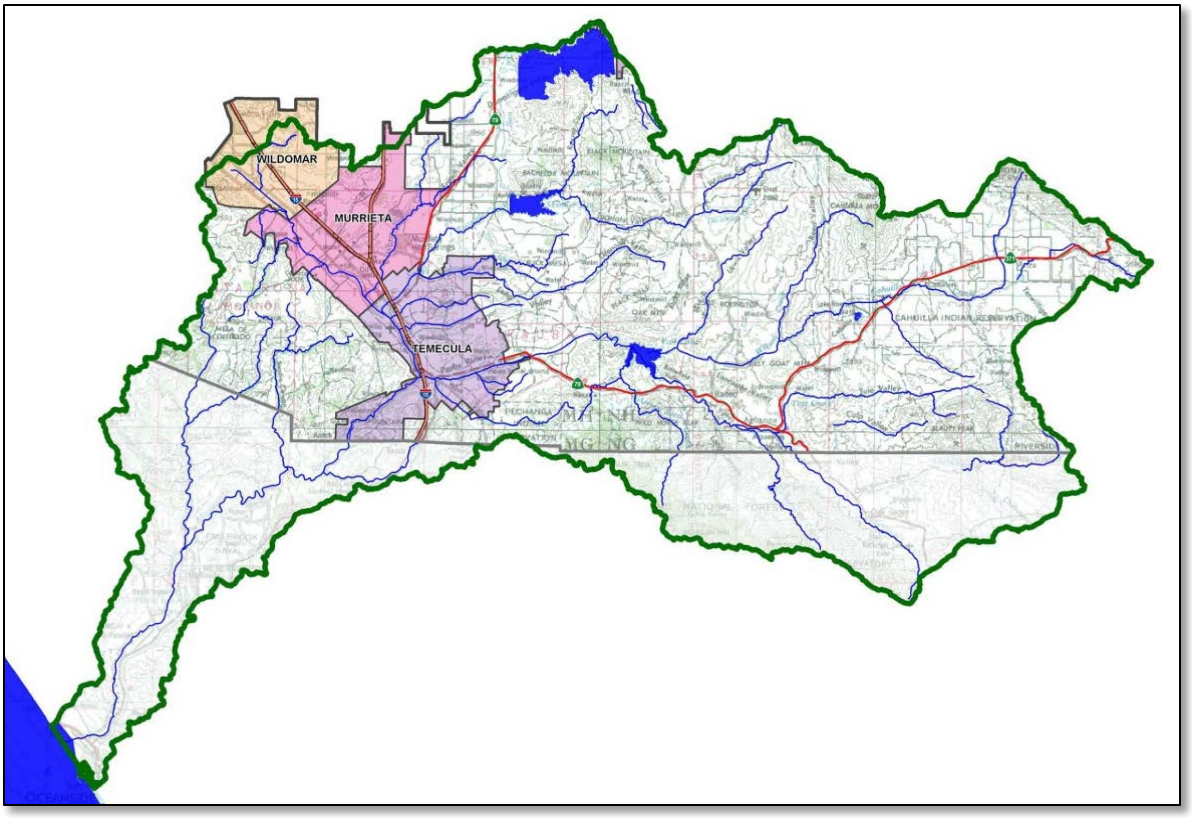
Foreword

This 2012 Water Quality Management Plan (WQMP) for the Santa Margarita Region of Riverside County is **NOT yet in effect**. It has been submitted to the San Diego Regional Water Quality Control Board (Regional Board) for approval, and within 180 days of Regional Board approval, each Copermittee in the Santa Margarita Region of Riverside County will begin implementation of the approved version of the Document. Until that time, consult with your local Copermittee to determine the applicable interim requirements.

Check back at www.rcflood.org/npdes/SantaMargaritaWS.aspx for updates.

WATER QUALITY MANAGEMENT PLAN

for the Santa Margarita Region of Riverside County



Date approved by the San Diego Regional Water Quality Control Board:

(Date will be inserted here upon Regional Board approval)

Water Quality Management Plan

for the Santa Margarita Region *of Riverside County*

In compliance with Order No. R9-2010-0016, this WQMP has been developed and will be implemented by the following Copermittees in the Santa Margarita Region within 180 days of the approval date on the front cover of this document:

Copermittees:

County of Riverside
All Project applications:
www.countyofriverside.us/

For WQMP questions in unincorporated County areas:
www.rcflood.org

Murrieta
http://www.murrieta.org/

Temecula
http://www.cityoftemecula.org/

Wildomar
http://www.cityofwildomar.org/

Prepared with assistance from
Brown and Caldwell

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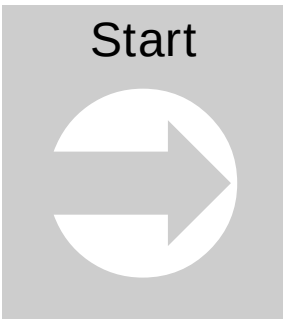
Exhibits



INTRODUCTION

This Water Quality Management Plan (WQMP) is a guidance document that will help you to design your project in compliance with San Diego Regional Water Quality Control Board (San Diego Regional Board) requirements for Priority Development Projects. These requirements are specified in the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit issued to the Riverside County Flood Control District, County of Riverside, and Cities of Murrieta, Temecula, and Wildomar (Copermittees) in November 2010 (2010 SMR MS4 Permit). The area covered by this MS4 Permit is referred to as the Santa Margarita Region (SMR).

This guidance is only applicable to projects in the cities of:

- Murrieta
- Temecula
- Wildomar

And

- Portions of Unincorporated County of Riverside that are within the Santa Margarita Watershed.

The requirements are complex and technical. Because every project is different, you should begin, if possible, by scheduling a pre-application meeting with the applicable City / County staff to understand the specific submittal requirements for your project.

Be sure to use the most recent version of this WQMP for each and every project, including updates and errata. The most recent version is available at www.rcflood.org/NPDES/Developers.aspx. This WQMP may be updated periodically based on the Copermittees' experience with implementation of this document. Any non-substantive updates to the WQMP will be provided in the Copermittee's Annual Report to the San Diego Regional Board. Substantive updates will be submitted to San Diego Regional Board staff for review and approval prior to implementation. If you are reading the WQMP on a computer, you can use hyperlinks within this document to navigate from section to section, and if you have an internet connection, you can

directly access various internet references. The hyperlinks are throughout the text, as well as in "References and Resources" sections (marked by the 🕮 icon).

To use the *WQMP,* start by reviewing Chapter 1 to find out whether and how the requirements apply to your particular project. Chapter 1 also provides an overview of the entire process of planning, design, construction, operation, and maintenance leading to compliance.

If there are terms and issues you find puzzling, look for answers in the Glossary or in Chapter 2. Chapter 2 provides background on key stormwater concepts and water quality regulations, including technical criteria for the design and selection of Best Management Practices (BMPs). Defined terms that are included in the glossary are also capitalized in the text.

Then proceed to Chapter 3 and follow the step-by-step guidance to prepare a Project-Specific WQMP for your site. Note that the steps in Chapter 3 reference additional detail in Chapters 4 and 5. A preliminary Project-Specific WQMP is commonly required to be submitted with your application for entitlements and development approvals and must be approved by the Copermittee before any approvals or entitlements will be granted. A final Project-Specific WQMP will be required to be submitted and approved prior to issuance of grading and building permits.

Construction Phase Controls

Your Project-Specific WQMP is a separate document from the Stormwater Pollution Prevention Plan (SWPPP). A SWPPP provides for temporary measures to control discharges of sediment and other pollutants during construction at sites that disturb one acre or more, whereas a WQMP is required to address discharges from the post-construction use of the site.

Chapter 4, describes key ways to coordinate your Project-Specific WQMP with other site plans such as landscaping, grading and erosion control plans, and overseeing construction of stormwater BMPs.

In Chapter 5 you'll find a description of the process for ensuring operation and maintenance of your BMPs over the life of the project. The chapter includes step-by-step instructions for preparing a WQMP Operation and Maintenance Plan.

Throughout each chapter, you'll find references and resources to help you understand the regulations, complete the WQMP, and design the project to be protective of water quality to the Maximum Extent Practicable (MEP).

PLAN AHEAD TO AVOID THE THREE MOST COMMON MISTAKES

The most common (and costly) errors made by applicants for development approvals with respect to stormwater compliance are:

1. Not planning for compliance early enough. You should think about the strategy for compliance with WQMP requirements before completing a conceptual site design or sketching a layout of subdivision lots. It is highly recommended that the project team (civil engineers, planners, architects, landscape architects, etc.) meet and confer at project inception, and then regularly throughout the design, to discuss design strategies that meet the requirements herein. Section 4.0 discusses some of the elements of your Project-Specific WQMP that will need to be coordinated among the various site plans that these professionals may develop.

2. Assuming proprietary Stormwater BMPs, or Conventional Treatment BMPs will be adequate for compliance. Low Impact Development (LID) BMPs that maximize infiltration, harvest and use, Evapotranspiration and/or bio-treatment, are now required for nearly all projects. See Chapter 2 for criteria affecting what Stormwater BMPs can be used on a project.

3. Not planning for long-term maintenance of your BMPs, and inspections / verifications by the Copermittee. Consider who will own and who will maintain the BMPs in perpetuity and how they will obtain access, and identify which arrangements are acceptable to the Copermittee (Chapter 5).

COMPLIANCE PROCESS AT A GLANCE

Applicants should follow these general steps to comply with the requirements of the 2010 SMR MS4 Permit:

1. Discuss WQMP requirements during a pre-application meeting with Copermittee staff, if possible. This can help you to confirm any requirements specific to the local Copermittee for your application process. Note that the Copermittee will require the applicant to certify that the project does or does not qualify as a Priority Development Project. The Copermittee will nevertheless have the ultimate discretion as to whether a WQMP will be required for any particular project.

2. If your project is subject to this Santa Margarita Region WQMP, review the instructions in this WQMP BEFORE you prepare your tentative map, preliminary site plan, drainage plan, and improvement plans. The requirements in this WQMP will affect each of these items. Neglecting to appropriately consider and address the requirements of this WQMP at all stages of project planning and design, will likely result in costly re-design being required.

3. When required by the Copermittee, prepare a preliminary Project-Specific WQMP and submit it with your application for Discretionary Approvals (entitlements).

4. Following any Discretionary Approval, develop your final Project-Specific WQMP as part of your plan to complete your detailed project design, incorporating the BMPs committed to in your preliminary Project-Specific WQMP.

5. Prepare a draft WQMP Operation and Maintenance Plan and submit both, together with your grading and improvement plans as part of your application for grading and/or building permits. Execute legal documents assigning responsibility for operation and maintenance of Stormwater BMPs. Protect proposed Post-Construction BMPs (and underlying infiltration soils) during construction, and maintain them following construction.

6. Following construction, submit 'as-built' plans and a final WQMP Operation and Maintenance Plan and formally transfer responsibility for maintenance to the owner or permanent occupant. Typically the Copermittees will require the final WQMP Operation and Maintenance Plan prior to issuance of Certificate of Occupancy.

7. Following occupancy, the occupant or owner (as defined in your WQMP Operation and Maintenance Plan) must maintain records that all necessary maintenance of Post-Construction BMP facilities has been performed and allow periodic Copermittee inspections of Structural Stormwater BMPs. Where Copermittees allow or require self-certifications of Structural Stormwater BMPs, the occupant or owner must certify that the Structural Stormwater BMPs are properly maintained and submit reports, prepared and certified by a Professional Engineer, to the Copermittee staff upon their request.

8. Preparation of a complete and detailed Project-Specific WQMP is the key to cost-effective compliance and expeditious review of your project. Instructions for preparing a Project-Specific WQMP are in Chapter 3.

Chapter 1

1.0 POLICIES AND PROCEDURES

Determine if your project requires a Project-Specific WQMP, and review the steps to compliance.

1.1. PROJECTS REQUIRING A WQMP

This Document is specific to projects in the Santa Margarita Region of Riverside County.

> ☞*Before continuing use of this document, it is highly encouraged that you use the 'Locate your Watershed' tool available at www.rcflood.org/npdes to verify that your project is within the Santa Margarita Region of Riverside County; which includes the incorporated Cities of Murrieta, Temecula and Wildomar, as well as the Unincorporated County of Riverside within the Santa Margarita Watershed.*

The 2010 SMR MS4 Permit (see Section 2.1.1) requires that a Project-Specific WQMP be prepared for all development projects within the SMR that meet the 'Priority Development Project' categories and thresholds listed in Table 1-1 (Section 1.1.1 below), and Redevelopment projects that meet the criteria in section 1.1.2 below.

ICON KEY
- ☞ Helpful Tip
- Submittal Requirement
- Terms to Look Up
- References & Resources

Additionally, the WQMP Applicability Checklist provided in Exhibit E, which is incorporated into each Copermittee's project application requirements, can be used as a means to document a conclusion that a project does or does not meet the criteria as a Priority Development Project. Note some thresholds are defined by square footage of impervious area; others by land area of development; others by area disturbed. Exhibit F includes a WQMP Review Checklist that can be used to ensure that your WQMP submittal includes all required elements.

For Projects being implemented by a Copermittee, see Section 1.2.

If your project is not a 'Priority Development Project, a Project-Specific WQMP is generally not required. Such projects, referred to as 'other development projects' are still required to incorporate appropriate minimum Site Design, Source Control and LID

BMPs which may or may not include Structural LID or Conventional Treatment BMPs. If your project is an 'other development project', consult the Copermittee to determine applicable requirements.

However, Copermittee staff may choose to require a Project-Specific WQMP for 'other development projects', based on their assessment of the potential for the proposed project to impact stormwater quality.

When determining whether WQMP requirements apply, a "project" should be defined consistent with California Environmental Quality Act (CEQA) definitions of "project." That is, the "project" is the whole of an action which has the potential for adding or replacing or resulting in the addition or replacement of roofs, pavement, or other impervious surfaces. "Whole of an action" means the project may not be segmented or piecemealed into small parts if the effect is to reduce the quantity of impervious area for any part to below the applicable threshold.

1.1.1. New Priority Development Projects

New Development Projects are defined by the 2010 MS4 permit as 'Priority Development Projects' if the project, or a component of the project meets the categories and thresholds described in Table 1-1 below.

TABLE 1-1. New Priority Development Project Categories

Category	Threshold	Development Project Description
New Development Projects	10,000 SF new Impervious surface	Development Projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site) including commercial, industrial, residential, mixed-use, and public development projects. This category includes Development Projects on public or private land which fall under the planning and building authority of the Copermittees.
Automotive Repair Shops	Dependant on SIC Code	Development Projects that include automotive repair shops that are categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.
Restaurants	5,000 SF	Development Projects that will sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet must meet all WQMP requirements except for the conventional treatment control BMP requirements of WQMP section 3.5, and the Hydromodification requirements of WQMP section 3.6.
Hillside Developments	5,000 SF	Hillside Development Projects greater than 5,000 square feet. This category is defined as any development project which creates 5,000 square feet of impervious surface and which is located in an area with known erosive soil conditions, where the development project will grade on any natural slope that is twenty-five percent or greater.

Category	Threshold	Development Project Description
Environmentally Sensitive Areas	2,500 SF Impervious surface	Development Projects located within, directly adjacent to or discharging directly to an Environmentally Sensitive Area (ESA) (where discharges from the Development Project site will enter Receiving Waters within the ESA), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed Development Project site to 10 percent or more of its naturally occurring condition. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject Development Project site, and not commingled with flows from adjacent or upstream lands.
Parking Lots	5,000 SF Impervious surface	Development Projects with impervious parking lots 5,000 square feet or more and potentially exposed to runoff. Parking lot is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business or for commerce.
Streets, Roads, Highways and Freeways	5,000 SF Impervious surface	Private Development Projects that include any paved impervious surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles and other vehicles. For Copermittee Transportation Projects, see Section 1.2.1.
Retail Gasoline Outlets	5,000 SF or ADT >100	Retail Gasoline Outlets that meet either of the following criteria: (a) 5,000 square feet or more; or (b) a projected Average Daily Traffic of 100 or more vehicles per day."
Pollutant Generating projects disturbing over 1 acre	1 acre disturbed area	Development Projects that disturb over 1 acre of land, where the post-construction use of the site generate pollutants at levels greater than natural background levels.

1.1.1.a) Entire Project

Where a new Development Project feature, such as a parking lot, falls into a Priority Development Project Category as described in Table 1-1 above, the entire project footprint is subject to WQMP requirements.

1.1.2. Redevelopment Projects

Redevelopment projects are considered 'Priority Development Projects' if:

- The project creates, adds, or replaces at least 5,000 square feet of impervious surfaces on an already developed site, AND:
- The existing development AND/OR the proposed redevelopment project meets the criteria in table 1-1 above

1.1.2.a) The "50% Rule" for Redevelopment Projects

Redevelopment Priority Development Projects may not only be required to develop a WQMP for the new 'project' footprint, but may also be required to retrofit the existing portions of the site for compliance with this WQMP as well (including runoff from existing areas not otherwise being modified as part of the current project).

- Where a Redevelopment Project results in a net increase of less than fifty percent of the impervious surfaces compared to the previously existing development, and the existing development was not subject to WQMP requirements, the WQMP applies only to the addition or replacement, and not to the entire development.

- Where a Redevelopment Project results in a net increase of more than fifty percent of the impervious surfaces compared to the previously existing development, the WQMP applies to the entire development, including portions of the site not otherwise being modified or improved as part of the current project.

Copermittee staff will require you to provide sufficient information about your existing developed site and proposed additions / modifications, and to assess whether or not the proposed redevelopment project increases the collective impervious surfaces beyond the 50% threshold.

☞*Note that when determining whether the 50% rule applies to a redevelopment project, impervious areas that are removed and replaced are not counted (that is, credit is given for removal of existing impervious square footage).*

1.2. REQUIREMENTS FOR PUBLIC WORKS PROJECTS

Public Works/Capital Improvement projects are considered Priority Development Projects, requiring a WQMP, if they meet the criteria in Sections 1.1.1 and/or 1.1.2, except as provided below.

1.2.1. Copermittee Transportation Projects

Copermittee Transportation Projects that implement the '*Low Impact Development: Guidance and Standards for Transportation Projects for Santa Margarita Region*' (Transportation Project Guidance or TPG) included as Exhibit D to this WQMP will not be required to prepare a Project-Specific WQMP.

Refer to Exhibit D to determine if the proposed project is indeed a 'Transportation Project'. If it is, follow the instructions in Exhibit D for designing and documenting the deployment of LID Principles and Structural Stormwater BMPs on the project. If the project is not a 'Copermittee Transportation Project,' and meets any of the criteria in Table 1-1 and/or

Section 1.1.2 above, a Project-Specific WQMP is required to be developed as described in this document.

1.2.2. Watershed Protection Projects

Watershed Protection Projects, in the context of stormwater management, are constructed to prevent economic, social and environmental damage to the watershed, including receiving waters, by providing the following:

- Water quality protection by the proper management of stormwater and floodplains
- Flood risk reduction to adjacent land uses, stored matter and stockpiled material
- Elimination of the comingling of stormwater and hazardous materials
- Erosion Mitigation
- Restoration of Rivers and Ecosystems
- Groundwater Recharge
- Creation of new open space and wetlands
- Programs for water conservation, stormwater capture and management
- Retrofit projects constructed to improve water quality

Watershed Protection Projects provide an important environmental benefit toward protecting Beneficial Uses, by preventing stormwater from mobilizing pollutant loads and/or managing pollutant sources into receiving waters from adjacent land uses.

Any potential impacts upon the environment from Watershed Protection Projects are mitigated through required compliance with CEQA, the United States Army Corps of Engineers 404 Permits, RWQCB Section 401 Water Quality Certification and California Department of Fish and Game 1601 Streambed Alteration Agreements. Furthermore Watershed Protection Projects are not considered development projects as they do not involve any post-construction human use or activity, and have no associated pollutants of concern. Consequently, these projects would not require the preparation of a Project-Specific WQMP. Such projects, to the extent that they are pursued by or are subject to discretionary approvals of a Copermittee, may be considered 'Other Development Projects', subject to the minimum LID and Source control requirements identified in the Copermittee's JRMP.

1.2.3. Utility Projects

Utility Projects consist of essential infrastructure that may provide storm water conveyance, raw sewage management, potable water, gas, oil, telecommunications and other services. Securing and protecting these important utilities below ground and out of the elements significantly decreases the risk of damage and prevents the services from contaminating the watershed. Installation of a utility may involve the replacement of impervious surfaces, however, they are typically replaced to existing line and grade. The project itself does not involve any post-construction human use or activity, and neither adds/nor modifies any pollutants of concern, and as such would not be required to prepare a Project-Specific WQMP. Such projects, to the extent that they are pursued by or are subject to discretionary approvals of a Copermittee*, may be considered 'Other Development Projects', subject to the minimum LID and Source control requirements identified in the LIP/JRMP. If the projects create new impervious surface, the new impervious surface would be subject to WQMP triggers or Road Standards Guidance triggers as appropriate.

1.3. WQMP Requirements for Projects in Progress

Requirements for preparing Project-Specific WQMPs have been in place for all applicable projects submitted to the Copermittee after July 13, 2005. The 2010 SMR MS4 Permit however includes new / additional requirements for Project-Specific WQMPs that are reflected in this revised WQMP guidance document. The following describes how these new requirements are required to be applied to Priority Development Projects that have already begun the process for securing approvals from the Copermittee.

The updated WQMP and Hydromodification requirements described in this document apply to all Priority Development Projects or phases of Priority Development Projects except those where:

- The project or phase has begun grading or construction activities at the time the updated WQMP and/or Hydromodification requirements go into effect†, or

* * Utility Projects that are pursued by a non-Copermittee utility, cannot be regulated by the Copermittees, except where and to the extent that the project requires a permit or other discretionary approval by the Copermittee.

† If your project site has been partially graded under an expired grading permit, consult your Copermittee to determine whether the requirements in this document apply to your project.

- The Copermittee determines that lawful prior approval rights for a Development Project or project phase exist, whereby application of the updated requirements to the project is illegal.

If you believe your project may meet either of these criteria, check with the Copermittee to verify. Each Copermittee individually determines how and when a project will be allowed to be grandfathered.

1.4. WQMP Requirements for Phased Projects

Before occupancy will be granted for any phase of a multi-phase Priority Development Project, all requirements of the WQMP must be met for the current phase.

If any Structural Stormwater BMPs necessary for the current phase of the project would be located in a future phase of the project, occupancy for the current phase will not be granted until such 'offsite' BMPs have been constructed and are fully operational. In addition, the Operation and Maintenance requirements described in Section 5.0 must be fully met for all such 'offsite' BMPs.

1.5. Types of Project-Specific WQMPs

1.5.1. Preliminary Project-Specific WQMPs

If a Discretionary Approval would entitle construction of new or replaced improvements which, individually or in aggregate, would qualify as a Priority Development Project, then the applicant must prepare a preliminary Project-Specific WQMP. The level of detail in a preliminary Project-Specific WQMP will depend upon the level of detail known about the overall project design at the time project approval is sought.

Local Requirements
Individual Copermittees may have requirements that differ from, or are in addition to, this WQMP. Check with the applicable Copermittee.

For example, if approval of a tentative tract map application would entitle site improvements on individual lots that individually or in aggregate would exceed the thresholds for Priority Development Projects in Table 1-1, the applicant should prepare a preliminary Project-Specific WQMP. If particular plans for individual lots have not been identified, the preliminary Project-Specific WQMP may nevertheless be required to identify the type, size, location, and final ownership of Structural Stormwater BMPs adequate to serve new roadways and any common areas, and to also manage runoff from an expected reasonable estimate of the square footage of future roofs, driveways, and other impervious surfaces on each individual lot. The Copermittee will then condition approval of the map on implementation of a final Project-Specific WQMP that is in substantial conformance with the approved preliminary Project-Specific WQMP prior to issuance of grading / building permits.

If a Copermittee deems it necessary, the future improvements on one or more lots may be required to be limited by a deed restriction or dedication of an appropriate easement, to suitably restrict the future building of structures at each Structural Stormwater BMP location.

In general, it is recommended Structural Stormwater BMPs not be located on individual single-family residential lots, particularly when those BMPs manage runoff from streets, or from common areas. However, local requirements may vary. Most often, it is better to locate Structural Stormwater BMPs on one or more separate, jointly owned parcels.

If a subdivision map being proposed is purely to subdivide land, and the Discretionary Approval does not entitle or require particular improvements to be made on the subdivided parcels that, in aggregate, would exceed the thresholds in Table 1-1, a Project-Specific WQMP may not be required, at the discretion of the Copermittee. For example, if a 30-acre parcel zoned for rural residential is to be subdivided into two 15-acre rural residential parcels, and any known or proposed improvements on either 15-acre parcel (if any) would not be classified as a Priority Development Project per Table 1-1, then, at the discretion of the Copermittee, a preliminary Project-Specific WQMP may not be required at the time of the Discretionary Approval of the subdivision map, as the subdivision map did not create entitlements for specific improvements that exceed the thresholds in Table 1-1. Subsequent proposals for improvements on either or both of the parcels will be subject to Discretionary Approvals, and conditions for preparation of a Project-Specific WQMP, as applicable at the time those Discretionary Approvals are sought.

1.5.2. Final Project-Specific WQMPs

All Priority Development Projects will be required to prepare a final Project-Specific WQMP, which shall be submitted together with associated grading and improvement plans, and approved prior to the issuance of any building or grading permits. The final Project-Specific WQMP shall be in substantial conformance with any preliminary Project-Specific WQMP submitted and approved by the Copermittee during the land use entitlement process.

Chapter 2

2.0 CONCEPTS AND CRITERIA

Technical background, and explanations of policies and general design requirements.

2.1. REGULATORY REQUIREMENTS

2.1.1. 2010 SMR MS4 Permit

The San Diego Regional Board first issued a Municipal Separate Storm Sewer System (MS4) Permit to the Copermittees in the Santa Margarita Region in 1990. That permit has been reissued four times since then, with the most recent permit being issued in 2010. These permits have required the Copermittees to develop and implement a comprehensive program to prevent Stormwater Pollution to the Maximum Extent Practicable.

The 2010 SMR MS4 Permit now mandates the Low Impact Development (LID) approach described in this WQMP, for managing Runoff from Priority Development Projects. This section (Section 2) explains the technical background of the Copermittees' approach to implementing these LID requirements; and Chapter 3 describes how to prepare a Project-Specific Water Quality Management Plan (referred to as a SSMP in the 2010 MS4 Permit) that is in compliance with these requirements.

2.1.2. Maximum Extent Practicable

The Clean Water Act (CWA) Section 402(p)(3)(iii) sets the standard for control of Stormwater Pollutants as "maximum extent practicable" (MEP), but the CWA doesn't define that term. As implemented, "maximum extent practicable" is ever-changing and varies with conditions. In general, to achieve the MEP standard, Copermittees must require deployment of

whatever BMPs are technically feasible (that is, are likely to be effective) and are not cost prohibitive.[1]

Many stormwater controls, including LID, have proven to be practicable in most Development Projects. To achieve fair and effective implementation, criteria and guidance for those controls must be detailed and specific—while also offering the right amount of flexibility or exceptions for special cases. The 2010 SMR MS4 Permit includes various standards, reflected in this WQMP, which the San Diego Regional Board has found to provide "MEP" control.

2.1.3. Best Management Practices

Clean Water Act Section 402(p) and USEPA regulations (40 CFR 122.26) require the Copermittees to implement a program of "management practices" to control Stormwater Pollutants to the MEP. BMPs are schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. This document defines several categories of BMPs. The glossary includes definitions for each category of BMP.

2.1.4. TMDL

A TMDL, or 'Total Maximum Daily Load,' is the maximum amount of a Pollutant that the Regional Board has established can be discharged into a waterbody from all sources (point and non-point) and still maintain Water Quality Standards. Under CWA Section 303(d), TMDLs must be developed for all waterbodies that do not meet Water Quality Standards after application of technology-based controls.

At this time, there are no adopted TMDLs in the Santa Margarita Watershed. As TMDLs are developed and adopted in this watershed, this WQMP will be updated as necessary.

2.2. POTENTIAL IMPACTS OF DEVELOPMENT

This section describes the potential impacts that Development Projects can have on streams, rivers and other water bodies.

2.2.1. Imperviousness

Schueler (1995) proposed imperviousness as a "unifying theme" for the efforts of planners, engineers, landscape architects, scientists, and local officials concerned with urban

[1] "Definition of Maximum Extent Practicable," memo by Elizabeth Jennings, Senior Staff Counsel, State Water Resources Control Board, February 11, 1993.

watershed protection. Schueler argued (1) that imperviousness is a useful indicator linking urban land development to the degradation of aquatic ecosystems, and (2) imperviousness can be quantified, managed, and controlled during land development.

Imperviousness has long been understood as the key variable in urban hydrology. Peak Runoff flow and total Runoff volume from small urban catchments are usually calculated as a function of the ratio of impervious area to total area. The ratio correlates to the composite runoff factor, usually designated "C." Increased flows resulting from urban development tend to increase the frequency of small-scale flooding downstream.

Imperviousness has three major components: rooftops, transportation (including streets, highways, and parking areas) and other hardscape. The transportation component is usually larger and is most likely to be directly connected to the MS4.

The effects of imperviousness can be mitigated by disconnecting impervious areas from the MS4 and by making drainage conveyances *less* efficient—that is, by encouraging retention and detention of runoff near the point where it is generated, more closely mimicking pre-development Runoff flows and durations and time of concentration.

2.2.2. Water Quality Impacts

Runoff from a developed site has the potential to contribute Pollutants to the MS4 and Receiving Waters. These Pollutants may originate as airborne dust, be washed from the atmosphere during rains or may be generated locally by automobiles and activities present at the site. Pollutants can be grouped in nine general categories as follows:

- Sediments are soils or other surficial materials that are eroded and then transported or deposited by the action of wind, water, ice, or gravity. Excessive discharge of sediments to waterbodies and streams can potentially increase turbidity, clog fish gills, reduce spawning habitat, lower young aquatic organism survival rates, smother bottom dwelling organisms, and/or suppress aquatic vegetation growth.

- Nutrients are inorganic substances, such as nitrogen and phosphorus. They commonly exist in the form of mineral salts that are either dissolved or suspended in water. Primary potential sources of nutrients in Runoff are fertilizers and eroded soils. Excessive discharge of nutrients to waterbodies and streams may cause excessive aquatic algae and plant growth. Such excessive production, referred to as cultural eutrophication, may lead to excessive decay of organic matter in the waterbody, loss of oxygen in the water, release of toxins in bed sediment, and/or the eventual death of aquatic organisms and fish kills.

- Metals are raw material components in both metal and non-metal products. Primary potential sources of metal pollution in Stormwater are typically commercially-available metals and non-metal products such as fuels, adhesives,

paints, and other coatings. Metal Pollutants may include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors in primer coatings and cooling tower systems. Metals that naturally occur in soil are typically not toxic at low concentrations. However, at higher concentrations, certain metals can be toxic to aquatic life. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish. Environmental concerns, regarding the potential for release of metals to the environment, have already led to restricted metal usage in certain applications.

- Toxic Organic Compounds are natural or synthetic carbon-based molecules that may be found in pesticides, solvents, and hydrocarbons. Organic compounds can, at certain concentrations, indirectly or directly constitute a hazard to life or health. When rinsing off objects, toxic levels of solvents and cleaning compounds can inadvertently be discharged to MS4 facilities. Dirt, grease, and grime retained in the cleaning fluid or rinse water may also adsorb levels of organic compounds that are harmful or hazardous to aquatic life.

- Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) may impact the recreational value or other Beneficial Uses of a waterbody and/or aquatic habitat. Excess organic matter that may have been introduced as trash can create a high biochemical oxygen demand in a stream and thereby lower its water quality.

- Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids. Introduction of these Pollutants to the waterbodies can occur due to the wide uses and applications of some of these products in municipal, residential, commercial, industrial, and construction areas. Elevated oil and grease content can decrease the aesthetic value of the waterbody, as well as the water quality.

- Bacteria and Viruses are environmentally-ubiquitous microorganisms that thrive under certain ecological conditions. Their proliferation is often from natural or uncontrollable sources but can also be caused by the transport of animal or human fecal wastes from a watershed. Water containing excessive bacteria and viruses, can alter the aquatic habitat and create a harmful environment for humans and aquatic life.

- Pesticides (including herbicides) are chemical compounds commonly used to control nuisance growth or prevalence of organisms. Excessive or inappropriate application of a pesticide may result in runoff that may be toxic to aquatic life.

The 2010 MS4 Permit requires the Copermittees to require proposed priority development projects to incorporate mitigations measures the address water quality impacts through incorporation of LID Principles and LID BMPs, Conventional Treatment BMPs (where LID BMPs are technically infeasible), and Hydromodification BMPs.

2.2.3. Hydromodification Impacts

The change in rainfall-runoff relationships that can result from development is referred to Hydromodification. In some stream systems, excessive Hydromodification can cause erosion of stream banks and beds, transport of fine sediments, and disruption of aquatic habitat.

Once altered, natural streams and their ecosystems may not be able to be fully restored, however, it may be possible to reduce further degradation. Managing Runoff from a single development site may seem inconsequential, but by changing the way most sites are developed (and redeveloped), we may be able to protect existing stream ecosystems in urban and urbanizing areas.

2.2.4. Priority Pollutants of Concern

'Priority Pollutants of Concern' are those pollutants that the proposed project has the potential to generate, and are also known to be impairing the downstream receiving waters. Identifying Priority Pollutants of Concern involves the following steps:

1. Identify Receiving Waters – Use the most recent version of the Water Quality Control Plan for the in the San Diego Region Basin to determine the proximate receiving waters that your project will discharge into. This information can be accessed from the following site: (http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/)

2. Identify Impairments in those Receiving Waters by Reviewing the 303(d) listings for all downstream Receiving Waters:

   http://waterboards.ca.gov/santaana/water_issues/programs/tmdl/303d.shtml

   and any pollutants being addressed by an adopted TMDL

   http://waterboards.ca.gov/santaana/water_issues/programs/tmdl/

3. Identify Pollutants associated with your site / project - This includes legacy pollutants that may already be present on your site, as well as Pollutants that are listed for the category of development on the Table below. That table may be updated by the Permittees periodically based on updated studies and information. Updates will be reported in the applicable Annual Report to the San Diego Regional Board and reflected in an update to this WQMP.

Table 2-1: Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
Detached Residential Development	P	N	P	P	N	P	P	P
Attached Residential Development	P	N	P	P	N	P	P	P[(2)]
Commercial/Industrial Development	P[(3)]	P	P[(1)]	P[(1)]	P[(5)]	P[(1)]	P	P
Automotive Repair Shops	N	P	N	N	P[(4, 5)]	N	P	P
Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
Parking Lots (>5,000 ft^2)	P[(6)]	P	P[(1)]	P[(1)]	P[(4)]	P[(1)]	P	P
Retail Gasoline Outlets	N	P	N	N	P	N	P	P

P = Potential
N = Not Potential
(1) A potential Pollutant if non-native landscaping exists or is proposed on-site; otherwise not expected.
(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected
(3) A potential Pollutant is land use involving animal waste
(4) Specifically petroleum hydrocarbons
(5) Specifically solvents
(6) Bacterial indicators are routinely detected in pavement runoff

2.3. LOW IMPACT DEVELOPMENT (LID)

The 2010 SMR MS4 Permit defines LID as follows:

> A storm water management and land development strategy that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

The Low Impact Development Manual for Southern California (CASQA, 2010) further describes that there are two types of LID:

- LID Principles which are site design concepts that prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime. LID Principles should be implemented to the MEP on all sites.

- LID BMPs which are structural BMPs that help mitigate otherwise unavoidable post-construction impacts; i.e. where implementation of LID Principles cannot fully address the Design Capture Volume for a particular portion of a site, LID BMPs must be implemented.

2.3.1. Benefits of LID

There are many potential benefits associated with the use of LID. Foremost, LID BMPs tend to retain Runoff, thus reducing the amount of potentially Polluted Runoff that can be transported to Receiving Waters. Additionally, LID BMPs have the advantage of supplementing the physical processes of interstitial settling and adsorption—common to all media filters—with additional complexation and adsorption to the biofilms that are developed, and for those that include vegetation, additional Pollutant removal through uptake through the plant roots. In addition, LID BMPs that integrate engineered / amended soils and/or vegetation benefit from the biological activity of bacteria, insects, and worms, which helps renew and maintain the media, increasing reliability and eliminating the need for frequent maintenance or re-setting of the filtration layers. LID BMPs also act as "sponges," absorbing the amount of Runoff from small storm events and some of the Runoff from larger events and retaining it so as to maximize infiltration and Evapotranspiration. This, in turn helps the post-development site's hydrologic regime mimic the pre-development hydrology.

In addition to Stormwater management, LID implementation can result in environmental, economic, and community benefits:

Potential Environmental Benefits:

- Improved water quality
- Maintenance of predevelopment Runoff volume and discharge
- Groundwater recharge
- Terrestrial and aquatic habitat preservation
- Reduced potable water demand
- Recycling and beneficial reuse
- Reduction in urban heat island effect

Potential Economic Benefits:

- Reduced construction and maintenance costs
- Improved marketability
- Energy cost reduction and water conservation

Potential Community Benefits:

- Improved aesthetic value
- Provides "green job" opportunities
- Educational opportunities

LID BMPs have been shown in studies throughout the country to be effective and reliable at treating a wide range of Pollutants that can be found in Runoff, including those listed in section 2.2.2 above. As such, the LID BMPs required in this WQMP are expected to treat discharges of urban-sourced Pollutants from Priority Development Projects with a high level of effectiveness, such that the runoff discharges from the project should not cause or contribute to an exceedance of Receiving Water Quality Objectives.

2.3.2. LID BMP Types and Prioritization

LID BMPs are a type of Structural Stormwater BMP that provide many of the benefits described above. For the purposes of this WQMP, LID BMPs are categorized and prioritized as follows:

- Priority 1: LID Retention BMPs
    - LID Infiltration BMPs are designed to infiltrate captured runoff into the underlying native soils. As such, these LID BMPs can be used only where soils are highly permeable. Review the assessment of constraints and opportunities in Step 2 to determine the applicability of this LID BMP to the Development Project. Typical LID Infiltration BMPs include infiltration basins, infiltration trenches and pervious pavements.
        - Pervious Pavement can be pervious pavers, asphalt or concrete surfaces, or permeable modular block. Unlike traditional pavements that are impermeable, porous pavements reduce the volume and peak of Stormwater Runoff as well as mitigate Pollutants from Stormwater Runoff. Permeable pavements can be designed as LID Infiltration BMPs, or as an LID Principle[1].

[1] When pervious pavement is designed primarily as a site design feature (i.e., it doesn't receive Runoff from more than 2 parts tributary impervious area to 1 part pervious pavement), the pervious pavement is considered a self-retaining area as described in Section 3.3.3. If additional area is drained onto the pervious pavement beyond the 2:1 ratio, the pervious pavement will be required to be constructed in accordance with a Copermittee approved Stormwater BMP design that allows for greater ratios, (such as the LID BMP Design Handbook). In this case, pervious pavement is considered an LID Infiltration BMP.

- Harvest and Use BMPs are used to facilitate capturing Stormwater Runoff for later use. Review the assessment of constraints and opportunities in Step 2 to determine the applicability of this LID BMP to the Development Project.

- Bioretention BMPs are engineered vegetated areas that are designed to receive runoff. These areas can be configured as free-form areas or planters to integrate with your landscape design. Bioretention BMPs are feasible on all soil types and distinguished from Biotreatment BMPs (below) by the fact that they capture and absorb the Design Capture Volume entirely into a biologically active soil media. Water retained in this soil media is then evapotranspired by plants in the BMP, or slowly allowed to infiltrate into the underlying soils. This BMP inherently maximizes both infiltration and evapotranspiration of Runoff based on the actual limitations of the soil and environment. In sufficiently drained soils, even when constructed with a subdrain, Bioretention BMPs will retain long term volumes of runoff equal to that of BMPs that solely rely on infiltration. See the additional discussion of Retention vs. Bioretention in Section 2.3.3.

- Priority 2: Other LID BMPs

  - Bioretention BMPs while designed to be a LID Retention BMP, Bioretention BMPs can also be used in areas where infiltration characteristics of the soils will not allow full retention of the Design Capture Volume. In this case, Infiltration and evapotranspiration of Runoff will still be maximized based on the actual limitations of the soil and environment.

  - Biotreatment BMPs are naturally-based LID BMPs, which can be used where soils are relatively impermeable. These BMPs are distinguished from LID Bioretention BMPs in that they are not designed to retain the Design Capture Volume in an engineered soil media, however they still provide similar functions and benefits to LID Bioretention BMPs by incorporation of features that provide for natural biological processes while still maximizing opportunities for infiltration and evapotranspiration. Examples of Biotreatment Control BMPs include extended detention basins, bioswales, and constructed wetlands. Consult with the Copermittee to determine approved LID Biotreatment BMPs.

Descriptions, illustrations, designs, and design criteria for the LID BMPs described herein can be found in the LID BMP Design Handbook (Exhibit C). The Copermittees may have their own designs for these same BMPs, or may specify other LID BMPs that applicants may use.

2.3.2.a) LID Prioritization

Consistent with Provision F.1.d.(4) of the 2010 SMR MS4 Permit, each Priority Development Project must implement LID Retention BMPs that capture and retain onsite the Design Capture Volume for each of the project's Drainage Management Areas (DMAs). If it has been shown to be technically infeasible to implement such LID Retention BMPs for some or all of DMAs on the site, other LID BMPs can be used to address the runoff from those DMAs.

2.3.3. LID Retention vs Bioretention

The 2010 SMR MS4 Permit requires that the Design Capture Volume be retained onsite unless it is technically infeasible. The intent behind these prioritization requirements is to reduce the volume of Runoff and Pollutant loads entering Receiving Waters. In cases where such retention practices are feasible, they may provide a significant benefit to Runoff quality, and help the project mimic the pre-development hydrologic regime.

BMPs solely reliant on retention practices (infiltration, harvesting and use, or evapotranspiration) however, require a high level of confidence in the long-term reliability of water demand, the infiltration characteristics of the underlying soils, and of evapotranspiration rates, to ensure timely drawdown of the storage volume.

The 2010 SMR MS4 Permit's retention prioritization requirements discussed above however make no explicit mention that this retention storage must be recovered so that subsequent Runoff events can be managed. Without adequate demand for the captured stormwater however, the captured water would become stagnant, causing health concerns through vector and mosquito breeding, and would cause excessive overflows and bypasses of the BMP; and the intent of the 2010 MS4 Permit's requirements – to minimize urban runoff and pollutant loads entering receiving waters - would not be fulfilled.

Conversely, LID Bioretention BMPs, when properly designed such as shown in the LID BMP Design Handbook, also inherently meet the goal of capturing the required volume of Runoff, and infiltrating and evapotranspiring that volume to the extent feasible given site soils and other conditions. In highly permeable soils, infiltration will meet or exceed the required Design Capture Volume; in less permeable soils the proportion infiltrated will be smaller and the remaining proportion will either be evapotranspired or receive full biotreatment. Such LID Biotreatment BMPs will achieve the *maximum* feasible level of infiltration and

> LID Bioretention BMPs provide the benefits of LID Retention BMPs, while providing a higher level of confidence that the captured volume will be drained within an acceptable timeframe to avoid nuisance conditions and ensure that subsequent storms will not bypass the BMP untreated.

evapotranspiration and achieve the *minimum* feasible (but highly biotreated) discharge.

A recent analysis of the monitored inflow and outflow data contained in the International Stormwater BMP Database showed an average long-term volume reduction on the order of 40 percent for biofilters, 30 percent for extended detention basins, and 60% for Bioretention BMPs. These performance figures are for installations on a variety of underlying soil types. The higher the infiltrative capacity of the underlying soils, the higher percentage of long term captured volume will be retained.

This means that a designer could substitute a LID Bioretention BMP designed to capture 100 percent of the Design Capture Volume, instead of an identically sized LID Harvest and Use BMP that has insufficient demand - without impairing the long term retention of stormwater runoff of the site's system of BMPs. This is because, if the Harvest and Use BMP would, based on the demands present on the site, retain less than 40 percent of the *long term volume of runoff*, the LID Biotreatment BMP would end up retaining more than the Harvest and Use BMP.

☞ *To further validate the volume reduction resulting from LID BMPs in the semi-arid environment of western Riverside County, the Riverside County Flood Control and Water Conservation District has constructed various LID BMPs, including Bioretention BMPs, at their headquarters in Riverside, CA and will be directly measuring the actual long term volume reductions.*

2.3.4. LID Infiltration Feasibility Criteria

In many areas of Riverside County, soils will support infiltration BMPs. However, there are several factors that affect their feasibility that must be considered before utilizing such BMPs. Some of the factors will require a licensed Geotechnical Engineer to verify, as identified in the sub-sections below.

2.3.4.a) Downstream Impacts

If infiltrating the Design Capture Volume would demonstrably negatively impact downstream water rights or other Beneficial Uses, LID Infiltration BMPs are not required. Such a condition must be substantiated by sufficient modeling to demonstrate such an impact. Such an exemption would have to be approved by the Copermittee and the San Diego Regional Board.

2.3.4.b) Groundwater Protection

The following restrictions on the use of centralized Infiltration BMPs are identified to ensure that your BMP does not cause or contribute to an exceedance of groundwater quality objectives. These restrictions do not apply to small infiltration systems dispersed throughout a Development Project.

- Infiltration BMPs must not be used for areas of industrial or light industrial activity, and other high threat to water quality land uses and activities as designated by each Copermittee unless first treated or filtered to remove Pollutants prior to infiltration.
- The seasonal high groundwater mark must be at least 10 feet below the invert of the Infiltration BMP.
- Infiltration BMPs must be located a minimum of 100 feet horizontally from any water supply wells.
- No part of a Infiltration BMP should be within a 2:1 (horizontal : vertical) influence line extending from any septic leach line.
- Infiltration BMPs must not be located in soils that, according to a licensed Geotechnical Engineer, do not have adequate physical and chemical characteristics (such as appropriate cation exchange capacity, organic content, clay content and infiltration rate) for the protection of groundwater.

2.3.4.c) Public Safety and Offsite Impacts:

Infiltration BMPs shall not be used in locations or in soils that may create a public safety or structural concern, such as but not limited to slope or structural in-stability, landslides, mudslides, liquefaction, seeps, adjacent to building foundations, or other geotechnical concerns. Such a determination must be in accordance with the recommendations of a licensed Geotechnical Engineer.

2.3.4.d) Infiltration Characteristics

BMPs entirely reliant on infiltration (such as infiltration basins or infiltration trenches) require a high level of confidence in the long-term reliability of the infiltration characteristics of the underlying soils. Adequate long-term infiltration capacity is the determining factor as to whether an infiltration BMP will be effective for the protection of Receiving Water quality.

'In-Situ' tested infiltration rates (i.e. the Saturated Hydraulic Conductivity) are known to vary widely both spatially and temporally. It is not uncommon to find that the tested infiltration rates at one location can be an order of magnitude different from another test conducted a matter of feet away – even within the same BMP footprint. Additionally it is known that the infiltration rate is typically reduced after construction of the project (compared to exploratory / feasibility testing performed before construction) due to grading, cut and fill conditions; and that the infiltration rate continues to further degrade over time due to unavoidable / inadvertent clogging of the native soils.

If the actual long-term infiltration rates within the BMP are too low, excessive ponding may occur, which has two negative effects:

1) mosquitoes and other vectors may begin breeding, and

2) Runoff from subsequent rainfall events may bypass the BMP, resulting in untreated runoff being discharged from the site and potential impacts to waterbodies.

To avoid creation of nuisance or vector conditions, a maximum Drawdown Time of 72 hours has been established. To ensure that over the life of the BMP the actual Drawdown Time does not exceed 72 hours, and based on the typical infiltration basin depth of 5 feet, the minimum long-term post-development infiltration rate must be at least 0.83 inches per hour (5ft * 12 / 72 hours = 0.83 inches/hour).

As discussed above however, the long-term post-development infiltration rates can be much lower than the initial (pre development) infiltration rates that are measured for feasibility testing. As such, infiltration testing requirements have incorporated a minimum factor of safety of 2 for Infiltration BMPs. Incorporating the established minimum factor of safety, the tested pre-development infiltration rates must be greater than 1.6 inches per hour to be assured that over the life of the BMP, the actual infiltration rate will not degrade to a level that nuisance or vector conditions could be created. This will also ensure that the BMP will be adequately drained for back-to-back storms.[1]

Accordingly, the following feasibility criteria have been developed to ensure that the most effective and reliable BMPs are deployed:

- If the 'in-situ' tested infiltration rate for the site is less than 1.6 inches per hour, due to the uncertainty in infiltration rates as discussed above LID Infiltration BMPs (infiltration basins, infiltration trenches, etc.) shall not be used. Infiltration testing must be performed using methodologies such as identified in the LID BMP Design Handbook, or Copermittee approved alternative methods. If Harvest and Use is also not feasible, Bioretention BMPs can instead be used. Bioretention BMPs provide infiltration and evapotranspiration to the MEP as described in section 2.3.3, while ensuring that the BMP drains appropriately and capacity is restored for subsequent storms.

[1] The analysis used to determine the threshold infiltration rates was based on factors of safety used in the adopted Orange County WQMP/Technical Guidance Document (Appendix VII), standard engineering practices, experience with BMPs that rely solely upon infiltration in Contra Costa County, and best professional judgment.

While soil amendment practices can affect Evapotranspiration rates, they do not have a substantial an effect on infiltration rates to the surrounding native soils or overall retention in an Infiltration BMP, and as such are not appropriate to prevent vector concerns or ensure adequate drainage for subsequent storms. Amended soils may be appropriate for self-retaining areas (micro-infiltration areas) described in section 3.3.2, when sited on Group C or D soils.

If the project meets the following criteria:

Table 2-2: Small Project Criteria

Residential	Commercial, Institutional	Industrial
Less than 10 acres and less than 30 DU	Less than 5 acres and less than 50,000 SF Impervious	Less than 2 acres and less than 20,000 SF Impervious

Then the project is considered a small project. If the small project is underlain with Hydrologic Soils Group (HSG) "D" soils according to available regional soils maps, and no available data for the site is conflicting with such a designation, 'in-situ' testing of infiltration rates may not be required, at the discretion of the Copermittee. In this case, LID Infiltration BMPs shall not be used.

2.3.4.e) Cut / Fill Conditions

The soil beneath Infiltration BMPs must be thoroughly evaluated in a geotechnical report since such BMPs are reliant solely on the infiltration rates of the underlying soils for their long term performance. Because of this, the project proponent must be able to perform tests on the actual soils that will exist at the infiltration surface. It is impossible to test the infiltration rate of an engineered fill that does not yet exist. As such, LID Infiltration BMPs would be prohibited if the planned fill was so deep that the bottom of the BMP could not extend down through the fill and into the native soils. A similar situation exists for those areas that will be significantly excavated as part of the site grading process, and the testing cannot be performed at the future cut elevation. If there is no practicable way to verify infiltration rates at the final BMP infiltration surface, LID Infiltration BMPs shall not be used. LID Infiltration BMPs may still be applicable for DMAs in other parts of a project site in which infiltration testing is feasible. Each DMA on a project site will be assessed accordingly.

2.3.4.f) Other Site Specific Factors

If the geotechnical investigation, performed by a licensed engineer, discovers other site-specific factors that would preclude effective and/or safe infiltration, such as, but not limited to, clay lenses, restrictive layers, or soils prone to liquefaction, LID Infiltration BMPs are not required in those areas.

2.3.5. LID Harvest and Use Feasibility Criteria

Harvest and Use BMPs may be employed on any site where it can be shown there is sufficient reliable and timely demand for non-potable water, subject to the following criteria:

2.3.5.a) Downstream Impacts

If harvesting and using Stormwater Runoff would demonstrably negatively impact downstream water rights or other Beneficial Uses, Harvest and Use BMPs are not required. Such a condition must be substantiated by sufficient modeling to demonstrate such an impact. Such an exemption would have to be approved by the Copermittee and the San Diego Regional Board.

2.3.5.b) Reclaimed Water Use

Utilizing reclaimed water where available inherently reduces the amount of treated municipal effluent discharged to waterbodies. Further, utilizing the capacity of the reclaimed water system, where available, has a significantly larger benefit for offsetting potable water supply than stormwater Harvest and Use BMPs. If reclaimed water is available to the site, the use of reclaimed water will take precedence over the harvest and use of Stormwater Runoff.

If reclaimed water will be used on the project, there is no need to further evaluate the feasibility of Harvest and Use BMPs. Document the use of reclaimed water in your Project-Specific WQMP.[1]

2.3.5.c) Code Compliance

If a particular use of captured stormwater, and/or available methods for storage of captured stormwater would be contrary to building codes in effect at the time of approval of the preliminary Project-Specific WQMP, then an evaluation of harvesting and use for that use would not be required.

2.3.5.d) Minimum Demands

The evaluation of the feasibility of Harvest and Use BMPs is performed for three potential categories of use: toilet flushing, irrigation and other onsite non-potable uses as described in the following tables. Data presented in the tables were generated based upon a continuous simulation analysis and demand factors consistent with similar analyses prepared for the 2011 Orange County WQMP and Technical Guidance

[1] Non-agricultural irrigation using recycled water must comply with the statewide permit for Landscape Irrigation Using Recycled Water and the State Department Health guidelines.

Document. Riverside County specific rainfall and evapotranspiration data was used to generate the analysis.

For evaluation of toilet flushing, flush volumes and use rates from the literature have been combined with a long-term continuous simulation to develop a minimum unit demand, referred to as the Toilet Users To Impervious Area ratio, that would be required to achieve the minimum 40 percent long-term retention of Runoff. See Table 2-1 below, as well as the discussion of Retention vs. Bioretention BMPs above.

- If the proposed project does not meet or exceed this minimum demand, implementing this Harvest and Use BMP would be less effective than a Bioretention BMP, and as such, this Harvest and Use BMP would not be required for the project.

Table 2-3: Harvest and Use Data for Toilet Use

Project type	**Residential**	**Retail / Office Commercial**	**Industrial**	**Schools**
Basis of Use Type	*Resident*	*Employee (non-visitor)*	*Employee (non-visitor)*	*Employee (non-student)*
Design Capture Storm depth, in	**Minimum Demand (toilet users per tributary impervious acre)**			
0.50	87	116	160	26
0.55	94	125	170	28
0.60	102	133	179	30
0.65	109	142	189	31
0.70	116	150	198	33
0.75	123	159	208	35
0.80	130	167	217	36
0.85	137	176	227	38
0.90	145	184	236	40
0.95	152	193	246	41
1.00	159	201	255	43
1.05	166	210	265	45
1.10	173	218	274	46
1.15	180	227	284	48
1.20	188	235	293	50

[A]*Unit demands used in analysis:* *Residential = 9.3 gal/resident/day*
Retail/office = 7 gal/employee/day
Industrial = 5.5 gal/employee/day
Schools = 33 gal/employee/day

[B]*Design storm capture = 0.7 in. with Lake Elsinore rainfall; 1.0 in. with Temecula rainfall. Other values were linearly interpolated/extrapolated*

For evaluation of irrigation, typical evapotranspiration and water demands have been combined with a long-term continuous simulation to develop a minimum ratio of Effective Impervious Area To Irrigated Area that would be required to achieve the minimum 40 percent long-term retention of Runoff. See Table 2-2 below, as well as the discussion of Retention vs. Bioretention BMPs above.

- If the proposed project cannot meet or exceed this ratio, implementing this Harvest and Use BMP would be less effective than a Bioretention BMP, and as such this Harvest and Use BMP would not be required for the project.

Table 2-4: Harvest and Use Data for Irrigation Use[A]

General landscape type	Conservation Design: K_L[B]=0.35	Active Turf Areas: K_L[B]=0.70
Design Capture Storm Depth[C], in	Minimum required irrigated area per tributary impervious acre for partial capture (ac/ac)	
0.50	0.36	0.22
0.55	0.72	0.35
0.60	1.08	0.47
0.65	1.45	0.60
0.70	1.81	0.91
0.75	2.17	1.16
0.80	2.53	1.41
0.85	2.90	1.66
0.90	3.26	1.91
0.95	3.62	2.16
1.00	3.98	2.41
1.05	4.35	2.66
1.10	4.71	2.91
1.15	5.07	3.16
1.20	5.43	3.41

[A]ET data from the CIMIS station at Temecula used for this analysis

[B] (KL) incorporates plant species, microclimate and water management/irrigation practices, as described in the 2011 Orange County WQMP and Technical Guidance Document.

[C]Design storm capture = 0.7 in. was calculated using Lake Elsinore rainfall; 1.0 in. with Temecula rainfall. Other values were linearly interpolated/extrapolated

For evaluation of other non-potable uses such as industrial uses, a long-term continuous simulation of precipitation intensity and frequency has been performed to develop a table of minimum demands that would be required to achieve the minimum 40 percent long-term retention of Runoff. See Table 2-3 below, as well as the discussion of Retention vs. Biotreatment above.

- If the proposed project cannot meet or exceed these minimum demands, implementing this Harvest and Use BMP would be less effective than a Bioretention BMP, and as such this Harvest and Use BMP would not be required for the project.

Table 2-5: Harvest and Use Data for other non-potable uses*

Design Capture Storm depth, in	Wet season demand required for minimum partial capture, gpd per impervious acre
0.50	880
0.55	932
0.60	985
0.65	1,037
0.70	1,089
0.75	1,141
0.80	1,194
0.85	1,246
0.90	1,298
0.95	1,350
1.00	1,403
1.05	1,455
1.10	1,507
1.15	1,559
1.20	1,612

**Design storm capture = 0.7 in. was calculated using Lake Elsinore rainfall; 1.0 in. with Temecula rainfall. Other values were linearly interpolated/extrapolated*

2.3.6. Feasibility of Other LID BMPs

Experience has shown implementation of other types of LID BMPs, such as Bioretention and/or Biotreatment is feasible on nearly all Development Project sites with sufficient advance planning. Projects where LID Bioretention and/or Biotreatment BMPs may not always be feasible generally fall into one of the following two categories:

- Portions of sites which are not being developed or redeveloped, but which must be retrofitted in accordance with the "50 percent rule." For example if site specific conditions preclude draining existing impervious surfaces on the newly developed portion of the site – and if the existing impervious surfaces cannot be otherwise retrofit with Other LID BMPs.

- Sites smaller than one acre approved for lot-line to lot-line development or redevelopment as part of a Copermittee's effort to preserve or enhance a pedestrian-oriented "smart-growth" type of urban design. For many scenarios, LID biotreatment options such as planters will be feasible.

If you believe specific conditions on your site preclude the use of LID BMPs, you must submit, in the Project-Specific WQMP, a detailed site-specific examination and demonstration that implementation of Other LID BMPs is technically infeasible.

2.3.7. BMP Area Considerations

Most LID BMPs can be fit within planned landscaped areas of a project with proper planning and site and grading/drainage optimization.

Table 2-4 provides the recommended percentage of a Development Project site that is required to be made available for LID BMPs. The Development Project may provide more area for LID BMPs if desired. Table 2-4 is intended to be used as follows:

- If the percentage of the Development Project site that would have to be made available for BMPs to meet the requirements in this WQMP exceeds the project-type specific minimum criteria shown in Table 2-4 below, then the remaining volume (beyond that which fits within the shown minimum criteria) must be addressed with other Conventional Treatment Control BMPs, Credits, Runoff fund contributions, or waivers.

- If the percentage of the site provided for BMPs is lower than the value shown in Table 2-4 and the BMP requirements have not fully been met, a reviewer can request that additional area be made available for BMPs until either the percentage of the site in Table 2-4 is provided or the BMP requirements are met, whichever is less.

Table 2-6: Recommended Effective Area 1 Required to be made Available for LID BMPs (% of site)[2]

Priority Development Project Type	New Development	Redevelopment
SF/MF Residential < 7 du/ac	10%	5%
SF/MF Residential 7 – 18 du/ac	7%	3.5%
SF/MF Residential > 18 du/ac	5%	2.5%
Mixed Use, Commercial/Industrial w/ FAR < 1.0	10%	5%
Mixed Use, Commercial/Industrial w/ FAR 1.0 – 2.0	7%	3.5%
Mixed Use, Commercial/Industrial w/ FAR > 2.0	5%	2.5%
Podium (parking under > 75% of project)	3%	1.5%
Zoning allowing development to property lines	2%	1%
Transit Oriented Development[3]	5%	2.5%
Parking	5%	2.5%

[1] *"Effective area" is defined as area which 1) is suitable for a BMP (for example, if infiltration is potentially feasible for the site based on infeasibility criteria, infiltration must be allowed over this area) and 2) receives runoff from impervious areas.*

[2] *Adapted from the San Bernardino County Stormwater Program Technical Guidance Document for Water Quality Management Plans (WQMP).*

[3] *Transit oriented development is defined as a development with development center within one half mile of a mass transit center.*

Key: du/ac = dwelling units per acre, FAR = Floor Area Ratio = ratio of gross floor area of building to gross lot area, MF = Multi Family, SF = Single Family

2.4. HYDROMODIFICATION

As land converts from natural land covers to developed land covers, the volume, rates and durations of runoff change in ways that can cause erosion impacts to stream systems. This is referred to as Hydromodification.

The 2010 SMR MS4 Permit specifies additional BMP requirements to help prevent Hydromodification impacts. Formerly referred to as 'Hydrologic Conditions of Concern', Hydromodification control approaches have evolved over time, with efforts first focused on managing peak flow rates, and have now shifted to matching the volume and timing of an event hydrograph and continuous simulation approaches. This can be accomplished through the use of Structural Post-Construction BMPs designed to control the post-construction Runoff hydrograph from the Development Project site.

Hydromodification requirements are separate from, but overlap, the LID requirements of the 2010 SMR MS4 Permit. The LID Design process described in this document will significantly reduce any potential Hydromodification impacts from a Development Project.

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2.5. HYDROLOGY FOR NPDES COMPLIANCE

2.5.1. Water Quality Hydrology

Most Runoff, and therefore most of the potential for conveyance of Pollutants, is produced by frequent storms of small or moderate intensity and duration. Accordingly, Structural Stormwater BMPs are designed to treat smaller storms and the first flush of larger storms.

2.5.1.a) Design Storm

Methods that have historically been used to determine an MEP-based and cost effective volume of treatment involve continuous simulation of long term rainfall and corresponding runoff from a hypothetical one-acre area entering a basin designed to draw down in a specified amount of time. The simulation is iterated with varying unit basin sizes, and the results are graphed to find the point of diminishing returns (i.e. the 'knee' of the curve) where incrementally larger BMPs result in incrementally smaller benefits to treatment of stormwater.

It has been found that the knee of the curve typically occurs with a basin designed for the 85th percentile 24-hour storm event. It has also been found that a basin of this size ends up treating about 80% of the total long term volume of runoff that occurs during the simulation period.

To simplify design calculations (that is, to avoid the need to perform continuous simulation for design of all BMPs), 2010 SMR MS4 Permit has established the 85th percentile, 24-hour storm event as the "Design Storm", which is the standard used in this WQMP.

An updated Isohyetal map showing the 85th percentile 24-hour storm depth at different locations throughout western Riverside County, based on long-term rainfall data, is provided in Exhibit A.

2.5.1.b) Composite Runoff Factor

The sizing of both Volume-Based BMPs and Flow-Based BMPs is based on determination of a composite runoff factor, which varies depending on the land use covers tributary to the BMP. This composite runoff factor, C, is determined using the following equation

$$C = 0.858 \cdot {I_f}^3 - 0.78 \cdot {I_f}^2 + 0.774 * I_f + 0.04$$

where the Impervious Fraction, I_f is obtained from Table 2-7 below.

Table 2-7: Impervious Fraction Based on Various Land Use Covers

Surface Type	Effective Impervious Fraction, I_f
Roofs	1.00
Concrete or Asphalt	1.00
Grouted or Gapless Paving Blocks	1.00
Compacted Soil (e.g. unpaved parking)	0.40
Decomposed Granite	0.40
Permeable Paving Blocks w/ Sand Filled Gap	0.25
Class 2 Base	0.30
Gravel or Class 2 Permeable Base	0.10
Pervious Concrete / Porous Asphalt	0.10
Open and Porous Pavers	0.10
Turf block	0.10
Ornamental Landscaping	0.10
Natural (A Soil)	0.03
Natural (B Soil)	0.15
Natural (C Soil)	0.30
Natural (D Soil)	0.40

Where multiple surface types are present, a Composite Impervious Fraction, and therefore a Composite Runoff Factor can be calculated using the following equation:

$$I_{f_{composite}} = \frac{\left[(I_f)_1 \cdot A_1\right] + \left[(I_f)_2 \cdot A_2\right] + [\dots]}{A_T}$$

2.5.1.c) Design Capture Volume (DCV or V_{BMP})

The 2010 MS4 permit requires that all LID Retention BMPs, Other LID BMPs and Volume-Based Conventional Treatment BMPs be sized to address the volume of runoff from the Design Storm, referred to as the 'Design Capture Volume', or V_{BMP}.Use the LID BMP Design Handbook to calculate the Design Capture Volume. For reference, the following equations are used by the LID BMP Design Handbook:

> NOTE
> The LID BMP Design Handbook (Exhibit C) includes calculation sheets that can be used to calculate and document the '**Design Capture Volume**,' and the **Design Flow Rate**. These should be documented as described in Section 3 herein.

$$DCV = D_{85} \cdot C \cdot A_{TRIB},$$

Where:

DCV = Design Capture Volume (ft^3)

D_{85} = Design Storm depth (from Exhibit A)

C = Composite Runoff Factor (unitless, per 2.5.1.b))

A_{TRIB} = area tributary to the BMP (acres, see section 3.3)

2.5.1.d) Design Flow Rate (Q_{BMP})

For flow-based Conventional Treatment BMPs, use the LID BMP Design Handbook to calculate the design flow rate. For reference, the LID BMP Design Handbook is based on the rational method and uses the following equation:

$$Q_{BMP} = C \cdot i \cdot A_{TRIB}$$

Where:

Q_{BMP} = Design Flow Rate (cfs)

i = rainfall intensity (0.2 inches/hour)

C = Composite Runoff Factor (unitless, per 2.5.1.b))

A_{TRIB} = area tributary to the BMP (acres, see section 3.3)

2.5.2. Hydromodification Hydrology

In addition to incorporating applicable LID BMPs to ensure water quality treatment of runoff, applicants may be required to provide additional LID Principles, LID BMPs, or other structural BMPs to mitigate Hydromodification.

☞ On or before June 30, 2013, the Copermittees will submit a Hydromodification Management Plan (HMP) which will specify final criteria for mitigation Hydromodification Impacts caused by Priority Development Projects. Until the HMP is approved by the San Diego Regional Board and implemented in accordance with the 2010 MS4 Permit, the following interim hydrologic calculations can be used to mitigate Hydromodification Impacts, where applicable as described in section 3.6.

2.5.2.a) Interim Hydromodification Mitigation Methods

Methodology A

The project applicant shall design a detention basin capable of all of the following:

1. Releasing the post-development 2-year and 10-year, 24-hour volume at flow rates less than or equal to the pre-development 2-year and 10 year, 24-hour peak flow rates, respectively.

2. Passing the 100-year storm event without damage to the BMP.

3. Controlling outlet velocities such that downstream erosion and habitat loss are minimized. The basin may also function as a water quality extended detention basin, or serve other multi-use functions, with the approval of the local agency.

Methodology B

Any method acceptable to the Copermittee that:

1. Implements Site Design, Source Control, Conventional Treatment BMPs and/or other measures capable of mitigating the assessed hydrologic impacts. The method must be supported by hydrologic modeling or other sufficient documentation. Sufficient documentation could include reference to EPA, CASQA, SWRCB and/or other approved studies supporting the use of the method.

2. Ensures that the project will be consistent with any approved master plans of drainage or analogous plans or programs.

Acceptable methodologies for performing the hydrologic analysis in Method A and Method B include:

- RCFC&WCD Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Copermittee

2.6. REFERENCES AND RESOURCES

- *The Importance of Imperviousness* (Tom Scheuler, 1995)
  Site Planning for Urban Stream Protection, available from the Center for Watershed Protection)
- California Stormwater BMP Handbooks
- Southern California LID Manual

- *Urban Runoff Quality Management,* Water Environment Federation and American Society of Civil Engineers, 1998. ISBN 1-57278-039-8 ISBN 0-7844-0174-8.
- *Stormwater Infiltration,* Bruce K. Ferguson, 1994. ISBN 0-87371-987-5
- Clean Water Act Section 402(p)
- 40 CFR 122.26(d)(2)(iv)(A)(2) – Stormwater Regulations for New Development
- *Restoring Streams in Cities* (Riley, 1998)
- *Stream Restoration: Principles, Processes, and Practices*
  (Federal Interagency Stream Restoration Working Group, 1998, revised 2001)
- *Municipal Handbook, Rainwater Harvesting Policies* (USEPA, 2008)
- *Green Roofs for Stormwater Runoff Control* (USEPA, 2009a)
- *Porous Pavements* (Ferguson, 2005)
- *Orange County WQMP and TGD, with errata, 2011*
- *CASQA LID Guidance Manual for Southern California*
- *RWQCB Water Quality Control Plan for the San Diego Basin (Basin Plan)*
- *Design Hansbook for Low Impact Development Best Management Practices,* Riverside County Flood Control and Water Conservation District, 2011.

Chapter
3

3.0 PREPARING YOUR PROJECT-SPECIFIC WQMP

Step-by-step assistance to document compliance.

Your Project-Specific WQMP is a document that will demonstrate that your Development Project complies with all applicable requirements of the 2010 SMR MS4 Permit — to implement LID Principles and BMPs, mitigate Hydromodification, incorporate required Source Control BMPs, and provide for operation and maintenance of Structural Stormwater BMPs.

ICON KEY
Helpful Tip
Submittal Requirement
1. Terms to Look Up
References & Resources

Every Copermittee requires a 'Project-Specific' WQMP for every Priority Development Project as described in Section 1.1. The Project-Specific WQMP must be submitted with your application for Discretionary Approvals (entitlements) and must have sufficient detail to ensure the stormwater design, site plan, and landscaping plan are congruent and will comply with the applicable LID and HCOC standards in the 2010 SMR MS4 Permit. Submitting a complete and thorough Project-Specific WQMP will facilitate quicker review and fewer cycles of review.

The procedure in this section is intended to facilitate, not substitute for, creative interplay among site design, landscape design, and drainage design. Several iterations may be needed to optimize your drainage design as well as aesthetics, circulation, and use of available area for your Development Project site.

Plan and design your Structural Stormwater BMPs integrally with the site planning and landscaping for your Development Project. It's best to start with general project requirements and preliminary site design concepts; then prepare the detailed site design, landscape design, and Project-Specific WQMP simultaneously. This will help ensure that your site plan, landscape plan, grading plan and Project-Specific WQMP are congruent.

3.1. ASSEMBLE PROJECT AND SITE INFORMATION

To perform the LID design, the designer needs to identify pertinent site and Project characteristics, including information such as (but not limited to):

- Existing natural hydrologic features and natural resources, including any contiguous natural areas, wetlands, watercourses, seeps, or springs.
- Existing site topography, including contours of any slopes of 4 percent or steeper, general direction of surface drainage, local high or low points or depressions, and any outcrops or other significant geologic features.
- Zoning, including requirements for setbacks and open space.

- Soil types (including hydrologic soil groups) and depth to groundwater, which may determine whether infiltration is a feasible option for managing site Runoff. Depending on site location and characteristics, and on the selection of Structural Stormwater BMPs, site-specific information (e.g. from boring logs or geotechnical studies) may be required.
- Existing site drainage. For undeveloped sites, this should be obtained by inspecting the site and examining topographic maps and survey data. For previously developed sites, site drainage and connection to the MS4 can be located from site inspection, MS4 maps, and plans for previous development.
- Existing vegetative cover and impervious areas, if any.
- Project Design Features, including impervious surfaces, landscaped surfaces, parking lots, land uses, etc.

3.2. OPTIMIZE SITE UTILIZATION (LID PRINCIPLES)

Review the information collected in section 3.1. Identify the principal constraints on site design as well as opportunities to reduce imperviousness and incorporate LID Principles into the Development Project site and landscape design. For example, constraints might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations, or safety concerns. Opportunities might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head).

Apply the following LID Principles to the layout of your project. Putting thought upfront about how best to organize the various elements of your site can help you to significantly reduce the project's potential impact on the environment and minimize the number of Structural LID and/or Conventional Treatment BMPs that must be implemented. Analyze your preliminary Development Project site layout concepts, and look for opportunities to accommodate the following LID Principles within your site layout. Performing this analysis and optimizing the layout for LID will come in handy during the remaining steps.

3.2.1. Preserve Existing Drainage Patterns

Integrating existing drainage patterns into the site plan will help maintain a Development Project's predevelopment hydrologic function. Preserving existing drainage paths and depressions will help maintain the time of concentration and infiltration rates of Runoff, decreasing peak flows. The best way to define existing drainage patterns is to visit the Development Project site during a rain event and to directly observe runoff flowing over the site. If this is impossible, drainage patterns can be inferred from topographic data, though it should be noted that depression micro-storage features are often not accurately mapped in topographic surveys. Analysis of the existing site drainage patterns during the site assessment phase of the Development Project can help to identify the best locations for buildings, roadways, and Structural Stormwater BMPs.

Minimize unnecessary site grading that eliminates small depressions, which can provide storage of small volumes of Runoff. Where possible, add additional depression "micro" storage throughout the site's landscaping. This is referred to in section 3.3 as 'self retaining areas'. Mild gradients can be used to extend the time of concentration, which reduces peak flows and increases the potential for additional infiltration. While of course risk of serious flooding must be minimized, the persistence of temporary "puddles" during storms is beneficial to infiltration.

- Where possible, conform the Development Project site layout along natural landforms, avoid excessive grading and disturbance of vegetation and soils, and preserve or replicate the site's natural drainage features and patterns.

- Set back Development Project improvements from creeks, wetlands, and riparian habitats.

- Use both existing and proposed site drainage patterns as a natural design element, rather than using expensive impervious conveyance systems. Use depressed landscape areas, vegetated buffers, and bioretention areas as amenities and focal points within the site and landscape design.

3.2.2. Protect Existing Vegetation and Sensitive Areas

Identify any areas containing dense native vegetation or well-established trees, and try to avoid disturbing these areas. Soils with thick, undisturbed vegetation have a much higher capacity to store and infiltrate Runoff than do disturbed soils. Reestablishment of a mature vegetative community can take decades. Sensitive areas, such as streams and floodplains should also be avoided.

- Define the development envelope and protected areas, identifying areas that are most suitable for development and areas that should be left undisturbed.
- Establish set-backs and buffer zones surrounding sensitive areas.
- Preserve significant trees and other natural vegetation where possible.

3.2.3. Preserve Natural Infiltration Capacity

A key component of LID is taking advantage of a site's natural infiltration and storage capacity. A site survey and geotechnical investigation can help to define areas with high potential for infiltration and surface storage. Look for opportunities to locate LID Principles and Structural Stormwater BMPs in any highly pervious areas. Doing so will maximize infiltration and limit the amount of Runoff generated.

- Concentrate development on portions of the site with less permeable soils, and preserve areas that can promote infiltration.

3.2.4. Minimize Impervious Area

As discussed in Chapter 2, imperviousness can be tied to potential environmental impacts due to Stormwater Runoff. Look for opportunities to minimize impervious cover through identification of the smallest possible land area that can be practically impacted or disturbed during site development.

- Limit overall coverage of paving and roofs. This can be accomplished by designing compact, taller structures, narrower and shorter streets and sidewalks, clustering buildings and sharing driveways, smaller parking lots (fewer stalls, smaller stalls, and more efficient lanes), and indoor or underground parking.
- Examine site layout and circulation patterns and identify areas where landscaping can be substituted for pavement, such as for overflow parking.
- Inventory planned impervious areas on your preliminary site plan. Identify where permeable pavements, such as crushed aggregate, turf block, permeable modular blocks, pervious concrete or pervious asphalt could be substituted for impervious

concrete or asphalt paving. This will help reduce the amount of Runoff that may need to be addressed through Structural Stormwater BMPs.

- Consider green roofs. Green roofs are roofing systems that provide a layer of soil/vegetative cover over a waterproofing membrane. A green roof mimics pre-development conditions by filtering, absorbing, and evapotranspiring precipitation to help mitigate the effects of an otherwise impervious rooftop. Green roofs with growing media 4 inches or deeper are considered 'self-retaining areas' as defined in Step 3, and do not produce increased Runoff or Runoff Pollutants (i.e., any Runoff from a green roof requires no further LID or Hydromodification BMPs).

3.2.5. Disperse Runoff to Adjacent Pervious Areas

Look for opportunities to direct Runoff from impervious areas to adjacent landscaping or other pervious areas. This is sometimes referred to as reducing Directly Connected Impervious Areas.

- Direct roof runoff into landscaped areas such as medians, parking islands, planter boxes, etc. and/or areas of pervious paving. Instead of having landscaped areas raised above the surrounding impervious areas, design them as depressed areas that can receive Stormwater from adjacent impervious pavement. For example, a lawn or garden depressed 3"-4" below surrounding walkways or driveways provides a simple but quite functional landscape design element. This is referred to as 'areas draining to self-retaining areas' in Section 3.3.

- Detain and retain Runoff throughout the site. On flatter sites, smaller Structural Stormwater BMPs may be interspersed in landscaped areas among the buildings and paving.

- On hillside sites, drainage from upper areas may be collected in conventional catch basins and piped to landscaped areas and LID BMPs in lower areas. Low retaining walls may also be used to create terraces that can accommodate LID BMPs. Wherever possible, direct drainage from landscaped slopes offsite and not to impervious surfaces like parking lots.

- Reduce curb maintenance and provide for allowances for curb cuts.

3.3. DELINEATE DRAINAGE MANAGEMENT AREAS

The delineation of Drainage Management Areas is key to successfully implementing your LID design. The procedure begins with:

1. Careful delineation of pervious areas and impervious areas (including roofs) throughout the site, and then;

2. Dividing the entire project area into individual, discrete Drainage Management Areas.

Typically, lines delineating Drainage Management Areas follow grade breaks and roof ridge lines. The exhibits, tables, text, and calculations in your Project-Specific WQMP will illustrate, describe, and account for runoff from each of these areas.

Where possible, establish separate Drainage Management Areas for each surface type (e.g., landscaping, pervious paving, or roofs). Assign each Drainage Management Area a unique code and determine its size in *square feet*. The total area of your site should total the sum of all of your Drainage Management Areas.

Next, determine how drainage from each Drainage Management Area will be handled. Each Drainage Management Area will be classified as one of the following four types:

A. Self-treating areas.

B. Self-retaining areas (also called "zero-discharge" areas).

C. Areas that drain to self-retaining areas.

D. Areas that drain to BMPs.

The first three types of Drainage Management Areas: Self-Treating, Self-Retaining, and draining to Self-Retaining, are ways to account for successful implementation of the LID Principles discussed in Step 1. Areas addressed by LID Principles are self-mitigating and do not require any further mitigation measures. Further, these areas will not require specialized Operation and Maintenance procedures, and can typically be maintained with normal landscape and site maintenance.

The fourth type of Drainage Management Area is a way to document the specific areas within the site layout that require additional mitigation measures through LID BMPs.

> As more LID Principles are implemented on the site, more of the site will mimic natural processes and become self-mitigating, resulting in less area that must be mitigated through structural LID BMPs.

3.3.1. Type 'A': Self-treating areas

Self-Treating Areas are areas that meet the following criteria:

- Areas that are either undisturbed from their natural condition, or restored with Native and/or California Friendly vegetative covers, AND
- Are irrigated, if at all, with appropriate low water use irrigation systems to prevent irrigation runoff.

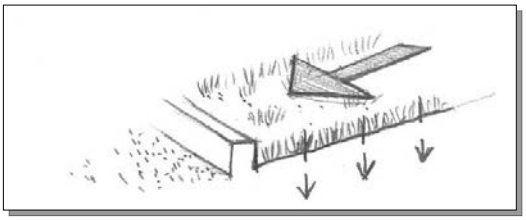


Figure 3-1: Self-Treating Areas

- Runoff from the area will not comingle with runoff from the developed portion of the site, or across other landscaped areas that do not meet the above criteria.

Examples include up-sloped undeveloped areas which are ditched and drained around a development, and landscaped areas (as described above) that drain off-site. Areas that do not meet the above criteria do not qualify as a Self-Treating Area. In general, Self-Treating Areas include no impervious areas, unless the impervious area is very small (e.g. 5 percent or less of the Self-Treating Area) and slopes are gentle enough to ensure Runoff from impervious areas will be absorbed into the vegetation and soil.

Table 3-1: Table for Documenting Self-Treating Areas (Type 'A' DMA)

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
A/1	*4,460*	*Undisturbed Natural*	*None*
A/2	*1,026*	*Native Low Water Use*	*Drip Irrigation*

Note: Example Data shown

3.3.2. Type 'B': Self-retaining areas

Self-Retaining Areas are shallowly depressed 'micro infiltration' areas designed to retain the Design Storm rainfall that reaches the area, without producing any Runoff. The technique works best on flat, landscaped sites. It may be used on mild slopes if there is a reasonable expectation that design of the area will result in the Design Storm rainfall event producing no Runoff.

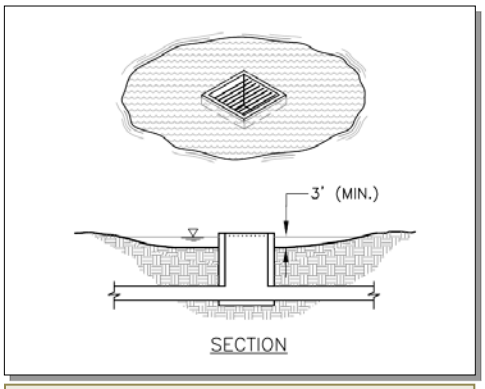


Figure 3-2 Self-Retaining Areas

To create Self-Retaining Areas in flat areas or on terraced slopes, either berm the area or depress the grade into a concave cross-section so that there is a reasonable expectation that these areas will retain the Design Storm rainfall. Grade slopes, if any, toward the center of the pervious area.

Soils: Self-Retaining Areas are not recommended for soils that are not expected to be freely draining, so as not to create vector or nuisance conditions. Self-retaining areas within C or D soils must be constructed with appropriately amended soils to increase the shallow storage capacity of the soils such that surficial ponded water will not occur due to the design storm rainfall. All Self-Retaining Areas (Regardless of soil type) should BE protected during construction such that compaction is minimized or avoided entirely where possible. If compaction within a Self-Retaining area nevertheless occurs, the compacted surface must be re-tilled to a depth of at least six inches and amended as necessary to restore the infiltrative and storage capacity of the soil.

Inlet elevations of area/overflow drains, if any, should be clearly specified to be 3 inches or more above the low point to *promote* ponding. In setting elevations, account for mulch or other landscaping cover that could reduce available ponding depth. Construction documents shall clearly specify the required elevation(s) of any overflow drain inlets.

Pervious pavements (e.g., crushed stone, porous asphalt, pervious concrete, or permeable pavers) can be self-retaining when constructed with a gravel base course four or more inches deep. This will ensure an adequate proportion of rainfall is infiltrated into native soils (including clay soils) rather than producing Runoff. Consult with a qualified (geotechnical) engineer regarding infiltration rates, pavement stability, and suitability for the intended traffic.

Drainage from green roofs is considered to be self-retained, however, an emergency overflow should be provided for extreme events. Drainage from green roofs should be routed to landscaping rather than being tied directly into MS4 facilities.

Table 3-2: Table for Documenting Self-Retaining Areas (Type 'B' DMAs)

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from table 3-3 = [C]	Required Retention Depth (inches) [D]
B/1	*Planter*	*604*	*0.8*	*C/1, C/2*	*1100+80 =1180*	*2.4*
B/2	*Pervious patio*	*2,149*	*0.8*	*C/3*	*1946*	*1.5*
B/3	*Planter*	*1677*	*0.8*	*N/A*	*N/A*	*0.8*

Note: Example Data shown

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

3.3.3. Type 'C': Areas draining to self-retaining areas

Runoff from impervious or partially pervious areas can be managed by routing it to Self-Retaining Areas consistent with the LID Principle discussed in section 3.2.5 for 'Dispersing Runoff to Adjacent Pervious Areas'. For example, roof downspouts can be directed to lawns, and parking areas can be drained to landscaped areas.

For *impervious* areas such as pavements that drain to a nearby Self-Retaining Area, the maximum ratio, based upon past modeling efforts in California, is 2 parts impervious area for every 1 part pervious area.

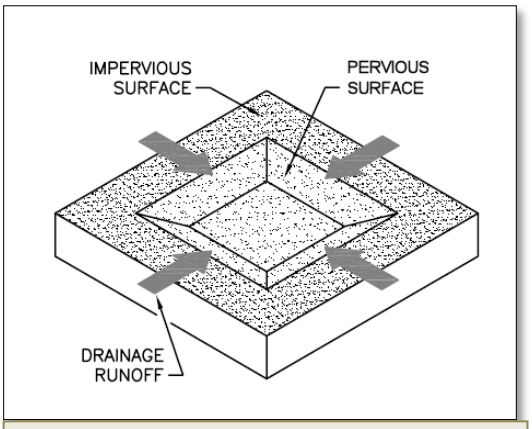


Figure 3-3: Areas draining to Self-Retaining Areas

For *partially* pervious areas draining to a Self-Retaining area the maximum ratio is:

$$\left(\frac{2}{\textbf{\textit{Impervious Fraction}}}\right) : 1$$

(Tributary Area **:** Self-Retaining Area)

Special Case
If your self-retaining area is a **Permeable Pavement**, higher ratios than 2:1 can be used **IF** the pervious pavement is designed in accordance with the LID BMP Design Handbook or other Copermittee-approved standard. In this case, the area draining to the pavement will be considered a **Type D DMA** (area draining to a BMP).

Where the Impervious Fraction is obtained from Section 2.5.1.b).

The drainage from the tributary area must be directed to and dispersed within the Self-Retaining Area, and the area must be designed to retain the entire Design Storm runoff without flowing off-site. For example, if the ratio of 2 parts impervious area into 1 part pervious area is used, and the Design Storm is 1 inch, then the pervious area must absorb 3 inches of water over its surface before overflowing to an off-site drain (one inch of rainfall for the Self-Retaining Area itself, plus 1 inch for each of the 2 parts of tributary impervious area).

Prolonged ponding is a potential problem at higher impervious/ pervious ratios. In your design, ensure that the pervious area soils can handle the additional run-on and are sufficiently well-drained, and/or amended as described in section 3.3.2.

Table 3-3: Table for Documenting Areas Draining to Self-Retaining Areas (Type 'C' DMAs)

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Runoff factor [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]
C/1	*1100*	*Roof*	*1*	*1100*			
C/2	*800*	*Pervious Walkway*	*0.1*	*80*			
				1180	*B/1*	*604*	*1.95 < 2*
C/3	*1946*	*Driveway*	*1*	*1946*	*B/2*	*2,149*	*0.91 < 2*

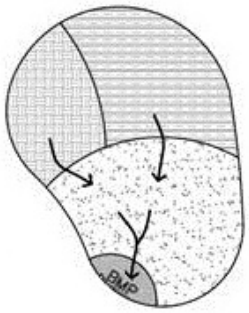
Note: Example Data shown

3.3.4. Type 'D': Areas draining to BMPs

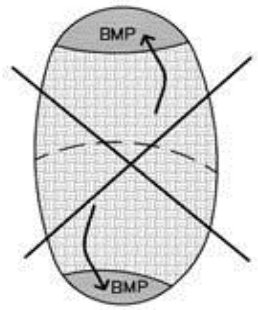
Areas draining to BMPs are areas that could not be fully mitigated through LID Principles (DMA Types A through C) and will instead drain to an LID BMP and/or a Conventional Treatment BMP designed to mitigate water quality impacts from that area, and Hydromodification where necessary.

More than one Drainage Management Area can drain to a single LID BMP, however, one Drainage Management Area may not drain to more than one LID BMP. See Figures 4-4 and 4-5.

Where possible, design site drainage so only impervious roofs and pavement drain to LID BMPs. This yields a simpler, more efficient design, with minimized LID BMP requirements, and also helps protect LID BMPs from becoming clogged by sediment.



More than one DMA can drain to a single BMP.



One DMA cannot drain to multiple BMPs

Figure 3-4: Drainage from Multiple DMAs

A table for documenting areas draining to BMPs is discussed in Section 3.4.3.

3.4. IMPLEMENT LID BMPS

Type 'D' Areas draining to BMPs must be addressed using LID BMPs according to the prioritization discussed in Section 2.3.2.

3.4.1. LID BMP Selection

3.4.1.a) LID Infiltration BMP Assessment

An assessment of the feasibility of utilizing LID Infiltration BMPs is required for all Development Projects, except *w*here it can be shown that Harvest and Use BMPs can and will be implemented to address the Design Capture Volume (see the Harvest and Use assessment below).

A site-specific evaluation of the feasibility of LID Infiltration BMPs must at minimum incorporate consideration of the criteria identified in Section 2.3.4. If one or more of the infiltration criteria indicate that LID Infiltration BMPs are not feasible for the Development Project site, the other remaining infiltration criteria do not need to be assessed.

3.4.1.b) LID Harvest and Use BMP Assessment

An assessment of the feasibility of implementing Harvesting and Use BMPs is required for all Development Projects, *except:*

- Where reclaimed water will be used for the non-potable water demands for the Development Project, or where downstream water rights may be impacted by Harvest and Use (see Harvest and Use discussion in Chapter 2).
- Where it can be shown that the LID design can reliably infiltrate or evapotranspire the Design Capture Volume (see the infiltration assessment below). In such a case, Harvest and Use BMPs can still be implemented for the Design Capture Volume if desired, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If neither of the above criteria apply, follow the steps below to assess the feasibility of:

- Irrigation use
- Toilet use
- Other non-potable uses (i.e. industrial use)

☞NOTE: It is very important to note that harvested water demand calculations differ in purpose and methods from water demand calculations done for water supply planning. When designing harvest and use systems for stormwater management, a reliable method of relatively quickly regenerating storage capacity (i.e., using water) must exist to provide storage capacity for subsequent storms. Therefore, demand calculations for harvest and use BMPs should attempt to estimate the actual demand that is reliably present to drain stormwater cisterns during the wet season, additionally considering that during a short time frame (a week to a couple of weeks) a series of storms may occur. This objective is fundamentally different from the objectives of water demand forecasting calculations done for water supply planning, which may err toward higher estimates of demand to provide conservatism to account for uncertainty. Harvested water demand calculations used to determine the feasibility of harvest and use BMPs must be based on estimates of actual expected demand that are reliably present to drain the cistern/vault during the wet season.

To assess the feasibility of implementing Harvest and Use BMPs, complete the following steps:

1. Document the following potential demands for the site, as applicable:

    a. *The total area of irrigated landscape.* It will be necessary to determine the type of landscaping that will be implemented on the site. For the purposes of this assessment, landscaping will either be a 'Conservation Design' (low water use, native species, etc), or 'Active Turf areas' (higher water use, ornamental species such as conventional sod). Determine the irrigated landscape area in acres.

    b. ***The expected number of toilet users.*** This should be based on the average number of daily toilet users (building occupants) during the Wet Season and should account for any periodic shut downs/lapses in occupancy (e.g., for vacations, maintenance, or other reasons). This requires close coordination with the project architect to accurately reflect the number of daily users.

    c. ***Other non-potable water demands.*** Identify any other on-site non-potable demand (in gallons per day) that is anticipated on an *average daily basis* during the Wet Season. Sources of demand should only be included if they are reliably and consistently present during the Wet Season.

2. Identify the planned ***total of all impervious areas*** on the proposed Development Project from which Runoff might be feasibly captured and

stored. Depending on the configuration of buildings and other impervious areas on the Development Project site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing Runoff and directing the stored Runoff from the potential use(s) identified in Step 1 above. Identify the total impervious area in acres.

3. Enter the Design Storm depth for the Development Project site (see Exhibit A) into the left column of Tables 2-1 through 2-3 in Section 2.3.5 to determine, respectively: a) the minimum number of toilet users per tributary impervious acre, b) the minimum square footage of effective irrigated area per tributary impervious acre, and c) the minimum demand for other non-potable uses per tributary impervious acre.

4. Multiply the unit values obtained from Step 3 by the total of impervious areas from Step 2, to develop the minimum demand that would be required for the various forms of Harvest and Use BMPs to be feasible on the Development Project. Then compare minimum demand values to the anticipated demands identified in Step 1.

   ☞ If any of the anticipated demands exceed the applicable minimum values, Harvest and Use BMPs are feasible for that demand type.

   ☞ If all of the anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required, however, other LID Retention BMPs, such as infiltration must be assessed and where applicable used – before LID Biotreatment BMPs can be used.

3.4.1.c) LID BMP Selection Matrix

Once the above assessments for Infiltration and Harvest and Use BMPs have been completed, the following table can be used to determine the applicable LID BMPs for your site. Refer to Table 3-4 below for determining LID BMPs that may be applicable to your project.

Table 3-4: LID BMP Selection Matrix

LID BMP Type	Are LID Retention BMPs Feasible?		
		No, but 'Other LID BMPs' are feasible, and	
	Yes	0.3"/hr. < K_{SAT} < 1.6"/hr.	K_{SAT} < 0.3"/hr.
Harvest and Use	✓(A)		
Infiltration	✓(B)		
Permeable Pavement	✓(C)		
Bioretention	✓(D)	✓(E)	✓
Biotreatment			✓

Notes for Table 4-5:

(A): Harvest and Use BMPs may be used where it can be shown that there is sufficient demand for harvested water. See Sections **2.3.5** and **3.4.1.b.**

(B): LID Infiltration BMPs may be used in locations where the tested infiltration rate of underlying soils is at least 1.6 in. per hour and no restrictions on infiltration apply to these locations. See Sections **2.3.4 and 3.4.1.a**.

(C) Permeable Pavement is a form of LID Infiltration BMP. However, when designed with a 2:1 ratio of impervious area to pervious pavement areas, or less, permeable pavement is considered a self retaining area, and is not considered an LID BMP for the purposes of this table. This table focuses on the 'special case' included in the Section 3.3.3, where a project proponent can choose to design the pervious pavement as an LID BMP in accordance with an approved design, such as the LID BMP Design Handbook, and perform any necessary infiltration testing; and in return drain additional impervious area onto the pervious pavement beyond the 2:1 ratio.

(D) As discussed in Section **2.3.3**, in well drained soils, water captured in Bioretention BMPs can be fully retained via infiltration and evapotranspiration.

(E) In this range of infiltration rates, Bioretention BMPs will be more reliable than LID Infiltration BMPs, but will still infiltrate and evapotranspire captured runoff to the maximum extent feasible based on in-situ actual characteristics.

3.4.2. Laying out your LID BMPs

Finding the right location for LID BMPs on your site involves a careful and creative integration of several factors:

- To make the most efficient use of the site and to maximize aesthetic value, integrate your LID BMPs with site landscaping. Many local zoning codes may require landscape setbacks or buffers, or may specify that a minimum portion of the site be landscaped. It may be possible to locate some or all of your site's LID BMPs within this same area, or within utility easements or other non-buildable areas.

- Use permeable pavements wherever possible. These pavement systems are not only aesthetically pleasing but they also minimize the amount of runoff that needs to be treated.

- Bioretention BMPs must be level or nearly level all the way around. When configured in a linear fashion (similar to swales) LID Bioretention BMPs may be gently sloped end to end, but opposite sides must be at the same elevation. BMPs on steeper slopes must be terraced or provided with check dams.

- For effective, low-maintenance operation, locate LID BMPs so drainage into and out of the device is by gravity flow. Many LID BMPs require 3 feet or more of head.

- LID BMPs require excavations 3 or more feet deep, which can conflict with underground utilities.

- If the property is being subdivided now or in the future, the BMP should be in a common, accessible area. In particular, avoid locating LID BMPs on private residential lots. Even if the LID BMP will serve only one site owner or operator, make sure the BMP is located for ready access for inspection by the local Copermittee and the local mosquito and vector control agency. The goal is to ensure that LID BMPs are maintained and functional, to assure a properly functioning maintenance mechanism since the ability of individual homeowners to provide maintenance is variable, and to avoid residential property rights issues for inspections and verifications. While the specific maintenance mechanism will be provided on a project by project basis, many Copermittees are pursuing methods to allow residential LID BMPs to be maintained by a public entity. Maintenance via a public maintenance mechanism will require BMPs to be located in common areas and not in individual lots.

- The LID BMP must be accessible to equipment needed for its maintenance. Access requirements for maintenance will vary with the type of BMP selected. LID Bioretention BMPs will typically need access for the same types of equipment used for landscape maintenance.

Document in your Project-Specific WQMP the site layout and site design decisions you made. This will provide background and context for how your design meets the quantitative LID BMP design criteria. Once you have laid out the LID BMPs, calculate the square footage you have set aside on your site plan for each BMP.

3.4.3. Calculate Minimum LID BMP Sizes

LID BMPs must at minimum be sized to address the Design Capture Volume. LID BMPs can be additionally sized and configured to meet Hydromodification Criteria described in section 3.6, if applicable.

3.4.3.a) Design Capture Volume

Appendix F of the LID BMP Design Handbook contains worksheets that can be used for calculating the required Design Capture Volume (aka V_{BMP}) for LID BMPs.

If the worksheet is not used, your calculations should be in tables using the following format:

Table 3-5: Example Format for Determining the Required Design Capture Volume for BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
						Design Storm Depth (in)	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]

[B], [C] are obtained as described in Section 2.5.1.b)
[E] is obtained from Exhibit A
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook. Maintain a completed design procedure sheet for each LID BMP.

3.4.3.b) Hydromodification

One option for addressing potential Hydromodification as described in section 3.6, is to modify your LID BMPs and/or enlarge them beyond the DCV (if necessary) such that the Hydromodification mitigation criteria are met. Refer to Section 3.6 to determine if Hydromodification controls are required for your project, and Section 2.5.2 for acceptable methods to demonstrate compliance with Hydromodification criteria.

3.4.4. Specify Design Details

In your preliminary Project-Specific WQMP, you will be required to provide preliminary design details sufficient to demonstrate that the area, volume, and other criteria of each can be met within the constraints of the site.

Your final Project-Specific WQMP and your construction and grading plans will need to include final design details consistent with your approved preliminary Project-Specific

WQMP. These final details must demonstrate that the required DCV, and any other requirements specified by the Copermittee, have been met. Ensure these details are consistent with preliminary site plans, landscaping plans, and architectural plans submitted with your application for planning and zoning approvals.

The LID BMP Design Handbook includes standard configurations, details and sizing calculator worksheets that are available for the LID BMPs referenced in this WQMP. Check with the local Copermittee to determine if this or alternative standards should be used for your project. The information in the LID BMP Design Handbook is designed to address the Design Capture Volume; alternative designs and sizes may be necessary for addressing Hydromodification. Local planning, building, and public works officials have final review and approval authority over the project design.

3.4.5. Determine if BMP Area and Volume are Adequate

Sizing and configuring BMPs is typically an iterative process. After specifying your preliminary design details as described in section 3.4.4, review the site plan to determine if the reserved BMP locations are sufficient for each of your LID BMPs.

If so, the planned BMPs will meet the WQMP sizing requirements for water quality.

If not, revise the plan accordingly. Revisions may include:

- Reducing the overall imperviousness of the project site. For example, consider incorporating additional permeable pavements to reduce the imperviousness of your site.
- Changing the grading and drainage to redirect some Runoff toward other BMPs which may have excess capacity.
- Making tributary landscaped Drainage Management Areas self-treating or self-retaining (may require changes to grading).
- Expanding BMP surface area.
- Revision to the square footage of a BMP typically requires a corresponding revision to the square footage of the surrounding or adjacent Drainage Management Area.
- The Hydromodification Requirements described in section 3.6 are a separate and additional standard that must be met by applicable projects. Even if your site has demonstrated compliance with the

DCV standard, such projects may need to implement additional or larger BMPs to meet the Hydromodification Requirements.

Section 3.5 describes alternative compliance measures that can be implemented if you have demonstrated that it is technically infeasible to address all required Type 'D' Drainage Management Areas with LID BMPs.

3.4.6. Unpaved Roads

If your project includes any unpaved roads, ensure that appropriate erosion and sediment control BMPs are incorporated to manage runoff and erosion during the post-construction life of the unpaved roads. At a minimum, the BMPs must include the following or alternative BMPs that are equally effective:

- Practices to minimize road related erosion and sediment transport;
- Grading of unpaved roads to slope outward where consistent with road engineering safety standards;
- Installation of water bars as appropriate; and
- Unpaved roads and culvert designs that do not impact creek functions and where applicable, that maintain migratory fish passage.

3.5. DOCUMENT ANY ALTERNATIVE COMPLIANCE MEASURES (LID WAIVER PROGRAM)

As discussed in Section 2.3.6, LID BMPs are expected to be feasible on virtually all Development Projects. Where LID BMPs have been demonstrated to be infeasible, an LID waiver must be granted by the Copermittee, and the minimum alternative compliance measures described in this section must be implemented for the remaining Type D Drainage Management Areas not addressed with LID BMPs.

3.5.1. LID Waiver

If you believe specific conditions on your site preclude the use of LID, you must submit, in the Project-Specific WQMP, a detailed site-specific examination and demonstration that implementation of Other LID BMPs (as discussed in Sections 2.3.2 and 2.3.6) is infeasible. Site-specific determinations shall be certified by a Professional Civil Engineer registered in the State of California, and must be approved by the Copermittee.

- If you plan to submit a site-specific infeasibility determination for Other LID BMPs, it is highly recommended to discuss this with the Copermittee early on, as such site-specific determinations are expected to be highly scrutinized and LID Waivers are only granted in truly extenuating circumstances.

- If a Copermittee grants an LID Waiver from implementation of LID BMPs for particular DMAs:
    - LID BMPs shall still be used for all other DMAs where LID is feasible.
    - Other Conventional Treatment BMPs approved by the Copermittee must be implemented, and the pollutant loads expected to be discharged due to not implementing LID Retention BMPs must be fully mitigated, as described in Sections 3.5.2 through 3.5.5.

3.5.2. Identify Priority Pollutants of Concern

The first step to identifying adequate alternative compliance measures is to identify the specific pollutants generated by your project that are also impairing the downstream receiving waters, referred to as 'priority pollutants of concern'. Follow the process identified in section 2.2.4 to identify the priority pollutants of concern for your project.

3.5.3. Required Pollutant Load Mitigation

All projects participating in the Alternative Compliance Program must fully mitigate the pollutant loads for the priority Pollutants of Concern that are expected to be discharged due to not implementing LID Retention BMPs. Table 3-6 below provides estimated pollutant concentrations that may be associated with various land use types, and has been compiled based on a study performed by the Southern California Coastal Water Research Project in the Los Angeles area watersheds (SCCWRP, TR510), assessments performed by the County of Los Angeles, and the National Stormwater Quality Database. There is currently insufficient data however to accurately model land use wash-off rates for all potential priority pollutants that may potentially be discharged from development land uses in Southern California. Accordingly, Total Suspended Solids (TSS) should be used as a surrogate for any priority pollutants of concern that are not identified in Table 3-6.

Table 3-6: Potential Untreated Median Concentration of Stormwater Runoff from Various Land Use Categories

Constituent	Residential	Commercial	Industrial	Transportation	Open Space
Sediments					
TSS (mg/L)	100	18	74	50	134
Pathogens					
Fecal Coliform (mpn/100 mL)	55426	22291	39595	2500	25565
Nutrients					
NH3 (mg/L)	0.25	0.25	0.26	0.14	0.05
N02+NO3 (mg/L)	0.51	0.50	0.58	0.45	0.99
Phos., total (mg/L)	0.32	0.28	0.30	0.32	0.05
Metals					
Cadmium, total (µg/L)	Non-detect	0.50	Non-detect	0.50	Non-detect
Chromium, total (µg/L)	Non-detect	2.5	2.5	2.5	Non-detect
Copper, total (µg/L)	18	17	33	39	8.0
Iron, total (µg/L)	546	587	600	512	233
Lead, total (µg/L)	8.0	4.0	19	2.5	1.0
Manganese, total (µg/L)	Non-detect	Non-detect	Non-detect	Non-detect	50
Zinc, total (µg/L)	103	156	550	218	23

Notes: TSS, fecal coliform, copper, lead, zinc data from Stein et al (2007), except for Transportation category data. Other data from County of L.A. monitoring data (http://dpw.lacounty.gov/wmd/NPDES/IntTC.cfm), except for Transportation fecal coliform which is from the National Stormwater Quality Database (Pitt and Maestre, 2005).

As discussed in Section 2.3.3, LID Retention BMPs sized to capture the runoff from the 85th percentile 24-hour storm, retain, on average, 80% of the long term runoff volume.

Therefore, to provide equivalent pollutant load reduction as LID Retention BMPs, mitigation measures must reduce 80% of the pollutant loads identified in Table 3-6 above for TSS (at minimum), and additionally any other Pollutant that is identified as a priority pollutant of concern for which data is available in Table 3-6.

3.5.4. Stormwater Credits

Certain types of development practices may provide broad scale environmental benefits to communities, which will reduce overall pollutant loadings into Receiving Waters. For example, a project that will redevelop a Brownfield site could reduce discharges of legacy pollutants into receiving waters and/or groundwater. Alternatively, a transit-oriented development would reduce car trips, which also reduces pollutant loadings.

3.5.4.a) Applying Water Quality Credits

The following water quality credits have been established for particular smart growth project categories. To determine the amount of credit a project would qualify for, the first step is to calculate the pollutant loads that would need to be mitigated as described in section 3.5.3. Any credits shown in Table 3-7 below would then be taken as a reduction to this required mitigation.

Table 3-7: Water Quality Credits for Applicable Project Categories

Project Category	Water Quality Credit
Redevelopment Projects that reduce the overall impervious footprint of the existing project site	*Percentage of site imperviousness reduced*
Historic district, historic preservation area, or similar areas	*10%*
Brownfield redevelopment	*25%*
Higher density development, 7 units/acre or more	*5%*
Higher density development, vertical density	*20%*
Mixed use development, transit oriented development or live-work development	*20%*
In-fill development	*10%*
[1] *Maximum total of water quality credits for a project is 50 %*	

If more than one category applies to a particular project, the credit percentages would be additive. Applicable performance criteria depend on the number of LID water quality credits claimed by the proposed project. Water quality credits can be additive up to a 50 percent reduction (50 percent reduction maximum) from a proposed project's obligation for sizing Conventional Treatment BMPs, contributing to an urban runoff/mitigation fund, or off-site mitigation projects. The volume credit would be calculated as the Design Capture Volume of the proposed condition multiplied by the sum of the percentages claimed above.

3.5.5. Conventional Treatment Control BMPs

Conventional Treatment Control BMPs are typically proprietary devices that provide treatment mechanisms for pollutants in runoff, but do not sustain significant natural biological processes, and typically do not reduce the volume of runoff.

3.5.5.a) Selection and Sizing of Conventional Treatment BMPs

Conventional Treatment BMPs must be implemented and sized to meet the following criteria:

- At minimum, all Conventional Treatment BMPs must be sized to address the Design Capture Volume or the Design Flow Rate, as applicable to the BMP type, as described in Section 2.5.1. Document in your Project-Specific WQMP the minimum size of your Conventional Treatment BMPs using the table below.

Table 3-8: Example Format for Conventional Treatment BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
						Design Storm Depth (in)	*Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Minimum Design Capture Volume, adjusted for any Water Quality Credits (cubic feet or cfs)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[H]

[B], [C] are obtained as described in Section 2.5.1.b)
[E] is obtained from Exhibit A
[G] for Flow-Based Treatment BMPs [G] = 43,560, for Volume-Based Treatment BMPs, [G] = 12.
[H] = [F], reduced by the project's total water quality credit percentage.

- Additionally, the onsite or offsite BMPs must fully mitigate the required pollutant loads as calculated from Sections 3.5.3 and 3.5.4. Meeting this standard may require additional or larger Conventional Treatment BMPs to be incorporated into the design, or the construction of / participation in an offsite mitigation project, if available.

- Pollutant Load removal efficiencies of any selected Conventional Treatment BMP must be substantiated by independent third-party 'in-situ' testing of the specific Conventional Treatment BMPs being considered, such as provided on the references included in the BMP Performance Report Library, located at:

http://rcflood.org/NPDES/BMPPerformance.aspx

Document in your Project-Specific WQMP that all Type 'D' DMAs that have not been addressed using LID BMPs have been fully mitigated with Conventional Treatment BMPs and any additional onsite or offsite mitigation as described above.

3.6. ADDRESS HYDROMODIFICATION

All Priority Development Projects must analyze and mitigate for Hydromodification effects unless the project type or location is exempted as described below.

☞On or before June 30, 2013, the Copermittees will submit a Hydromodification Management Plan (HMP) which will specify final criteria for mitigating Hydromodification Impacts caused by Priority Development Projects. Until the HMP is approved by the San Diego Regional Board and implemented in accordance with the 2010 MS4 Permit, the following interim criteria identifies those projects that will have to mitigate Hydromodification Impacts.

3.6.1. Interim Hydromodification Applicability Criteria

All Priority Development Projects must mitigate for Hydromodification Impacts unless one of the following criteria is met.

1. Runoff from the Priority Development Project:

    a) Discharges directly into a storm drain that is concrete lined all the way from the point of discharge to the ocean, bay, lagoon, water storage reservoir or lake;

    b) Is in full compliance with Copermittee requirements for connections and discharges to the MS4 (including both quality and quantity requirements);

    c) Will not cause increased upstream or downstream erosion or adversely impact downstream habitat; or

    d) Is authorized by the Copermittee.

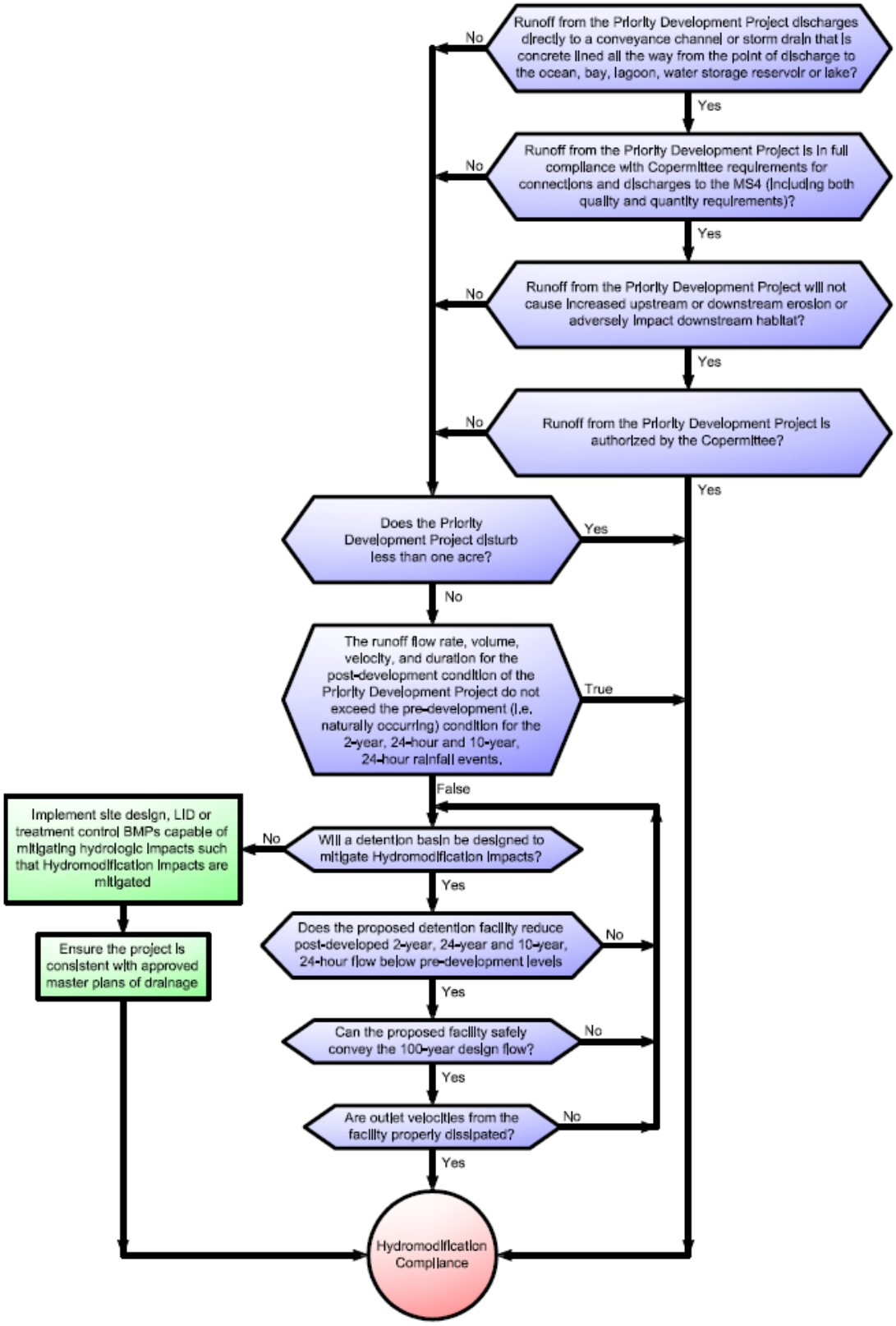
2. The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

3. The Runoff flow rate, volume, velocity, and duration for the post-development condition of the Priority Development Project do not exceed the pre-development (i.e. naturally occurring) condition for the 2-year, 24-hour and 10-year, 24-hour rainfall events. This condition must be substantiated by hydrologic modeling acceptable to the Copermittee.

If none of the above criteria apply, you may then need to reassess the LID design described in Sections 3.2 through 3.5 and revise the design as needed to demonstrate compliance using either Methodology A or Methodology B described in Section 2.5.2.

Figure 3-6 below shows the process for determining if Hydromodification Criteria applies.

Figure 3-5: HCOC Criteria Specific to the Santa Margarita Region



3.7. SPECIFY SOURCE CONTROL BMPS

Some everyday activities – such as trash recycling/disposal and washing vehicles and equipment – can generate Pollutants that tend to find their way into the MS4. These Pollutants can be minimized by applying Source Control BMPs.

Source Control BMPs include Permanent, structural features (Structural Source Control BMPs) that may be required in your Development Project plans—such as roofs over and berms around trash and recycling areas—and Operational BMPs, such as regular sweeping and "housekeeping," that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational Source Control BMPs cannot be substituted for a feasible and effective Structural Source Control BMP.

Use the following procedure to specify Source Control BMPs for your Development Project site:

1. Identify Pollutant Sources. Review your site plan to identify potential sources such as but not limited to:

   - Storm Drain Inlets
   - Floor Drains
   - Sump Pumps
   - Pets Control/Herbicide Application
   - Pools, Spas, Fountains and other water features
   - Food Service Areas
   - Trash Storage Areas
   - Industrial Processes
   - Outdoor storage areas
   - Vehicle and Equipment Cleaning and Maintenance/Repair Areas
   - Fueling areas
   - Loading Docks
   - Fire Sprinkler Test/Maintenance water
   - Plazas, Sidewalks and Parking Lots.

2. Identify in your WQMP the Permanent Structural Source Control BMPs, as applicable, for each identified source.

3. Using Table 3-9 as a model, identify in your WQMP the Operational Source Control BMPs, for each source, which should be implemented as long as the anticipated activities continue at the site. Copermittee Stormwater Ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table 3-9: Format for Table of Structural and Operational Source Control BMPs

Potential source of Runoff Pollutants	*Structural Source Control BMPs*	*Operational Source Control BMPs*

3.8. Coordinate your WQMP Design with Other Site Plans

Follow the guidance in Section 4.0 to ensure that your Project-Specific WQMP, including all LID Principles, LID BMPs, Alternative Compliance measures, Hydromodification BMPs, and Source Control BMPs are properly identified on and coordinated with all other site plans, such as Architectural Plans, Improvement Plans, Construction Plans, and Landscaping Plans.

3.9. Develop an Operation and Maintenance Plan

All Structural Stormwater BMPs must be maintained and functional throughout the life of the project to ensure their ongoing effectiveness for protecting runoff quality and quantity. As required by the 2010 SMR MS4 Permit, the Copermittee will periodically verify that Structural Stormwater BMPs on your site are maintained and continue to operate as designed.

To make this possible, your local Copermittee will also require that you prepare and submit a WQMP Operation and Maintenance Plan.

Details of these requirements, and instructions for preparing a WQMP Operation and Maintenance Plan, are provided in Section 5.0.

Chapter 4

4.0 COORDINATION WITH OTHER SITE PLANS

Guidance for coordinating your Project-Specific WQMP with other site plans, including Architectural Plans, Grading Plans, Construction SWPPPs, and Landscaping Plans.

Your Project-Specific WQMP must contain enough detail to demonstrate your planned LID Principles, LID BMPs, Alternative Compliance measures, Hydromodification BMPs, and Source Control BMPs are feasible and are coordinated with the project construction plan, architectural renderings, grading plan, landscape design, and other information submitted with your application for development approvals.

4.1. PREPARE A WQMP SITE PLAN

To help ensure that your Project Design has fully met the WQMP requirements and is fully coordinated with your other project plans, you will be required to prepare and submit a WQMP Site Plan with your WQMP submittals.

At a minimum, your WQMP Site Plan should include the following:

- Vicinity and Location Maps
- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Paths
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use discretion on whether or not you may need to show additional information and/or to create multiple sheets to appropriately accommodate these features. Keep in mind that the Copermittee plan reviewer must be able to easily analyze your Project-Specific WQMP and WQMP Site plan, and compare those to your other plans and maps as described below.

4.2. COORDINATION WITH ARCHITECTURAL PLANS

Information and presentations submitted to design review committees, planning commissions, and other decision-making bodies must incorporate relevant aspects of the Stormwater design. In particular, ensure:

- The visual impact of Structural Stormwater BMPs adjacent to building foundations and any terracing or retaining walls required for the BMP design, is shown in renderings and other architectural drawings.
- Renderings and representation of street views incorporate any Structural Stormwater BMPs located in street-side buffers and setbacks.
- Any potential conflicts with local development standards have been identified and resolved.
- The selected BMPs do not create conflicts with pedestrian access between parking and building entrances.
- Any potential conflicts with local development standards have been identified and resolved.

4.3. COORDINATION WITH IMPROVEMENT PLANS

Details of how your BMPs are constructed can be critical to ensuring they work properly. A misplaced inlet, an overflow at the wrong elevation, or the wrong soil mix can make an LID BMP ineffective even before it comes on-line, and could result in delays to project approvals and additional expense.

Additional detail as described in this section, must be shown on plans submitted with applications for building and grading permits. During construction and at completion, Copermittee inspectors will check the work against the approved plans.

LID Principles and LID BMPs have been routinely incorporated into Development Projects for only a few years. The community of land development professionals and Copermittee staff continue to compile and analyze "lessons learned" from their experience. The following guidance is based on those lessons.

4.3.1. What to Show on Improvement Plans

With few exceptions, the plan set should include separate sheets specifically incorporating the BMPs described in the Project-Specific WQMP. The information on these sheets must be carefully coordinated and made consistent with grading plans, utility plans, landscaping plans, and (in many cases) architectural plans. Consider including the grading plan (screened) as background for the stormwater sheets. It may also be appropriate to show

portions of the roofing plan wherever roof ridges define Drainage Management Areas. Additionally, utilizing different colors with associated legends will help reviewers differentiate the different details shown on the construction plans with respect to grading and runoff management.

In particular, ensure that relevant aspects of the Stormwater design are properly incorporated into your construction documents, including:

4.3.1.a) BMP Reference Table

When you submit Building and Grading plans for Copermittee review and approval, the plan checker will compare that submittal with your Project-Specific WQMP. To facilitate the plan checker's comparison and speed review of your project, create a WQMP Checklist for your project.

Table 4-1: Format for BMP Reference Table

Project-Specific WQMP Page #	*BMP Identifier and Description*	*See Plan Sheet #s*

Here's how:

1) Create a table similar to Table 4-1. Number and list each measure or BMP you have specified in your Project-Specific WQMP in Columns 1 and 2 of the table. Leave Column 3 blank. Incorporate the table into your Project-Specific WQMP.

2) When you submit construction plans, duplicate the table (by photocopy or electronically). Now fill in Column 3, identifying the plan sheets where the BMPs are shown. List all plan sheets on which the BMP appears. Submit the updated table with your construction plans so that the plan checker can quickly locate the Structural Stormwater BMPs that were committed to in the Project-Specific WQMP.

Note that the updated table—or Construction Plan WQMP Checklist—is only a reference tool to facilitate comparison of the construction plans to your Project-Specific WQMP. Copermittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

4.3.1.b) Grading is Key

Copermittee staff will typically require grading plans to show each BMP, along with the delineation of Drainage Management Areas. Call out elevations, including the following:

- Curb elevations, inlet elevations, grade breaks and other features of the drainage design are consistent with the delineation of the Drainage Management Areas.
- At curb cut inlets, show elevations for top of paving, top of curb and top of the bioretention soil layer.
- At overflow grates, show the grate elevation and the adjacent top of soil elevation.
- Call out elevations of piped inlets.

Show how Drainage Management Areas follow grade breaks, consistent with the grading plan and the Project-Specific WQMP.

4.3.1.c) Show How Runoff Moves

As needed for clarity, show the direction of Runoff flow across roofs and pavement and into BMPs. For runoff conveyed via pipes or channels, show locations, slopes, and elevations at the beginning and end of each run.

For roof drainage, show the routing of roof downspouts. Use drawings or notes to make clear how drainage from leaders is routed under walkways, across pavement, through drainage pipes, or by other means to reach the BMP.

Show pipes or channels connecting the BMP underdrain and overflow to the site drainage system, MS4, or other approved discharge point. Call out slopes and key elevations.

4.3.1.d) Landscaping and Utility Plans

- Irrigation runoff is prohibited in the Santa Margarita Region. Any instance of irrigation water reaching the MS4, is a violation of the Copermittees' ordinances. Ensure that all irrigation systems are properly designed, such as with drip irrigation systems, so as to eliminate the potential for irrigation runoff.
- Vaults and utility boxes will be accommodated outside BMPs and will not be placed within Structural Stormwater BMPs in a manner that interferes with their performance and/or Operation and Maintenance.

- Landscaping plans, including planting plans, need to show locations of Structural Stormwater BMPs, and the plant requirements must be consistent with the engineered soils and conditions in the BMPs. For more information on plant species appropriate for Bioretention BMPs, see Appendix A of the Low Impact Development Manual for Southern California:

http://www.casqa.org/LinkClick.aspx?fileticket=zhEf2cj4Q%2fw%3d&tabid=218

4.3.1.e) Show LID Principles and Structural Stormwater BMPs in Cross-Section

Use one or more cross-section drawings to illustrate details and key BMP elevations, including bottom of excavation, top of gravel layer, top of soil layer, edge treatments, inlet elevations, overflow grate elevations, rim elevations, locations of rock for energy dissipation, moisture barriers, and other information. Call out specifications or refer to specifications elsewhere for gravel and soil mix.

- Any area drains within Type 'B' Self Retaining areas should be identified with elevations of the inlet into the drain, such that the required retention depth will be provided.

- The top edge (overflow) of each BMP provides for the required ponding depth.

4.4. COORDINATION WITH CONSTRUCTION ACTIVITIES

Successful construction of BMPs requires attention to detail during every stage of the construction process, from initial layout to rough grading, installation of utilities, construction of buildings, paving, landscaping, and final clean-up and inspection.

Construction project managers need to understand the purpose and function of BMPs and know how to avoid common missteps that can occur during construction. For LID BMPs, the following operating principles should be noted at a pre-construction meeting.

- Runoff flow from the intended tributary Drainage Management Area must flow into the BMP.

- The surface reservoir must fill to its intended volume during high inflows.

- Runoff must filter rapidly through the filtration/soil layer.

- Filtered Runoff must infiltrate into the native soil to the extent feasible (or allowable).

- Remaining Runoff must be captured and drained to a storm drain or other approved location.

4.4.1. Coordination with Erosion and Sediment Control Plan / SWPPP

BMPs may not perform as designed if the BMP and the BMP location are not protected during site construction. It is important to specify that appropriate measures be taken by construction staff to protect these areas and BMPs. Be sure that all construction site staff is aware of these requirements, because historical construction habits may take time to change.

- Avoid intentional or unintentional compaction of planned landscaped areas, particularly areas that have been designated for infiltration such as Self Retaining Areas, LID Infiltration BMPs and Bioretention BMPs. If these areas are compacted, or even just used as an access path for heavy equipment during site grading, then the soil structure and infiltration characteristics will be destroyed, and the BMP will not perform as designed. If this occurs, require re-tilling and/or soil amendments as necessary to restore the infiltrative capacity of the underlying soils.

- Once any BMP is constructed, surround the BMP with sediment control BMPs, and maintain those sediment control BMPs until site occupancy is granted. Even small amounts of construction sediment can significantly affect the performance of the BMPs.

- Construct pervious pavements as the last order of work, if possible.

4.4.2. Items to Be Inspected During Construction

Ensure that the project contract documents are specific enough to ensure that the elements of the WQMP are properly constructed. See the example construction checklist on the following pages for ideas of items that may need to be verified in the contract documents and during construction.

EXAMPLE BMP CONSTRUCTION CHECKLIST

Staking

- ❒ Square footage of BMPs meets or exceeds minimum shown in Project-Specific WQMP
- ❒ Site grading and grade breaks are staked consistent with and sufficient to define the boundaries of the tributary Drainage Management Area(s) (DMAs) shown in the Project-Specific WQMP
- ❒ Inlet elevation of the BMP is low enough to receive drainage from the entire tributary DMA
- ❒ Locations and elevations of overland flow or piping, including roof leaders, from impervious areas to the BMP have been laid out and any conflicts resolved
- ❒ Rim elevation of the BMP is staked consistent with plans
- ❒ Locations for vaults, utility boxes, and light standards have been identified so that they will not conflict with BMPs

EXCAVATION (to be confirmed prior to backfilling or pipe installation)

- ❒ Excavation conducted with materials and techniques to minimize compaction of soils within the BMP area
- ❒ Excavation is to accurate area and depth
- ❒ Slopes or side walls protect from sloughing of native soils into the BMP
- ❒ Moisture barrier, if specified, has been added to protect adjacent pavement or structures.
- ❒ Native soils at bottom of excavation are ripped or loosened to promote infiltration

OVERFLOW OR SURFACE CONNECTION TO MS4
(to be confirmed prior to backfilling with any materials)

- ❒ Overflow is at specified elevation (typically no lower than two inches below BMP rim)
- ❒ No knockouts or side inlets are in overflow riser
- ❒ Overflow location selected to minimize surface flow velocity (near, but offset from, inlet recommended)
- ❒ Grating excludes mulch and litter (beehive or atrium-style grates with ¼" openings recommended)
- ❒ Overflow structure are located away from inlets to the BMP
- ❒ Overflow is connected to storm drain or other specified outlet via appropriately sized piping

UNDERGROUND CONNECTION TO MS4 /OUTLET ORIFICE
(to be confirmed prior to backfilling BMP with any materials)

- ❒ Perforated pipe underdrain is installed with holes facing down
- ❒ Perforated pipe is connected to the specificed discharge point
- ❒ Underdrain pipe is at elevation shown on plans. In facilities allowing infiltration, preferred elevation is above native soil but low enough to still be covered by the underdrain rock; in bioretention facilities that are sealed or with liners, preferred elevation is as near bottom as possible
- ❒ Cleanouts are in accessible locations and connected via sweeps
- ❒ Structures (arches or large diameter pipes) for additional surface storage are installed as shown in plans and specifications and have the specified volume

(continued)

Figure 4-1: Example BMP Construction Checklist

EXAMPLE BMP CONSTRUCTION CHECKLIST (CONTINUED)

DRAIN ROCK/SUBDRAIN (to be confirmed prior to installation of soil mix)

- ❒ Rock is installed as specified.
- ❒ Rock is smoothed to a consistent top elevation. Depth and top elevation are as shown in plans
- ❒ Slopes or side walls protect from sloughing of native soils into the BMP
- ❒ No filter fabric is placed between the subdrain and soil mix layers

SOIL MIX (FOR BIORETENTION)

- ❒ Soil mix is as specified. Quality of mix is confirmed by delivery ticket or on-site testing as appropriate to the size and complexity of the BMP
- ❒ Mix is not compacted during installation but may be thoroughly wetted to encourage consolidation
- ❒ Mix is smoothed to a consistent top elevation. Depth of mix and top elevation are as shown in plans, accounting for depth of mulch to follow and required reservoir depth

IRRIGATION

- ❒ Irrigation system is installed so it can be controlled separately from other landscaped areas. Smart irrigation controllers and drip emitters are recommended
- ❒ Spray heads, if any, are positioned to avoid direct spray into outlet structures

PLANTING

- ❒ Plants are installed consistent with approved planting plan
- ❒ Any trees and large shrubs are staked securely
- ❒ No clayey material, including inappropriate native soils are used in the BMP
- ❒ 1"-2" mulch may be applied following planting; mulch selected to avoid floating
- ❒ Final elevation of soil mix, including mulch, is maintained following planting
- ❒ Curb openings are free of obstructions

FINAL ENGINEERING INSPECTION

- ❒ Drainage Management Area(s) are free of construction sediment and landscaped areas are stabilized
- ❒ Inlets are installed to provide smooth entry of Runoff from adjoining pavement, have sufficient reveal (drop from the adjoining pavement to the top of the mulch or soil mix, and are not blocked
- ❒ Inflows from roof leaders and pipes are connected and operable
- ❒ Temporary flow diversions are removed
- ❒ Rock or other energy dissipation at piped or surface inlets is adequate
- ❒ Overflow outlets are configured to allow the BMP to flood and fill to near rim before overflow
- ❒ Plantings are healthy and becoming established
- ❒ Irrigation is operable
- ❒ If rains have occurred: BMP drains rapidly; no surface ponding is evident
- ❒ Any accumulated construction debris, trash, or sediment is removed from BMP
- ❒ Certification Statement from design professional that all BMPs have been constructed and/or installed in accordance with the approved plans and specs.

Chapter 5

5.0 WQMP OPERATION & MAINTENANCE

How to prepare a customized WQMP Operation & Maintenance Plan for the BMPs on your site.

Provision F.1.f(2)(b) of the 2010 SMR MS4 Permit requires that each Copermittee must verify that Structural Stormwater BMPs are adequately maintained. Copermittees must report the results of these verifications to the San Diego Regional Board annually.

Structural Stormwater BMPs installed as part of your Development Project will be incorporated into the Copermittee's verification program. This is a five-stage process:

1) Determine who will own the Structural Stormwater BMPs and be responsible for its maintenance in perpetuity and document this in your Project-Specific WQMP. The Project-Specific WQMP must also identify the means by which ongoing maintenance will be assured (for example, a maintenance agreement that runs with the land).

2) Identify Project-Specific maintenance requirements, allow for these requirements in your project planning and preliminary design, and document the typical maintenance requirements in your Project-Specific WQMP.

3) Prepare a WQMP Operation and Maintenance Plan (WQMP O&M Plan) for the site incorporating detailed requirements for each LID BMP, any Conventional Treatment BMP and Hydromodification BMP. Other types of LID Principles, such as self-retaining areas may also require operation and maintenance to ensure that they continue to function as designed. Typically, a draft WQMP Operation and Maintenance Plan must be submitted with the Final WQMP, and a final WQMP Operation and Maintenance Plan must be submitted and approved by the Copermittee prior to issuance of a certificate of occupancy. Local requirements vary as to schedule. Check with Copermittee staff.

4) Maintain the Structural Stormwater BMPs from the time they are constructed until ownership and maintenance responsibility is formally transferred to the site owner / operator.

5) Maintain the BMPs in perpetuity and comply with your Copermittee's self-inspection, reporting, and verification requirements.

Table 5-1: Schedule for Planning your WQMP Operation and Maintenance Plan

Stage	*Description*	*Where documented*	*Schedule*
1	Determine BMP ownership and maintenance responsibility	Preliminary Project-Specific WQMP	Discuss with project owner at initial project planning phase.
2	Identify Project-Specific maintenance requirements	Preliminary Project-Specific WQMP	Submit with planning & zoning application
3	Develop detailed operation and maintenance plan	Final Project-Specific WQMP	Submit draft with Building Permit application; final due before building permit final and applying for a Certificate of Occupancy
4	Interim operation and maintenance of BMPs	As required by Copermittee O&M verification program	During and following construction including warranty period
5	Ongoing maintenance and compliance with inspection & reporting requirements	As required by Copermittee O&M verification program	In perpetuity

5.1. STAGE 1: OWNERSHIP AND MAINTENANCE RESPONSIBILITY

Ownership & maintenance responsibility for Structural Stormwater BMPs should be discussed as early as due diligence and definitely at the beginning of project planning. Experience has shown that provisions to implement and finance maintenance of Structural Stormwater BMPs can be a major stumbling block to project approval, particularly for small residential subdivisions.

Your Project-Specific WQMP must specify:

1) Who will be responsible for maintaining the site in conformance with the WQMP O&M Plan.

2) The means for financing the maintenance of Structural Stormwater BMPs in perpetuity once the BMP is implemented and the Development Project is complete. This should include the mechanisms for the eventual replacement of the BMP or elements of the BMP.

3) How the maintenance obligations will carry over to subsequent owners, as further described in sections 5.1.1 through 5.1.3 below.

5.1.1. Private Ownership and Maintenance

The Copermittee may require—as a condition of project approval—that a maintenance agreement be executed and recorded against the title of the property. Consult with the local Copermittee for a copy of any required maintenance agreement.

The agreement will thereby "run with the land", so the maintenance agreement executed by a developer is binding on the owners of the subdivided lots and subsequent owners. The agreement must be recorded prior to conveyance of the subdivided property.

5.1.2. Transfer to Public Ownership

Some Copermittees may have developed a process by which a Structural Stormwater BMP can be deeded to the public in fee or as an easement, for public maintenance. The Copermittee may recoup the costs of maintenance through a special tax, assessment district, or similar mechanism.

- ☞ Check with the local Copermittee to determine if any such 'public maintenance' mechanisms are in place, and for any associated requirements.

Transferring an LID BMP to Public Ownership may create additional design constraints, however it removes the burden from the site owner / operator from having to maintain the BMP in perpetuity. Because sites typically drain to the street, it may be possible to locate a BMP parallel to the street and within road right of way, or on a common, publically accessible lot.

Even if the Structural Stormwater BMP is to be deeded or transferred to the Copermittee after construction is complete, it is still the responsibility of the applicant/developer, to maintain the BMP in accordance with the WQMP O&M Plan until that responsibility is formally transferred to the subsequent owner.

5.1.3. Copermittee Projects

Public projects (such as Public Works / CIP projects) implemented by a Copermittee will be maintained by the Copermittee in accordance with a Facility Pollution Prevention Plan as described in the Copermittee's Jurisdictional Runoff Management Plan (JRMP).

5.2. STAGE 2: IDENTIFY MAINTENANCE REQUIREMENTS

Include in your Project-Specific WQMP a description of the maintenance requirements for each Structural Stormwater BMP, including for any self-retaining and/or landscaped self-treating areas. This will help ensure that:

- Ongoing costs of Structural Stormwater BMP maintenance have been considered in your BMP selection and design.
- Site and landscaping plans provide for access for inspections and by maintenance equipment.
- Landscaping plans incorporate irrigation requirements for Structural Stormwater BMP plantings as appropriate.
- Initial maintenance and replacement of Structural Stormwater BMP plantings is incorporated into landscaping contracts and guarantees.

Fact sheets in the LID BMP Design Handbook describe typical maintenance requirements for many of the Structural Stormwater BMPs described in this WQMP. Use this information, or other requirements specified by the Copermittee to specify the maintenance requirements for each of the Structural Stormwater BMPs, including LID BMPs, Conventional Treatment BMPs, Hydromodification BMPs, and Structural Source Control BMPs identified in your Project-Specific WQMP. In addition, identify any necessary maintenance requirements for any other LID Principles that were incorporated into the project, such as buffer areas, etc.

5.3. STAGE 3: DEVELOP YOUR WQMP OPERATIONS &MAINTENANCE PLAN

Submit a draft WQMP O&M Plan with your final WQMP when you apply for permits to begin grading or construction on the site. A final WQMP O&M Plan (updated as necessary) will be required to be submitted with the 'as-built' plans and approved before occupancy is granted.

The final WQMP O&M Plan should incorporate solutions to any problems noted or changes that occurred during construction.

Your Final WQMP O&M Plan and 'as-built' plans must be submitted to and approved by your Copermittee before your building permit can be made final and a certificate of occupancy issued.

The Project-Specific WQMP and WQMP O&M Plan must be kept onsite for use by maintenance personnel and during site inspections.

The following step-by-step guidance will help you prepare each required section of your WQMP O&M Plan. Preparation of the Plan will require familiarity with your Structural Stormwater BMPs as they have been designed / constructed and a fair amount of "thinking through" plans for their operation and maintenance. The text and forms provided here will assist you, but are no substitute for thoughtful planning.

5.3.1. Step 1: Designate Responsible Individuals

To begin creating your WQMP O&M Plan, your organization must designate and identify:

- The individual who will have direct responsibility for the maintenance of the BMPs identified in the WQMP O&M Plan. This individual should be the designated contact with Copermittee inspectors and should sign self-inspection reports and any correspondence with the Copermittee regarding verification inspections. The Copermittee may accept self-certification or third-party certification by a California licensed Professional Engineer.

- Employees or contractors who will report to the designated contact and are responsible for conducting all required operation and maintenance.

- The corporate officer authorized to negotiate and execute any contracts that might be necessary for future changes to operation and maintenance of the BMPs identified in the WQMP O&M Plan or to implement remedial measures if problems occur.

- Your designated respondent to problems with the BMPs, such as clogged drains or broken irrigation mains, that would require immediate response should they occur during off-hours.

Include an organization chart to show the relationships of authority and responsibility between the individuals responsible for WQMP operation and maintenance. This need not be elaborate, particularly for smaller organizations.

Describe how funding for operation and maintenance will be assured, including sources of funds, budget category for expenditures, process for establishing the annual maintenance budget, and process for obtaining authority should unexpected expenditures for major corrective maintenance be required.

Describe how your organization will accommodate training of staff or contractors regarding the purpose, mode of operation, and maintenance requirements for the BMPs Identified in your WQMP O&M Plan. Also, describe how your organization will ensure ongoing training as needed and in response to staff changes.

5.3.2. Step 2: Summarize Drainage and BMPs

Incorporate the following information from your Project-Specific WQMP into your WQMP O&M Plan:

- Figures delineating and designating Drainage Management Areas
- Figures showing locations of BMPs on the site
- Tables of the DMAs served by each Structural Stormwater BMP

Ensure that these figures incorporate any changes that may have occurred during planning and zoning review, building permit review, or construction.

5.3.3. Step 3: Document BMPs "As Built"

Once each Structural Stormwater BMP is constructed, plans for the BMP shall be 'as-built' by a licensed civil/geotechnical engineer registered in the state of California and submitted to the Copermittee, and also included as part of the WQMP O&M Plan. The information contained on the 'as-built' plans must be consistent with standard engineering practice. Following is a list of types of information that should be documented on 'as-built' plans as applicable and appropriate:

- Plans, elevations, and details of all Structural Stormwater BMPs. Annotate if necessary with designations used in the Project-Specific WQMP.
- Design information or calculations submitted in the detailed design phase (i.e., not included in the Project-Specific WQMP).
- Specifications of construction of the Structural Stormwater BMPs, including sand or soil, compaction, pipe materials, and bedding.

In the final WQMP O&M Plan, incorporate field changes to design drawings, including changes to any of the following:

- Location and layouts of inflow piping, flow splitter boxes, and piping to off-site discharge.
- Depths and layering of soil, sand, or gravel.
- Placement of filter fabric or geotextiles
- Changes or substitutions in soil or other materials.
- Natural soils encountered (e.g. sand or clay lenses).
- Etc.

5.3.4. Step 4: Prepare Customized Maintenance Plans

Prepare a maintenance plan, schedule, and inspection checklists (e.g. routine, annual, and after major storms) for each Structural Stormwater BMP including for any self-retaining and/or landscaped self-treating areas. Plans and schedules for two or more similar BMPs on the same site may be combined.

Use the following resources to prepare your customized maintenance plan, schedule, and checklists.

- Specific information noted in Steps 2 and 3, above.
- Other input from the Structural Stormwater BMP designer, Copermittee staff, or other sources.
- BMP Fact Sheets in the LID BMP Design Handbook, as applicable.

Note any particular characteristics or circumstances that could require attention in the future, and include any troubleshooting advice.

Also include in an appendix any manufacturer's data, operating manuals, and maintenance requirements for any:

- Pumps or other mechanical equipment.
- Proprietary devices used as or in conjunction with BMPs.

Manufacturers' publications should be referenced in the text (including models and serial numbers where available). Copies of the manufacturers' publications should be included as an attachment in the back of your WQMP O&M Plan or as a separate document.

5.3.5. Step 5: Compile O&M Plan

Your WQMP O&M Plan should follow the general outline below.

Note that for Copermittee Projects, the WQMP O&M Plan requirements will be incorporated into a new or existing FPPP, following the format and content of the Copermittee's Facility Pollution Prevention Plans..

I. Inspection and Maintenance Log

II. Updates, Revisions and Errata

III. Introduction

Narrative overview describing the site; drainage areas, routing, and discharge points; and Structural Stormwater BMPs

IV. Responsibility for Maintenance

A. General

(1) Name and contact information for responsible individual(s).

(2) Organization chart or charts showing organization of the maintenance function and location within the overall organization.

(3) Reference to Operation and Maintenance Agreement (if any). A copy of the agreement should be attached.

(4) Maintenance Funding

(a) Sources of funds for maintenance

(b) Budget category or line item

(c) Description of procedure and process for ensuring adequate funding for maintenance

B. Staff Training Program

C. Records

D. Safety

V. Summary of Drainage Management Areas and BMPs

A. Drainage Management Areas

(1) Drawings showing pervious and impervious areas (copied or adapted from Project-Specific WQMP)

(2) Designation and description of each Drainage Management Area and how flow is routed to the corresponding Stormwater BMP

B. Structural Stormwater BMPs

(1) Drawings showing location and type of each Structural Post-Construction BMP

(2) General description of each BMP (Consider a table if more than two BMPs)

(a) Drainage Management Area and routing of discharge

(b) Stormwater BMP type and size

VI. Stormwater BMP Design Documentation

A. "As-built" drawings of each Structural Stormwater BMP (design drawings in the draft Plan)

B. Manufacturer's data (as applicable) including manuals, and maintenance requirements for pumps, mechanical or electrical equipment, and proprietary facilities (include a "placeholder" in the draft WQMP Operations and Maintenance Plan for information not yet available at the draft phase).

C. Specific operation and maintenance concerns and troubleshooting

VII. Maintenance Schedule or Matrix

A. Maintenance Schedule for each Structural Stormwater BMP with specific requirements for:

(1) Routine inspection and maintenance

(2) Annual inspection and maintenance

(3) Inspection and maintenance after major storms

B. Service Agreement Information

Assemble and make copies of your WQMP O&M Plan. One or more copies must be submitted to the Copermittee, including one electronic copy. At least one copy must be kept on-site. Here are some suggestions for formatting the WQMP O&M Plan:

- Format plans to 8½" x 11" to facilitate duplication, filing, and handling
- Include the revision date in the footer on each page
- Scan graphics and incorporate with text into a single electronic file. Keep the electronic file backed-up so that copies of the WQMP O&M Plan can be made if the hard copy is lost or damaged.

5.3.6. Step 6: Updates

Your Stormwater Control Operation and Maintenance Plan (or FPPP for CoPermittee projects) will be a living document and thus will require periodic updates. There are two types of updates, each with their own implications as noted below. Note that these are examples of minimum thresholds and you should consult with your Co-Permittee for specific direction and advisement.

- Minor Updates – Turnover of named maintenance personnel, mechanical equipment, addition of maintenance procedures, etc.

- Major Updates – Relocation of BMPs, modification of maintenance schedule(s) of BMPs, change in legal ownership and/or party responsible for maintaining the BMPs in perpetuity, major site re-grading or re-paving that can affect DMAs, changing one BMP for an alternative BMP, etc.

Updates may be transmitted to your Co-Permittee at any time. However, at a minimum, updates to the O&M Plan must be maintained, implemented, and available to Co-Permittee inspectors. These updates should reference the sections of the O&M Plan being changed. In addition, major updates may necessitate a revision to the WQMP and as such may cause the need for the document to be re-recorded. Consult with your Co-Permittee before performing any major updates to your approved and implemented Project-Specific WQMP. Conversely, updates may not require re-recordation if they are consistent with the original, executed agreement.

Failure to maintain an up-to-date copy of the plan may be a violation of Copermittee requirements subject to fines and/or other penalties.

5.4. STAGE 4: INTERIM OPERATION & MAINTENANCE

The property owner is responsible for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. Applicants may be required to warranty Stormwater BMPs against lack of performance due to flaws in design or construction for a minimum of two rainy seasons following completion of construction. The warranty may need to be secured by a bond or other financial instrument if required by the Co-Permittee.

5.5. STAGE 5: OPERATION & MAINTENANCE VERIFICATION

Each Copermittee implements a program to ensure that the Structural Stormwater BMPs are operating and are maintained properly and all BMPs are working effectively to remove Pollutants in Runoff from the site. This may include periodic site inspections, or requirements for self-certifications by a licensed professional engineer. This program will be described by each Copermittee in their respective JRMP.

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EXHIBIT A:

Isohyetal Map for the 85th Percentile 24-hour Storm Event

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed
Santa Margarita Watershed

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | CANYON LAKE | LAKE ELSINORE | MENIFEE | HEMET | WILDOMAR | MURRIETA | TEMECULA

N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

EXHIBIT B:

Project-Specific WQMP Template

(Will be developed upon approval of the WQMP by the San Diego Regional Board)

EXHIBIT C:

LID BMP Design Handbook

Please Visit

www.rcflood.org/npdes/developers

to access the current Handbook.

EXHIBIT D:

Transportation Project Guidance

Low Impact Development:

Design and BMP Guidance for Public Transportation Projects in the Santa Margarita Region

Riverside County Flood Control and Water Conservation District

County of Riverside

City of Murrieta

City of Temecula

City of Wildomar

Draft June 2012

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Tables

Acronyms and Abbreviations

ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
BMP	Best Management Practice
Caltrans	California Transportation Department
CASQA	California Stormwater Quality Association
CEQA	California Environmental Quality Act
CWA	Clean Water Act
EPA	Environmental Protection Agency
ESA	Environmentally Sensitive Area
Guidance	Design and BMP Guidance for Public Transportation Projects in the Santa Margarita Region
HCOC	Hydrologic Conditions of Concern
JRMP:	Jurisdictional Runoff Management Plan
LID	Low Impact Development
MAS	Maximum Allowable Speed
MEP	Maximum Extent Practicable
MSHCP	Multi-Species Habitat Conservation Plan
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Regional Board Order R9-2010-0016
NPDES	National Pollutant Discharge Elimination System
Regional Board	San Diego Regional Water Quality Control Board
ROW	Right-of-Way
SSMP	Standard Storm Water Mitigation Plan
TMDL	Total Maximum Daily Load
Transportation Project	Public Works Road Priority Development Project
WQMP	Water Quality Management Plan

Section 1
Introduction

A. Purpose of the Guidance

The federal Clean Water Act (CWA) establishes requirements for the discharge of urban runoff from Municipal Separate Storm Sewer Systems (MS4) under the National Pollutant Discharge Elimination System (NPDES) program. On November 10, 2010, the San Diego Regional Water Quality Control Board (Regional Board) issued Permit Order No. R9-2010-0016 ("MS4 Permit") to authorize the discharge of Runoff from MS4 facilities in Riverside County within the Santa Margarita Region MS4 Permit area.

MS4 Permit Section F.1.d.(2)(g) authorizes the MS4 Program to develop a standard roadway design and post-construction Best Management Practices (BMP) guidance document ("Guidance") that may be used in lieu of a project specific Water Quality Management Plan (WQMP) for each public works Road Priority Development Project ("Transportation Project"). Accordingly, the Santa Margarita Region MS4 Permittees have prepared this Guidance to provide direction to Transportation Project Owners and Operators (including city engineers, planners, and MS4 program staff) regarding how to address MS4 Permit requirements for Transportation Projects (including Class I Bikeway and sidewalk projects) within their jurisdictions. Specifically, this Guidance provides the basis for evaluating the technical feasibility of incorporating Low Impact Development (LID) and Hydromodification-based BMPs into the design of a Transportation Project.

The remaining parts of this section provide information regarding the applicability and appropriate use of this Guidance. Subsequent sections of this document provide detailed information regarding how to apply this Guidance to applicable Transportation Projects. Specifically, this Guidance is intended to provide information to support completion of the Transportation Project Template included in Appendix B. It is recommended that one be familiar with this document prior to completing the Template.

B. NPDES Permit Requirements

The MS4 Permit requires that a WQMP be prepared for Priority Development Projects. MS4 Permit Section F.1.d. states:

> *On or before June 30, 2012, the Copermittees must submit an updated SSMP [Standard Storm Water Mitigation Plan; equivalent to a WQMP], to the San Diego Water Board's Executive Officer…Within 180 days of determination that the SSMP is in compliance with this Order's provisions, each Co-permittee must amend its local ordinances consistent with the updated SSMP, and begin implementing the updated SSMP…The SSMP must meet the requirements of section F.1.d of this Order to (1) reduce Priority Development Project discharges of storm water Pollutants from the MS4 to the MEP [Maximum Extent Practicable], and (2) prevent Priority Development Project runoff discharges from the MS4 from causing or contributing to a violation of Water Quality Standards.*

Priority Development Projects are those projects listed in MS4 Permit Section F.1.d.(2). These categories include new public works street, road, highway or freeway projects further defined as any paved Impervious surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles, and other vehicles (MS4 Permit Section F.1.d.(2)(g)).

Transportation Projects also include Street, Road, Highway or Freeway Redevelopment projects that create, add, or replace at least 5,000 square feet of Impervious surface on an already developed site. Where Redevelopment results in an increase of less than fifty percent of the Impervious surfaces of a previously existing development, and the existing development was not subject to WQMP requirements, the MS4 Permit requirements apply only to the addition or replacement of Impervious surface; not to the entire development. Where Redevelopment results in an increase of more than fifty percent of the Impervious surfaces of a previously existing development, the MS4 Permit requirements apply to the entire project.

Typically, project proponents fulfill the MS4 Permit requirements applicable to Priority Development Projects through the completion of a Project-Specific WQMP. However, as noted above, the MS4 Permit authorizes the MS4 Program to develop a separate Guidance for Transportation Projects:

> *To the extent that the Copermittees develop revised standard roadway design and post-construction BMP guidance that comply with the provisions of Section F.1 of the Order, then Public Works Projects that implement the revised standard roadway sections do not have to develop a Project-Specific SSMP [equivalent to a WQMP]. The standard roadway design and post-construction BMP guidance must be submitted with the Copermittee's updated SSMP.*

C. Characteristics of Transportation Projects

This Guidance only applies to Transportation Projects. Street and Road development activities that are part of a private Priority Development Project are addressed in the WQMPs prepared to address Runoff from the larger common plans of development. Private Street and Road development activities have the ability to evaluate various land development alternatives that provide opportunities to maximize stormwater retention on site. Applicable MS4 Permit requirements for Priority Development Projects are addressed through the completion of a Project-Specific WQMP. In contrast, Transportation Projects have unique and specific limitations, including but not limited to the following:

- Lack of sufficient Right-of-Way (ROW) for the incorporation of LID-based BMPs that can be sized to meet the numeric sizing requirements applicable to Priority Development Projects.
- The footprint of a Transportation Project is often limited, with hydraulic constraints such as a lack of underground storm drain systems that would be necessary to facilitate treatment of Runoff.

- Existing local, state and federal design and code specifications applicable to public transportation systems may limit or prohibit certain LID-based BMPs.
- Safety concerns may dictate the use or application of specific roadway construction techniques that can affect LID-based BMP implementation.
- Funding for Transportation Projects may be limited, or may have requirements that stipulate use on specific transportation-related project features, e.g., addressing safety concerns.

In addition to the above limitations, Transportation Projects that function as part of the MS4 receive Runoff and associated Pollutants from both existing urban areas and other external sources, including adjacent land use activities, aerial deposition, brake pad and tire wear and other sources that may be outside the Copermittee's authority to regulate or are beyond the Copermittee's economic or technological ability to control.

Given the limitations described above, the Copermittees have developed this Guidance to establish an alternative approach to incorporating LID and Hydromodification-based BMPs into Transportation Projects to the MEP.

D. Functional Equivalence to WQMP

As stated in MS4 Permit Section F.1.d, the purpose of an approved WQMP is to (1) reduce Priority Development Project discharges of stormwater Pollutants from the MS4 to the MEP, and (2) prevent the discharge of Priority Development Project Runoff from causing or contributing to a violation of Water Quality Standards. This document serves as the approved Guidance for preparation of Project-Specific WQMPs for Transportation Projects.

Regardless of the 5,000 square foot threshold defined by the MS4 Permit, the Permit requires all Transportation Projects to use this Guidance during the project design process. Certain types of Transportation Projects may ultimately be exempt from applying the requirements of this Guidance, but exemption status needs to be determined independently for each Transportation Project using this Guidance and documented in the project file. For Transportation Projects not exempt from this Guidance, this document and associated *Template for LID Guidance and Standards Transportation Projects* (See Section 6.b) provide a step by step technical analysis to ensure that LID-based BMPs are implemented to the MEP.

This Guidance, which is functionally equivalent to the WQMP required for other Priority Development Projects, establishes minimum Site Design/LID-based BMPs that the MS4 Permit requires to be evaluated for Transportation Projects. These BMPs shall be implemented in Transportation Projects to the MEP. In addition, depending on the nature of the Transportation Project and BMPs selected, this Guidance also establishes Source and Treatment Control BMP requirements (e.g., as applicable to infiltration BMPs). Hydrologic Conditions of Concern (HCOC) criteria, within the context of pre- and post-project implementation, are considered as part of the project-specific feasibility analysis. BMPs to address HCOC must also be implemented in the design of Transportation Projects to the MEP considering the maximum extent space is available and it is feasible to implement the BMPs within the context of meeting other safety-related requirements to move water as quickly as possible off Impervious surfaces.

The LID-based BMP techniques contained within this document are based on information provided by a variety of sources, including the *Design Handbook for Low Impact Development Best Management Practices* prepared by the Riverside County Flood Control and Water Conservation District,

Environmental Protection Agency's (EPA) Municipal Handbook, *Managing Wet Weather with Green Infrastructure* and the *Low Impact Development Manual for Southern California: Technical Guidance and Site Planning Strategies* prepared for the Southern California Stormwater Monitoring Coalition, in cooperation with the State Water Resources Control Board, by the Low Impact Development Center. This Guidance also provides links and references to other sources of information regarding the application of LID-based BMPs to Transportation Projects (Section 6).

E. Applicability

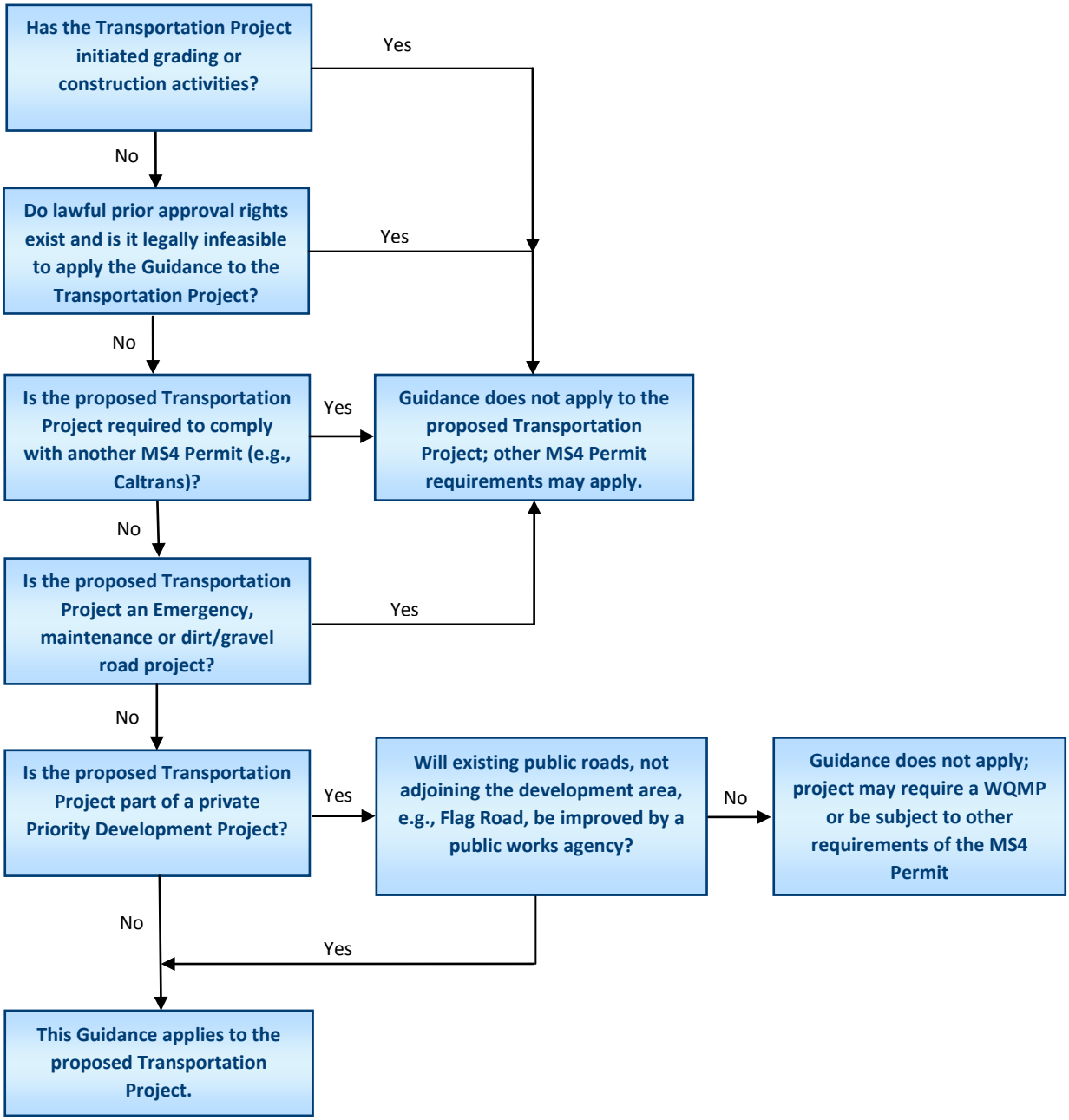
The effective date of this Guidance is 180 days after approval by the San Diego Regional Board Executive Officer. Guidance requirements do not apply to all proposed Transportation Projects. Transportation Projects are implemented to address many needs, ranging from improving the transportation network to support local and regional development, to meeting public safety and maintenance needs. Given the vast array of potential activities carried out to develop and manage transportation networks, Project Owners and Operators should consult this Guidance, as needed, to evaluate its applicability to a proposed Transportation Project. **Table 1-1** and **Figure 1-1** summarize Guidance applicability.

If a finding is made that this Guidance applies, then the Project Owner and Operator should continue to use this Guidance to ensure compliance with MS4 Permit requirements applicable to Transportation Projects. If it is determined that this Guidance does not apply to the proposed Transportation Project, this finding, along with the basis for the finding, should be documented in the project file.

Table 1-1. Transportation Project Guidance Applicability

This Guidance applies to the following projects: • Public Works Transportation Projects in the area covered by the Santa Margarita Region MS4 Permit, which involve the construction of new transportation surfaces or the improvement of existing transportation surfaces (including Class I Bikeways and sidewalks) such that the footprint of the transportation facility is increased.
This Guidance does not apply and a WQMP is not required for the following projects: • Transportation Projects that have already begun grading or construction activities by the effective date of this Guidance. • Transportation Projects where lawful prior approval rights exist and it is legally infeasible to apply this Guidance to the project. (If California Environmental Quality Act (CEQA) approval has been obtained within six months of Guidance approval.) • Emergency Projects, as defined by this Guidance (see Section 2). • Maintenance Projects, as defined by this Guidance (see Section 2). • Dirt or gravel Roads. • Transportation Projects that are part of a private Priority Development Project and required to prepare a WQMP. • Transportation Projects subject to other MS4 Permit requirements, e.g., California Transportation Department (Caltrans) oversight projects, cooperative projects with an Adjoining County or an agency outside the jurisdiction covered by the Santa Margarita Region MS4 Permit.

Figure 1-1. Applicability of the Transportation Project Guidance to a Proposed Transportation Project



F. Organization and Use of the Guidance

The project category, project type, and project-specific feasibility analysis determines the extent to which LID Principles and BMPs are applicable to a Transportation Project. **Figure 1-2** summarizes the key process steps for evaluating a proposed Transportation Project.

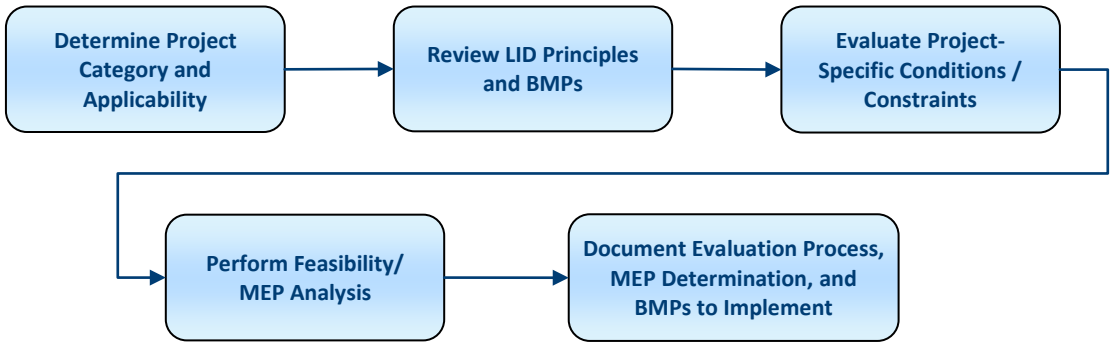


Figure 1-2. Transportation Project Evaluation Steps

The remaining sections of this Guidance describe each step in the process, specifically:

- **Section 2, Transportation Project Categories** – This section further refines Guidance applicability based on the type of Transportation Project.
- **Section 3, Transportation Project Evaluation** – This section establishes Guidance specific to new and Existing Transportation Projects. The Guidance does not establish specific minimum size or Impervious area criteria that trigger Transportation Project coverage. Instead, Section 3 establishes (a) minimum BMP design principles and techniques that shall be considered for all Transportation Projects to which the Guidance applies; (b) summarizes site constraints that should be evaluated with each Transportation Project; and (c) provides project-specific BMP feasibility criteria for consideration to evaluate the feasibility of incorporating green infrastructure elements (LID Principles and BMPs) into the proposed Transportation Project.
- **Section 4, Source Control BMPs** – This section notes the Source Control BMPs that should be evaluated for applicability to Transportation Projects.
- **Section 5, Transportation Project Implementation Requirements** – This section describes the minimum documentation requirements applicable to Transportation Projects and the nexus between the project evaluation and other MS4 Permit requirements.
- **Section 6, Resources** – This section includes resources for implementation, including planning and design information to facilitate implementation of LID-based BMPs in Transportation Projects, a Glossary, and Transportation Project BMP Template that should be used as part of the evaluation process for proposed Transportation Projects.

Section 2
Transportation Project Categories

This Guidance establishes four categories of Transportation Projects (**Table 2-1**):

- Category 1 – Emergency Projects
- Category 2 – Maintenance Projects
- Category 3 – Existing Transportation Projects
- Category 4 – New Transportation Projects

Category 1 or 2 projects are considered exempt from implementation requirements contained within this Guidance and are not required to prepare a Project-Specific WQMP. However, the Project Owner and Operator should consult the Jurisdictional Runoff Management Plan (JRMP) applicable to the jurisdiction within which the Transportation Project will be built to identify applicable local requirements.

If the Transportation Project falls within Category 3 or 4, this Guidance applies to the project, regardless of the 5,000 square foot minimum addition of paved Impervious surface or the applicability requirements associated with Priority Development Projects. For Category 3 or 4 Transportation Projects, the LID Principles and BMPs applicable to the project type shall be evaluated and incorporated into the project design to the MEP (see Section 3).

Category 3 Existing Transportation Projects may be subcategorized into capacity improvement, non-capacity improvement, or Class I Bikeway and sidewalk projects (not Adjoining an existing Road). This subcategorization may be important for the selection and evaluation of appropriate LID Principles and BMPs for incorporation into the Transportation Project (see Section 3). If a Road project includes Adjoining bikeway or sidewalk features, the selection and evaluation of BMPs should consider both the Road and the Adjoining bikeway/sidewalk features as a single Transportation Project.

Table 2-1. Transportation Project Categories and Example Projects[1]

Exempt from Guidance Requirements		Category 3 Existing Transportation Project	Category 4 New Transportation Project
Category 1 Emergency Project	**Category 2 Maintenance Project**		
▪ Emergency Road work of any nature that occurs outside the normal planning process	▪ Routine, reactive, or Preventive Maintenance activities within the Road ROW ▪ Pavement Preservation, Preventive Maintenance, Pavement Reconstruction, or Pavement Rehabilitation activities within the existing ROW ▪ Traffic Control Device improvements to address safety concerns ▪ Bridge rehabilitation within existing Surface Footprint (no traffic capacity change or modification of existing drainage) ▪ Seismic Enhancement / Retrofit projects ▪ Safety Enhancement projects that result in the addition of no new transportation surfaces ▪ Median Improvement projects with no new road surface ▪ Curb and gutter improvements ▪ Utility cuts ▪ Alteration of the existing Road profile within the existing Surface Footprint	▪ **Roadway Capacity Improvement Projects** — Lane Additions — Bridge capacity improvements — Grade Separation projects, where capacity is increased ▪ **Non-Capacity Roadway Improvement Projects** — Shoulder / Parking Lane improvements — Turn Pocket additions — Signal project that adds a turn lane — Horizontal Alignment Correction to improve Sight Distance — Grade Separation projects, with no change in capacity — Addition of passing lane — Addition of a turn out — Addition of a bike lane or sidewalk that adjoins an existing roadway ▪ **Class I Bikeway or Sidewalk Projects** — Improvements beyond existing Class I Bikeway or sidewalk, footprint not Adjoining a roadway	▪ New Street, Road, Highway or Freeway, or bridge project ▪ New Class I Bikeway or sidewalk project, not Adjoining a roadway

[1] The described project types for each Category are considered as examples that a Copermittee can use in determining which category is applicable to the Transportation Project.

Section 3
Transportation Project Evaluation

A. LID Principles and BMPs

The MS4 Permit requires Transportation Projects to incorporate the following LID Principles and BMPs to the MEP:

- Conservation of natural areas to the extent feasible
- Minimization of the Impervious footprint
- Minimization of disturbances to natural drainage
- Design and construction of Pervious areas to receive Runoff from Impervious areas
- Use of landscaping that minimizes irrigation and Runoff, promotes surface infiltration, and minimizes the use of pesticides and fertilizers

The extent to which these design principles may be incorporated into a Transportation Project through the use of LID Principles and BMP techniques depends on the project type and the project-specific feasibility analysis (see below). For Transportation Projects, potential LID Principles and BMPs to be evaluated include:

- Minimizing Road Widths
- Drainage Swales
- Bioretention
- Permeable Pavements
- Sidewalk Trees and Tree Boxes
- Infiltration Basins

With the exception of infiltration basins, these LID Principles and BMPs are generally described in EPA's Guidance *Managing Wet Weather with Green Infrastructure: Green Streets* (see Section 6 for additional references). Infiltration basin techniques, based on CASQA guidelines, are already in use throughout Riverside County. Their use as a BMP for Transportation Projects shall be consistent with Section F.1.c.(6)of the MS4 Permit applicable to infiltration and groundwater protection. The following sections provide an overview of each of the above LID Principles and BMPs.

Where the bikeway or sidewalk features are part of or Adjoining to a Road project, the BMP evaluation is based on the entire Transportation Project. For separate Class I Bikeway or sidewalk projects that do not adjoin the Road surface, only a select group of BMP techniques are required for evaluation. These BMPs are discussed separately at the end of this section.

Minimizing Road Widths

a. Plan site layout and Road network to respect the existing hydrologic functions of the land (preserve wetlands, buffers, high-permeability soils, etc.) and minimize the Impervious area.

b. Minimize Road widths while maintaining jurisdictional code requirements for Emergency service vehicles and a free flow of traffic.

c. Look for opportunities to eliminate imperviousness within all areas of the proposed Transportation Project site.

Drainage Swales

a. Plan site drainage using vegetated swales (preferably without irrigation) to accept sheet flow Runoff and convey it in broad shallow flow to reduce Stormwater volume through infiltration, improve water quality through vegetative and soil filtration, and reduce flow velocity by increasing channel roughness.

Green Streets: EPA-833-F-09-002, August 2009

b. Consider use of vegetated or Pervious material swales for site drainage before considering use of hard-lined Impervious channels.

c. Identify additional benefits that may be attained from swales through amended soils, bioretention soils, gravel storage areas, underdrains, weirs, and thick diverse vegetation, including, where possible, use of native vegetation.

Infiltration Basins

a. Plan roadway drainage to be directed away from the Road surface to infiltration basins. Typical detention or retention basins may be designed as infiltration facilities in some cases, with the ability to store Runoff until it gradually exfiltrates through the soil. A 72-hour drawn down is usually recommended.

www.casqa.org – Califonia BMP Handbooks

b. Incorporate infiltration basins, which can have high Pollutant removal efficiency and can reduce flows to mimic pre-development hydrologic conditions. Use of infiltration BMPs shall be consistent with the pretreatment of Runoff prior to infiltration requirements established by the MS4 Permit for areas subject to high vehicular traffic (25,000 or more Average Daily Traffic [ADT]).

c. Evaluate appropriate soil conditions for infiltration and site constraints. Groundwater separation should be at least 10 feet from the basin invert to the measured ground water elevation.

d. Evaluate traffic / pedestrian safety and site aesthetics while locating infiltration basins.

e. Reference the county's design criteria for infiltration basins for consistency with these and other design elements. Caltrans also has specific design requirements for infiltration basins in their ROW.

Bioretention

a. Plan site layout using Bioretention features such as Curb Extensions, sidewalk planters, and tree boxes designed to take Runoff from the Road.

b. Look for opportunities to incorporate site specific Bioretention features into specifications and standards.

c. Look for opportunities to use the roadway median as a Bioretention feature.

d. Evaluate Road configurations, topography, soil conditions, and space availability for opportunities to incorporate Bioretention features.

Green Streets: EPA-833-F-09-002, August 2009

e. Evaluate existing site utilities for opportunities to incorporate Bioretention features as a Retrofit.

f. Evaluate and select plants with respect to maintenance requirements, salt tolerance, and plant height considering traffic safety and security. If an approved plant list is available, plants should be selected from this list.

Sidewalk Trees and Tree Boxes

a. Incorporate tree cover into the site layout.

b. Evaluate site opportunities for sidewalk tree features and tree boxes.

c. Provide sufficient uncompacted soil and space for proper tree health and growth via larger tree boxes, structural soils, root paths, or "silva cells" that allow sufficient tree root space.

Green Streets: EPA-833-F-09-002, August 2009

d. Consider sufficient tree space in the ROW while maintaining traffic and pedestrian safety. Consider sufficient tree space for root growth to prevent Road structural impacts.

e. Evaluate space for trees vs. added construction costs.

Permeable Pavement

a. Plan low speed and parking areas within a site layout for incorporating permeable pavement.

b. Evaluate permeable gutters.

c. Evaluate permeable concrete, permeable asphalt, permeable interlocking concrete pavers, and grid pavers as alternatives to conventional, less Pervious concrete and asphalt surfaces.

Green Streets: EPA-833-F-09-002, August 2009

d. Incorporate an aggregate base to provide structural support, Runoff storage, and Pollutant removal through filtering and adsorption.

LID Principles and BMPs Applicable to Class I Bikeway and Sidewalk Projects

LID Principles and BMPs for Class I Bikeway and sidewalk projects not Adjoining the Road surface:

- Directing drainage to Pervious surfaces
- Minimizing path width
- Use of tree wells
- Use of permeable pavement

B. Feasibility/MEP Analysis of LID Principles and BMP Design Techniques

The extent to which the BMP techniques described above are applied to a Transportation Project depends on the results of the BMP feasibility analysis completed for each project. All potential BMP techniques described above shall be considered for each Transportation Project.

Each Transportation Project is unique and may have site-specific constraints that influence the feasibility of implementing BMP techniques contained within this Guidance (**Figure 3-1**). For example, available ROW may constrain BMP options and feasibility from a space perspective. As space is typically a limiting factor for BMP implementation, Category 4 projects (New Transportation Projects) should acquire as much available space as feasible, early in the process. Site drainage features, characteristics and connectivity, site grades, and underground utilities may make some BMPs desirable over others, while making others infeasible. For example, inability to access irrigation water and power for components and controls will limit the functionality of certain vegetated BMPs. The type of traffic or intended Road use may make some BMPs infeasible (i.e., heavy traffic on Pervious pavement).

Figure 3-1. Potential Transportation Project Constraints

- **Regulatory Requirements**
  - TMDL/Impaired waters requirements
  - Environmentally Sensitive Areas
  - CEQA mitigation
- **Site-specific Characteristics**
  - Drainage characteristics
  - Soil characteristics, geologic conditions
  - Elevated groundwater conditions
  - Groundwater protection areas
  - Natural sediment loads
- **Infrastructure & Project-specific Characteristics**
  - Programmatic or funding restrictions
  - ROW constraints
  - Existing features (drainage, curb and gutter, grades, etc.)
  - Utility constraints (e.g., pipelines, cables)
  - Availability of irrigation water
  - Availability of power
  - Types of traffic loads

The following sections identify common Transportation Project elements that should be evaluated as part of the analysis to determine the feasibility of implementing BMPs to the MEP. They should also be used to demonstrate where specific BMPs are infeasible. This list is not necessarily exhaustive given the unique nature of each Transportation Project; accordingly, other considerations may be evaluated and documented, as appropriate. These elements should also be evaluated for Class I Bikeway and sidewalk projects, not Adjoining a roadway surface to determine the feasibility of incorporating BMPs potentially applicable to these projects.

Programmatic Requirements / Funding Restrictions

a. The BMP techniques described within this Guidance may be implementable and approvable for a wide variety of Transportation Projects, capital improvement programs, and funding sources; however, some programs or funding sources may place constraints on the nature or type of project features that can be implemented. For example, funding sources for certain safety improvement projects may have strict project / program requirements that only allow funding for select project features. Such constraints may restrict the feasibility of some BMP techniques.

b. Other programs may require project features that affect BMP implementation, such as compliance with Americans with Disabilities Act (ADA) requirements.

c. Some BMP techniques may be too costly for the scope of the Transportation Project.

Drainage Connectivity and Utilities

a. The Transportation Project may alter previously established drainage patterns. New Transportation Projects and improvements to existing transportation facilities must tie into adjoining drainage features creating opportunities for and potential constraints on implementation of BMP techniques. The drainage characteristics of each project site must be evaluated to determine which BMP techniques will be feasible, and the extent to which such BMPs may be implemented.

b. Run-On conditions from adjoining properties or existing roadway surfaces will affect how certain BMP techniques can be implemented within a Transportation Project. Run-On conditions should be determined and analyzed to determine the extent to which they influence BMP selection and implementation. Opportunities for re-directing Run-On prior to entering the project site to reduce the hydraulic impact on water quality BMPs should be considered.

c. Location of existing utilities may reduce the feasibility of certain BMP techniques.

d. Design and placement of new utilities or relocation of existing utilities can provide opportunities for implementation of BMP techniques. New utilities should be considered along with BMP design and placement to maximize implementation opportunities and minimize feasibility constraints.

Environmentally Sensitive Areas and Impaired Waterbodies

a. A Transportation Project's proximity to an Environmentally Sensitive Area (ESA), which includes Impaired waters or waters governed by Total Maximum Daily Load (TMDL) requirements, drinking water well or other location requiring enhanced water quality protection may necessitate the use of specific BMP techniques.

b. The JRMP applicable to the project area includes any specific BMPs required for implementation where the Receiving Water is Impaired or subject to an urban Wasteload Allocation under a TMDL. This document should be consulted to identify any specific BMP techniques required for incorporation into the Transportation Project design.

Road Widths and Parking Requirements

a. General Plan roadway classifications and local code requirements may place minimum width restrictions on Roads, limiting the amount of Impervious surface that can be reduced and the remaining space available for BMP technique implementation.

b. Parking area requirements and restrictions may limit the amount of Pervious surface that can be reduced and the remaining space available for BMP implementation.

Drainage Swales

a. Sufficient ROW must be present for proper swale installation. Proper grade and drainage connectivity must be available to provide for broader, shallower flows while tying into existing local drainage.

b. The size of the Transportation Project's drainage area, amount of site Run-On, and ability to redirect the Run-On will affect the size and feasibility of Drainage Swales.

c. Vegetated Drainage Swales require healthy vegetation for proper functionality. Irrigation water and power must be available for maintaining proper vegetative growth during dry periods. Using non-native vegetation may increase maintenance costs and resource requirements, which may affect feasibility of implementation.

d. Soil characteristics should allow for infiltration.

e. Aesthetic goals and vector control requirements may necessitate specific swale features or affect the feasibility of their implementation.

Infiltration Basins

a. Appropriate soil conditions for infiltration must exist. Area slopes that are no steeper than 4:1 should be present and Baseflow conditions should not exist.

b. Infiltration basins should be located at least 100 feet from bridge structures.

c. Groundwater separation should be at least 10 feet from the basin invert to the measured groundwater elevation.

d. A 72-hour drawn down period is recommended for proper functionality.

e. The MS4 Permit requires that the use of infiltration BMPs be consistent with the pretreatment of Runoff prior to infiltration requirements established by the MS4 Permit for areas subject to high vehicular traffic (25,000 or more ADT).

f. Traffic and pedestrian safety and site aesthetics may affect locating infiltration basins and their feasibility.

Bioretention

a. Sufficient ROW must be present for using the median for Bioretention or including Bioretention Curb Extension or sidewalk planters within a Transportation Project, including ADA requirements.

b. Bioretention features must tie into existing drainage conditions.

c. Traffic and pedestrian safety and site aesthetics may affect feasibility of the use of medians for Bioretention or feasibility of identifying locations for installation of Curb Extensions or sidewalk planters.

d. Irrigation water and power must be available for proper plant maintenance. Using native vegetation vs. non-native may reduce the need for maintenance, improving feasibility.

Sidewalk Trees and Tree Boxes

a. Sufficient ROW within the Transportation Project site must be present for implementation of this BMP technique.

b. Irrigation water and power must be available for proper tree maintenance. Using native vs. non-native trees may reduce the need for maintenance, improving feasibility.

c. Traffic and pedestrian safety and site aesthetics may affect locating sidewalk trees or tree boxes and their feasibility.

Permeable Pavement

a. Permeable pavement can be an effective BMP technique in selected low speed areas, e.g., entrance/exits to parking lots, or parking areas (e.g., dedicated areas or along existing Streets), but is not considered suitable for most Transportation Projects.

b. Permeable pavement is not suitable for transportation surfaces with high traffic or that may bear a heavy load.

c. Using permeable pavement for parking surfaces may be feasible unless soil characteristics will not support infiltration or drainage conditions affect functionality.

d. Specialized maintenance is necessary for permeable pavements to maintain the intended infiltration capacity. The ability of a Copermittee to provide resources (funding, labor and equipment) for proper maintenance of permeable surfaces will affect feasibility.

Maintenance Requirements

a. Every BMP technique described in this Guidance requires maintenance to help ensure long term Runoff management effectiveness. The feasibility of any BMP technique will depend upon the level of maintenance resources available in the long term.

b. The feasibility of BMP techniques will depend on the level of expertise necessary to maintain the BMPs. Project Owners and Operators must have the expertise and equipment necessary to maintain all aspects of the BMP techniques selected for a Transportation Project, or have the resources to contract for the maintenance.

c. Several BMP techniques, when implemented as an element of a Transportation Project, may require another public agency or department for proper maintenance. For example, maintenance of vegetated BMPs may fall within a local landscape maintenance program. As such, the resources, equipment and expertise available from other agencies may affect BMP feasibility.

d. Several BMP techniques may require consideration of existing Source Control programs, e.g., catch-basin cleaning or street sweeping. The applicable JRMP should be consulted for applicable Source Control BMP requirements.

Section 4
Source Control BMPs

Each Transportation Project must evaluate and incorporate applicable Source Control BMPs into project planning to control Pollutants after project construction is complete and the project is put into its intended service.

Table 4-1 identifies recommended Source Control BMPs. The Copermittees responsible for implementing and maintaining the applicable Source Control BMPs should be identified and documented. In addition, it is recommended that the Source Control BMP section of the applicable Copermittee JRMP(s) be reviewed to determine if any additional Source Control BMPs may apply.

Table 4-1. Potential Source Control BMPs for Transportation Projects

Recommended Source Control BMPs	
Category 3 or 4 Projects (other than Class I Bikeway or sidewalk projects)	**Class I Bikeway and Sidewalk Projects**
Non-Structural Source Control BMPs	**Non-Structural Source Control BMPs**
▪ Irrigation System and Landscape Maintenance ▪ Sweeping of Transportation Surfaces Adjoining Curb and Gutter ▪ Drainage Facility Inspection and Maintenance	▪ Public Education Program ▪ Use of Signage ▪ Installation and Maintenance of Trash Bins and Pet Waste Collection Bags
Structural Source Control BMPs	
▪ MS4 Stenciling and Signage ▪ Landscape and Irrigation System Design ▪ Protect Slopes and Channels	

Section 5
Transportation Project Implementation Requirements

A. Project Documentation

For Category 1 and 2 projects (Emergency and Maintenance Projects, respectively), the project development file should contain documentation showing that this Guidance and the implementation of LID-based BMP did not apply.

All Category 3 and 4 Transportation Projects require supplemental documentation in the project development file that includes the following:

- Project category and type;
- Site constraints;
- Project feasibility analysis findings; and
- LID-based BMPs incorporated into the Transportation Project.

Copermittee MS4 staff responsible for assuring compliance with MS4 Permit requirements within their jurisdiction will evaluate the applicability and feasibility determination made by the Project Owner and Operator for each Transportation Project. Where appropriate, this staff may require additional information to demonstrate compliance with this Guidance in order for acceptance and permitting. Appendix A includes a template for documenting the project specific analysis for Category 3 and 4 projects.

If the funding source of a Transportation Project has requirements that affect what features and/or BMPs may be incorporated or implemented, such as block grant funding, the funding requirements may be used in determining the feasibility of BMPs. Funding requirements affecting Transportation Project BMP implementation must be documented to demonstrate how the requirements affect the feasibility determinations and must be included in the project file.

A Project Owner and Operator may document the proposed BMPs via a supplementary document to the proposed project plans, such as contract documents or specifications, or directly within the project plans as plan notes. Project plans and file documentation will show or describe the types, sizes, and locations of BMP techniques proposed for each proposed Transportation Project. The Permittee shall maintain the documentation along with all other information required for approval and permitting the proposed Transportation Project within the project files.

B. Compliance with Other Permit Requirements

Other regulations and requirements are applicable to proposed Transportation Projects, for example, 404 Permit/401 Certification requirements, and NPDES General Construction Permit requirements. Other regulatory permit conditions may require additional or more (or less) stringent BMP implementation than required by the MS4 Permit. Compliance with this Guidance does not supplant all conditions associated with other regulatory permits and programs. In cases where other requirements are similar but not prescriptive nor specific, they do not automatically overrule a feasibility evaluation performed using this Guidance. In such cases, the feasibility evaluation performed using this Guidance shall be considered the most thorough evaluation also meeting the intent of the other similar requirements.

C. Other Considerations

This Guidance has been developed to assist Copermittee staff in implementing the Transportation Project requirements in the MS4 Permit. Copermittees wishing to go beyond MEP requirements to develop "demonstration projects" for stormwater quality design may do so, as long as the minimum MEP requirements for each BMP technique are met. Such demonstration projects would be developed under a different, more expansive determination of feasibility not considered to be the standard applicable to conventional Transportation Projects.

Section 6
Resources

A. Glossary

B. Transportation Project BMP Template

C. LID-based BMP Planning and Design Information

A. Glossary

Adjoining – Proposed project sites (or land parcels) that share a common border. For example, a parcel slated for New Development or significant Redevelopment that has a common border with an existing Road ROW that will be modified as a result of the development project.

Americans with Disabilities Act (ADA) – Federal law that prohibits discrimination on the basis of disability in employment, State and local government, public accommodations, commercial facilities, transportation, and telecommunications. The ADA as enacted by the U.S. Congress in 1990; it was last amended in 2008 with changes taking effect January 1, 2009.

Average Daily Traffic (ADT) - The average 24-hour volume of traffic, being the total volume during a stated period divided by the number of days in that period. The period is a year, unless stated otherwise.

Baseflow - Sustained natural stream flow or channelized flow caused by groundwater and/or uncontrolled irrigation flows. Sometimes referred to as groundwater flow or dry-weather flow.

Best Management Practice (BMP) – Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the Pollution of Waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site Runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of MS4 permits, BMPs are typically used in place of numeric effluent limits.

Bioretention - BMP that functions as a soil and plant-based filtration device that removes Pollutants through a variety of physical, biological, and chemical treatment processes. These facilities normally consist of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. The Runoff's velocity is reduced by passing over or through the buffer strip and subsequently distributed evenly along a ponding area. Exfiltration of the stored water in the Bioretention area planting soil into the underlying soils occurs over a period of days. Bioretention BMPs are feasible on all soil types and distinguished from biotreatment BMPs (below) by the fact that their design will process the design volume entirely through a biologically active soil media, and that they inherently maximize both infiltration and evapotranspiration of Runoff.

California Environmental Quality Act (CEQA) Approval – Formal approval of a proposed project under CEQA (California environmental legislation that establishes procedures for conducting an environmental analysis for all projects in California [California Public Resources Code, Section 21000, et. seq.]).

Capacity Improvement Project – Transportation Project that changes the maximum sustainable flow rate at which vehicles or persons reasonably can be expected to traverse a point or uniform segment of a lane or roadway during a specified time period under given roadway, geometric, traffic, environmental, and control conditions; usually expressed as vehicles per hour, passenger cars per hour, or persons per hour.

Class I Bikeway – Bike path that provides a completely separated ROW for the exclusive use of bicycles and pedestrians.

Contamination - As defined in the Porter-Cologne Water Quality Control Act, Contamination is "an impairment of the quality of waters of the State by waste to a degree which creates a hazard to the public

health through poisoning or through the spread of disease. 'Contamination' includes any equivalent effect resulting from the disposal of waste whether or not waters of the State are affected."

Curb Extension - Landscaped areas within the parking zone of a Street that capture urban Runoff. Curb Extensions are enclosed by a curb on the Street side, which has openings, called "curb cuts," that allow Street Runoff to enter and exit the facility. Extending into the Street from the curb narrows the Road width which also increases pedestrian safety and helps calm traffic. A Curb Extension allows water to flow into a landscaped area that may include vegetated swales, planters, or rain gardens.

Drainage Swale - Open channels designed to accept sheet flow Runoff and convey it in broad shallow flow. The intent of swales is to reduce stormwater volume through infiltration, improve water quality through vegetative or soil filtration, and reduce flow velocity by increasing channel roughness.

Emergency - Any sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services. "Emergency" includes such occurrences as fire, flood, earthquake, or other soil or geologic movements, as well as such occurrences as riot, accident, or sabotage.

Emergency Project – Work on a Street, Road, Highway or Freeway, Class I Bikeway or sidewalk in response to an Emergency. Emergency Projects are Category 1 projects per this Guidance.

Environmentally Sensitive Area (ESA) - Areas that include but are not limited to all Clean Water Act Section 303(d) Impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); areas designated as preserves or their equivalent under the Natural Communities Conservation Program within the Cities and County of Orange; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.

Existing Transportation Project – Proposed project that will modify an existing transportation surface in a manner that increases the Surface Footprint or Impervious area of the roadway; including both Capacity and Non-Capacity Improvement Projects or existing Class I Bikeway or sidewalk projects not adjoining a roadway.

Flag Road – A Non-Capacity Improvement Project that modifies an existing Road that is Non-Adjoining to a New Development or significant Redevelopment to accommodate traffic access to the development project when completed.

Freeway – A divided arterial highway with full control of access and with Grade Separations at intersections.

General Plan - Blueprints for jurisdictions in the Santa Margarita Region MS4 Permit area that describe the future growth and development planned within the area over the long term. The General Plan acts as a constitution for both public and private development, the foundation upon which local leaders make growth and use related decisions. The General Plan is meant to express goals with respect to both human-made and natural environments and sets forth the policies and implementation measures to achieve them for the welfare of those who live, work, and do business in the area (e.g., see http://www.rctlma.org/genplan/, for Riverside County General Plan).

Grade Separation - A crossing of two highways or a highway and a railroad at different levels.

Horizontal Alignment Correction – A Transportation Project designed to increase the Sight Distance for drivers that does not change existing Road capacity.

Hydrologic Conditions of Concern (HCOC) - An HCOC exists when the alteration of a site's hydrologic regime caused by development would cause significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects.

Hydromodification - The change in the natural watershed hydrologic processes and Runoff characteristics (i.e., interception, infiltration, overland flow, interflow and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport. In addition, alteration of stream and river channels, such as stream channelization, concrete lining, installation of dams and water impoundments, and excessive streambank and shoreline erosion are also considered Hydromodification, due to their disruption of natural watershed hydrologic processes.

Impaired – A water body in which water quality does not meet applicable Water Quality Standards and/or is not expected to meet Water Quality Standards, even after the application of technology based Pollution controls required by the CWA.

Impervious - Any surface in the landscape that cannot effectively absorb or infiltrate urban Runoff; for example conventional paved: sidewalks, rooftops, Roads, and parking areas.

Jurisdictional Runoff Management Plan (JRMP) - A written description of the specific jurisdictional Runoff management measures and programs that each Copermittee will implement to comply with this Order and ensure that stormwater Pollutant discharges in Runoff are reduced to the MEP and do not cause or contribute to a violation of Water Quality Standards**.**

Lane Addition – Addition to an existing Road of a strip of roadway to be used for a single line of vehicles.

Low Impact Development (LID) – A stormwater management and land development strategy that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

LID BMPs - LID BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the Pollution of Waters of the United States through stormwater management and land development strategies that emphasize conservation sand the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions. LID BMPs include retention practices that do not allow Runoff, such as infiltration, rain water harvesting and reuse, and evapotranspiration. LID BMPs also include flow-through practices such as biofiltration that may have some discharge of stormwater following Pollutant reduction.

LID Principles - LID Principles are Site Design BMP concepts that help prevent or minimize the causes (or drivers) of project impacts, and help mimic the pre-development hydrology. Implementing LID Principles will help minimize the need for specific stormwater BMPs on a project.

Maintenance Project- A project conducted to maintain original line and grade, hydraulic capacity, or original purpose of the facility. Maintenance Projects are Category 2 projects, as described in Table 2-1 of this Guidance.

Maximum Extent Practicable (MEP) – As defined in Attachment C (Acronyms, Abbreviations and Definitions) of the Santa Margarita Region MS4 Permit (Order No. R9-2010-0016).

Median Improvement – Improvements made to the portion of a divided Street, Road, Highway or Freeway separating travel lanes for traffic moving in opposite directions.

MS4 Permit –NPDES Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4s) Draining the County of Riverside, the Incorporated Cities of Riverside County, and the Riverside County Flood Control and Water Conservation District within the San Diego Region (Order No. R9-2010-0016, NPDES Permit No. CAS0108766).

New Development – Priority Development Project Categories identified in Section F.1.d.(2) of the Santa Margarita Region MS4 Permit. "New Development" does not include Routine Maintenance to maintain original line and grade, hydraulic capacity, or original purpose of a facility, nor does it include Emergency Projects required to protect public health and safety.

New Transportation Project – Proposed project will establish a new Street, Road, Highway or Freeway or bridge and meets the definition of a Priority Development Project for Streets, Roads, Highways and Freeways.

Non-Adjoining Project– Proposed project sites (or land parcels) that do not share a common border. For example, a parcel slated for New Development or significant Redevelopment that does not share a common border with an existing Road that will be improved as a result of the development project.

Non-Capacity Improvement Project - Transportation Project that does not change the maximum sustainable flow rate at which vehicles or persons reasonably can be expected to traverse a point or uniform segment of a lane or roadway during a specified time period under given roadway, geometric, traffic, environmental, and control conditions; usually expressed as vehicles per hour, passenger cars per hour, or persons per hour.

Overlay – An Overlay is a layer, usually hot mix asphalt, placed on existing flexible or rigid pavement to restore ride quality, to increase structural strength (load carrying capacity), and to extend the service life of a Road.

Parking Lane - An auxiliary lane primarily for the parking of vehicles.

Pavement Preservation – The sum of all activities undertaken to provide, maintain and extend the life of a Street, Road, Highway or Freeway. This includes corrective, routine and Preventive Maintenance to keep the roadway in a safe and usable condition and delay the need for rehabilitation.

Pavement Reconstruction - Replacement of an existing pavement structure by the placement of the equivalent of a new pavement structure. Reconstruction usually involves complete removal and replacement of the existing pavement structure and may include new and/or recycled materials.

Pavement Rehabilitation - Structural enhancements that extend the service life of an existing pavement and/or improve its load carrying capability. Rehabilitation techniques include restoration treatments and structural Overlays.

Pervious – Surface or area that is not Impervious, that is, at least some portion of urban runoff or Run-On to the surface infiltrates to underlying soil (see also definition for "Impervious").

Pollutant – Any agent that may cause or contribute to the degradation of water quality such that a condition of Pollution or Contamination is created or aggravated.

Pollution - As defined in the Porter-Cologne Water Quality Control Act: "the alteration of the quality of the waters of the State by waste, to a degree that unreasonably affects the either of the following: 1) The waters for beneficial uses; or 2) facilities that serve these beneficial uses." Pollution may include Contamination.

Preventive Maintenance - A planned treatment on a Road in good condition that is intended to preserve the surface, retard future deterioration, prolong service life and delay the need for rehabilitation.

Priority Development Project – Development projects that meet the categories and criteria identified in the 2010 Santa Margarita MS4 Permit, Section F.1.d.

Project Owner and Operator – The agency or jurisdiction responsible for the management and maintenance of the Transportation Project following its completion.

Project-Specific WQMP - A plan specifying and documenting permanent LID Principles and stormwater BMPs to control post-construction Pollutants and stormwater runoff for the life of the project, and to maintain stormwater BMPs for the life of the project.

Public Works Project – A Transportation Project implemented under the jurisdiction of the Santa Margarita Region MS4 Permit by a Permittee with authority to finance, build, operate, or maintain the facility.

Redevelopment – The creation, addition, and or replacement of Impervious surface on an already developed site. Examples include the expansion of a building footprint, Road widening, the addition to or replacement of a structure, and creation or addition of Impervious surfaces. Replacement of Impervious surfaces includes any activity that is not part of a Routine Maintenance activity where Impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; new sidewalk construction, pedestrian ramps, or bike lane on existing Roads; and routine replacement of damaged pavement, such as pothole repair.

Receiving Water – Waters of the U.S. within the area under the jurisdiction of the MS4 Permit.

Retrofit - Programs and projects to address the impacts of existing development through reducing the impacts from Hydromodification, promote LID, support riparian and aquatic habitat restoration, reduce the discharges of stormwater Pollutants from the MS4 to the MEP, and prevent discharges from the MS4 from causing or contributing to a violation of Water Quality Standards.

Right-of-Way (ROW) - A general term denoting land, property, or interest therein (usually in a strip) acquired for or devoted to transportation purposes.

Road – see "Street, Road, Highway or Freeway".

Routine Maintenance – Maintenance work that is planned and performed on a regular basis to maintain and preserve the condition of the Street, Road, Highway or Freeway, or to respond to specific conditions and events that restore the Street, Road, Highway or Freeway to an adequate level of service.

Run-On - Stormwater that flows from another property or properties onto a subject property via overland flow (uncontrolled Run-On) or via a local storm drain (directed Run-On).

Safety Enhancement - A project that corrects or improves high hazard locations, eliminates roadside obstacles, improves highway signing and pavement marking, installs priority control systems for Emergency vehicles at signalized intersections, installs or replaces Emergency motorist aid call boxes, or installs traffic control or warning devices at locations with high accident potential.

Seismic Enhancement/Retrofit – Maintenance activity to modify an existing transportation infrastructure to comply with structural requirements for seismic activity.

Shoulder - The paved or unpaved portion of the roadway adjoining the traveled way for accommodating stopped vehicles, for Emergency use, and for lateral support of base and surface courses.

Sight Distance - The length of highway ahead that is visible to the driver.

Site Design BMPs – Any project design feature that reduces the creation or severity of potential Pollutant sources or reduces the alteration of the project site's natural flow regime. Redevelopment projects that are undertaken to remove Pollutant sources (such as existing surface parking lots and other Impervious surfaces) or to reduce the need for new Roads and other Impervious surfaces (as compared to conventional or low density New Development) by incorporating higher densities and/or mixed land uses into the project design, are also considered Site Design BMPs.

Source Control BMP - Land use or site planning practices, or structural or nonstructural measures that aim to prevent Runoff Pollution by reducing the potential for Contamination at the source of Pollution. Source Control BMPs minimize the contact between Pollutants and Runoff.

Street – see "Street, Road, Highway, or Freeway."

Street, Road, Highway, or Freeway – A general term denoting a public way for the transportation of people, materials, goods, and services but primarily for vehicular travel.

Surface Footprint – The area of an existing Road that is part of the active transportation surface.

Total Maximum Daily Load (TMDL) - Maximum amount of a Pollutant that can be discharged into a water body from all sources (point and non-point) and still maintain Water Quality Standards. Under CWA Section 303(d), TMDLs must be developed for all waterbodies that do not meet Water Quality Standards after application of technology-based controls.

Traffic Control Device - A sign, signal, marking, or other device placed on or adjacent to a Street or highway by authority of a public body or official having jurisdiction to regulate, warn, or guide traffic.

Transportation Project – Streets, Roads, Highways, Freeways, Class I Bikeways, or sidewalk projects within the area under the jurisdiction of the Santa Margarita Region MS4 Permit used for transportation of automobiles, trucks, motorcycles, bicycles and other vehicles. Excludes routine, reactive, or Preventive Maintenance activities where the Surface Footprint is not increased (Maintenance Projects) and Emergency Projects. Category 3 and Category 4 projects, described in Table 2-1 of this Guidance, are considered Transportation Projects.

Turn Pocket – Addition of Impervious surface at an existing Road intersection for the purpose of facilitating right or left turns.

Wasteload Allocation – Maximum quantity of Pollutants a discharger of waste is allowed to release into a particular waterway, as set by a regulatory authority. Discharge limits usually are required for each specific water quality criterion being, or expected to be, violated.

Water Quality Management Plan (WQMP) – Equivalent to the Standard Storm Water Mitigation Plan (SSMP) described by the Santa Margarita Region MS4 Permit. The WQMP is a plan for managing the quality and quantity of stormwater or urban Runoff that flows from a developed site after construction is completed and the facilities or structures are occupied and/or operational. WQMPs are required for New Development and significant Redevelopment projects as described in Section F.1.d of the Santa Margarita Region MS4 Permit.

Water Quality Standards - The beneficial uses (e.g., swimming, fishing, municipal drinking water supply, etc.,) of water and the water quality objectives necessary to protect those uses.

B. Transportation Project BMP Template

Santa Margarita Region MS4 Permit Program

Template for

Low Impact Development:

Design and BMP Guidance for Public Transportation Projects

Insert Project Name

Prepared for/by:

Insert Owner/Developer Name

Insert Address

Insert City, State, ZIP

Insert Telephone

Prepared by (if prepared by Consultant):

Insert Consulting/Engineering Firm Name

Insert Address

Insert City, State, ZIP

Insert Telephone

Project Certification

This report has been completed in compliance with the *Low Impact Development: Guidance and Standards for Transportation Projects*, prepared to comply with the 2010 Santa Margarita Region MS4 Permit requirements applicable to Transportation Projects. The signatory of this document attests to the technical information contained herein and the date upon which recommendations, conclusions, and decisions have been based. I find this report to be complete, current and accurate:

Name: _____

Title: _____

Agency: _____

Date: _____

Section 1 Introduction

This template was prepared to provide a tool for project proponents to (1) determine the applicability of the Guidance to a proposed Transportation Project; (2) provide a process for evaluating the feasibility of using LID-based techniques in the proposed Transportation Project; and (3) establish a template for documenting the project evaluation process and the decisions made regarding the feasibility to incorporate LID-based BMPs into the design of the Transportation Project. Users should review the Guidance before applying this template to a proposed Transportation Project.

Guidance Applicability

Table 1.1 summarizes the applicability of the Guidance to Transportation Projects. **Figure 1-1** provides a flowchart to assist with the evaluation of applicability. If the Guidance applies to the proposed project, this template should be used to evaluate the feasibility of incorporating LID-based BMPs into the Transportation Project design. **Figure 1-2** illustrates the process for completing the template. Refer to this figure as needed to ensure that all steps are completed.

Table 1-1. Project Transportation Project Guidance Applicability

This Guidance applies to the following projects:
• Public Transportation Projects in the area covered by the Santa Margarita Region MS4 Permit, which involve the construction of new transportation surfaces or the improvement of existing transportation surfaces (including Class I Bikeways and sidewalks) such that the footprint of the transportation facility is increased.

This Guidance does not apply to the following projects:

- Transportation Projects that have already begun grading or construction activities by the effective date of this Guidance
- Transportation Projects where lawful prior approval rights exist and it is legally infeasible to apply this Guidance to the project. (If California Environmental Quality Act (CEQA) approval has been obtained within six months of Guidance approval.)
- Emergency Projects, as defined by this Guidance (see Section 2)
- Maintenance Projects, as defined by this Guidance (see Section 2)
- Dirt or gravel roads
- Transportation Projects that are part of a private Priority Development Project and required to prepare a WQMP
- Transportation Projects subject to other MS4 Permit requirements, e.g., California Transportation Department (Caltrans) oversight projects, cooperative projects with an adjoining County or an agency outside the jurisdiction covered by the Santa Margarita Region MS4 Permit

Figure 1-1. Applicability of the Transportation Project Guidance to a Proposed Transportation Project

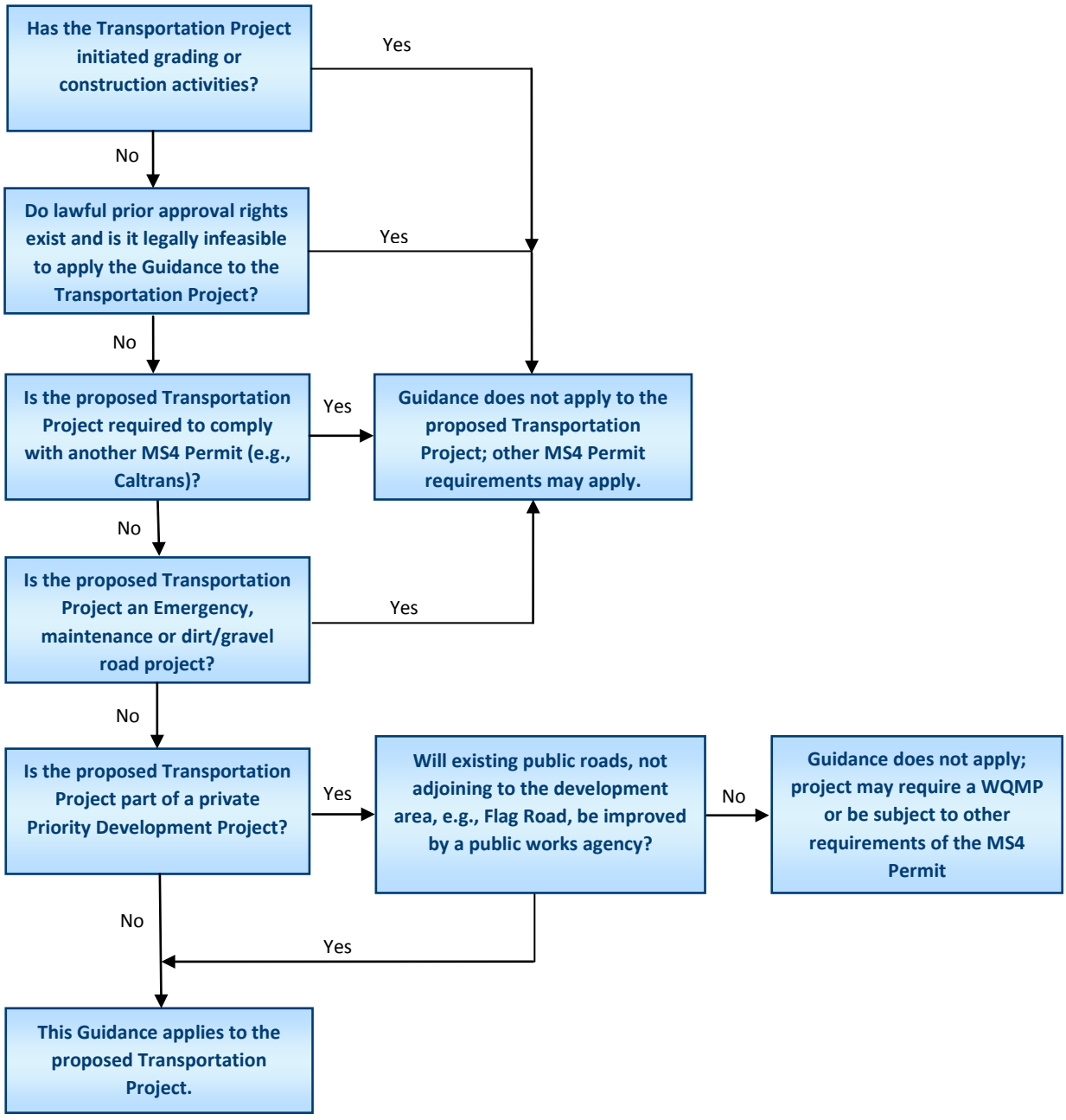
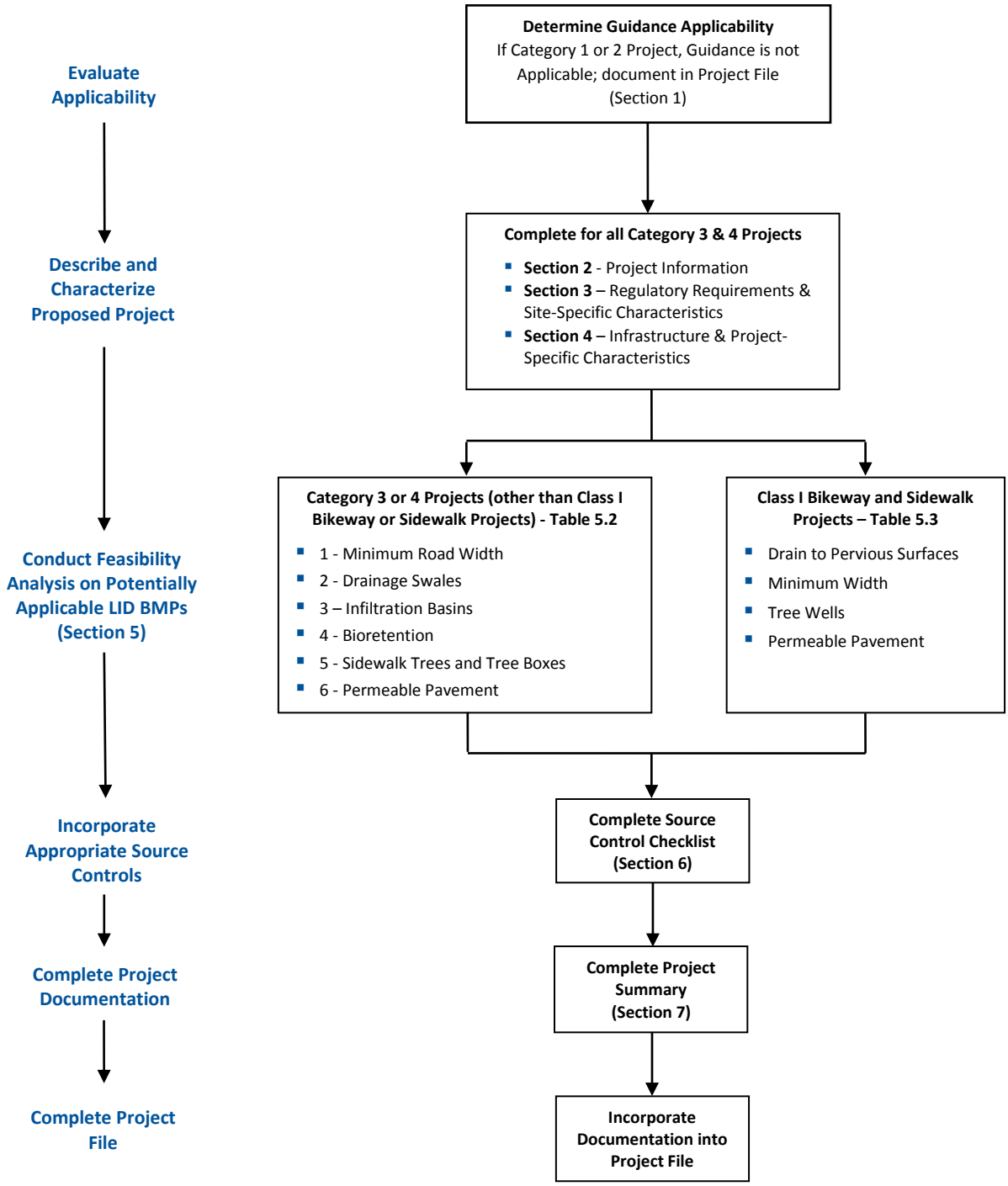


Figure 1-2. Process to Complete Transportation Project BMP Template



Section 2 Transportation Project Information

The purpose of this section is to provide general project information and a description of the proposed Transportation Project. The description should have sufficient detail to identify the Transportation Project location, boundaries and size, and, if classified as a Category 3 Transportation Project (see Section 2 of Guidance), the basis for the subcategorization (Capacity vs. Non-Capacity Roadway Improvement Project or Non-Adjoining Class I Bikeway or Sidewalk Project).

Table 2.1 - Project Characteristics

Project Name					
Project Owner/Operator (Agency)					
Project Contact Name:					
Mailing Address:		E-mail Address:		Telephone:	

Project Category	Check the box for the applicable Project Category *(See Table 2-1 in Guidance)* ☐ Category 3 – Existing Transportation Project ☐ Category 4 – New Transportation Project	
Check the appropriate boxes below, based on the Project Category checked above		
Category 3	☐ Roadway Capacity Improvement Project	☐ Lane Additions ☐ Bridge project ☐ Grade Separation project ☐ Other project type
	☐ Non-Capacity Roadway Improvement Project	☐ Shoulder improvements ☐ Parking Lane improvements ☐ Turn Pocket addition ☐ Signal project that adds a turn lane ☐ Horizontal Alignment Correction (improve Sight Distance) ☐ Grade Separation project ☐ Passing Lane Addition ☐ Turn Out addition ☐ Other project type
	☐ Class I Bikeway or sidewalk	☐ Improvement to existing Class I Bikeway or sidewalk ☐ Other project type
Category 4	☐ New Road project ☐ New bridge project ☐ New Class I Bikeway or sidewalk project	
Project Schedule:		

Table 2.2 - Project Description

General Project Description:					
Project Area (ft^2):		Project Length (ft):		Coordinates of the approximate center of the project:	Latitude: Longitude:
For Category 3 & 4 projects, complete the information below.					
Describe how the existing Surface Footprint will be modified, if applicable					
Describe how the capacity of the existing transportation surface (if any) will be improved					
For a Class I Bikeway or sidewalk project, describe how the existing surface will be improved					

Section 3 Regulatory Requirements & Site-Specific Chararacteristics

Describe the regulatory requirements and site-specific characteristics associated with the project site that can influence the selection of LID-based BMPs. Attach supporting information, as needed.

Table 3.1 – Regulatory Requirements & Site-Specific Characteristics

Regulatory Requirements	
Consult applicable Jurisdictional Runoff Management Plan (JRMP) to document Pollutants of Concern based on Impaired waters listings or TMDL implementation requirements.	
Document any known CEQA conditions, Multi-Species Habitat Conservation Plan (MSHCP), California Fish & Game Code Section 1600, CWA Section 401, or CWA Section 404 requirements.	
Site-Specific Characteristics	
Drainage Area (ft^2)	
Existing Site Impervious Area (ft^2)	
Expected Post-Project Impervious Area (ft^2)	
Hydrologic Soil Group* *Describe hydrologic soil group and associated infiltration characteristics, if known*	
Expected Infiltration Characteristics *Describe known infiltration characteristics based on soil group or soil test data (attach if such data are available)*	
Natural Sediment Load Characteristics *Describe local sediment characteristics that could impact selection or functionality of BMPs*	
Depth to Groundwater *Determine depth to groundwater, if known (provide source of information*)	

* See soils section of the Riverside County Flood Control & Water Conservation District's Hydrology Manual http://floodcontrol.co.riverside.ca.us/downloads/planning/Hydrology%20Manual%20-%20Complete.pdf

Section 4 Infrastructure & Project-Specific Characteristics

Describe the existing infrastructure and project-specific characteristics associated with the project site that can influence the selection of LID-based BMPs. Attach supporting information, as needed; insert N/A for any element that is not applicable to the proposed project.

Table 4.1 - Infrastructure & Project-Specific Characteristics

Programmatic & Funding Restrictions	
Project Funding *Provide information regarding project funding*	Project Budget:
	Funding Source:
	Are there any limitations or restrictions on the use of dedicated funds: ☐ Yes; if this box checked, explain limitations ☐ No
Programmatic Constraints *Identify any programmatic or regulatory constraints, e.g., Americans with Disabilities Act; need for Emergency access, etc.*	Does the project require compliance with other programmatic, regulatory, or code requirements that may affect application of BMPs? ☐ Yes; if this box checked, explain limitations ☐ No
Impaired Waters & TMDL Requirements	
Regulatory Constraints *Describe applicable BMP specific requirements to address Impaired water related concerns*	Identify the local JRMP consulted: Does the applicable JRMP identify any BMP requirements that need to be implemented in the project area: ☐ Yes; describe the BMP requirements and how they have been addressed in the project design ☐ No
Right-of-Way (ROW)	
ROW Constraints *Describe potential ROW constraints to BMP implementation*	

Table 4.1 - Infrastructure & Project-Specific Characteristics (Cont.)

Drainage Connectivity	
Connectivity Constraints *Based on drainage features of the project site, describe potential constraints to BMP implementation*	
Utilities	
Utility Constraints *Identify any utility-related constraints*	Does the project have any utility constraints that may affect application of BMPs? ☐ Yes; if this box checked, explain constraints ☐ No
Resource Availability	
Irrigation Water *Describe availability of irrigation water to support BMPs that require establishment of landscaping*	
Power *Describe availability of power to support use of an irrigation system*	
Estimated Road Use	
Vehicle Load *Describe the expected vehicle loads, e.g., H-20 truck loads, that will use the transportation surface after project completion*	
Maximum Allowable Speed (MAS) *Describe expected speed of vehicles on completed transportation surface; if variable, provide the MAS for different project elements*	
Roadside Parking Requirements *Describe any minimum requirements associated with design of roadside parking areas*	
Capacity Design (Average Daily Traffic, ADT). Is the ADT ≥ 25,000?	☐ Yes ☐ No

Section 5 BMP Feasibility Analysis

Section 5.1 - Overview

Projects categorized as a Category 3 or Category 4 shall incorporate the following Site Design BMP principles to the maximum extent feasible:

- Conservation of natural areas to the extent feasible
- Minimization of the Impervious footprint
- Minimization of disturbances to natural drainage
- Design and construction of Pervious areas to receive runoff from Impervious areas
- Use of landscaping that minimizes irrigation and runoff, promotes surface infiltration, and minimizes the use of pesticides and fertilizers

The extent to which these design principles may be incorporated into a project through the use of BMP techniques depends on the project type and the project-specific feasibility analysis. This section provides a stepwise approach for evaluating the feasibility to incorporate LID-based BMPs into a proposed project. **Table 5.1** identifies the BMPs required for evaluation in relation to the project category or type. Based on the box checked, the project reviewer is directed to the appropriate table for subsequent analyses. **Table 5.2** provides sources for BMP planning and design information that may be considered for use in Transportation Projects. **Table 5.3** provides a checklist for LID BMP feasibility analysis for Category 3 or 4 projects, and **Table 5.4** provides a similar checklist applicable to Class I Bikeway or Sidewalk Projects analysis.

Table 5.1 - LID BMP Evaluation Requirements

Check the appropriate box. The LID BMPs listed within each category must be included in the feasibility analysis

☐ **Category 3 or 4 (other than a Class I Bikeway or sidewalk project)**	☐ **Class I Bikeway or Sidewalk Project**
▪ 1 - Minimum Road Width ▪ 2 - Drainage Swales ▪ 3 – Infiltration Basins ▪ 4 - Bioretention ▪ 5 - Sidewalk Trees and Tree Boxes ▪ 6 - Permeable Pavement	▪ Drain to Pervious Surfaces ▪ Minimum Width ▪ Use of Tree Wells ▪ Permeable Pavement

- If the Category 3 or 4 box was checked above, complete the feasibility analysis for <u>each</u> of the LID BMPs in Table 5.3
- If the Class I Bikeway or Sidewalk project box was checked, complete Table 5.4

Section 5.2 – BMP References

To support completion of the feasibility analyses for each LID-based BMP in Table 5.3, Table 5.2 provides sources for BMP design information that may be considered for use in Transportation Projects. These information sources are intended to guide decision-making with regards to making feasibility determinations about the efficacy of incorporating LID-based BMPs in the project design. Additional general information regarding the use of LID-based BMPs in Transportation Projects may be found in Section 6.C of the Guidance.

The resource information provided in Table 5.2 does not represent an exhaustive list of source material regarding LID-based BMPs; in fact, new information regarding how to design LID-based BMPs is regularly published. In addition, this information is not to be used as a substitute for development of engineering designs appropriate for the project site.

Table 5.2 – BMP Design Information

LID-based BMP Information Source	Minimum Street Width	Drainage Swales	Infiltration Basins	Bioretention	Sidewalk Trees & Tree Boxes	Permeable Pavement
Riverside County Flood Control and Water Conservation District Design Handbook for Low Impact Development Management Practices http://rcflood.org/NPDES/LIDBMP.aspx	--	Section 3.2	Section 3.1	Section 3.5	Section 3.5, p. 5[1]	Section 3.3
Low Impact Development Manual for Southern California: Technical Guidance and Site Planning Strategies http://www.casqa.org/LID/SoCalLID/tabid/218/Default.aspx	--	pp. 137-138	--	pp. 68-84	p. 71[1]	pp. 83-113
U. S. EPA Municipal Handbook: Green Streets, Managing Wet Weather with Green Infrastructure[2] http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf	pp. 2-4	--	--	--	--	--
County of San Diego, Low Impact Development Handbook: Stormwater Management Strategies http://www.sdcounty.ca.gov/dplu/docs/LID-Handbook.pdf (General Information) http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf (Fact Sheets)	Fact Sheet 14, 15	--	--	Fact Sheets 15, 19	--	pp. 46-51, Fact Sheets 8, 9, 10
County of Los Angeles Low Impact Development Standards Manual http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf	--	--	--	--	pp. 49-52[1]	pp. 53-57
City of Santa Barbara Storm Water BMP Guidance Manual http://www.santabarbaraca.gov/Resident/Community/Creeks/Storm_Water_Management_Program.htm	--	Section 6.6.2	--	Section 6.6.1	Section 6.9.2[1]	Section 6.8
Caltrans Treatment BMP Technology Report http://www.dot.ca.gov/hq/env/stormwater/annual_report/2008/annual_report_06-07/attachments/Treatment_BMP_Technology_Rprt.pdf	--	p. D-5	--	pp. B-11 – B-12	pp. B-7 – B-10	--
Evaluation of Best Management Practices for Highway Runoff Control: *Low Impact Development Design Manual for Highway Runoff Control* http://www.coralreef.gov/transportation/evalbmp.pdf	--	Section 14	--	Section 5	--	Section 10

[1] Information focuses on design of planter boxes

[2] Handbook provides information on all LID types except Infiltration Basins, but information is general in nature

Table 5.3 – LID BMP Feasibility Analysis 1 – Minimum Road Widths	
1.a - Does the project need to meet jurisdictional code or General Plan requirements for minimum Road widths?	☐ Yes; if checked, describe requirements ☐ No
1.b – Based on the findings of 1.a., determine if this BMP can be applied to the project. If applicable, describe how it was incorporated into the project design.	☐ Applicable, describe design features incorporating this BMP; include in Table 7.1 ☐ Not Applicable, describe basis for decision (e.g., project requirements, traffic or pedestrian safety concerns)

Table 5.3 – LID BMP Feasibility Analysis
2 – Drainage Swales

2.a – Are there any programmatic constraints that prevent the use of this BMP, *e.g., Americans with Disabilities Act; need for Emergency access, funding restrictions, etc.? See Section 3.b of the Guidance.*	☐ Yes; if checked, provide basis for finding and STOP; this BMP is infeasible ☐ No; BMP is potentially feasible, continue to 2.b
2.b - Considering grade and need for drainage connectivity, is there sufficient ROW for proper swale installation?	☐ No; if checked, provide basis for finding ☐ Yes
2.c - Can Drainage Swales be sized large enough to capture site Run-On and redirect it into the drainage system?	☐ No; if checked, provide basis for finding ☐ Yes
2.d - Are existing soil characteristics sufficient to support infiltration such that nuisance or vector conditions are not created by any ponded water that may occur?	☐ No; if checked, provide basis for finding ☐ Yes
• If "No" is checked for 2.b, 2.c, or 2.d, then STOP - this BMP is infeasible; attach appropriate documentation support as needed • If "Yes" is checked for 2.b, 2.c, and 2.d, then this BMP is potentially feasible, continue on to 2.e and 2.f	
2.e - Are irrigation water and power available to support vegetation in swale during dry periods?	☐ No; if checked, provide basis for finding ☐ Yes
2.f - If irrigation water and power are not available, can the site support native vegetation that does not require irrigation?	☐ No; if checked, provide basis for finding ☐ Yes
• If "No" is checked for 2.e and 2.f, this BMP is infeasible • If "Yes" is checked for 2.e or 2.f, then this BMP is potentially feasible; continue to 2.g	
2.g – Are there any special maintenance, equipment, or experience requirements associated with the implementation of this BMP?	☐ Yes; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ No
2.h – If this BMP is implemented, will there be any one-time capital costs incurred, e.g., for new equipment required to maintain the BMP, that impact project funding?	☐ Yes; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ No
2.i – Is there long-term funding available to maintain this BMP?	☐ Yes ☐ No
• If any of the findings from 2.g, 2.h or 2.i prevent the use of this BMP, then this BMP is infeasible; attach appropriate documentation as needed • If the findings from 2.g., 2.h, and 2.i do not prevent implementation of this BMP, then the BMP is feasible; incorporate into Table 7.1	

Table 5.3 – LID BMP Feasibility Analysis
3 – Infiltration Basins

3.a – Are there any programmatic constraints that prevent the use of this BMP, *e.g., Americans with Disabilities Act; need for Emergency access, funding restrictions, etc.? See Section 3.b of the Guidance.*	☐ Yes; if checked, provide basis for finding and STOP; this BMP is infeasible ☐ No; BMP is potentially feasible, continue to 3.b
3.b - Do appropriate soil conditions exist at the project site to allow effective infiltration consistent with a drawdown period, not to exceed 72 hours?	☐ No; if checked, provide basis for finding ☐ Yes
3.c - Is there at least 10 feet separation between the planned basin invert and the measured groundwater elevation?	☐ No; if checked, provide basis for finding ☐ Yes
3.d- Is there at least 100 feet separation from the proposed basin(s) and any known water supply wells?	☐ No; if checked, provide basis for finding ☐ Yes
3.e - Is the underlying soil and/or groundwater free from any known contamination?	☐ No; if checked, provide basis for finding ☐ Yes
3.f - Is there sufficient space to size or place an infiltration basin that: • Has slopes that are no steeper than 4:1, and • Is located at least 100 feet from bridge structures?	☐ No; if checked, provide basis for finding ☐ Yes
3.g - For a project area that has high vehicular traffic (25,000 or more Average Daily Traffic), can the planned infiltration basin meet the MS4 Permit's pretreatment of runoff requirements?	☐ No; if checked, provide basis for finding ☐ Yes
3.h - Can an infiltration basin be incorporated into the site plan in a manner that does not create traffic or pedestrian safety concerns?	☐ No; if checked, provide basis for finding ☐ Yes
3.i - Does inclusion of an infiltration basin detract from the aesthetics of the roadway or project area that cannot be mitigated?	☐ No; if checked, provide basis for finding ☐ Yes
• If "No" is checked for any of the above questions (3.b – 3.i), this BMP is infeasible • If "Yes" is checked for all of the above (3.b - 3.i), then this BMP is potentially feasible; continue to 3.j	
3.j – Are there any special maintenance, equipment or experience requirements associated with the implementation of this BMP?	☐ Yes; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ No
3.k – If this BMP is implemented, will there be any one-time capital costs incurred, e.g., for new equipment required to maintain the BMP, that impact project funding?	☐ Yes; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ No
3.l – Is there long-term funding available to maintain this BMP?	☐ Yes ☐ No
• If any of the findings from 3.j, 3.k or 3.l prevent the use of this BMP, then this BMP is infeasible; attach appropriate documentation as needed • If the findings from 3.j., 3.k, and 3.l do not prevent implementation of this BMP, then the BMP is feasible; incorporate into Table 7.1	

Table 5.3 – LID BMP Feasibility Analysis
4 – Bioretention

4.a – Are there any programmatic constraints that prevent the use of this BMP, *e.g., Americans with Disabilities Act; need for Emergency access, funding restrictions, etc.? See Section 3.b of the Guidance.*	☐ Yes; if checked, provide basis for finding and STOP; this BMP is infeasible ☐ No; BMP is potentially feasible, continue to 4.b
4.b - Is there sufficient ROW to consider Curb Extensions?	☐ No; if checked, provide basis for finding ☐ Yes
4.c - Is there sufficient ROW to consider sidewalk planters?	☐ No; if checked, provide basis for finding ☐ Yes
4.d – Is there sufficient space to consider using the Road median for Bioretention?	☐ No; if checked, provide basis for finding ☐ Yes
• If "No" is checked for 4.b, 4.c and 4.d, then STOP - this BMP is infeasible; attach appropriate documentation support as needed • If "Yes" is checked for 4.b, 4.c or 4.d, then this BMP is potentially feasible, continue on to 4.e	
4.e – Can the site be designed so that median, Curb Extensions or sidewalk planters tie into the existing drainage at the project site?	☐ No; if checked, provide basis for finding ☐ Yes
• If "No" is checked for 4.e, then STOP - this BMP is infeasible; attach appropriate documentation support as needed • If "Yes" is checked for 4.e, then this BMP is potentially feasible, continue on to 4.f and 4.g	
4.f - Are irrigation water and power available to support Bioretention area or sidewalk planters?	☐ No; if checked, provide basis for finding ☐ Yes
4.g - If irrigation water and power are not available, can the site support native vegetation that does not require irrigation?	☐ No; if checked, provide basis for finding ☐ Yes
• If "No" is checked for 4.f and 4.g, then STOP - this BMP is infeasible • If "Yes" is checked for 4.f or 4.g, then this BMP is potentially feasible; continue on to 4.h	
4.h – Based on anticipated traffic capacity and MAS applicable to the project site, are there any traffic or pedestrian safety concerns that prevent application of this BMP?	☐ Yes; if checked, provide basis for finding ☐ No
• If "Yes" is checked for 4.h this BMP is infeasible • If "No" is checked for 4.h, then this BMP is potentially feasible; continue to 4.i.	
4.i – Are there any special maintenance, equipment or experience requirements associated with the implementation of this BMP?	☐ Yes; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ No
4.j – If this BMP is implemented, will there be any one-time capital costs incurred, e.g., for new equipment required to maintain the BMP, that impact project funding?	☐ Yes; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ No
4.j – Is there long-term funding available to maintain this BMP?	☐ Yes ☐ No
• If any of the findings from 4.i, 4.j or 4.k prevent the use of this BMP, then this BMP is infeasible; attach appropriate documentation as needed • If the findings from 4.i, 4.j, and 4.k do not prevent implementation of this BMP, then the BMP is feasible; incorporate into Table 7.1	

Table 5.3 – LID BMP Feasibility Analysis
5 – Sidewalk Trees and Tree Boxes

5.a – Are there any or programmatic constraints that prevent the use of this BMP, *e.g., Americans with Disabilities Act; need for Emergency access, funding restrictions, etc.? See Section 3.b of the Guidance.*	☐ Yes; if checked, provide basis for finding and STOP; this BMP is infeasible ☐ No; BMP is potentially feasible, continue to 5.b
5.b - Is there sufficient ROW to incorporate sidewalk trees or tree boxes into the project site?	☐ No; if checked, provide basis for finding ☐ Yes
• If "No" is checked for 5.b, then STOP - this BMP is infeasible; attach appropriate documentation support as needed • If "Yes" is checked for 5.b, then this BMP is potentially feasible, continue on to 5.c and 5.d	
5.c - Are irrigation water and power available to support vegetation in the Bioretention area or sidewalk planters?	☐ No; if checked, provide basis for finding ☐ Yes
5.d - If irrigation water and power are not available, can the site support native vegetation that does not require irrigation?	☐ No; if checked, provide basis for finding ☐ Yes
• If "No" is checked for 5.c and 5.d, then STOP - this BMP is infeasible • If "Yes" is checked for 5.c or 5.d, then this BMP is potentially feasible; continue on to 5.e	
5.e – Based on anticipated traffic capacity and MAS applicable to the project site, are there any traffic or pedestrian safety concerns that prevent application of this BMP?	☐ Yes; if checked, provide basis for finding ☐ No
• If "Yes" is checked for 5.e this BMP is infeasible • If "No" is checked for 5.e, then this BMP is potentially feasible; continue to 5.f	
5.f – Are there any special maintenance, equipment or experience requirements associated with the implementation of this BMP?	☐ Yes; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ No
5.g – If this BMP is implemented, will there be any one-time capital costs incurred, e.g., for new equipment required to maintain the BMP, that impact project funding?	☐ Yes; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ No
5.h – Is there long-term funding available to maintain this BMP?	☐ Yes ☐ No
• If any of the findings from 5.f, 5.g or 5.h prevent the use of this BMP, then this BMP is infeasible; attach appropriate documentation as needed • If the findings from 5.f, 5.g and 5.h do not prevent implementation of this BMP, then the BMP is feasible; incorporate into Table 7.1	

Table 5.3 – LID BMP Feasibility Analysis
6 – Permeable Pavement

6.a – Are there any or programmatic constraints that prevent the use of this BMP, *e.g., Americans with Disabilities Act; need for Emergency access, funding restrictions, etc.? See Section 3.b of the Guidance.*	☐ Yes; if checked, provide basis for finding; STOP, this BMP is infeasible ☐ No; BMP is potentially feasible, continue to 6.b
6.b - Does the planned Road project include any of the listed types of Impervious surfaces (check all that apply)?	☐ Roadside parking/Parking Lane ☐ Driveways ☐ Sidewalks, walkways ☐ None of the above
• If "none of the above" is checked in 6.b, then STOP – BMP is infeasible • If any box other than "none of the above" is checked, BMP is potentially feasible; continue to 6.c	
6.c – Will any of the transportation surfaces checked in 6.b be subject to high traffic volume or heavy traffic loads that prevent the use of permeable pavement?	☐ Yes; if checked, provide basis for finding ☐ No
6.d – Do the underlying soils at the project site provide adequate infiltration capacity for use of this BMP while not causing structural concerns?	☐ No; if checked, provide basis for finding ☐ Yes
• If "Yes" is checked for 6.c or "No" is checked for 6.d, then STOP - this BMP is infeasible; attach appropriate documentation support as needed • If "No" is checked for 6.c and "Yes" is checked for 6.d, then this BMP is potentially feasible for all impervious surface types checked in 6.b; continue to 6.e • If "Yes" is checked for 6.c and 6.d and "sidewalks, walkways" was checked in 6.b, then this BMP is potentially feasible for sidewalk or walkway elements of the project; continue to 6.e	
6.e – Are there any special maintenance, equipment, or experience requirements associated with the implementation of this BMP?	☐ No; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ Yes
6.f – Will the BMP maintain an adequate service life (at least 5 years) such that the BMP is economically feasible?	☐ No; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ Yes
6.g – If this BMP is implemented, will there be any one-time capital costs incurred, e.g., for new equipment required to maintain the BMP, that impacts project funding?	☐ Yes; if checked, provide basis for finding and determine whether the findings prevent implementation of this BMP ☐ No
6.h – Is there long-term funding available to maintain this BMP?	☐ Yes ☐ No
• If any of the findings from 6.e, 6.f, 6.g or 6.h prevent the use of this BMP, then this BMP is infeasible; attach appropriate documentation as needed • If the findings from 6.e, 6.f, 6.g and 6.h do not prevent implementation of this BMP, then the BMP is feasible; incorporate into Table 7.1	

Table 5.4 – LID BMP Feasibility Analysis – Class I Bikeway and Sidewalks

1 - Has the Class I Bikeway or sidewalk been designed to sheet-flow runoff onto adjacent permeable areas in a manner that will maximize opportunities for infiltration and filtration, while not channelizing or causing erosion?	☐ Yes; if checked, provide basis for finding, incorporate BMP into Table 7.1 ☐ No; if checked, provide basis for finding; continue on to Question 2.
2 - Has the Class I Bikeway or sidewalk been designed using the minimum width possible, given expected usage and considering public safety?	☐ Yes; if checked, provide basis for finding; incorporate BMP into Table 7.1; continue on to Questions 3 and 4. ☐ No; if checked, provide basis for finding; continue on to Questions 3 and 4.
3 - If trees are incorporated into the design of the Bikeway or sidewalk, have tree boxes been used?	☐ Yes; if checked, provide basis for finding; incorporate BMP into Table 7.1 ☐ No; if checked, provide basis for finding
4 - Do the underlying soils at the project site provide adequate infiltration capacity for use of some type of permeable pavement?	☐ No; if checked, BMP is infeasible; provide basis for finding ☐ Yes; if checked, continue on to Question 5
5 - Are there any project funding or programmatic constraints that prevent the use of permeable pavement in the project design, *e.g., Americans with Disabilities Act; need for Emergency access, funding restrictions, etc.*?	☐ Yes; if checked, BMP is infeasible; provide basis for finding ☐ No; if checked, continue on to Question 6
6 - Are there any maintenance requirements, including long-term funding, that prevent the use of permeable pavement in the project design?	☐ Yes; if checked, BMP is infeasible; provide basis for finding ☐ No; if checked, include permeable pavement in the project design and incorporate the BMP into Table 7.1

Section 6 Source Control BMPs

Section 6 identifies Source Control BMPs potentially applicable to the proposed Transportation Project. If this is strictly a Road project, then only Part 1 needs to be filled out. Part 2 needs to be filled out if the Road project includes bike path or sidewalk features adjoining or Non-Adjoining the Road surface, or if the proposed project is only a Class I Bikeway or sidewalk project. The project reviewer should evaluate the applicability of each source control BMP and identify the agency responsible for implementing the BMPs once the project is constructed.

Table 6.1 - Source Control BMPs

Source Control BMP	Check One		If not Included, Provide Basis	If Included, Agency Responsible for Implementation
	Included	Not Included		
Part 1: Category 3 or 4 Projects (other than Class I Bikeway or sidewalk projects)				
Irrigation System and Landscape Maintenance	☐	☐		
Sweeping of Transportation Surfaces Adjoining Curb and Gutter	☐	☐		
Drainage Facility Inspection and Maintenance	☐	☐		
MS4 Stenciling and Signage	☐	☐		
Landscape and Irrigation System Design	☐	☐		
Protect Slopes and Channels	☐	☐		
Part 2: Class I Bikeway and Sidewalk Projects				
Public Education Program	☐	☐		
Use of Signage	☐	☐		
Installation and Maintenance of Trash Bins and Pet Waste Collection Bags	☐	☐		

Section 7 Project Summary

Table 7.1 summarizes and documents (a) applicability and use of LID-based BMPs in the project design; (b) applicable Source Control BMPs, and (c) known regulatory requirements that impacted the project design. Fill out the information relevant to the project type and provide supporting information where needed.

Table 7.1 – Project Summary (Category 3 & 4 Projects)

<table>
<tr><td rowspan="6">☐ Category 3 or Category 4 Project (other than Class I Bikeway or sidewalk projects)

Summarize the LID BMPs incorporated into the project design (based on the findings of Table 5.3 - LID BMP Feasibility Analysis). For each LID BMP checked:
▪ Describe briefly how the LID BMP was incorporated; and
▪ Provide references to attachments or design plans (e.g., sheet numbers) where needed to support description</td><td colspan="2">☐ Minimum Road Width</td></tr>
<tr><td>☐ Drainage Swales</td><td>Maintenance Responsibility:</td></tr>
<tr><td>☐ Infiltration Basins</td><td>Maintenance Responsibility:</td></tr>
<tr><td>☐ Bioretention</td><td>Maintenance Responsibility:</td></tr>
<tr><td>☐ Sidewalk Trees and Tree Boxes</td><td>Maintenance Responsibility:</td></tr>
<tr><td>☐ Permeable Pavement</td><td>Maintenance Responsibility:</td></tr>
<tr><td rowspan="4">☐ Class 1 Bikeway and Sidewalk Projects

Summarize the LID BMPs incorporated into the project design (based on the Table 5.4 - LID BMP Feasibility Analysis). For each BMP checked:
▪ Describe briefly how the LID BMP was incorporated; and
▪ Provide references to attachments or design plans (e.g., sheet numbers) as needed to support description.</td><td colspan="2">☐ Drain to Pervious Surfaces</td></tr>
<tr><td colspan="2">☐ Minimum Width</td></tr>
<tr><td>☐ Use of Tree Wells</td><td>Maintenance Responsibility:</td></tr>
<tr><td>☐ Permeable Pavement</td><td>Maintenance Responsibility:</td></tr>
<tr><td>Regulatory Requirements
Document design elements that address any known regulatory requirements (see Table 3.1); if none, check the N/A box.</td><td colspan="2">☐ Design elements affected by regulatory requirements
Describe:

☐ N/A</td></tr>
<tr><td>Source Control BMPs
Summarize the applicable source controls and the agency responsible for implementation.</td><td colspan="2"></td></tr>
<tr><td>Documentation
List all attachments that support this project summary.</td><td colspan="2"></td></tr>
</table>

C. LID-based BMP Planning and Design Information

The purpose of this Guidance section is to provide examples of LID-based BMPs that may be considered for use in Transportation Projects. This information is provided in two parts (1) general LID-based BMP information; and (2) LID-based BMP-specific information. These sources are intended to guide decision-making with regards to making feasibility determinations about the efficacy of incorporating these BMPs into Transportation Project planning and design. This information does not represent an exhaustive list of source material; in fact, new information regarding how to design LID-based BMPs is regularly published. This information is not to be used as a substitute for development of engineering designs appropriate to the Transportation Project site.

General LID-based BMP Guidance

The following documents provide general information regarding the application of LID-based BMPs in various scenarios including Transportation Projects. While reference material is available from other areas outside the southwestern United States, these references have not been included, primarily because of their lack of relevance to the hydrologic regime that exists in the Santa Margarita Region:

- *Design Handbook for Low Impact Development Best Management Practices*. 2011. Riverside County Flood Control and Water Conservation District. September 2011. http://rcflood.org/NPDES/LIDBMP.aspx.
- *Low Impact Development Manual for Southern California: Technical Guidance and Site Planning Strategies*. 2010. Prepared for the Southern California Stormwater Monitoring Coalition. April 2010. http://www.casqa.org/LID/SoCalLID/tabid/218/Default.aspx.
- *Green Streets: A Conceptual Guide to Effective Green Streets Design Solutions*. 2009. U.S. Environmental Protection Agency, EPA-833-F-09-002. August 2009. http://water.epa.gov/aboutow/eparecovery/upload/2009_09_10_eparecovery_EPA_ARRA_Green_Streets_FINAL.pdf.
- *Municipal Handbook: Green Streets, Managing Wet Weather with Green Infrastructure*. 2008. U.S. Environmental Protection Agency, EPA-833-F-08-009. December 2008. http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf
- *Low Impact Development Handbook: Stormwater Management Strategies*. 2007. County of San Diego, Department of Planning and Land Use. December 2007. http://www.sdcounty.ca.gov/dplu/docs/LID-Handbook.pdf (General Information); http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf (Fact Sheets)
- *Storm Water BMP Guidance Manual*. 2008. City of Santa Barbara. June 2008. http://www.santabarbaraca.gov/Resident/Community/Creeks/Storm_Water_Management_Program.htm
- *County of Los Angeles Low Impact Development Standards Manual. January 2009.* http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf
- *Rainwater Harvesting Program: Green Streets and Green Alleys Design Guidelines Standards*, 1st Edition. City of Los Angeles, Department of Public Works, Bureau of Sanitation, Watershed Protection Division, September 4, 2009. http://www.lastormwater.org/siteorg/program/green.htm
- *Evaluation of Best Management Practices for Highway Runoff Control*: *Low Impact Development Design Manual for Highway Runoff Control*. 2006. Prepared for the National Cooperative Highway

Research Program, Transportation Research Board, and National Research Council. http://www.coralreef.gov/transportation/evalbmp.pdf

- *Green Infrastructure for Southwest Neighborhoods*. 2010. Watershed Management Group, Tucson, AZ. August 2010. http://watershedmg.org/sites/default/files/greenstreets/WMG_GISWNH_1.0.pdf
- Low Impact Development Center, http://www.lowimpactdevelopment.org

Specific LID-Based BMP Information

The following sections provide design-related information for the LID-based BMPs described in Section 3 of this Guidance.

Minimum Road Width

- *Municipal Handbook: Green Streets, Managing Wet Weather with Green Infrastructure.* 2008. U.S. Environmental Protection Agency, EPA-833-F-08-009. December 2008. http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf - **see pages 2-4**
- *Low Impact Development Handbook: Stormwater Management Strategies*. 2007. County of San Diego, Department of Planning and Land Use. December 2007. http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf (Fact Sheets) – **Fact Sheets 14, 15**

Drainage Swales

- *Design Handbook for Low Impact Development Best Management Practices*. 2011. Riverside County Flood Control and Water Conservation District. September 2011. http://rcflood.org/NPDES/LIDBMP.aspx - **see Section 3.2**
- *Low Impact Development Manual for Southern California: Technical Guidance and Site Planning Strategies*. 2010. Low Impact Development Center, Inc. April 2010. http://www.casqa.org/LID/SoCalLID/tabid/218/Default.aspx - **see pages 137-138**
- *Storm Water BMP Guidance Manual*. 2008. City of Santa Barbara. June 2008. http://www.santabarbaraca.gov/Resident/Community/Creeks/Storm_Water_Management_Program.htm – **see Section 6.6.2**
- *Treatment BMP Technology Report*. 2008. California Department of Transportation (Caltrans), CTSW-RT-08-167.02.02. April 2008. http://www.dot.ca.gov/hq/env/stormwater/annual_report/2008/annual_report_06-07/attachments/Treatment_BMP_Technology_Rprt.pdf - **see page D-5**
- *Evaluation of Best Management Practices for Highway Runoff Control*: *Low Impact Development Design Manual for Highway Runoff Control*. 2006. Prepared for the National Cooperative Highway Research Program, Transportation Research Board, and National Research Council. http://www.coralreef.gov/transportation/evalbmp.pdf - **see Section 14**

Infiltration Basins

- *Design Handbook for Low Impact Development Best Management Practices*. 2011. Riverside County Flood Control and Water Conservation District. September 2011. http://rcflood.org/NPDES/LIDBMP.aspx - **see Section 3.1**

Bioretention

- *Design Handbook for Low Impact Development Best Management Practices*. 2011. Riverside County Flood Control and Water Conservation District. September 2011. http://rcflood.org/NPDES/LIDBMP.aspx - **see Section 3.5**
- *Low Impact Development Manual for Southern California: Technical Guidance and Site Planning Strategies*. 2010. Low Impact Development Center, Inc. April 2010. http://www.casqa.org/LID/SoCalLID/tabid/218/Default.aspx - **see pages 68-84**
- *Low Impact Development Handbook: Stormwater Management Strategies*. 2007. County of San Diego, Department of Planning and Land Use. December 2007. http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf (Fact Sheets) – **see Fact Sheets 15, 19**
- *Storm Water BMP Guidance Manual*. 2008. City of Santa Barbara. June 2008. http://www.santabarbaraca.gov/Resident/Community/Creeks/Storm_Water_Management_Program.htm – **see Section 6.6.1**
- *Treatment BMP Technology Report*. 2008. California Department of Transportation (Caltrans), CTSW-RT-08-167.02.02. April 2008. http://www.dot.ca.gov/hq/env/stormwater/annual_report/2008/annual_report_06-07/attachments/Treatment_BMP_Technology_Rprt.pdf - **see pages B-11 - B-12**
- *Evaluation of Best Management Practices for Highway Runoff Control*: *Low Impact Development Design Manual for Highway Runoff Control*. 2006. Prepared for the National Cooperative Highway Research Program, Transportation Research Board, and National Research Council. http://www.coralreef.gov/transportation/evalbmp.pdf - **see Section 5**

Sidewalk Trees & Tree Boxes (including planter boxes)

- *Design Handbook for Low Impact Development Best Management Practices*. 2011. Riverside County Flood Control and Water Conservation District. September 2011. http://rcflood.org/NPDES/LIDBMP.aspx - **see Section 3.5, page 5** for information regarding planter boxes
- *Low Impact Development Manual for Southern California: Technical Guidance and Site Planning Strategies*. 2010. Low Impact Development Center, Inc. April 2010. http://www.casqa.org/LID/SoCalLID/tabid/218/Default.aspx - **see page 71** for information regarding planter boxes
- *County of Los Angeles Low Impact Development Standards Manual. January 2009.* http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf - **see pages 49-52** for information regarding planter boxes
- *Storm Water BMP Guidance Manual*. 2008. City of Santa Barbara. June 2008. http://www.santabarbaraca.gov/Resident/Community/Creeks/Storm_Water_Management_Program.htm – **see Section 6.9.2** for information regarding planter boxes
- *Treatment BMP Technology Report*. 2008. California Department of Transportation (Caltrans), CTSW-RT-08-167.02.02. April 2008. http://www.dot.ca.gov/hq/env/stormwater/annual_report/2008/annual_report_06-07/attachments/Treatment_BMP_Technology_Rprt.pdf - **see pages B-7 - B-10**

Permeable Pavement

- *Design Handbook for Low Impact Development Best Management Practices*. 2011. Riverside County Flood Control and Water Conservation District. September 2011. http://rcflood.org/NPDES/LIDBMP.aspx - **see Section 3.3**
- *Low Impact Development Manual for Southern California: Technical Guidance and Site Planning Strategies*. 2010. Low Impact Development Center, Inc. April 2010. http://www.casqa.org/LID/SoCalLID/tabid/218/Default.aspx - **see pages 83-113**
- *Low Impact Development Handbook: Stormwater Management Strategies*. 2007. County of San Diego, Department of Planning and Land Use. December 2007. http://www.sdcounty.ca.gov/dplu/docs/LID-Handbook.pdf (General Information); http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf (Fact Sheets) – **see pages 46-51, Fact Sheets 8, 9, 10**
- *County of Los Angeles Low Impact Development Standards Manual. January 2009.* http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf - **see pages 53-57**
- *Storm Water BMP Guidance Manual*. 2008. City of Santa Barbara. June 2008. http://www.santabarbaraca.gov/Resident/Community/Creeks/Storm_Water_Management_Program.htm – **see Section 6.8**
- *Evaluation of Best Management Practices for Highway Runoff Control*: *Low Impact Development Design Manual for Highway Runoff Control*. 2006. Prepared for the National Cooperative Highway Research Program, Transportation Research Board, and National Research Council. http://www.coralreef.gov/transportation/evalbmp.pdf – **see Section 10**

EXHIBIT E:

WQMP Applicability Checklist

WQMP Applicability Checklist for the SANTA MARGARITA REGION of Riverside County

Project Case No. and Name: _____

1) In the Table below, mark each Category that applies to your Project, the Existing Site, or select Neither:

Category	Threshold	New Development Project Description	Project	Existing Site	Neither
New Development Projects	**10,000 SF Impervious surface**	Projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site) including commercial, industrial, residential, mixed-use, and public development projects. This category includes Development Projects on public or private land which fall under the planning and building authority of the Copermittees.	☐	☐	☐
Automotive Repair Shops	**Dependent on SIC Code**	Projects that include automotive repair shops that are categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.	☐	☐	☐
Restaurants	**5,000 SF**	Projects that will sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet must meet all WQMP requirements except for the conventional treatment control BMP requirements of WQMP section 3.5, and the Hydromodification requirements of WQMP section 3.6.	☐	☐	☐
Hillside Developments	**5,000 SF**	Hillside Development Projects greater than 5,000 square feet. This category is defined as any development project which creates 5,000 square feet of impervious surface and which is located in an area with known erosive soil conditions, where the development project will grade on any natural slope that is twenty-five percent or greater.	☐	☐	☐
Environmentally Sensitive Areas	**2,500 SF Impervious surface**	Projects located within, or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA) (where discharges from the Development Project site will enter Receiving Waters within the ESA), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed Development Project site to 10 percent or more of its naturally occurring condition. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject Development Project site, and not commingled with flows from adjacent or upstream lands.	☐	☐	☐
Parking Lots	**5,000 SF Impervious surface**	Development Projects with impervious parking lots 5,000 square feet or more and potentially exposed to runoff. Parking lot is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.	☐	☐	☐
Streets, Roads, Highways and Freeways	**5,000 SF Impervious surface**	Development Projects that include any paved impervious surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles, and other vehicles. For Copermittee Transportation Projects, see section 1.2.1.	☐	☐	☐
Retail Gasoline Outlets	**5,000 SF or ADT >100**	Retail Gasoline Outlets that meet either of the following criteria: (a) 5,000 square feet or more; or (b) a projected Average Daily Traffic of 100 or more vehicles per day."	☐	☐	☐
Pollutant Generating New Development Projects	**1 acre disturbed area**	New Development Projects that disturb over 1 acre of land, where the post-construction use of the site generate pollutants at levels greater than natural background levels.	☐	☐	☐

2) Does the project create, add, or replace at least 5,000 square feet of impervious surfaces on an already developed site?

Yes	No
☐	☐

A Project-Specific WQMP is REQUIRED if **EITHER of the following are true:**

- ANY of the check boxes under 'Project' are selected, **OR**
- BOTH Question 2 is answered 'yes' AND any of the check boxes under 'Existing Site' are selected.

A WQMP is	
REQUIRED	**NOT Required**
☐	☐

_____ _____ _____

Printed Name Signature License Number

EXHIBIT F:

WQMP Review Checklist

(Will be developed upon approval of the WQMP by the San Diego Regional Board)

EXHIBIT G:

Glossary

SMR WQMP Glossary

Name	Definition
2010 SMR MS4 Permit	Order R9-2010-0016, an NPDES MS4 Permit issued by the San Diego Regional Board.
Beneficial Use	The uses of water necessary for the survival or well being of man, plants and wildlife. These uses of water serve to promote the tangible and intangible economic, social and environmental goals. "Beneficial Uses" of the waters of the State that may be protected include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. Existing Beneficial Uses are uses that were attained in the surface or ground water on or after November 28, 1975; and potential Beneficial Uses are uses that would probably develop in future years through the implementation of various control measures. "Beneficial Uses" are equivalent to "Designated Uses" under federal law. [California Water Code Section 13050(f)].
Best Management Practice (BMP)	Any procedure or device designed to minimize the quantity of Pollutants that enter the MS4 or to control stormwater flow. See Chapter Two.
Bioretention BMP	A type of LID Retention BMP that is designed to capture the Design Capture Volume and absorb that volume entirely into a biologically active soil media. Water retained in this soil media is then evapotranspired by plants in the BMP, or slowly allowed to infiltrate into the underlying soils. This BMP inherently maximizes both infiltration and Evapotranspiration of Runoff based on the actual limitations of the soil and environment.
Biotreatment BMP	A type of **LID BMP** that can be used in certain circumstances when LID Retention BMPs are not feasible. These BMPs provide similar functions and benefits as LID Bioretention BMPs, such as inclusion of natural biological processes and maximizing opportunities for Infiltration and Evapotranspiration, however they are not designed to retain the Design Capture Volume in an engineered soil media. Examples of Biotreatment BMPs include extended detention basins, bioswales, and constructed wetlands.
California Stormwater Quality Association (CASQA)	Publisher of the California Stormwater Best Management Practices Handbooks, available at www.cabmphandbooks.com.
CEQA	California Environmental Quality Act

SMR WQMP Glossary

Name	Definition
Condition(s) of Approval (COA)	Requirements a Copermittee may adopt for a project in connection with a discretionary action (e.g., approval of a subdivision map or issuance of a use permit). COAs may specify features required to be incorporated into the final plans for the project and may also specify uses, activities, and operational measures that must be observed over the life of the project.
Conventional Treatment BMPs	A type of stormwater BMP that provides treatment of stormwater runoff. Conventional treatment control BMPs, while designed to treat particular Pollutants, typically do not provide the same level of volume reduction as LID BMPs, and commonly require more specialized maintenance than LID BMPs. As such, the 2010 SMR MS4 Permit and this WQMP require the use of LID BMPs wherever feasible, before Conventional Treatment BMPs can be considered or implemented.
Copermittee	District, County, and Cities of Murrieta, Temecula, and Wildomar. The terms *'local Copermittee'* and *'your Copermittee'* refers to the Copermittee that has jurisdiction over the proposed **Priority Development Project**.
CWA	The federal Clean Water Act
Design Capture Volume (DCV, or V_{BMP})	The volume of runoff resulting from the **Design Storm**. This volume must be captured within Stormwater BMPs to achieve Pollutant removal to the MEP. The DCV will depend on the Design Storm (using Exhibit A) and the types of post-development surfaces on the site. Reducing impervious surfaces on the site will reduce the DCV. This is the design sizing standard for LID BMPs, as well as for conventional Treatment BMPs whose design is based on treating a particular volume of runoff.
Design Flow Rate	The flow rate resulting from an hourly rainfall intensity of 0.2 inches per hour. The Design Flow Rate will depend on the types of post-development surfaces on the site. Flow-based BMP designs can only be used when implementing conventional Treatment Control BMPs.
Design Flow Rate (Q_{BMP})	The design standard for conventional Treatment BMPs whose design is based on processing a certain flow rate. See also Section 2.
Design Storm	The 85th percentile 24-hour storm depth, based on local historical rainfall records. See Exhibit A.
Detention	The practice of holding stormwater runoff in ponds, vaults, within berms, or in depressed areas and letting it discharge slowly to the MS4.
Development Project	Any project that proposes Construction, rehabilitation, redevelopment, or reconstruction of any public or private residential industrial, or commercial facility, or any other projects designed for post-construction human activity or occupation.

SMR WQMP Glossary

Name	Definition
Directly Connected Impervious Area	Any impervious surface which drains into a catch basin, area drain, or other conveyance structure (such as a street) without first directing the flow across pervious areas (e.g. lawns).
Discretionary Approval	Means a project which requires the exercise of judgment or deliberation by the public agency or body when they decide to approve or disapprove a particular activity. Discretionary approvals are distinguished from situations where the public agency or body merely has to determine whether there has been conformity with applicable statutes, ordinances, or regulations. **Check with the Copermittee to determine if a particular action is considered Discretionary.**
Drainage Management Area (DMA)	Individual, discrete drainage areas that typically follow grade breaks and roof ridge lines.
Drawdown Time	The time required for a detention or retention BMP to drain and return to the dry-weather condition. For detention BMPs, Drawdown Time is a function of basin volume and outlet orifice size. For infiltration BMPs, Drawdown Time is a function of basin volume and infiltration rate. For Harvest and se BMPs, Drawdown Time is a function of the cistern volume and the demand for use of captured stormwater.
DU	Dwelling Unit
EIR	Environmental Impact Report
Ephemeral	Water bodies, or segments thereof, that contain water only for a short period following precipitation events.
ESA	Environmentally Sensitive Area. At minimum, as defined in the 2010 MS4 Permit, all Receiving Waters are considered ESAs.
Evapotranspiration	The process of transferring moisture from the earth to the atmosphere by evaporation of water and transpiration from plants.
Facility Pollution Prevention Plan (FPPP)	A plan that the Copermittee maintains that describes the practices that are implemented at their municipal facilities to reduce stormwater pollution to the MEP and prohibit illegal discharges.
Final Project-Specific WQMP	A fully completed version of the Water Quality Management Plan that must be submitted and approved prior to recordation of the final map parcel map or issuance of building permit. See also Preliminary Project-Specific WQMP
Harvest and Use BMPs	Stormwater BMPs that capture stormwater runoff in a vault or cistern, and stores that water for later use, such as for irrigation.
Head	In hydraulics, energy represented as a difference in elevation. In slow-flowing open systems, such as most stormwater BMPs, this is the difference in water surface elevation, e.g., between an inlet and outlet.
Hydrograph	Runoff flow rate graphed as a function of time.

SMR WQMP Glossary

Name	Definition
Hydrologic Soil Group (HSG)	Classification of soils by the NRCS into A, B, C, and D groups according to infiltration characteristics.
Hydromodification	The change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, interflow and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport.
Hydromodification Management Plan (HMP)	A Plan that, once developed by the Copermittees, will specify requirements that must be implemented so that projects will not cause Hydromodification.
Impervious surface	Any surface that cannot effectively absorb or infiltrate urban runoff; for example conventional paved: sidewalks, rooftops, roads, and parking areas.
Infiltration BMPs	A type of LID Retention BMP where the primary treatment mechanism is through seepage of runoff into a site's underlying soil.
Infiltration Rate	Rate at which water can be added to a soil without creating runoff (in/hr).
Integrated Pest Management (IPM)	A decision-making process for managing pests that combines biological, cultural, mechanical, physical, and chemical tools and other management practices to control pests in a safe, cost effective, and environmentally sound manner that contributes to the protection of public health
Intermittent	Waterbodies, or segments thereof, that contain water for extended periods during the year, but not at all times.
JRMP	Jurisdictional Runoff Management Plan. Each Copermittee maintains a Jurisdictional Runoff Management Plan that describes their programs and activities conducted to comply with the 2010 MS4 Permit. This WQMP is a component of the JRMP.
LID BMPs	A type of stormwater BMP that is based upon the concepts of **Low Impact Development**. LID BMPs not only provide highly effective treatment of stormwater runoff, but also yield potentially significant reductions in runoff volume – helping to mimic the pre-development hydrologic regime, and also require less ongoing maintenance than Conventional Treatment BMPs. See also discussion in Chapter 2.
LID Principles	LID Principles are Site Design concepts that help prevent or minimize the causes (or drivers) of project impacts, and help mimic the pre-development hydrology. Implementing LID Principles will help minimize the need for specific Stormwater BMPs on a project.

SMR WQMP Glossary

Name	Definition
LID Retention BMP	A type of Stormwater BMP that is designed to store the Design Capture Volume, and avoid any discharge to downstream systems in storms up to the Design Storm. For the purposes of this WQMP, LID Retention BMPs include Infiltration BMPs, Harvest and Use BMPs, Pervious Pavement BMPs and Bioretention BMPs. See also Other LID BMPs
Low Impact Development (LID)	LID includes schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the Pollution of Waters of the United states through Stormwater management and land development strategies that emphasize conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions. LID BMPs include retention practices that do not allow Runoff, such as infiltration, rain water harvesting and reuse, and evapotranspiration. LID BMPs also include flow-through practices such as biofiltration that may have some discharge of Stormwater following Pollutant reduction.
Maximum Extent Practicable (MEP)	Standard, established by the 1987 amendments to the Clean Water Act, for the reduction of Pollutant discharges from MS4s. Also see Chapter Two.
Municipal Separate Storm Sewer System (MS4)	A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) as defined in 40 CFR 122.26(b)(8).
National Pollutant Discharge Elimination System (NPDES)	As part of the 1972 Clean Water Act, Congress established the NPDES Permitting system to regulate the discharge of Pollutants from municipal sanitary sewers and industries. The NPDES was expanded in 1987 to incorporate permits for discharges from MS4s as well. (aka MS4 Permits)
NRCS	Natural Resources Conservation Service
O&M	Operation and Maintenance. All BMPs implemented as part of a WQMP must continue to be operational and must be maintained throughout the life of the project.
Operational Source Control BMPs	Source Control programs or activities implemented by a site operator to prevent pollution. Examples include regular sweeping of parking lots, and other 'housekeeping' efforts.
Other Development Projects	Discretionary Development Projects that are not categorized as Priority Development Projects.

SMR WQMP Glossary

Name	Definition
Other LID BMPs	Stormwater BMPs that incorporate features that provide for natural biological processes while maximizing opportunities for infiltration and Evapotranspiration. These are distinguished from **LID Retention BMPs**, which in addition to the above features, are also designed to retain stormwater runoff.
Permeable or Pervious or Porous Pavements	Pavements for roadways, sidewalks, or plazas that are designed to infiltrate runoff *through* the pavement. Types of Permeable Pavements include pervious concrete, pervious asphalt, porous pavers, and granular materials.
Pollutant of Concern	Pollutants for which water bodies are listed as impaired under CWA section 303(d), pollutants associated with the land use type of a development, and/or pollutants commonly associated with runoff.
Pre-Development	Conditions that would exist naturally.
Preliminary Project-Specific WQMP	A preliminary project-specific WQMP is commonly required to be submitted with an application for entitlements and development approvals and must be approved by the Copermittee before any approvals or entitlements will be granted.
Priority Development Project	Development Projects that meet the categories and criteria identified in Table 1-1 (see 2010 SMR MS4 Permit, item F.1.d.).
Priority Pollutant of Concern	Pollutants that are associated with a proposed project and are listed as impaired under CWA section 303(d).
Project-Specific WQMP	A plan specifying and documenting LID Principles and Structural Stormwater BMPs to control post-construction Pollutants and stormwater runoff for the life of the project, and to maintain Stormwater BMPs for the life of the project. Copermittees may require a preliminary Project-Specific WQMP submittal, to be followed by a final Project-Specific WQMP.
Proprietary Stormwater BMPs	Products designed and marketed by private businesses for treatment of stormwater. Many of these products require complicated or proprietary maintenance. **Check with the Copermittee before proposing to use Proprietary Stormwater BMPs.**
Rational Method	A method of calculating runoff flows based on rainfall intensity, tributary area, and a coefficient representing the proportion of rainfall that runs off. In the Rational Method Q = C * I * A as further described in section 2.
Receiving Water	Any water body that is identified in the San Diego Basin Plan (and any amendments), which is available from the San Diego Regional Board's website.

SMR WQMP Glossary

Name	Definition
Redevelopment Project	Any project that meets the criteria described in Section 1. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; new sidewalk construction, pedestrian ramps, or bikelane on existing roads; and routine replacement of damaged pavement, such as pothole repair.
Regional Water Quality Control Board (or Regional Board)	Regional Boards are responsible for implementing Pollution control provisions of the CWA and California Water Code within their jurisdiction. There are nine Regional Boards in California. The Regional Boards issued the 2010 MS4 Permit to the Copermittees on November 10, 2010. This WQMP has been developed to comply with requirements in that MS4 Permit.
Runoff	When it rains on impervious or partially pervious surfaces, a portion of the rainfall will remain on the surface of the land and become runoff that travels downstream. Runoff consists of all flows in a stormwater conveyance system that consists of the following components: (1) stormwater (wet weather flows) and (2) non-stormwater including dry weather flows.
Santa Margarita Region (SMR)	The portion of Riverside County covered by Order R9-2010-0016, an NPDES MS4 Permit issued by the Santa Diego Regional Board. This includes the entirety of the incorporated cities of Murrieta, Temecula and Wildomar, as well as the portions of the unincorporated County of Riverside witin the Santa Margarita Watershed.
Seasonal High Groundwater Mark	The groundwater elevation expected due to a normal wet season and shall be obtained by boring logs or test pits.
Self-retaining area	An area designed to retain runoff. Examples are graded depressions with landscaping or pervious pavements.
Self-treating area	Natural, or landscaped area (as described in section 3.3) that drains off-site without comingling with developed portions of the site.
Site Design	See **LID Principles**.
Source Control BMP	A procedure of structural feature integrated into a site designed to prevent Pollutants from coming into contact with rainfall and/or runoff.
Stormwater Pollution Prevention Plan (SWPPP)	A plan providing for temporary measures to control sediment and other Pollutants *during* construction. In contrast with the WQMP which is a plan to reduce pollutant in runoff during the post-construction use and life of the project.
Structural (Permanent) Source Control BMP	A type of source control BMP that is a structural part of the site, such as roofs over and berms around trash and recycling areas.

SMR WQMP Glossary

Name	Definition
Structural Stormwater BMPs	Structural Stormwater BMPs are Structural Post-Construction BMPs that are designed to address stormwater runoff impacts from the completed site, and throughout the use and life of the project.. Stormwater BMPs consist of LID BMPs, Conventional Treatment BMPs, Hydromodification BMPs, and Structural Source Control BMPs.
Total Maximum Daily Load (TMDL)	A TMDL is the maximum amount of a Pollutant that can be discharged into a waterbody from all sources (point and non-point) and still maintain Water Quality Standards. Under CWA Section 303(d), TMDLs must be developed for all waterbodies that do not meet Water Quality Standards after application of technology-based controls.
Treatment	Removal of Pollutants from runoff.
Waste Discharge Requirements	As defined in Section 13374 of the California Water Code, the term "Waste Discharge Requirements" is the equivalent of the term "permits" as used in the Federal Water Pollution Control Act, as amended. The Regional Board usually reserves reference to the term "permit" to Waste Discharge Requirements for discharges to surface Waters of the U.S.
Water Quality Management Plan (WQMP)	Referred to as a Standard Stormwater Mitigation Plan (SSMP) in the 2010 MS4 Permit. This is a plan to reduce the discharge of pollutants to the MEP from the post-construction use and life of a project.

SMR WQMP Glossary

Name	Definition
Waters of the U.S.	As defined in the 40 CFR 122.2, the Waters of the U.S. are defined as: "(a) All waters, which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (b) All interstate waters, including interstate "wetlands;" (c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (3) Which are used or could be used for industrial purposes by industries in interstate commerce; (d) All impoundments of waters otherwise defined as waters of the United States under this definition: (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; (f) The territorial seas; and (g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA."
Wet Season	October 1st to April 30th.