture volume for the area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients set forth in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998), pages 175–178 (e.g., approximately the 85th percentile 24-hour storm runoff event); or

(b) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology set forth in Section 5 of the California Stormwater Quality Association's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.

(2) **Flow Hydraulic Design Basis** – Treatment systems whose primary mode of action depends on flow capacity shall be sized to treat:

(a) 10 percent of the 50-year peak flowrate;

(b) The flow of runoff produced by a rain event equal to at least two times the 85th percentile hourly rainfall intensity for the applicable area, based on historical records of hourly rainfall depths; or

(c) The flow of runoff resulting from a rain event equal to at least 0.2 inches per hour intensity.

(3) **Combination Flow and Volume Design Basis** – Treatment systems that use a combination of flow and volume capacity shall be sized to treat at least 80 percent of the total runoff over the life of the project, using local rainfall data.

ii. Implementation Level – The Permittees shall immediately require the controls in this task.

Due Date for Full Implementation – Immediate, except December 1, 2010, for Vallejo Permittees.

iii. Reporting – Permittees shall use the reporting tables required in Provision C.3.b.v.

iv. Limitations on Use of Infiltration Devices in Stormwater Treatment Systems

(1) For Regulated Projects, each Permittee shall review planned land use and proposed treatment design to verify that installed stormwater treatment systems with no under-drain, and that function primarily as infiltration devices, should not cause or contribute to the degradation of groundwater quality at project sites. An infiltration device is any structure that is deeper than wide and designed to infiltrate stormwater into the subsurface and, as designed, bypass the natural groundwater protection afforded by surface soil. Infiltration devices include dry wells, injection wells, and infiltration trenches (includes french drains).

(2) For any Regulated Project that includes plans to install stormwater treatment systems which function primarily as infiltration devices, the Permittee shall require that:

(a) Appropriate pollution prevention and source control measures are implemented to protect groundwater at the project site, including the inclusion of a minimum of two feet of suitable soil to achieve a maximum 5 inches/hour infiltration rate for the infiltration system;

(b) Adequate maintenance is provided to maximize pollutant removal capabilities;

(c) The vertical distance from the base of any infiltration device to the seasonal high groundwater mark is at least 10 feet. (Note that some locations within the Permittees' jurisdictions are characterized by highly porous soils and/or high groundwater tables. In these areas, a greater vertical distance from the base of the infiltration device to the seasonal high groundwater mark may be appropriate, and treatment system approvals should be subject to a higher level of analysis that considers the potential for pollutants (such as from onsite chemical use), the level of pretreatment to be achieved, and other similar factors in the overall analysis of groundwater safety);

(d) Unless stormwater is first treated by a method other than infiltration, infiltration devices are not approved as treatment measures for runoff from areas of industrial or light industrial activity; areas subject to high vehicular traffic (i.e., 25,000 or greater average daily traffic on a

main roadway or 15,000 or more average daily traffic on any intersecting roadway); automotive repair shops; car washes; fleet storage areas (e.g., bus, truck); nurseries; and other land uses that pose a high threat to water quality;

(e) Infiltration devices are not placed in the vicinity of known contamination sites unless it has been demonstrated that increased infiltration will not increase leaching of contaminants from soil, alter groundwater flow conditions affecting contaminant migration in groundwater, or adversely affect remedial activities; and

(f) Infiltration devices are located a minimum of 100 feet horizontally away from any known water supply wells, septic systems, and underground storage tanks with hazardous materials. (Note that some locations within the Permittees' jurisdictions are characterized by highly porous soils and/or high groundwater tables. In these areas, a greater horizontal distance from the infiltration device to known water supply wells, septic systems, or underground storage tanks with hazardous materials may be appropriate, and treatment system approvals should be subject to a higher level of analysis that considers the potential for pollutants (such as from onsite chemical use), the level of pretreatment to be achieved, and other similar factors in the overall analysis of groundwater safety).

C.3.e. Alternative or In-Lieu Compliance with Provision C.3.c.

i. The Permittees may allow a Regulated Project to provide alternative compliance with Provision C.3.c in accordance with one of the two options listed below:

(1) **Option 1: LID Treatment at an Offsite Location**

Treat a portion of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures onsite or with LID treatment measures at a joint stormwater treatment facility **and** treat the remaining portion of the Provision C.3.d runoff with LID treatment measures at an offsite project in the same watershed. The offsite LID treatment measures must provide hydraulically-sized treatment (in accordance with Provision C.3.d) of an equivalent quantity of both stormwater runoff and pollutant loading and achieve a net environmental benefit.

(2) **Option 2: Payment of In-Lieu Fees**

Treat a portion of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures onsite or with LID treatment measures at a joint stormwater treatment facility **and** pay equivalent in-lieu fees[5] to treat the remaining portion of the Provision

[5] **In-lieu fees** – Monetary amount necessary to provide both hydraulically-sized treatment (in accordance with Provision C.3.d) with LID treatment measures of an equivalent quantity of stormwater runoff and pollutant loading, and a proportional share of the operation and maintenance costs of the Regional Project.

C.3.d runoff with LID treatment measures at a Regional Project.[6] The Regional Project must achieve a net environmental benefit.

(3) For the alternative compliance options described in Provision C.3.e.i.(1) and (2) above, offsite projects must be constructed by the end of construction of the Regulated Project. If more time is needed to construct the offsite project, for each additional year, up to three years, after the construction of the Regulated Project, the offsite project must provide an additional 10% of the calculated equivalent quantity of both stormwater runoff and pollutant loading. Regional Projects must be completed within three years after the end of construction of the Regulated Project. However, the timeline for completion of the Regional Project may be extended, up to five years after the completion of the Regulated Project, with prior Executive Officer approval. Executive Officer approval will be granted contingent upon a demonstration of good faith efforts to implement the Regional Project, such as having funds encumbered and applying for the appropriate regulatory permits.

ii. Special Projects

(1) When considered at the watershed scale, certain land development projects characterized as ~~types of~~ smart growth, high density, ~~and~~ or transit-oriented development can either reduce existing impervious surfaces, or create less "accessory" impervious areas and automobile-related pollutant impacts. Incentive LID T~~t~~reatment R~~r~~eduction C~~c~~redits approved by the Water Board may be applied to these ~~types of~~ Special Projects, which are Regulated Projects that meet the specific criteria listed below in Provisions C.3.e.ii.(2),(3)&(4). For any Special Project, the allowable incentive LID Treatment Reduction Credit is the maximum percentage of the amount of runoff identified in Provision C.3.d. for the Special Project's drainage area, that may be treated with one or a combination of the following two types of non-LID treatment systems:

- Tree-box-type high flowrate biofilters
- Vault-based high flowrate media filters

The allowed LID Treatment Reduction Credit recognizes that density and space limitations for the Special Projects identified herein may make 100% LID treatment infeasible. Under Provision C.3.e.vi, each Permittee is required to report on the infeasibility of LID treatment for each of the Special Projects for which LID Treatment Reduction Credit was applied.

(2) Category A Special Project Criteria

(a) To be considered a Category A Special Project, a Regulated Project must meet all of the following criteria:

[6] **Regional Project –** A regional or municipal stormwater treatment facility that discharges into the same watershed that the Regulated Project does.

(i) Be built as part of a Permittee's stated objective to preserve or enhance a pedestrian-oriented type of urban design.

(ii) Be located in a Permittee's designated central business district, downtown core area or downtown core zoning district, neighborhood business district or comparable pedestrian-oriented commercial district, or historic preservation site and/or district.

(iii) Create and/or replace one half acre or less of impervious surface area.

(iv) Include no surface parking, except for incidental surface parking. Incidental surface parking is allowed only for emergency vehicle access, Americans with Disabilities Act (ADA) accessibility, and passenger and freight loading zones.

(v) Have at least 85% coverage for the entire project site by permanent structures. The remaining 15% portion of the site is to be used for safety access, parking structure entrances, trash and recycling service, utility access, pedestrian connections, public uses, landscaping, and stormwater treatment.

(b) Any Category A Special Project may qualify for 100% LID Treatment Reduction Credit, which would allow the Category A Special Project to treat up to 100% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.

(3) Category B Special Project Criteria

(a) To be considered a Category B Special Project, a Regulated Project must meet all of the following criteria:

(i) Be built as part of a Permittee's stated objective to preserve or enhance a pedestrian-oriented type of urban design.

(ii) Be located in a Permittee's designated central business district, downtown core area or downtown core zoning district, neighborhood business district or comparable pedestrian-oriented commercial district, or historic preservation site and/or district.

(iii) Create and/or replace greater than one-half acre but no more than 2 acres of impervious surface area.

(iv) Include no surface parking, except for incidental surface parking. Incidental surface parking is allowed only for emergency vehicle access, ADA accessibility, and passenger and freight loading zones.

(v) Have at least 85% coverage for the entire project site by permanent structures. The remaining 15% portion of the site is to be used for safety access, parking structure entrances, trash

and recycling service, utility access, pedestrian connections, public uses, landscaping, and stormwater treatment.

(b) For any Category B Special Project, the maximum LID Treatment Reduction Credit allowed is determined based on the density achieved by the Project in accordance with the criteria listed below. Density is expressed in Floor Area Ratios (FARs) for commercial and mixed-use development projects and in Dwelling Units per Acre (DU/Ac) for residential development projects.

(i) 50% Maximum LID Treatment Reduction Credit

- For any commercial or mixed use Category B Special Project with a FAR of at least 2:1, up to 50% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.
- For any residential Category B Special Project with a density of at least 50 DU/Ac, up to 50% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.

(ii) 75% Maximum LID Treatment Reduction Credit

- For any commercial or mixed use Category B Special Project with a FAR of at least 3:1, up to 75% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.
- For any residential Category B Special Project with a density of at least 75 DU/Ac, up to 75% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.

(iii) 100% Maximum LID Treatment Reduction Credit

- For any commercial or mixed use Category B Special Project with a FAR of at least 4:1, up to 100% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.
- For any residential Category B Special Project with a density of at least 100 DU/Ac, up to 100% of the amount of runoff identified in Provision C.3.d. for the Project's drainage area may be treated with either one or a combination of the two types of non-LID treatment systems listed in Provision C.3.e.ii.(1) above.

(4) Category C Special Project Criteria (Transit-Oriented Development)

(a) Transit-Oriented Development refers to the clustering of homes, jobs, shops and services in close proximity to rail stations, ferry terminals

or bus stops offering access to frequent, high-quality transit services. This pattern typically involves compact development and a mixing of different land uses, along with amenities like pedestrian-friendly streets. To be considered a Category C Special Project, a Regulated Project must meet all of the following criteria:

(i) Be characterized as a non auto-related land use project. That is, Category C specifically excludes any Regulated Project that is a stand-alone surface parking lot; car dealership; auto and truck rental facility with onsite surface storage; fast-food restaurant, bank or pharmacy with drive-through lanes; gas station, car wash, auto repair and service facility; or other auto-related project unrelated to the concept of Transit-Oriented Development.

(ii) If a commercial or mixed-use development project, achieve at least an FAR of 2:1.

(iii) If a residential development project, achieve at least a density of 25 DU/Ac.

(b) For any Category C Special Project, the total maximum LID Treatment Reduction Credit allowed is the sum of three different types of credits that the Category C Special Project may qualify for, namely: Location, Density and Minimized Surface Parking Credits.

(c) Location Credits

(i) A Category C Special Project may qualify for the following Location Credits:

- 50% Location Credit: Located within a ¼ mile radius of an existing or planned transit hub.
- 25% Location Credit: Located within a ½ mile radius of an existing or planned transit hub.
- 25% Location Credit: Located within a planned Priority Development Area (PDA), which is an infill development area formally designated by the Association of Bay Area Government's / Metropolitan Transportation Commission's FOCUS regional planning program. FOCUS is a regional incentive-based development and conservation strategy for the San Francisco Bay Area.

(ii) Only one Location Credit may be used by an individual Category C Special Project, even if the project qualifies for multiple Location Credits.

(iii) At least 50% or more of a Category C Special Project's site must be located within the ¼ or ½ mile radius of an existing or planned transit hub to qualify for the corresponding Location Credits listed above. One hundred percent of a Category C Special Project's site must be located within a PDA to qualify for the corresponding Location Credit listed above.

(iv) Transit hub is defined as a rail, light rail, or commuter rail station, ferry terminal, or bus transfer station served by three or more bus routes (i.e., a bus stop with no supporting services does not qualify). A planned transit hub is a station on the MTC's Regional Transit Expansion Program list, per MTC's Resolution 3434 (revised April 2006), which is a regional priority funding plan for future transit stations in the San Francisco Bay Area.

(d) Density Credits: To qualify for any Density Credits, a Category C Special Project must first qualify for one of the Location Credits listed in Provision C.3.e.ii.((4)(c) above.

(i) A Category C Special Project that is a commercial or mixed-use development project may qualify for the following Density Credits:

- 10% Density Credit: Achieve an FAR of at least 2:1.
- 20% Density Credit: Achieve an FAR of at least 4:1.
- 30% Density Credit: Achieve an FAR of at least 6:1.

(ii) A Category C Special Project that is a residential development project may qualify for the following Density Credits:

- 10% Density Credit: Achieve a density of at least 30 DU/Ac.
- 20% Density Credit: Achieve a density of at least 60 DU/Ac.
- 30% Density Credit: Achieve a density of at least 100 DU/Ac.

(iii) Commercial and mixed-use Category C Projects do not qualify for Density Credits based on DU/Ac and residential Category C Projects do not qualify for Density Credits based on FAR.

(iv) Only one Density Credit may be used by an individual Category C Special Project, even if the project qualifies for multiple Density Credits.

(e) Minimized Surface Parking Credits: To qualify for any Minimized Surface Parking Credits, a Category C Special Project must first qualify for one of the Location Credits listed in Provision C.3.e.ii.(4)(c) above.

(i) A Category C Special Project may qualify for the following Minimized Surface Parking Credits:

- 10% Minimized Surface Parking Credit: Have 10% or less of the total post-project impervious surface area dedicated to at-grade surface parking. The at-grade surface parking must be treated with LID treatment measures.
- 20% Minimized Surface Parking Credit: Have no surface parking except for incidental surface parking. Incidental surface parking is allowed only for emergency vehicle access, ADA accessibility, and passenger and freight loading zones.

(ii) Only one Minimized Surface Parking Credit may be used by an individual Category C Special Project, even if the project qualifies for multiple Minimized Surface Parking Credits.

(5) Any Regulated Project that meets all the criteria for multiple Special Projects Categories (i.e., a Regulated Project that may be characterized as a Category B or C Special Project) may only use the LID Treatment Reduction Credit allowed under one of the Special Projects Categories (i.e., a Regulated Project that may be characterized as a Category B or C Special Project may use the LID Treatment Reduction Credit allowed under Category B or Category C, but not the sum of both.)

~~(2) By December 1, 2010, the Permittees shall submit a proposal to the Water Board containing the following information:~~

- ~~Identification of the types of projects proposed for consideration of LID treatment reduction credits and an estimate of the number and cumulative area of potential projects during the remaining term of this Permit for each type of project;~~
- ~~Identification of institutional barriers and/or technical site-specific constraints to providing 100% LID treatment onsite that justify the allowance for non-LID treatment measures onsite;~~
- ~~Specific criteria for each type of Special Project proposed, including size, location, minimum densities, minimum floor area ratios, or other appropriate limitations;~~
- ~~Identification of specific water quality and environmental benefits provided by these types of projects that justify the allowance for non-LID treatment measures onsite;~~
- ~~Proposed LID treatment reduction credit for each type of Special Project and justification for the proposed credits. The justification shall include identification and an estimate of the specific water quality benefit provided by each type of Special Project proposed for LID treatment reduction credit; and~~
- ~~Proposed total treatment reduction credit for Special Projects that may be characterized by more than one category and justification for the proposed total credit.~~

iii. Effective Date – December 1, 2011.

iv. Implementation Level

(1) For any private development project for which a planning application has been deemed complete by a Permittee on or before the Permit effective date, Provisions C.3.e.i-ii shall not apply so long as the project applicant is diligently pursuing the project. Diligent pursuance may be demonstrated by the project applicant's submittal of supplemental information to the original application, plans, or other documents required for any necessary approvals of the project by the Permittee. If during the time period between the Permit effective date and the required implementation date of December 1, 2011, the project applicant has not taken any action to obtain

the necessary approvals from the Permittee, the project will then be subject to the requirements of Provision C.3.e.i-ii.

(2) For public projects for which funding has been committed and construction is scheduled to begin by December 1, 2012, the requirements of Provisions C.3.e.i-ii shall not apply.

(3) Provisions C.3.e.i-ii supersede any Alternative Compliance Policies previously approved by the Executive Officer

(4) For all offsite projects and Regional Projects installed in accordance with Provision C.3.e.i-ii, the Permittees shall meet the Operation & Maintenance (O&M) requirements of Provision C.3.h.

v. Reporting –The Permittees shall submit the ordinance/legal authority and procedural changes made, if any, to implement Provision C.3.e with their 2012 Annual Report. Annual reporting thereafter shall be done in conjunction with reporting requirements under Provision C.3.b.v.

Any Permittee choosing to require 100% LID treatment onsite for all Regulated Projects and not allow alternative compliance under Provision C.3.e, shall include a statement to that effect in the 2012 Annual Report and all subsequent Annual Reports.

vi. Reporting on Special Projects

(1) Beginning December 1, 2011, Permittees shall track any identified potential Special Projects that have submitted planning applications but that have not received final discretionary approval.

(2) By March 15 and September 15 of each year, Permittees shall report to the Water Board on these tracked potential Special Projects using Table 3.1 found at the end of Provision C.3. All the required column entry information listed in Table 3.1 shall be reported for each potential Special Project. Any Permittee with no potential Special Projects shall so state.

For each Special Project listed in Table 3.1, Permittees shall include a narrative discussion of the feasibility or infeasibility of 100% LID treatment, onsite and offsite. Both technical and economic feasibility or infeasibility shall be discussed, as applicable. The discussion shall also contain enough technical and/or economic detail to document the basis of infeasibility used.

(3) Once a Special Project has final discretionary approval, it shall be reported in the Provision C.3.b. Reporting Table in the same reporting year that the project was approved. In addition to the column entries contained in the Provision C.3.b. Reporting Table, the Permittees shall provide the following supplemental information for each approved Special Project:

(a) Submittal Date: Date that a planning application for the Special Project was submitted.

(b) Description: Type of project, number of floors, number of units (commercial, mixed-use, residential), type of parking, and other relevant information.

(c) Site Acreage: Total site area in acres.

(d) Density in DU/Ac: Number of dwelling units per acre.

(e) Density in FAR: Floor Area Ratio

(f) Special Project Category: For each applicable Special Project Category, list the specific criteria applied to determine applicability. For each non-applicable Special Project Category, indicate n/a.

(g) LID Treatment Reduction Credit Available: For each applicable Special Project Category, state the maximum total LID Treatment Reduction Credit applied. For Category C Special Projects also list the individual Location, Density, and Minimized Surface Parking Credits applied.

(h) List of Stormwater Treatment Systems: List all LID stormwater treatment systems approved. For each type of LID treatment system, indicate the percentage of the total amount of runoff identified in Provision C.3.d. for the Special Project's drainage area that will be treated.

(i) List of Non-LID Stormwater Treatment Systems: List all non-LID stormwater treatment systems approved. For each type of non-LID treatment system, indicate: (1) the percentage of the total amount of runoff identified in Provision C.3.d. for the Special Project's drainage area, and (2) whether the treatment system either meets minimum design criteria published by a government agency or received certification issued by a government agency, and reference the applicable criteria or certification.

Table 3.1 Standard Tracking and Reporting Form for Potential Special Projects

Project Name and No.	Permittee	Address	Application Submittal Date	Description	Site Total Acreage	Density DU/Ac	Density FAR	Special Project Category	LID Treatment Reduction Credit Available	List of LID Stormwater Treatment Systems	List of Non-LID Stormwater Treatment Systems
								Category A: Category B: Category C: Location: Density: Parking:	Category A: Category B: Category C: Location: Density: Parking:	Indicate each type of LID treatment system and the percentage of total runoff treated	Indicate each type of non-LID treatment system and the percentage of total runoff treated. Indicate whether minimum design criteria met or certification received (see footnotes).

Project Name and No: Name of the Special Project and Project No. (if applicable)

Permittee: Name of the Permittee in whose jurisdiction the Special Project will be built.

Address: Address of the Special Project; if no street address, state the cross streets.

Submittal Date: Date that a planning application for the Special Project was submitted; if a planning application has not been submitted, include a projected application submittal date.

Description: Type of project (commercial, mixed-use, residential), number of floors, number of units, type of parking, and other relevant information.

Site Acreage: Total site area in acres.

Density in DU/Ac: Number of dwelling units per acre.

Density in FAR: Floor Area Ratio

Special Project Category: For each applicable Special Project Category, list the specific criteria applied to determine applicability. For each non-applicable Special Project Category, indicate n/a.

LID Treatment Reduction Credit Available: For each applicable Special Project Category, state the maximum total LID Treatment Reduction Credit available. For Category C Special Projects also list the individual Location, Density, and Minimized Surface Parking Credits available.

List of LID Stormwater Treatment Systems: List all LID stormwater treatment systems proposed. For each type, indicate the percentage of the total amount of runoff identified in Provision C.3.d. for the Special Project's drainage area.

List of Non-LID Stormwater Treatment Systems: List all non-LID stormwater treatment systems proposed. For each type, indicate the percentage of the total amount of runoff identified in Provision C.3.d. for the Special Project's drainage area. For each type of non-LID treatment system, indicate: (1) the percentage of the total amount of runoff identified in Provision C.3.d. for the Special Project's drainage area, and (2) whether the treatment system either meets minimum design criteria published by a government agency or received certification issued by a government agency, and reference the applicable criteria or certification.

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ATTACHMENT F

Provision C.3.g.
Santa Clara Permittees
Hydromodification Management Requirements

Santa Clara Permittees Hydromodification Management Requirements

1. On-site and Regional Hydromodification Management (HM) Control Design Criteria

a. *Range of flows to control:* Flow duration controls shall be designed such that post-project stormwater discharge rates and durations match pre-project discharge rates and durations from 10 percent of the pre-project 2-year peak flow[4] up to the pre-project 10-year peak flow, except where the lower endpoint of this range is modified as described in Section 5 of this Attachment.

b. *Goodness of fit criteria*: The post-project flow duration curve shall not deviate above the pre-project flow duration curve by more than 10 percent over more than 10 percent of the length of the curve corresponding to the range of flows to control.

c. *Allowable low flow rate*: Flow control structures may be designed to discharge stormwater at a very low rate that does not threaten to erode the receiving waterbody. This flow rate (also called *Qcp*[5]) shall be no greater than 10 percent of the pre-project 2-year peak flow unless a modified value is substantiated by analysis of actual channel resistance in accordance with an approved User Guide as described in Section 5 of this Attachment.

d. *Standard HM modeling*: On-site and regional HM controls designed using the Bay Area Hydrology Model (BAHM[6]) and site-specific input data shall be considered to meet the HM Standard. Such use must be consistent with directions and options set forth in the most current BAHM User Manual.[7] Permittees shall demonstrate to the satisfaction of the Executive Officer that any modifications of the BAHM made are consistent with this attachment and Provision C.3.g.

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[4] Where referred to in this Order, the 2-year peak flow is determined using a flood flow frequency analysis procedure based on USGS Bulletin 17B to obtain the peak flow statistically expected to occur at a 2-year recurrence interval. In this analysis, the appropriate record of hourly rainfall data (e.g., 35–50 years of data) is run through a continuous simulation hydrologic model, the annual peak flows are identified, rank ordered, and the 2-year peak flow is estimated. Such models include USEPA's Hydrologic Simulation Program—Fortran (HSPF), U.S. Army Corps of Engineers' Hydrologic Engineering Center-Hydrologic Modeling System (HEC-HMS), and USEPA's Storm Water Management Model (SWMM).

[5] Qcp is the allowable low flow discharge from a flow control structure on a project site. It is a means of apportioning the critical flow in a stream to individual projects that discharge to that stream, such that cumulative discharges do not exceed the critical flow in the stream.

[6] See www.bayareahydrologymodel.org , Resources.

[7] *The Bay Area Hydrology Model User Manual* is available at http://www.bayareahydrologymodel.org/downloads.html.

e. *Alternate HM modeling and design*: The project proponent may use a continuous simulation hydrologic computer model[8] to simulate pre-project and post-project runoff and to design HM controls. To use this method, the project proponent shall compare the pre-project and post-project model output for a rainfall record of at least 30 years, and shall show that all applicable performance criteria in 1.a. – c. above are met.

2. Impracticability Provision

Where conditions (e.g., extreme space limitations) prevent a project from meeting the HM Standard for a reasonable cost, *and* where the project's runoff cannot be directed to a Regional HM control[9] within a reasonable time frame, *and* where an in-stream measure is not practicable, the project shall use (1) site design for hydrologic source control, *and* (2) stormwater treatment measures that collectively minimize, slow, and detain[10] runoff to the maximum extent practicable. In addition, if the cost of providing site design for hydrologic source control and treatment measures to the maximum extent practicable does not exceed 2% of the project cost (as defined in "2.a." below), the project shall contribute financially to an alternative HM project as set forth below:

a. *Reasonable cost*: To show that the HM Standard cannot be met at a reasonable cost, the project proponent must demonstrate that the total cost to comply with both the HM Standard and the Provision C.3.d treatment requirement exceeds 2 percent of the project construction cost, excluding land costs. Costs of HM and treatment control measures shall not include land costs, soil disposal fees, hauling, contaminated soil testing, mitigation, disposal, or other normal site enhancement costs such as landscaping or grading that are required for other development purposes.

b. *Regional HM control:* A regional HM control shall be considered available if there is a planned location for the regional HM control and if an appropriate funding mechanism for a regional control is in place by the time of project construction.

c. *In-stream measures practicability:* In-stream measures shall be considered practicable when an in-stream measure for the project's watershed is planned and an appropriate funding mechanism for an in-stream measure is in place by the time of project construction.

d. *Financial contribution to an alternative HM project:* The difference between 2 percent of the project construction costs and the cost of the treatment measures at the site (both costs as described in Section 2.a of this Attachment) shall be contributed to an alternative HM project, such as a stormwater treatment retrofit, HM retrofit, regional HM control, or in-stream measure. Preference shall be given to projects discharging, in this order, to the same tributary, mainstem, watershed, then in the same municipality or county.

3. Record Keeping

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[8] Such models include USEPA's Hydrologic Simulation Program—Fortran (HSPF), U.S. Army Corps of Engineers Hydrologic Engineering Center-Hydrologic Modeling System (HEC-HMS), and USEPA's Storm Water Management Model (SWMM).

[9] *Regional HM controls* are flow duration control structures that collect stormwater runoff discharge from multiple projects (each of which should incorporate hydrologic source control measures as well) and are designed such that the HM Standard is met for all the projects at the point where the regional control measure discharges.

[10] Stormwater treatment measures that detain runoff are generally those that filter runoff through soil or other media, and include bioretention units, bioswales, basins, planter boxes, sand filters, and green roofs.

Permittees shall collect and retain the following information for all projects subject to HM requirements:

a. Site plans identifying impervious areas, surface flow directions for the entire site, and location(s) of HM measures;

b. For projects using standard sizing charts, a summary of sizing calculations used;

c. For projects using the BAHM, a listing of model inputs;

d. For projects using custom modeling, a summary of the modeling calculations with corresponding graph showing curve matching (existing, post-project, and post-project with HM controls curves);

e. For projects using the Impracticability Provision, a listing of all applicable costs and a brief description of the alternative HM project (name, location, date of start up, entity responsible for maintenance); and

f. A listing, summary, and date of modifications made to the BAHM, including technical rationale. Permittees shall submit this list and explanation annually with the Annual Report. This may be prepared at the Countywide Program level and submitted on behalf of participating Permittees.

4. HM Control Areas

Applicable projects shall be required to meet the HM Standard when such projects are located in areas of HM applicability as described below and shown in the revised Santa Clara Permittees' HM Map (see Attachment M). ~~the Santa Clara Permittees' HM Map (available at http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/muni/mrp/Final%20TO%20HM%20Maps.pdf).~~

a. **Purple areas**: These areas represent catchments that drain to hardened channels that extend continuously to the Bay or to tidally influenced sections of creeks. The HM Standard and associated requirements do not apply to projects in the areas designated in purple on the map.

Plans to restore a creek reach may reintroduce the applicability of HM requirements, unless the creek restoration project is designed to accommodate the potential hydromodification impacts of future development; if this is not the case, in these instances, Permittees may add, but shall not delete, areas of applicability accordingly.

b. **Red areas**: These areas represent catchments and subwatersheds that are greater than or equal to 65% impervious, based on existing imperviousness data sources. The HM Standard and associated requirements do not apply to projects in the areas designated in red on the map.

~~**c. Pink areas**: These are areas that are under review by the Permittees for accuracy of the imperviousness data. The HM Standard and associated requirements apply to projects in areas designated as pink on the map until such time as a Permittee presents new data that indicate that the actual level of imperviousness of a particular area is greater than or equal to 65% impervious. Any new data will be submitted to the Water Board in one coordinated submittal within one year of permit adoption.~~

c. **Green area**: These areas represent catchments and subwatersheds that are less than 65% impervious ~~and are not under review by the Permittees~~. The HM Standard and associated requirements apply to projects in areas designated as green on the map.

5. Potential Exceptions to Map Designations

The Program may choose to prepare a User Guide[11] to be used for evaluating individual receiving waterbodies using detailed methods to assess channel stability and watercourse critical flow. This User Guide would reiterate and collate established stream stability assessment methods that have been presented in the Program's HMP.[12] After the Program has collated its methods into User Guide format, received approval of the User Guide from the Executive Officer,[13] and informed the public through such process as an electronic mailing list, the Permittees may use the User Guide to guide preparation of technical reports for the following: implementing the HM Standard using in-stream or regional controls; determining whether certain projects are discharging to a watercourse that is less susceptible (from point of discharge to the Bay) to hydromodification (e.g., would have a lower potential for erosion than set forth in these requirements); and/or determining if a watercourse has a higher critical flow and project(s) discharging to it are eligible for an alternative Qcp for the purpose of designing on-site or regional measures to control flows draining to these channels (i.e., the actual threshold of erosion-causing critical flow is higher than 10 percent of the 2-year pre-project flow). In no case shall the design value of Qcp exceed 50 percent of the 2-year pre-project flow.

[11] The User Guide may be offered under a different title.
[12] The Program's HMP has undergone Water Board staff review and been subject to public notice and comment.
[13] The User Guide will not introduce a new concept, but rather reformat existing methods; therefore, Executive Officer approval is appropriate.

APPENDIX II

Attachments L and M
to be added to
Water Board Order No. R2-2009-0074

ATTACHMENT L

Provision C.3.c.i.(1)(b)(vi)

Specification of soils for Biotreatment or Bioretention Facilities

Soils for biotreatment or bioretention areas shall meet two objectives:

- Be sufficiently permeable to infiltrate runoff at a minimum rate of 5" per hour during the life of the facility, and
- Have sufficient moisture retention to support healthy vegetation.

Achieving both objectives with an engineered soil mix requires careful specification of soil gradations and a substantial component of organic material (typically compost).

Local soil products suppliers have expressed interest in developing 'brand-name' mixes that meet these specifications. At their sole discretion, municipal construction inspectors may choose to accept test results and certification for a 'brand-name' mix from a soil supplier.

Tests must be conducted within 120 days prior to the delivery date of the bioretention soil to the project site.

Batch-specific test results and certification shall be required for projects installing more than 100 cubic yards of bioretention soil.

SOIL SPECIFICATIONS

Bioretention soils shall meet the following criteria. "Applicant" refers to the entity proposing the soil mixture for approval by a Permittee.

1. General Requirements – Bioretention soil shall:
   a. Achieve a long-term, in-place infiltration rate of at least 5 inches per hour.
   b. Support vigorous plant growth.
   c. Consist of the following mixture of fine sand and compost, measured on a volume basis:

      60%-70% Sand

      30%-40% Compost
2. Submittal Requirements – The applicant shall submit to the Permittee for approval:
   a. A sample of mixed bioretention soil.
   b. Certification from the soil supplier or an accredited laboratory that the Bioretention Soil meets the requirements of this guideline specification.
   c. Grain size analysis results of the fine sand component performed in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.
   d. Quality analysis results for compost performed in accordance with Seal of Testing Assurance (STA) standards, as specified in 4.

e. Organic content test results of mixed Bioretention Soil. Organic content test shall be performed in accordance with by Testing Methods for the Examination of Compost and Composting (TMECC) 05.07A, "Loss-On-Ignition Organic Matter Method".

f. Grain size analysis results of compost component performed in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.

g. A description of the equipment and methods used to mix the sand and compost to produce Bioretention Soil.

h. Provide the name of the testing laboratory(s) and the following information:

(1) Contact person(s)

(2) Address(s)

(3) Phone contact(s)

(4) E-mail address(s)

(5) Qualifications of laboratory(s), and personnel including date of current certification by STA, ASTM, or approved equal

3. <u>Sand for Bioretention Soil</u>

a. Sand shall be free of wood, waste, coating such as clay, stone dust, carbonate, etc., or any other deleterious material. All aggregate passing the No. 200 sieve size shall be non-plastic.

b. Sand for Bioretention Soils shall be analyzed by an accredited lab using #200, #100, #40, #30, #16. #8, #4, and 3/8 inch sieves (ASTM D 422 or as approved by municipality), and meet the following gradation:

Sieve Size	**Percent Passing (by weight)**	
	Min	***Max***
3/8 inch	100	100
No. 4	90	100
No. 8	70	100
No. 16	40	95
No. 30	15	70
No. 40	5	55
No. 100	0	15
No. 200	0	5

Note: all sands complying with ASTM C33 for fine aggregate comply with the above gradation requirements.

4. Composted Material

Compost shall be a well decomposed, stable, weed free organic matter source derived from waste materials including yard debris, wood wastes or other organic materials not including manure or biosolids meeting the standards developed by the US Composting Council (USCC). The product shall be certified through the USCC Seal of Testing Assurance (STA) Program (a compost testing and information disclosure program).

a. Compost Quality Analysis – Before delivery of the soil, the supplier shall submit a copy of lab analysis performed by a laboratory that is enrolled in the US Composting Council's Compost Analysis Proficiency (CAP) program and using approved Test Methods for the Evaluation of Composting and Compost (TMECC). The lab report shall verify:

(1) Feedstock Materials shall be specified and include one or more of the following: landscape/yard trimmings, grass clippings, food scraps, and agricultural crop residues.

(2) Organic Matter Content: 35% - 75% by dry wt.

(3) Carbon and Nitrogen Ratio: C:N < 25:1 and C:N >15:1

(4) Maturity/Stability: shall have a dark brown color and a soil-like odor. Compost exhibiting a sour or putrid smell, containing recognizable grass or leaves, or is hot (120F) upon delivery or rewetting is not acceptable. In addition any one of the following is required to indicate stability:

(i) Oxygen Test < 1.3 O2 /unit TS /hr

(ii) Specific oxy. Test < 1.5 O2 / unit BVS /

(iii) Respiration test < 8 C / unit VS / day

(iv) Dewar test < 20 Temp. rise (°C) e.

(v) Solvita® > 5 Index value

(5) Toxicity: any one of the following measures is sufficient to indicate non-toxicity.

(i) NH4- : NO3-N < 3

(ii) Ammonium < 500 ppm, dry basis

(iii) Seed Germination > 80 % of control

(iv) Plant Trials > 80% of control

(v) Solvita® > 5 Index value

(6) Nutrient Content: provide analysis detailing nutrient content including N-P-K, Ca, Na, Mg, S, and B.

(i) Total Nitrogen content 0.9% or above preferred.

(ii) Boron: Total shall be <80 ppm; Soluble shall be <2.5 ppm

(7) Salinity: Must be reported; < 6.0 mmhos/cm

(8) pH shall be between 6.5 and 8. May vary with plant species.

b. Compost for Bioretention Soil Texture – Compost for bioretention soils shall be analyzed by an accredited lab using #200, 1/4 inch, 1/2 inch, and 1 inch sieves (ASTM D 422 or as approved by municipality), and meet the following gradation:

Sieve Size	**Percent Passing (by weight)**	
	Min	***Max***
1 inch	99	100
1/2 inch	90	100
1/4 inch	40	90
No. 200	2	10

c. Bulk density shall be between 500 and 1100 dry lbs/cubic yard

d. Moisture content shall be between 30% - 55% of dry solids.

e. Inerts – compost shall be relatively free of inert ingredients, including glass, plastic and paper, < 1 % by weight or volume.

f. Weed seed/pathogen destruction – provide proof of process to further reduce pathogens (PFRP). For example, turned windrows must reach min. 55C for 15 days with at least 5 turnings during that period.

g. Select Pathogens – Salmonella <3 MPN/4grams of TS, or Coliform Bacteria <10000 MPN/gram.

h. Trace Contaminants Metals (Lead, Mercury, Etc.) – Product must meet US EPA, 40 CFR 503 regulations.

i. Compost Testing – The compost supplier will test all compost products within 120 calendar days prior to application. Samples will be taken using the STA sample collection protocol. (The sample collection protocol can be obtained from the U.S. Composting Council, 4250 Veterans Memorial Highway, Suite 275, Holbrook, NY 11741 Phone: 631-737-4931, www.compostingcouncil.org). The sample shall be sent to an independent STA Program approved lab. The compost supplier will pay for the test.

VERIFICATION OF ALTERNATIVE BIORETENTION SOIL MIXES

Bioretention soils not meeting the above criteria shall be evaluated on a case by case basis. Alternative bioretention soil shall meet the following specification: "Soils for bioretention facilities shall be sufficiently permeable to infiltrate runoff at a minimum rate of 5 inches per hour during the life of the facility, and provide sufficient retention of moisture and nutrients to support healthy vegetation."

The following steps shall be followed by municipalities to verify that alternative soil mixes meet the specification:

1. General Requirements – Bioretention soil shall achieve a long-term, in-place infiltration rate of at least 5 inches per hour. Bioretention soil shall also support vigorous plant growth. The applicant refers to the entity proposing the soil mixture for approval.

   a. Submittals – The applicant must submit to the municipality for approval:

      (1) A sample of mixed bioretention soil.

      (2) Certification from the soil supplier or an accredited laboratory that the Bioretention Soil meets the requirements of this guideline specification.

      (3) Certification from an accredited geotechnical testing laboratory that the Bioretention Soil has an infiltration rate between 5 and 12 inches per hour as tested according to Section 1.b.(2)(ii).

      (4) Organic content test results of mixed Bioretention Soil. Organic content test shall be performed in accordance with by Testing Methods for the Examination of Compost and Composting (TMECC) 05.07A, "Loss-On-Ignition Organic Matter Method".

      (5) Grain size analysis results of mixed bioretention soil performed in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.

      (6) A description of the equipment and methods used to mix the sand and compost to produce Bioretention Soil.

      (7) The name of the testing laboratory(s) and the following information:

         (i) contact person(s)

         (ii) address(s)

         (iii) phone contact(s)

         (iv) e-mail address(s)

         (v) qualifications of laboratory(s), and personnel including date of current certification by STA, ASTM, or approved equal

   b. Bioretention Soil

      (1) Bioretention Soil Texture

      Bioretention Soils shall be analyzed by an accredited lab using #200, and 1/2" inch sieves (ASTM D 422 or as approved by municipality), and meet the following gradation:

Sieve Size	**Percent Passing (by weight)**	
	Min	***Max***
1/2 inch	97	100
No. 200	2	5

      (2) Bioretention Soil Permeability testing

      Bioretention Soils shall be analyzed by an accredited geotechnical lab for the following tests:

(i) Moisture – density relationships (compaction tests) shall be conducted on bioretention soil. Bioretention soil for the permeability test shall be compacted to 85 to 90 percent of the maximum dry density (ASTM D1557).

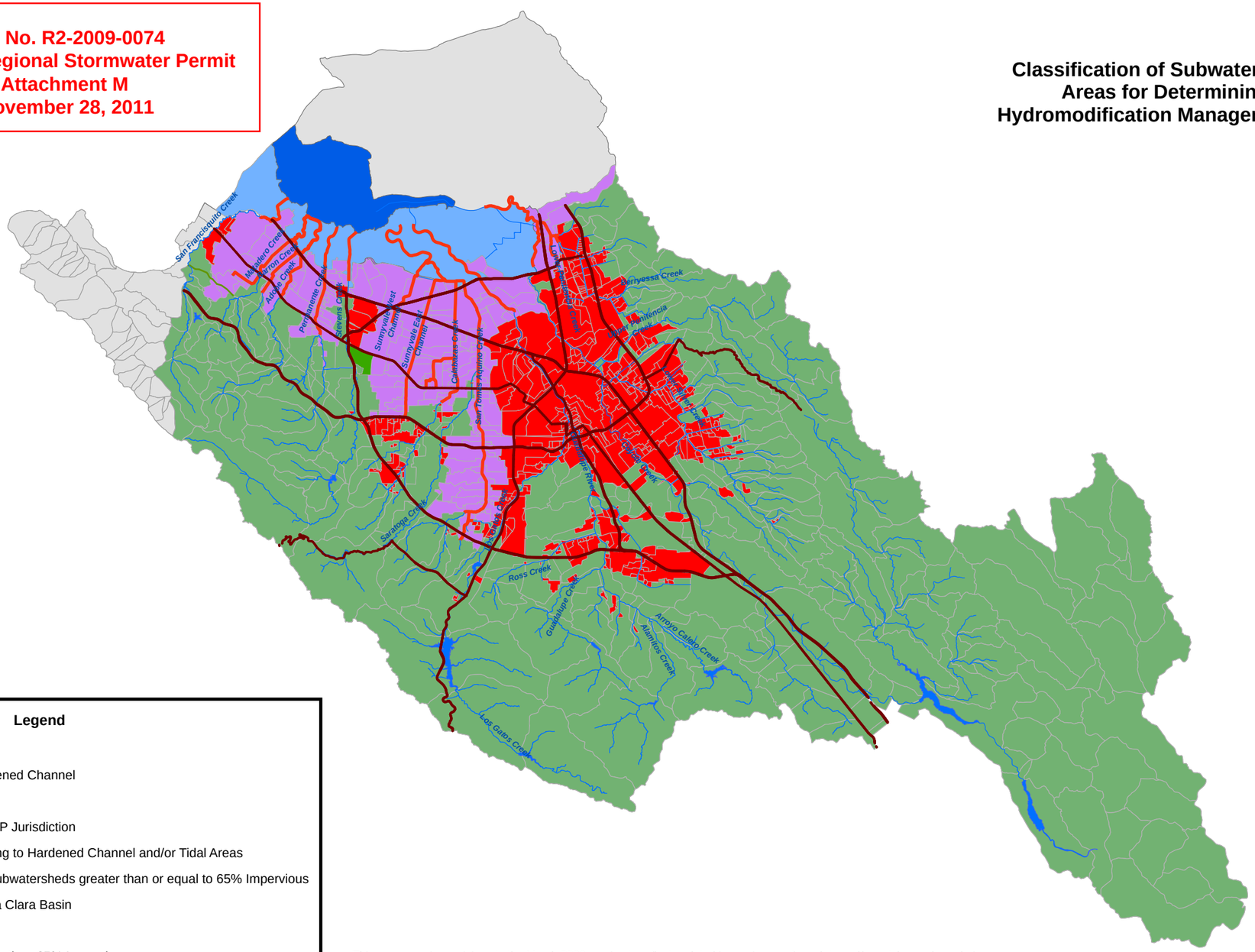
(ii) Constant head permeability testing in accordance with ASTM D2434 shall be conducted on a minimum of two samples with a 6-inch mold and vacuum saturation.

MULCH FOR BIORETENTION FACILITIES

Mulch is recommended for the purpose of retaining moisture, preventing erosion and minimizing weed growth. Projects subject to the State's Model Water Efficiency Landscaping Ordinance (or comparable local ordinance) will be required to provide at least two inches of mulch. Aged mulch, also called compost mulch, reduces the ability of weeds to establish, keeps soil moist, and replenishes soil nutrients. Aged mulch can be obtained through soil suppliers or directly from commercial recycling yards. It is recommended to apply 1" to 2" of composted mulch, once a year, preferably in June following weeding.

Order No. R2-2009-0074
Municipal Regional Stormwater Permit
Attachment M
November 28, 2011

Classification of Subwatersheds and Catchment Areas for Determining Applicability of Hydromodification Management (HM) Requirements



Legend

- Major Roads
- Continuously Hardened Channel
- Major Creeks
- Outside SCVURPPP Jurisdiction
- Catchments Draining to Hardened Channel and/or Tidal Areas
- Catchments and Subwatersheds greater than or equal to 65% Impervious
- Reservoirs in Santa Clara Basin
- Baylands
- Subwatersheds less than 65% Impervious

Revision Date: November 2010

N

0 0.5 1 2 3 4 5 Miles

This map contains revisions to the March 2009 version to reflect updated impervious surface data and/or catchment boundaries in the Cities of San Jose, Sunnyvale, Mountain View, and Milpitas, as described in the report to the Water Board dated October 14, 2010, consistent with the HM applicability criteria set forth in Attachment F, Section 4 of the MRP.

APPENDIX III

Fact Sheet

This Fact Sheet describes the legal requirements and technical rationale that serve as the basis for this Order's requirements. This Fact Sheet constitutes a portion of the findings for the Order.

Purpose

The purpose of the Order is to amend Water Board Order No. R2-2009-0074, the San Francisco Bay Municipal Regional Stormwater Permit, to add criteria for determining which types of Regulated Projects may be considered Special Projects and to allow these Special Projects to reduce the amount of stormwater runoff that must be treated with Low Impact Development (LID) stormwater treatment systems.

Background and Summary of Existing Requirements

On October 14, 2009, the Water Board adopted Order No. R2-2009-0074, NPDES No. CAS612008, prescribing Waste Discharge Requirements under the San Francisco Bay Municipal Regional Stormwater Permit for the discharge of stormwater runoff from the municipal separate storm sewer systems (MS4s) of the named Permittees.

Provision C.3. of Order No. R2-2009-0074 requires the Permittees to use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects. Provision C.3. requires that the source control, site design, and stormwater treatment measures be LID measures.

Provision C.3.b. of Order No. R2-2009-0074 defines Regulated Projects as the different categories of new development and redevelopment projects that Permittees must regulate under Provision C.3. These categories are defined on the basis of the land use and the amount of impervious surface created and/or replaced by the project because all impervious surfaces contribute pollutants to stormwater runoff and certain land uses contribute more pollutants. Impervious surfaces can neither absorb water nor remove pollutants as the natural, vegetated soil they replaced can. Also, urban development creates new pollution by bringing higher levels of car emissions that are aerially deposited, car maintenance wastes, pesticides, household hazardous wastes, pet wastes, and trash, which can all be washed into the storm sewer.

Provision C.3.c. of Order No. R2-2009-0074 recognizes LID as a cost-effective, beneficial, holistic, integrated stormwater management strategy[1]. The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treat stormwater as a resource, rather than a waste product. Practices used to adhere to these LID principles include measures such as preserving undeveloped open space, rain barrels and cisterns, green roofs, permeable pavement, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes.

[1] USEPA, *Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices* (Publication Number EPA 841-F-07-006, December 2007) http://www.epa.gov/owow/nps/lid/costs07)

This Provision sets forth a three-pronged approach to LID with source control, site design, and stormwater treatment requirements. The concepts and techniques for incorporating LID into development projects, particularly for site design, have been extensively discussed in BASMAA's Start at the Source manual (1999) and its companion document, Using Site Design Techniques to Meet Development Standards for Stormwater Quality (May 2003), as well as in various other LID reference documents.

Provision C.3.c.i.(2)(b) requires each Regulated Project to treat 100% of the Provision C.3.d. runoff with LID treatment measures onsite or with LID treatment measures at a joint stormwater treatment facility. LID treatment measures are harvesting and re-use, infiltration, evapotranspiration, or biotreatment. A properly engineered and maintained biotreatment system may be considered only if it is infeasible to implement harvesting and re-use, infiltration, or evapotranspiration at a project site.

Provision C.3.c.i.(2)(b)(vi) requires the Permittees to propose specifications for soil installed in all biotreatment or bioretention facilities built under the provisions of this permit. These minimum specifications are contained in Attachment L. These specifications were proposed by the Permittees pursuant to Provision C.3.c.iii.(3) after research performed under their direction.[2, 3, 4]

Provision C.3.c.i.(2)(b)(vii) requires minimum specifications for green roofs which are installed as treatment measures under this permit. The Permittees proposed green roof minimum specifications pursuant to Provision C.3.c.iii.(4) and submitted a brief report in support of their proposal.[5]

Special Projects

Provision C.3.e.ii.(1) of Order No. R2-2009-0074 was included based on the Permittees' and building industry stakeholders' comments and testimony during order adoption that certain types of smart growth, high density, and transit-oriented development projects cannot practicably implement LID treatment including biotreatment. LID treatment measures, including infiltration, harvest for use, evapotranspiration and green roofs can be infeasible to implement in a dense urban context in some cases, from a physical or cost basis. The urban centers in this region are often underlain by tight clay soils that make infiltration difficult, requiring storage at possibly prohibitive cost. Stormwater harvest for internal, non-potable use still meets regulatory obstacles from implementation of the plumbing code and lack of winter water demand. Green roofs continue to be very expensive, and evapotranspiration is lowest in the cold winter when rains fall. Many dense, central business district developments lack room for planted areas for biotreatment.

Moreover, these projects have various environmental benefits, including either reducing existing impervious surfaces associated with commercial or residential development due to increased

[2] Technical Memorandum – Regional Bioretention Soil Guidance & Model Specification, Bay Area Stormwater Management Agencies Association – WRA Environmental Consultants, November 12, 2010

[3] Technical Memorandum – Regional Bioretention Installation Guidance, Bay Area Stormwater Management Agencies Association – WRA Environmental Consultants, November 12, 2010

[4] Annotated Bibliography – Regional Biotreatment Soil Guidance, Bay Area Stormwater Management Agencies Association – WRA Environmental Consultants, November 12, 2010

[5] Green Roof Minimum Specifications, Bay Area Stormwater Management Agencies Association, April 29, 2011.

density, or creating less "accessory" impervious areas and less auto-related pollutant impacts. Auto use in general and its associated pollution is reduced because residential areas are closer to commercial areas for jobs and services, and closer to transit hubs. In addition, concentrating development in urban centers should reduce pressure to develop green fields on the urban perimeter.

Incentive LID treatment reduction credits approved by the Water Board may be applied to these types of Regulated Projects that are considered "Special Projects."

Provision C.3.e.ii.(2) of Order No. R2-2009-0074 required the Permittees to submit by December 1, 2010, a proposal to the Water Board identifying the types of projects proposed as Special Projects and therefore eligible for LID Treatment Reduction Credit. The proposal was required to include specific criteria for each type of Special Project proposed, including size, location, minimum densities, minimum floor area ratios, other appropriate limitations, and the proposed LID Treatment Reduction Credit. Specifically, the Provision required the proposal to contain the following:

- Identification of the types of projects proposed for consideration of LID treatment reduction credits and an estimate of the number and cumulative area of potential projects during the remaining term of this permit for each type of project.
- Identification of institutional barriers and/or technical site specific constraints to providing 100% LID treatment onsite that justify the allowance for non-LID treatment measures onsite.
- Specific criteria for each type of Special Project proposed, including size, location, minimum densities, minimum floor area ratios, or other appropriate limitations.
- Identification of specific water quality and environmental benefits provided by these types of projects that justify the allowance for non-LID treatment measures onsite.
- Proposed LID Treatment Reduction Credit for each type of Special Project and justification for the proposed Credits. The justification shall include identification and an estimate of the specific water quality benefit provided by each type of Special Project proposed for LID treatment reduction credit.
- Proposed total treatment reduction credit for Special Projects that may be characterized by more than one category and justification for the proposed total Credit.

On December 1, 2010, the Bay Area Stormwater Management Agencies Association (BASMAA) submitted a Special Projects proposal on behalf of the Permittees, which defined the types of Special Project Categories and their corresponding LID Treatment Reduction Credits.

BASMAA's stormwater proposal was posted on the Water Board's website and circulated for public comment on December 10, 2010. Comments on the proposal were received from U.S. EPA, the Natural Resources Defense Council (NRDC), San Francisco Baykeeper, the Building Industry Association, other building industry groups, and developers.

Water Board staff has met on a regular basis with representatives of BASMAA and, within these meetings, revisions of the December 10, 2010, proposal have been made and publicly circulated. Representatives of U.S. EPA, the Metropolitan Transportation Commission (MTC) and the

Association of Bay Area Governments (ABAG), among other stakeholders, have participated in some of these meetings. Water Board staff has also met separately with representatives of NRDC and San Francisco Baykeeper.

In the Permittees' original submittal and at subsequent meetings, the Permittees' have provided Water Board staff with estimates of the number and type of projects that may potentially qualify as Special Projects and the percentage of LID Treatment Reduction Credit that may be applied for the various projects.

The proposed revision to Provision C.3.e.ii. of Order No. R2-2009-0074 establishes specific criteria for determining which types of Regulated Projects may be considered Special Projects, which are more stringent than originally proposed by the Permittees. The proposed revision establishes three categories of Special Projects, with different amounts of maximum allowable non-LID treatment, based on size, land use type, and density. Projects that are the most dense and would have the greatest infeasibility problems with LID implementation are allowed to use the most non-LID treatment. Category A projects (Provision C.3.e.ii), which represents the smallest Special Projects, must be under a half acre, built in a pedestrian-oriented business district and have 85% lot coverage. Category B projects (Provision C.3.e.iii) must also have 85% lot coverage, a minimum density, and be between a half acre and 2 acres. Category C, transit-oriented development projects (Provision C.3.e.iv), have no size limitation, but must have a minimum density, and are allowed an additional non-LID treatment percentage based on proximity to transit, density, and parking criteria to establish a tiered approach for determining the total LID Treatment Reduction available. The amount of Provision C.3.d. design stormwater runoff not treated with LID measures, must be treated with one or a combination of the following two specific non-LID treatment systems:

- Tree-box-type high flowrate biofilters
- Vault-based high flowrate media filters

If LID treatment measures are not feasible, these are the best controls for qualifying Special Projects to reduce pollutants in stormwater discharges to the maximum extent practicable.

Provision C.3.e.ii.(2) of Board Order No. R2-2009-0074 is now superseded by a new Provision C.3.e.ii.(2) and Provisions C.3.e.ii.(3) and C.3.e.ii.(4), which specify criteria in three categories for determining which types of Regulated Projects may be considered Special Projects and which are more stringent than originally proposed by the Permittees.

Qualifying Special Projects are dense urban development projects that will reduce development pressure on the greenfield suburban fringe by concentrating residences and commercial development in urban centers. These projects have many more commercial square feet and dwelling units per square foot of impervious surface. Dense urban "smart growth" tends to be more pedestrian-friendly, allowing reduced auto use and reduction of associated pollution.

Transit-oriented developments are designed to reduce automobile use and will reduce associated urban runoff pollution. Typically, high density residential developments are designed to be within ½ mile of a major transit hub, with commercial development also included in the developments so that shops and jobs are all clustered in a central location, with easy transit access. These elements add up to fewer automobile trips and more use of transit.

Page 6 of *New Places, New Choices: Transit-Oriented Development in the San Francisco Bay Area*, November 2006, by the MTC, states:

> In 2002, the Bay Area's "Smart Growth Strategy" —a landmark, long-range regional visioning effort —found that promoting transit-oriented development and focusing housing, jobs and retail along transit corridors would preserve as much as 66,000 acres of open space by 2020, compared with current development trends. Such a strategy also would reduce average weekday driving by as much as 3.6 million vehicle miles in 2020, conserving 150,000 gallons of gasoline a day and reducing daily carbon dioxide emissions (the principal greenhouse gas) by 2.9 million pounds per day. Already, Bay Area households located close to transit stations make fewer driving trips than do others in the region. Households within a half-mile of train stations and ferry stops log only 20 vehicle miles of travel per day, just 56 percent of the regional average. The fewer trips people make, the fewer the pollution-producing "cold starts" of their cars. These factors combine to result in lower fuel use and lower tailpipe emissions by those households living close to transit — and they also add up to powerfully persuasive evidence of the environmental benefits of TOD in the Bay Area.

Page 8 of the same MTC report also states:

> ...Proximity Matters - Bay Area residents who live within a half-mile of rail or ferry stops are four times as likely to use transit, three times as likely to bike, and twice as likely to walk as are those who live at greater distances.

The proposed reporting requirements (Provision C.3.e.vi) provides Water Board staff with early notice of the Special Projects that are being considered by the Permittees prior to the Permittees granting final planning approval. This allows Water Board staff to validate the Permittees' analysis of the number and size of potential Special Projects that may be approved during the remainder of the MRP's permit term. The reporting requirements also require the Permittees to describe in detail the basis for infeasibility of implementing LID treatment when non-LID treatment is used. Also, the Permittees must describe the types of filter vaults or tree filters used, and the certification these systems have achieved. Water Board staff intends to use the data collected in the proposed reporting requirements to revise the Special Projects criteria as appropriate for the next MRP permit term.

Biotreatment Soil Media and Green Roof Minimum Specifications

Provisions C.3.c.i.(2)(vi) and C.3.c.iii.(3) of Order No. R2-2009-0074 required the Permittees to submit to the Water Board by May 1, 2011, a proposed set of model biotreatment soil media specifications and soil infiltration testing methods to verify a long-term infiltration rate of 5 to 10 inches/hour.

The Permittees submitted a proposal for the soil media specifications and soil infiltration testing methods on December 1, 2010, which was distributed for public comment on December 15, 2010. Comments were received on January 28, 2011, from Roger James of Resources Management and from NRDC.

Provisions C.3.c.i.(2)(vii) and C.3.c.iii.(4) of Order No. R2-2009-0074 require the Permittees to submit to the Water Board by December 1, 2011, proposed minimum specifications for green roofs to be considered biotreatment systems.

The Permittees submitted a proposal for the minimum green roof specifications on April 29, 2011, which was distributed for public comment on May 4, 2011. No comments were received.

This Order approves the model biotreatment soil media specifications, soil infiltration testing methods, and minimum green roof specifications submitted by the Permittees.

Hydromodification Management (HM) – Santa Clara Permittees

Provision C.3.g. of Order No. R2-2009-0074 requires that certain new development projects manage increases in stormwater runoff flow and volume so that post-project runoff shall not exceed estimated pre-project runoff rates and durations, where such increased flow and/or volume is likely to cause increased potential for erosion of creek beds and banks, silt pollutant generation, or other adverse impacts on beneficial uses due to increased erosive force.

Based on Hydrograph Modification Management Plans that were developed for the Permittees on a countywide basis, the Water Board adopted HM requirements specific to the Permittees in each county, prior to the 2009 adoption of the MRP. Provision C.3.g. of Order No. R2-2009-0074 restates the major common elements of the specific HM requirements for all Permittees. Within Provision C.3.g., Attachment F contains the specific HM requirements for the Santa Clara Permittees.

Provision C.3.g.ii.(5) of Order No. R2-2009-0074 requires the Santa Clara Permittees to comply with all the requirements in Attachment F of the same Order. Requirement 4. of Attachment F (pages F-3 and F-4 of Order No. R2-2009-0074) defines geographical areas where applicable Regulated Projects are required to meet the HM Standard and associated requirements. These areas of HM applicability described in Requirement 4. are shown in the Santa Clara Permittees' HM Map available at http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/muni/mrp/Final%20TO%20HM%20Maps.pdf.

Requirement 4.c. of Attachment F states that pink areas on the HM Map are under review by the Permittees for accuracy of the imperviousness data. The HM Standard and associated requirements apply to projects in areas designated as pink on the map until such time as a Permittee presents new data that indicates that the actual level of imperviousness of a particular area is greater than or equal to 65% impervious. Any new data is to be submitted to the Water Board in one coordinated submittal within one year of permit adoption.

The Santa Clara Permittees submitted new impervious data and a revised HM Map that reflects the new data to the Water Board on October 14, 2010. On March 11, 2011, the Santa Clara Permittees submitted a revised HM Map to correct a small error in the October 2010 HM Map, and to provide additional information per Water Board staff request. The revised HM Map shows that in the majority of the pink area of the originally-approved Santa Clara Permittees' HM Map, the HM Standard and associated requirements do apply. In the revised HM Map, these areas are now shown in green to represent the applicability of the HM Standard and associated

requirements. The remaining small portion of the pink area in the original HM Map is now shown in red to represent areas where the HM Standard and associated requirements do not apply.

This Order approves the revised Santa Clara Permittees' HM Map and replaces the HM Map originally adopted by Order No. R2-2009-0074.