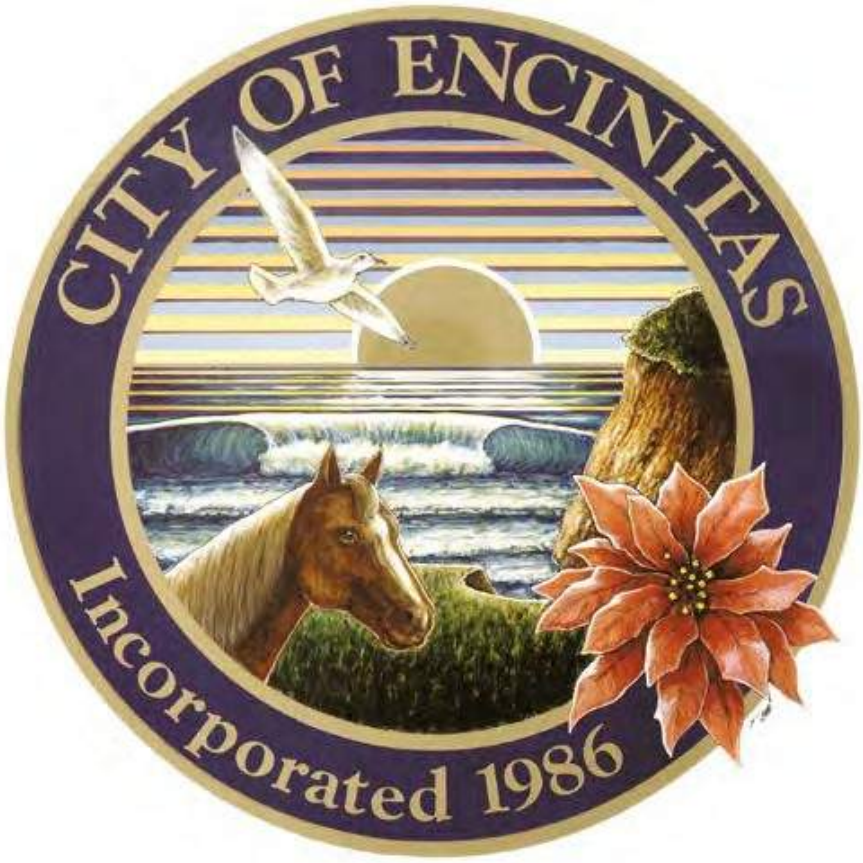


2026 BMP DESIGN MANUAL

ADOPTED TBD
EFFECTIVE _____

Encinitas BMP Design Manual

This manual was adapted from the Model BMP Design Manual for the San Diego Region.

In May 2013, the California Regional Water Quality Control Board for the San Diego Region (SDRWQCB) reissued the National Pollutant Discharge Elimination System permit for Municipal Separate Storm Sewer Systems (MS4s) for the San Diego Copermittees.

The reissued MS4 Permit updates and expands stormwater requirements for new developments and redevelopments. The MS4 Permit reissuance to the San Diego County Copermittees went into effect in 2013 (Order No. R9-2013-0001) and was amended in February 2015 by Order No. R9-2015-0001. As required by the reissued MS4 Permit, the City of Encinitas has adopted this Best Management Practices (BMP) Design Manual (from here in referred to as the "**manual**") to replace the Encinitas Stormwater Manual (Chapter 7 of the Engineering Design Manual), which was based on the requirements of the 2007 MS4 Permit. The effective date of this manual was **February 16, 2016.**

Following the adoption and implementation of the February 2016 Manual, regional efforts were made to update the model manual to address practical application issues experienced by jurisdictions across the region, clarifications from the SDRWQCB, and evolved BMP sizing, maintenance, and design guidance. This updated manual is consistent with the approved Regional BMP Design Manual and any subsequent updates, and replaces and supersedes the February 2016 City of Encinitas BMP Design Manual and is effective _____

This Manual is intended to address:

This Manual addresses updated onsite post-construction stormwater requirements for Standard Projects and Priority Development Projects (PDPs), and provides updated procedures for planning, preliminary design, selection, and final design of permanent stormwater BMPs based on the performance standards presented in the MS4 Permit. The intended users of the BMP Design Manual include project applicants for both private and public developments, their representatives responsible for preparation of Stormwater Quality Management Plans (SWQMPs), and City personnel responsible for review of these plans.

The following are significant updates to stormwater requirements of the MS4 Permit compared to the 2007 MS4 Permit and 2011 Countywide Model SUSMP:

- PDP categories have been updated, and the minimum threshold of impervious area to qualify as a PDP has been reduced.
- Many of the low impact development (LID) requirements for site design that were applicable only to PDPs under the 2007 MS4 Permit are applicable to all projects (Standard~~, Basic~~ and Exempt Projects and PDPs) under the MS4 Permit.
- The standard for stormwater pollutant control (formerly treatment control) is retention of the 24-hour 85th percentile storm volume, defined as the event that has a precipitation total greater than or equal to 85 percent of all daily storm events larger than 0.01 inches over a given period of record in a specific area or location.
- For situations where onsite retention of the 85th percentile storm volume is technically not feasible, biofiltration must be provided to satisfy specific "biofiltration standards". These standards consist of a set of siting, selection, sizing, design, and operation and maintenance (O&M) criteria that must be met for a BMP to be considered a "biofiltration BMP" – see Section 2.2.1 and Appendix F.

- Exemptions from hydromodification management are reduced, and certain categories of exemptions that are not identified in the MS4 Permit must be identified in a

Watershed Management Area Analysis (WMAA).

- The flow control performance standard for hydromodification management is based on controlling flow to pre-development (natural) condition rather than pre-project condition.

- Hydromodification management requirements are expanded to include requirements to protect critical coarse sediment yield areas.

- Alternative (offsite) compliance approaches are provided as an option to satisfy pollutant control or hydromodification management performance standards if a Copermittee implements an alternative compliance program. Copermittees are given discretion by the MS4 Permit to allow the project applicants to participate in an alternative compliance program without demonstrating technical infeasibility of retention and/or biofiltration BMPs onsite.

This manual is organized in the following manner:

An introductory section titled **"How to Use this Manual"** provides a practical orientation to intended uses and provides examples of recommended workflows for using the manual.

Chapter 1 provides information to help the manual user determine which of the stormwater management requirements are applicable to the project: source controls/site design BMPs, pollutant controls, and/or hydromodification management. This chapter also introduces the procedural requirements for preparation, review, processing, and approval of project submittals.

Chapter 2 defines the performance standards for source control and site design BMPs, stormwater pollutant control BMPs, and hydromodification management BMPs. This chapter also presents information on the underlying concepts associated with these performance standards to provide the project applicant with technical background, explains why the performance standards are important, and gives a general description of how the performance standards can be met.

Chapter 3 describes the essential steps in preparing a comprehensive stormwater management design and explains the importance of starting the process early during the preliminary design phase. By following the recommended procedures in Chapter 3, project applicants can develop a design that complies with the complex and overlapping stormwater requirements. This chapter is intended to be used by Standard~~, Basic~~ and Exempt Projects and PDPs; however, certain steps will not apply to Standard~~, Basic~~ and Exempt Projects (as identified in the chapter).

Chapter 4 presents the source control and site design requirements to be met by all development projects and is therefore intended to be used by all projects.

Chapter 5 applies to PDPs only. It presents the specific process for determining which category or combination of onsite pollutant control BMPs is most appropriate for the PDP site and explains how to design the BMP(s) to meet the stormwater performance standards. The prioritization order of onsite pollutant control BMPs begins with retention, then biofiltration, and finally flow-thru treatment control (in combination with offsite alternative compliance).

Chapter 6 applies only to PDPs that are subject to hydromodification management requirements. This chapter provides guidance for meeting the performance standards for the two components of

hydromodification management: protection of critical coarse sediment yield areas and flow control for post-project runoff from the project site. Chapter 6 incorporates applicable requirements of the "Final Hydromodification Management Plan (HMP) Prepared for County of San Diego, California," dated March 2011, with modifications based on updated requirements in the MS4 Permit. Chapter 6 does not apply to Standard Projects or to PDPs with only pollutant control requirements.

Chapter 7 addresses the long term O&M requirements of structural BMPs presented in this manual and discusses mechanisms to ensure O&M in perpetuity. Chapter 7 applies to PDPs only and is not required for Standard Projects; however Standard Projects may use this chapter as a reference.

Chapter 8 describes the specific requirements for the content of project submittals to facilitate local jurisdictions' review of project plans for compliance with applicable requirements of the manual and the MS4 Permit for both Standard Projects and PDPs. This chapter pertains specifically to the content of project submittals, and not to specific details of jurisdictional requirements for processing of submittals; it is intended to complement the requirements for processing of project submittals that are included in Chapter 1.

Appendices to this manual provide detailed guidance for BMP design, calculation procedures, worksheets, maps, and other figures to be referenced for BMP design. These Appendices are not intended to be used independently from the overall manual – rather they are intended to be used only as referenced in the main body of the manual.

This manual is organized based on project category. Requirements that are applicable to all projects are presented in Chapter 4. Additional requirements applicable only to PDPs are presented in Chapters 5 through 7.

Throughout this manual, the term "structural BMP" is a general term that encompasses the pollutant control BMPs and hydromodification management BMPs required for PDPs under the MS4 Permit. A structural BMP may be a pollutant control BMP, a hydromodification management BMP, or an integrated pollutant control and hydromodification management BMP. Hydromodification management BMPs are also referred to as flow control BMPs in this manual.

Appendices

Figures

Tables

303(d)	Refers to Clean Water Act Section 303(d) list of impaired and threatened waters
ASTM	American Society for Testing and Materials
BF	Biofiltration (BMP Category)
BMPs	Best Management Practices
CEQA	California Environmental Quality Act
DCV	Design Capture Volume
DMA	Drainage Management Area
ESA	Environmentally Sensitive Area
FT	Flow-thru Treatment Control BMP (BMP Category)
GLUs	Geomorphic Landscape Units
GR	General Requirements
HMP	Hydromodification Management Plan
HSPF	Hydrologic Simulation Program-FORTRAN
HU	Harvest and Use
INF	Infiltration (BMP Category)
LID	Low Impact Development
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NRCS	Natural Resource Conservation Service
O&M	Operation and Maintenance
PDPs	Priority Development Projects
POC	Point of Compliance
PR	Partial Retention (BMP Category)
SC	Source Control
SCCWRP	Southern California Coastal Water Research Project
SD	Site Design
SDHM	San Diego Hydrology Model
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SUSMP	Standard Urban Stormwater Mitigation Plan
SWMM	Storm Water Management Model
SWQMP	Storm Water Quality Management Plan
TN	Total Nitrogen
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WMAA	Watershed Management Area Analysis
WQIP	Water Quality Improvement Plan

This manual is intended to help a project applicant develop a Stormwater Quality Management Plan (SWQMP) for a development project (public or private) that complies with local and MS4 Permit requirements. Most applicants will require the assistance of a qualified civil engineer, architect, and/or landscape architect to prepare a SWQMP.

Beginning Steps for All Projects: What requirements apply?

Start by reviewing **Chapter 1** to determine whether the proposed project is a "Standard Project", ~~"Basic Project",~~ "Exempt Project" or a "PDP", the primary factor affecting which stormwater quality requirements apply.

Not all of the requirements and processes described in this manual apply to all projects. Therefore, it is important to begin with a careful analysis of which requirements apply and to verify with City staff, since every project is different. Chapter 1 provides an overview of the process of planning, design, construction, operation and maintenance, with associated jurisdictional review and approval steps leading to compliance. The flow chart below shows how to categorize a project in terms of applicable post-construction stormwater requirements. The flow chart is followed by a table that lists the applicable section of this manual for each project type.

Once an applicant has determined which requirements apply, **Chapter 2** describes the specific performance standards associated with each requirement. For example, an applicant may learn from Chapter 1 that the project must meet stormwater pollutant control requirements. Chapter 2 describes what these requirements entail, why thesey requirements are in place, and how they can be met. Refer to the list of acronyms and glossary as guidance to understanding the meaning of key terms within the context of this manual.

Next Steps for All Projects: How should an applicant approach a project stormwater management design?

Most projects will then proceed to **Chapter 3** to follow the step-by-step guidance to prepare a stormwater project submittal for the site. This chapter does not specify any regulatory criteria beyond those already specified in Chapter 1 and 2 – rather it is intended to serve as a resource for project applicants to help navigate the task of developing a compliant Stormwater Quality Management Plan submittal. Note that the first steps in Chapter 3 apply to all projects, while other steps in Chapter 3 only apply to PDPs.

The use of a step-by-step approach is highly recommended because it helps ensure that the right information is collected, analyzed, and incorporated into project plans and submittals at the appropriate time in the jurisdictional review process. It also helps facilitate a common framework for discussion between the applicant and the reviewer. However, each project is different, and it may be appropriate to use a different approach as long as the applicant demonstrates compliance with the MS4 Permit requirements that apply to the project.

Final Steps in Using This Manual: How should an applicant design BMPs and prepare documents for compliance?

Standard ~~and Basic~~ Projects	PDPs
Standard ~~and Basic~~ Projects will proceed to **Chapter 4** for guidance on implementing source control and site design requirements.	PDPs will proceed to **Chapter 4** for guidance on implementing source control and site design requirements.

~~After Chapter 4, Standard Projects shall provide BMPs based on Section 1.4.3.1 and then will proceed to **Chapter 8** for project submittal requirements.~~	PDPs will use **Chapters 5 through 7** and associated Appendices to implement pollutant control and hydromodification management requirements for the project site, as applicable. These projects will proceed to **Chapter 8** for project submittal requirements.

Plan Ahead to Avoid Common Mistakes

The following list identifies strategies to avoid some common errors that delay or compromise development approvals with respect to stormwater compliance.

- Plan for compliance as a first step. The strategy for stormwater quality compliance should be considered before completing a conceptual site design or sketching a layout of project site or subdivision lots (see Chapter 3). Planning early is crucial; for example, LID/Site Design is required for all development projects and onsite retention of stormwater runoff is required for PDPs. Additionally, collection of necessary information early in the planning process (e.g. geotechnical conditions, groundwater conditions) can help avoid delays resulting from redesign.

- Know that proprietary stormwater treatment facilities and strategies acceptable under previous MS4 Permits may not be sufficient to achieve compliance. Under the MS4 Permit, the standard for pollutant control for PDPs is **retention of the 85th percentile storm volume** (see Chapter 5). Flow-thru treatment cannot be used to satisfy permit requirements unless the project also participates in an alternate compliance program. Under some conditions, certain proprietary BMPs may be classified as "biofiltration" according to Appendix F of this manual and can be used for primary compliance with storm water pollutant treatment requirements (i.e. without alternative compliance).

- Plan for on-going inspections and maintenance of PDP structural BMPs in perpetuity. It is essential to select structural BMPs that can be effectively operated and maintained by the ultimate property owner, to ensure access for maintenance, to control maintenance costs, and to secure a mechanism for funding of long term Operation & Maintenance of structural BMPs, (see Chapter 7).

Chapter 1

1 Policies and Procedural Requirements

This chapter introduces stormwater management policies and is intended to help categorize a project, determine the applicable stormwater management requirements, and provide options for achieving compliance. This chapter also introduces the procedural requirements for preparation, review, and approval of project submittals.

1.1 Introduction to Stormwater Management Policies

MS4 Permit Provision E.3.a-c; E.3.d.(1)

Stormwater management requirements for development projects are derived from the MS4 Permit and implemented by local jurisdictions.

On May 8, 2013, the California Regional Water Quality Control Board San Diego Region (referred to as "San Diego Water Board") reissued a municipal stormwater permit titled "National Pollutant Discharge Elimination System Permit and Waste Discharge Requirements for Discharges from the MS4s Draining the Watersheds within the San Diego Region" (Order No. R9-2013-0001; referred to as MS4 Permit) to the municipal Copermittees. The MS4 Permit was issued by the San Diego Water Board pursuant to section 402 of the federal Clean Water Act, implementing regulations (Code of Federal Regulations Title 40, Part 122) adopted by the United States Environmental Protection Agency, and Chapter 5.5, Division 7 of the California Water Code. The MS4 Permit, in part, requires each Copermittee to use its land use and planning authority to implement a development planning program to control and reduce the discharge of pollutants in stormwater from new development and significant redevelopment to the maximum extent practicable (MEP). MEP is defined in the MS4 Permit.

Different requirements apply to different project types.

The MS4 Permit requires all development projects to implement source control and site design practices that will minimize the generation of pollutants. While all development projects are required to implement source control and site design/LID practices, the MS4 Permit has additional requirements for development projects that exceed size thresholds and/or fit under specific use categories. These projects, referred to as PDPs, are required to incorporate structural BMPs into the project plan to reduce the discharge of pollutants and to address potential hydromodification impacts

from changes in flow and sediment supply.

1.2 Purpose and Use of the Manual

This manual presents a "unified BMP design approach".

To assist the land development community, streamline project reviews, and maximize cost-effective environmental benefits, the Copermittees developed a unified BMP design approach[1] that meets the performance standards specified in the MS4 Permit. By following the process outlined in this manual, project applicants (for both private and public developments) can develop a single, integrated design that complies with the complex and overlapping MS4 Permit source control and site design requirements, stormwater pollutant control requirements (i.e. water quality), and hydromodification management (flow-control and sediment supply) requirements.

1.2.1 Determine Applicability of Construction BMP Requirements

Figure 1-1 below presents a flow chart of the decision process that the manual user should use to:

1. Categorize a project;
2. Determine stormwater requirements; and
3. Understand how to submit projects for review and verification.

This figure also indicates where specific procedural steps associated with this process are addressed in Chapter 1.

Refer to appendix J-1 for a step-by-step checklist that will aid in determining applicability of permanent, post-construction stormwater BMP requirements to your project.

[1] The term "unified BMP design approach" refers to the standardized process for site and watershed investigation, BMP selection, BMP sizing, and BMP design that is outlined and described in this manual with associated appendices and templates. This approach is considered to be "unified" because it represents a pathway for compliance with the MS4 Permit requirements that is anticipated to be reasonably consistent across the local jurisdictions in San Diego County. In contrast, applicants may choose to take an alternative approach where they demonstrate to the satisfaction of the Copermittee, in their submittal, compliance with applicable performance standards without necessarily following the process identified in this manual

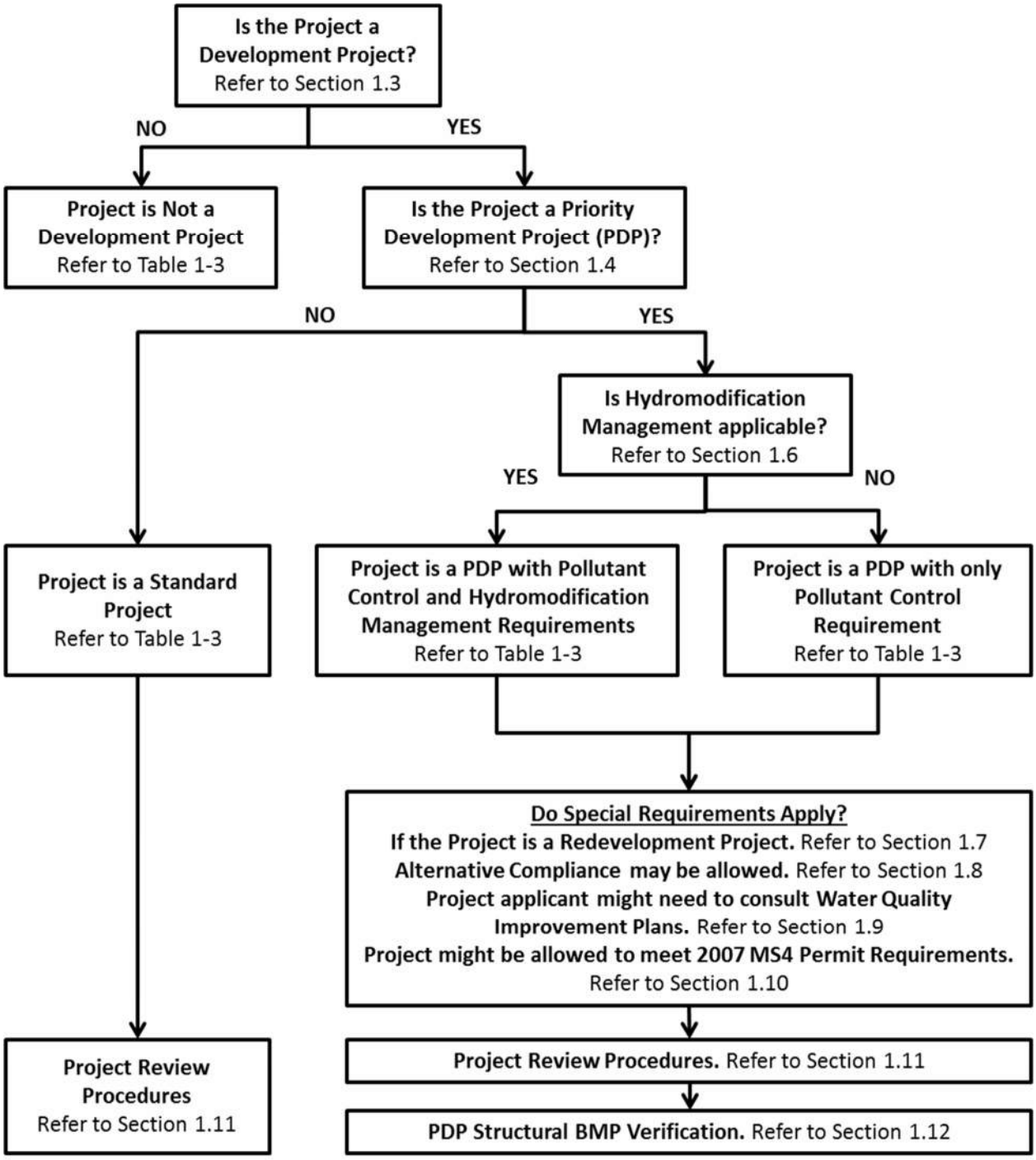


FIGURE 1-1. Procedural Requirements for a Project to Identify Storm Water Requirements

1.2.2 Determining Applicability of Permanent BMP Requirements

All projects and phases of projects, even if exempted from meeting some or all of the Permanent BMP Requirements, are required to implement temporary erosion, sediment, good housekeeping and pollution prevention BMPs to mitigate stormwater pollutants during the construction phase.

Refer to the City's Stormwater Standards Manual for detailed information on these requirements.

1.3 Defining a Project

Not all site improvements are considered "development projects" under the MS4 Permit.

This manual is intended for new development and redevelopment projects, inclusive of both private and public projects. Development projects are defined by the MS4 Permit as "construction, rehabilitation, redevelopment, or reconstruction of any public or private projects". Development projects are issued local permits to allow construction activities. To further clarify, this manual applies only to development or redevelopment activities that have the potential to contact stormwater and contribute an anthropogenic source of pollutants, or reduce the natural absorption and infiltration abilities of the land.

A project must be defined consistent with the California Environmental Quality Act (CEQA) definitions of "project."

CEQA defines a project as: a discretionary action being undertaken by a public agency that would have a direct or reasonably foreseeable indirect impact on the physical environment. This includes actions by the agency, financing, grants, permits, licenses, plans, and regulations or other entitlements granted by the agency. CEQA requires that the project include "the whole of the action" before the agency. This requirement precludes "piecemealing," which is the improper (and often artificial) separation of a project into smaller parts in order to avoid triggering requirement thresholds.

In the context of this manual, the "project" is the "whole of the action" which has the potential for adding or replacing or resulting in the addition or replacement of roofs, pavement, or other impervious surfaces and thereby resulting in increased flows and stormwater pollutants. "Whole of the action" means the project may not be segmented or phased into small parts either onsite or offsite if the effect is to reduce the quantity of impervious area and fall below thresholds for applicability of stormwater requirements.

When defining the project, the following questions are considered:

- What are the project activities?
- Do they occur onsite or offsite?
- What are the limits of the project (project boundary)?
- What is the whole of the action associated with the project (i.e. what is the total amount of new or replaced impervious area considering all of the collective project components through all phases of the project)?
- Are any facilities or agreements to build facilities offsite in conjunction with providing service to the project (street widening, utilities)?

For subdivisions where homes, driveways, hardscape, and other impervious surfaces will be created, the "whole of the action" consists of grading and build out of the approved new homes and any proposed hardscape. Installation of any new and/or replaced hardscape by a subsequent new homeowner will be considered a separate project for purposes of determining relevant stormwater

management requirements.

For subdivisions where homes are not proposed, but home construction is anticipated in the near future, the "whole of the action" shall include the subdivision project and anticipated future homes, roads, driveways and any other related impervious surface. An estimate of total impervious surface created and/or replaced shall be included in the permanent BMP sizing calculations.

For subdivisions where no homes are proposed, and the lots are intended to be sold separately to individual owners for custom home builds, the "whole of the action" shall be considered the proposed subdivision only. Any future homes or other improvements built by a separate owner will be considered a separate project.

If a project applicant plans on developing and constructing homes or other impervious surfaces on more than one lot in a subdivision, the entire scope of work proposed shall be considered the "whole of the action". Likewise, projects proposed by a single person or entity on adjacent lands at the same time shall not be piecemealed into separate projects.

Table 1-1 is used to determine whether stormwater management requirements defined in the MS4 Permit and presented in this manual apply to the project.

If a project meets one of the exemptions in Table 1-2 then permanent BMP requirements do not apply to the project; i.e. requirements in this manual are not applicable. If permanent BMP requirements apply to a project, Sections 1.4 to 1.7 will further define the extent of the applicable requirements based on the MS4 Permit. The MS4 Permit contains standard requirements that are applicable to all projects (Standard~~, Basic~~ and Exempt Projects and PDPs), and more specific requirements for projects that are classified as PDPs.

TABLE 1-1. Applicability of Permanent, Post-Construction Storm Water Requirements

Do permanent stormwater requirements apply to your project?
Requirements DO NOT apply to:
Replacement of impervious surfaces that are part of a routine maintenance activity, such as: • Replacing roof material on an existing building • Restoring pavement or other surface materials affected by trenches from utility work • Resurfacing existing roads and parking lots, including milling, slurrying, overlaying, and restriping • Routine replacement of damaged pavement, if the sole purpose is to repair the damage • Constructing new sidewalk, pedestrian ramps or bike lanes on existing roads (within existing street right-of-way) if designed as described in damaged pavement. See Section 1.3.1 for additional details on common damaged pavement replacement scenarios. • Restoring a historic building to its original historic design • Installation of ground mounted solar arrays over existing impermeable surface. **Note:** Work that creates impervious surface outside of the existing impervious footprint is not considered routine maintenance. Repair or improvements to an existing building or structure that do not alter the size: • Plumbing, electrical and HVAC work • Interior alterations including major interior remodels and tenant build-out within an existing commercial building • Exterior alterations that do not change the general dimensions and structural framing of the building (does not include building additions or projects where the existing building is demolished).

Development project type determination and permanent BMP requirement applicability shall be at the sole discretion of the City Engineer.

1.3.1 Routine Maintenance Determination for Pavement Projects

Table 1-2 provides additional detail about whether several types of projects that typically occur in or along street, alleys, and similar areas can be considered routine maintenance. This table reflects guidance provided by the San Diego Water Board to the City of Lemon Grove in March 2022, to the City of San Diego in October 2020, and the City of Poway in September 2021. Based on this guidance, public projects and private projects both may be considered routine maintenance as described in this section, as long as they meet all criteria described in the numbered list following Table 1-2.

TABLE 1-2. Applicability of Routine Maintenance Exemption for Pavement Projects

Project Scenarios	Routine Maintenance
1. Full depth replacement of over 5,000 sf of contiguous, impervious damaged pavement that includes one or more of the following: a. Includes disturbance of native soil b. Includes disturbance of uncompacted subgrade c. Includes disturbance of compacted subgrade	**Yes**[1]
2. Replacing an entire concrete panel as a result of utility trenching projects that includes one or more of the following: a. Includes disturbance of native soil b. Includes disturbance of uncompacted subgrade c. Includes disturbance of compacted subgrade	**Yes**[1]
3. Full depth replacement of several damaged, non-contiguous, impervious patches with each individual patch under 5,000 sf, but cumulatively the patches result in over 5,000 sf of impervious area, that includes one or more of the following: a. Includes disturbance of native soil b. Includes disturbance of uncompacted subgrade c. Includes disturbance of compacted subgrade	**Yes**[1]
4. Replacing a sidewalk that otherwise based on its condition does not require replacement. Replacement occurs for ADA compliance only, within the same footprint, with over 5,000 sf of replaced impervious area, and includes one or more of the following:	No[2] *(But see note at left about sidewalk work*

Project Scenarios	Routine Maintenance
a. In the public right-of-way b. Within a property *Note: as noted in Table 1-2, routine sidewalk repair or replacement that is necessary based on the condition of the sidewalk (e.g. broken concrete) is generally considered routine maintenance.*	*that is considered routine maintenance)*
5. Replacing a sidewalk outside an existing impervious footprint with a meandering walkway, resulting in over 5,000 sf of new and replaced impervious area for ADA compliance.	No[2]
6. Creating new walkways (i.e. new impervious area) that must be ADA compliant that includes one or more of the following: a. Ingress/egress to the building/feature b. All ADA walkways within a project	No[2]
7. Creating new, shared use pathways wider than the minimum width required for ADA compliance that includes one or more of the following: a. Entire width of shared ADA walkway and pedestrian/vehicle access pathway b. Only the minimum ADA width portion of the pathway (i.e. 5 feet) c. Entire width of any pathway greater than the minimum ADA width	No[2]
8. Creating a new sidewalk triggered by an ADA complaint that includes one or more of the following: a. All projects of this nature regardless of size b. Projects of this nature over 5,000 sf but only up to a given size threshold	No[2]
9. Creating and replacing curb ramps in any of the following situations, with the disturbed area being the minimum footprint needed to meet ADA requirements, that includes one or more of the following:	**Yes**[1]

Project Scenarios	Routine Maintenance
a. Curb ramp replacement completely within existing curb ramp footprint b. Curb ramp replacement encroaches into the street without creating new impervious area c. Curb ramp replacement encroaches into the pervious parkway and creates new impervious area d. New curb ramp that encroaches into street without creating new impervious area e. New curb ramp encroaches into pervious parkway and creates new impervious area	
10. Replacing driveway aprons, with the disturbed area being the minimum footprint needed to meet ADA requirements that includes one or more of the following: a. Driveway apron replacement completely within existing driveway apron footprint b. Driveway apron replacement encroaches into the street as needed without creating new impervious area c. Driveway apron replacement encroaches into the pervious parkway as needed and creates new impervious area	**Yes**[1]
11. Creating driveway aprons, with the disturbed area being the minimum footprint needed to meet ADA requirements that include one or more of the following: a. New driveway apron encroaches into the street as needed without creating new impervious area b. New driveway apron encroaches into pervious parkway as needed and creates new impervious area	No[2]

[1] Must also meet all of the numbered criteria described in the discussion following this table to be considered routine maintenance.

[2] Project may use the PDP exemptions described in section 1.4.3 if designed in a way that meets the requirements necessary to qualify for those exemptions. These PDP exemptions include, for example, hydraulically disconnected sidewalks and street improvements that follow Green Street guidance.

To qualify as routine maintenance, project scenarios identified as routine maintenance in Table 1-3 must also meet all of the requirements in the numbered list below.

1. The project is identified as part of the City's regularly scheduled pavement maintenance on existing facilities or is an existing private road or parking lot that requires scheduled maintenance only.
2. The project is not part of, or associated with, development project mitigation requirements, development project construction, development project construction agreement, or conditions of approval.
3. No street widening or other enhancements are occurring in association with the damaged pavement project that would normally trigger PDP requirements or be PDP exempt per MS4 Permit Provision E.3.b.(3) – Green Streets Exemption (see "PDP Exemption Category 2" in Section 1.4.3 for more information).
4. The project would normally be CEQA exempt.
5. Construction BMPs must be implemented to control sediment and other pollutants associated with construction activity in accordance with the requirements the City of Encinitas Stormwater Standards Manual . More detail about construction BMPs is provided in Section 1.3.1.1 below.
6. The City shall maintain a list of projects that fall under this category. The City's project manager is responsible for documenting that the project qualifies as routine maintenance per Section 1.3.1 and satisfies all the criteria in this numbered list. The City's project manager shall keep this documentation in the project file.

Different routine maintenance scenarios combined together still are considered routine maintenance as long as they are not combined with an activity type that is not routine maintenance. For example, a project that includes full depth pavement replacement that disturbs native soil (scenario 1a) and curb ramp replacement that encroaches into the street (scenario 9b) but no other activities would be considered routine maintenance.

Note, however, that if an activity that otherwise would be considered routine maintenance per Section 1.3.1 is combined with other activities that are classified as a PDP or use the Green Streets Exemption, then the activities that would have been considered routine maintenance are no longer considered routine maintenance since they are part of a PDP. They require treatment in that case; see Section 1.4.1 for additional information.

1.3.1.1 Construction BMP Requirements for Routine Maintenance Pavement Projects

As noted in item 6 in Section 1.3.1 above, construction BMP requirements must be met for a routine maintenance exemption to apply. All applicable BMPs from the City of Encinitas Stormwater Standards Manual must be implemented. The following highlights the construction (temporary) BMPs most likely to be applicable for routine maintenance work that occurs along streets:

- Cover and berm (perimeter controls) stockpiles at the end of each work day. Stockpiles must be placed at least 18 inches from the face of curb and are prohibited where they obstruct flow.
- Implement at least one of the following at the end of each work day for demolished curbs,

gutters, ribbon gutters, and any other concentrated flow pathways that re impacted by the project even when there is no forecasted rain. These BMPs help prevent sediment transport from non-stormwater discharges such as irrigation runoff, water main breaks, water line flushing, etc.

  - Install check dams along the impacted concentrated flow pathways.
  - Install run-on controls (e.g. gravel bag berms) to divert water around the impacted concentrated flow pathways.
  - Cover and secure the impacted concentrated flow pathways with an erosion control product such as mats, plastic sheeting (e.g. Visqueen), or equivalent.

- Implement erosion control for disturbed areas (any areas where pavement has been removed, soil or base is exposed, and any other areas where project work has disturbed soil, such as landscaping adjacent to the work area) when either (a) there is a 50% chance of rain within 24 hours, OR (b) the disturbed area is inactive (no soil disturbing activities for a period of 7 days or greater).
  - Use pavement replacement approach that results in no exposed disturbed soil at the end of the work day (e.g. full depth reclamation, or applying compacted cold mix or hot mix at the end of the day to areas where pavement has been removed).
    - Note: Contractors must obtain written approval from the City Engineer to utilize a full depth asphalt restoration method(s) if it differs from the approved construction plans, Standard Drawings, and/or Special Provisions.

  OR

  - Implement and effective combination of one or more of the following:
    - Install run-on controls (e.g. gravel bag berms) and/or use by-pass method(s) to prevent run-on to areas where soil has been disturbed.
    - Cover the areas where pavement has been removed, soil or base is exposed, and any other areas where project work has disturbed soil with an erosion control product or technique such as steel traffic plates in conjunction with cold patches around the edges, mats, plastic sheeting (e.g. Visqueen), or an equivalent method.
    - Cover and secure demolished curb gutter, ribbon gutters, and any other impacted concentrated flow pathway with an erosion control product such as mats, plastic sheeting (e.g. Visqueen), or equivalent.

1.4 Is the Project a PDP?

MS4 Permit Provision E.3.b.(1)

This section presents the PDP categories defined in the MS4 Permit and describes the limited exemption categories available.

1.4.1 PDP Categories

In the MS4 Permit, PDP categories are defined based on project size, type and design features.

Projects shall be classified as PDPs if they are in one or more of the PDP categories presented in the MS4 Permit, which are listed below. Review each category, defined in (a) through (f), below. A PDP applicability checklist for these categories is also provided in Appendix J-2. If any of the categories match the project, the entire project is a PDP. For example, if a project feature such as a parking lot falls into a PDP category, then the entire development footprint including project components that otherwise would not have been designated a PDP on their own (such as other impervious components that did not meet PDP size thresholds, and/or landscaped areas), shall be subject to PDP requirements. Note that size thresholds for impervious surface created or replaced vary based on land use, land characteristics, and whether the project is a new development or redevelopment project. Therefore, all definitions must be reviewed carefully. Also, note that categories are defined by the total quantity of "added or replaced" impervious surface, not the **net change** in impervious surface.

For example, consider a redevelopment project that adds 7,500 square feet of new impervious surface and removes 4,000 square feet of existing impervious surface. The project has a net increase of 3,500 square feet of impervious surface. However, the project is still classified as a PDP because the total added or replaced impervious surface is 7,500 square feet, which is greater than 5,000 square feet.

"Collectively" for the purposes of the manual means that all contiguous and non-contiguous parts of the project that represent the whole of the action must be summed up. For example, consider a residential development project that will include the following impervious components:

- 3,600 square feet of roadway
- 350 square feet of sidewalk
- 4,800 square feet of roofs
- 1,200 square feet of driveways
- 500 square feet of walkways/porches

The collective impervious area is 10,450 square feet.

PDP Categories defined by the MS4 Permit:

(a) New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.

(b) Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.

(c) New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses:

(i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812).

Information and an SIC search function are available at https://www.osha.gov/pls/imis/sicsearch.html.

(ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater.

(iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.

(iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

(d) New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).

Note: ESAs are 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 Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittee (see Section 1.4.2 below to determine if any other local areas have been identified).

For projects adjacent to an ESA, but not discharging to an ESA, the 2,500 sq-ft threshold does not apply as long as the project does not physically disturb the ESA and the ESA is upstream of the project.

(e) New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses:

(i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.

Information and an SIC search function are available at https://www.osha.gov/pls/imis/sicsearch.html.

(ii) Retail gasoline outlets. This category includes Retail gasoline outlets that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic of 100 or more vehicles per day.

(f) New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction.

Exclusions that apply to this category only: Projects creating less than 5,000 square feet of impervious surface and where any added landscaping does not require regular use of pesticides and fertilizers, such as a slope stabilization project using native plants, are excluded from this category. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as for emergency or maintenance access or for bicycle or pedestrian use, if they are built with pervious surfaces or if they sheet flow to surrounding pervious surfaces. See Section 1.4.2 for additional guidance.

Area that may be excluded from impervious area calculations for determining if the project is a PDP:

(a) Based on guidance from the San Diego Water Board, activities defined as routine maintenance per Section 1.3.1 cannot be combined with work that is a PDP or uses the Green Streets Exemption. If combined with work that is a PDP or uses the Green Streets Exemption, work described in Section 1.3.1 that would be routine maintenance if done on its own is no longer routine maintenance, and it requires treatment as described in Section 1.3.1 for work that does not qualify as routine maintenance. For additional guidance, see Example 1 below, following this list.

(b) Except as described in item (a), areas of a project that are considered exempt from storm water requirements (e.g., routine maintenance activities such as resurfacing, interior repair or improvements to an existing building, etc.) shall not be included as part of "added or replaced" impervious surface in determining project classification. For additional guidance, see Example 2, following this list.

Example 1: A project includes reconfiguration of an existing road for traffic calming and pedestrian improvements. This project includes creation or replacement of 15,000 square feet of pavement, and the replaced pavement areas are not damaged. This work does not qualify as routine maintenance per Section 1.3.1 but does qualify to use the Green Streets Exemption. The project also includes full depth replacement of several patches of damaged pavement in adjacent parts of the road; these full depth replacement patches are a total of 6,000 square feet. While if done by itself the 6,000 square feet of full depth damaged pavement replacement would qualify to be considered routine maintenance per Section 1.3.1, in this case it is also subject to Green Streets standards since it is combined with work that is using the Green Streets Exemption.

Example 2: A project includes replacing the roof on a 10,000 square foot commercial building. The project also includes building a new trash enclosure (150 square feet). The roof replacement work does not expose underlying soil and is routine maintenance per Table 1-2, so the roof replacement area is not included in determining whether the project is a PDP. Because the trash enclosure work is 150 square feet of impervious area, it is considered a Standard Project. Standard Project requirements apply to the trash enclosure work, and the roof replacement work is considered routine maintenance.

Redevelopment projects may have special considerations with regards to the total area required to be treated. Refer to Section 1.7.

1.4.2 Local Additional PDP Categories and/or Expanded PDP Definitions

To determine whether your project discharges directly to an Environmentally Sensitive Area, begin by referring to the map of ESAs in Appendix J. This map includes all locally known ESAs as defined by the MS4 Permit. Additionally, if a site-specific open space area and/or wetland area has been identified on the property or downstream of the property, this must be considered when determining whether the project is a PDP. Consult with City staff for additional guidance.

1.4.3 Local PDP Exemptions or Alternative PDP Requirements

~~1.4.3.1 Requirements for Standard and Basic Projects~~

~~The City of Encinitas, in addition to the PDPs categorized in section 1.4.1, categorizes non-PDP projects as Standard or Basic Projects. Projects that create and/or replace 500 square feet or more of impervious surface but are not classified as one of the PDP categories described above are considered **Standard Projects**. Projects that create and/or replace less than 500 square feet of impervious surface and are not classified as one of the PDP categories described above are considered **Basic Projects**.~~

~~Standard projects shall provide natural bioretention BMPs or document equivalent volume reduction via site design or other structural BMP, for stormwater pollution control based on the following sizing calculation method or the DCV calculation method described in Chapter 5 and Appendix B. The total surface area shall include new and replaced impervious areas of the proposed project. If it is determined that bioretention BMPs are not feasible, at the discretion of the City Engineer, partial retention BMPs, biofiltration BMPs or other source control BMPs may be used. The DCV calculation method may be used to determine volume reduction needed for Standard Projects. The following sizing calculation may be used for sizing natural bioretention BMPs. All Standard Projects must also implement source control and site design measures as described in Chapter 4. Consult Chapter 5 for structural BMP design options.~~

~~**MINIMUM BMP AREA = 0.03 Σ (Surface Type SF X Surface Type Runoff Factor)**~~

~~Basic Projects must also implement source control and site design measures as described in Chapter 4 but are not required to provide structural BMPs.~~

~~In situations with uncontrolled cross lot drainage that do not drain into a controlled, engineered drainage conveyance system the City Engineer may require additional or upsized stormwater treatment and flow control facilities. These facilities shall be designed for the greater surface area and volume of either treatment sizing required for new or removed and replaced impervious surface areas OR sizing for Hydromodification based on the net new impervious surface area. Special attention shall be made to design the overflow of these facilities to maintain the historical drainage pattern to the maximum extent practical.~~

~~1.4.3.2~~1.4.3.1 Local PDP Exemptions

As defined in the MS4 Permit, projects that meet the following criteria may qualify for an exemption from PDP requirements:

1) New or retrofit paved sidewalks, bicycle lanes, or trails that meet the following criteria:
   a) Designed and constructed to direct stormwater runoff to adjacent vegetated areas,

or other non-erodible permeable areas; OR

b) Designed and constructed to be hydraulically disconnected from paved streets or roads; OR

c) Designed and constructed with permeable pavements or surfaces in accordance with current USEPA Green Streets guidance, "Managing Wet Weather with Green Infrastructure – Municipal Handbook: Green Streets" (USEPA, most recent edition).

2) Retrofitting or redevelopment of existing paved alleys, streets or roads that are designed and constructed in accordance with the current USEPA Green Streets guidance, "Managing Wet Weather with Green Infrastructure – Municipal Handbook: Green Streets" (USEPA, most recent edition).

Consult City staff if you think your project may qualify for an exemption based on the above definitions. Note that the source control and site design stormwater requirements that are applicable to all projects will still apply even if a project is exempt from PDP requirements.

1.5 Determining Applicable Storm Water Management Requirements

MS4 Permit Provision E.3.c.(1)

Depending on project type and receiving water, different stormwater management requirements apply.

New development or redevelopment projects that are subject to this manual requirement pursuant to Section 1.3, but are not classified as PDPs based on Section 1.4, include Standard Projects~~, Basic Projects~~ and Exempt projects. Source control and site design requirements apply to all projects including Standard Projects~~, Basic Projects~~, Exempt Projects and PDPs. Additional structural BMP requirements (i.e. pollutant control and hydromodification management) apply to PDPs and Standard projects (on a more limited basis). Stormwater management requirements for a project, and the applicable sections of this manual, are summarized in Table 1-3.

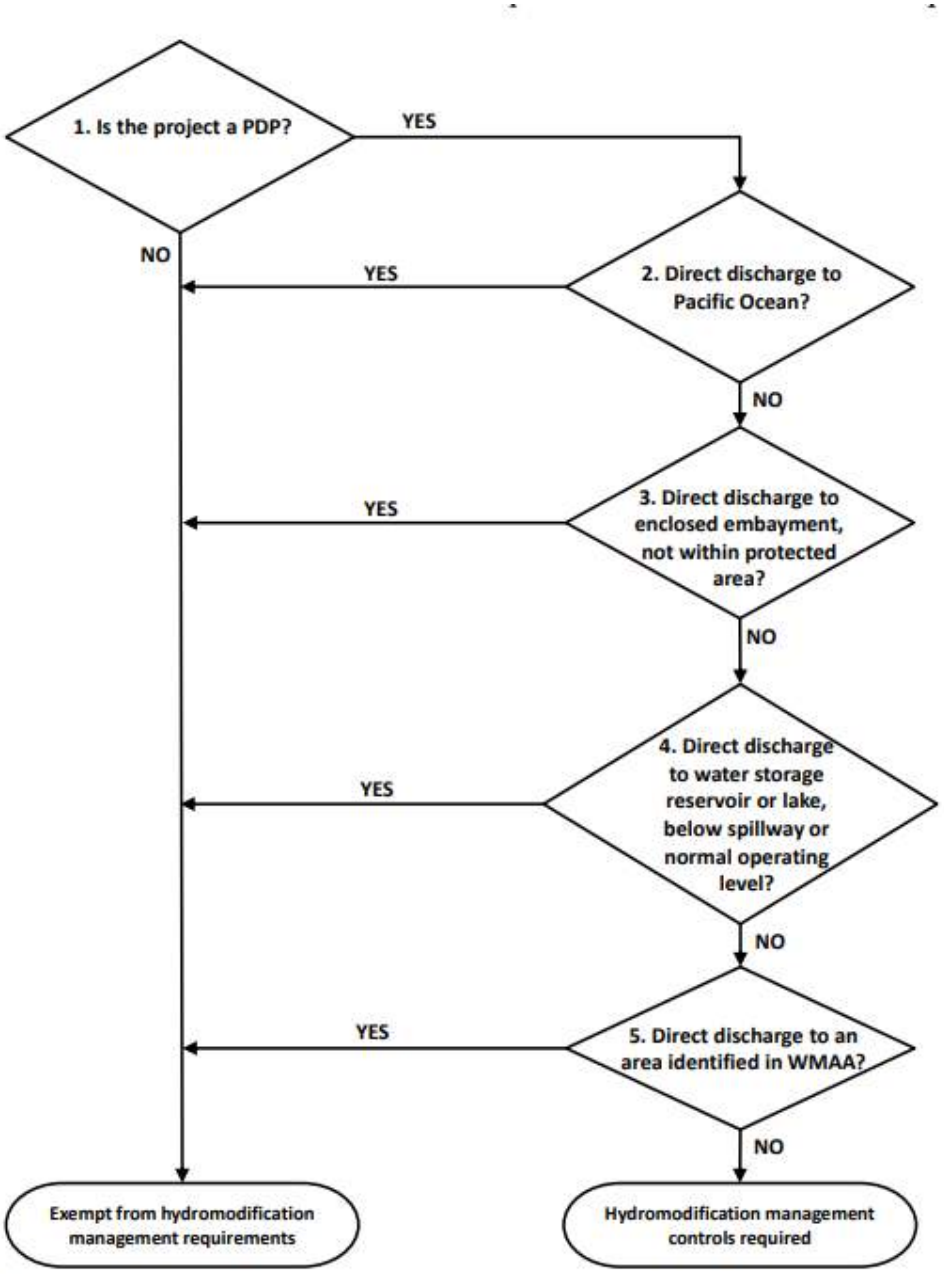
TABLE 1-4. Applicability of Manual Sections for Different Project Types

Project Type	Project Development Process (Chapter 3 and 8)	Source Control and Site Design (Section 2.1 and Chapter 4)	Structural Pollutant Control (Section 2.2 and Chapter 5 and 7)	Structural Hydromodification Management (Section 2.3, 2.4 and Chapter 6 and 7)
Not a Development Project	The requirements of this manual do not apply			
~~Basic Project*~~	☑	☑	~~NA~~	~~NA~~
Standard Project~~*~~	☑	☑	NA	NA

PDP with only Pollutant Control Requirements**	☑	☑	☑	NA
PDPs with Pollutant Control and Hydromodification Management Requirements	☑	☑	☑	☑

~~* Standard Projects refer to Section 1.4.3.1 for designing required structural BMPs.~~

** Some PDPs may be exempt from Structural Hydromodification Management BMPs, refer to Section 1.6 to determine.



*Direct discharge refers to an uninterrupted hardened conveyance system; Note to be used in conjunction with Node Descriptions.

Figure 1-2. Applicability of Hydromodification Management BMP Requirements

1.6 Applicability of Hydromodification Management Requirements

MS4 Permit Provision E.3.c.(2)

Hydromodification management requirements apply to PDPs only.

If the project is a Standard~~, Basic~~ or Exempt Project, hydromodification management requirements do not apply. Hydromodification management requirements apply to PDPs (both new and re-development) unless the project meets specific exemptions discussed below.

PDP exemptions from hydromodification management requirements are based on the receiving water system.

The City has the discretion to exempt a PDP from hydromodification management requirements where the project discharges stormwater runoff to:

(i) Existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean;

(ii) Conveyance channels whose bed and bank are concrete lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean; or

(iii) An area identified by the Copermittees as appropriate for an exemption by the optional WMAA incorporated into the Water Quality Improvement Plan (WQIP) pursuant to Provision B.3.b.(4) of the MS4 permit.

As allowed by the MS4 Permit, projects discharging directly to the Pacific Ocean, by either existing underground storm drain systems or conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to the Pacific Ocean, are exempt. This exemption is subject to the following additional criteria defined by this manual:

a) The outfall must be located on the beach (not within or on top of a bluff),

b) A properly sized energy dissipation system must be provided to mitigate outlet discharge velocity from the direct discharge to the ocean for the ultimate condition peak design flow of the direct discharge,

c) The invert elevation of the direct discharge conveyance system (at the point of discharge to the ocean) should be equal to or below the mean high tide water surface elevation at the point of discharge, unless the outfall discharges to quay or other non-erodible shore protection.

- For cases in which the direct discharge conveyance system outlet invert elevation is above the mean high tide water surface elevation but below the 100-year water surface elevation, additional analysis is required to determine if energy dissipation should be extended between the conveyance system outlet and the elevation associated with the mean high tide water surface level.
- No exemption may be granted for conveyance system outlet invert elevations located above the 100-year floodplain elevation.

As allowed by the MS4 Permit, projects discharging directly to a water storage reservoir or lake, by either existing underground storm drain systems or conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to the water storage reservoir or lake, are exempt. This exemption is subject to the following additional criteria defined by this manual:

a) A properly sized energy dissipation system must be provided in accordance with local design standards to mitigate outlet discharge velocity from the direct

discharge to the water storage reservoir or lake for the ultimate condition peak design flow of the direct discharge,

b) The invert elevation of the direct discharge conveyance system (at the point of discharge to the water storage reservoir or lake) should be equal to or below the lowest normal operating water surface elevation at the point of discharge, unless the outfall discharges to quay or other non-erodible shore protection. Normal operating water surface elevation may vary by season; contact the reservoir operator to determine the elevation. For cases in which the direct discharge conveyance system outlet invert elevation is above the lowest normal operating water surface elevation but below the reservoir spillway elevation, additional analysis is required to determine if energy dissipation should be extended between the conveyance system outlet and the elevation associated with the lowest normal operating water surface level.

c) No exemption may be granted for conveyance system outlet invert elevations located above the reservoir spillway elevation.

As allowed by the MS4 Permit, projects discharging directly to an area identified as appropriate for an exemption in the WMAA for the watershed in which the project resides, by either existing underground storm drain systems or conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to the designated area, are exempt. Consult the WMAA within the WQIP for the watershed in which the project resides to determine areas identified as appropriate for an exemption. Exemption is subject to any criteria defined within the WMAA, and criteria defined below by this manual:

a) A properly sized energy dissipation system must be provided to mitigate outlet discharge velocity from the direct discharge to the exempt river reach for the ultimate condition peak design flow of the direct discharge,

b) The invert elevation of the direct discharge conveyance system (at the point of discharge to the exempt river reach) should be equal to or below the 10-year floodplain elevation. Exceptions may be made at the discretion of the City Engineer, but shall never exceed the 100-year floodplain elevation. The City Engineer may require additional analysis of the potential for erosion between the outfall and the 10- year floodplain elevation.

c) No exemption may be granted for conveyance system outlet invert elevations located above the 100-year floodplain elevation.

1.7 Special Considerations for Redevelopment Projects (50% Rule)

MS4 Permit Provision E.3.b.(2)

Redevelopment PDPs (PDPs on previously developed sites) may need to meet storm water management requirements for ALL impervious areas (collectively) within the ENTIRE project site.

If the project is a redevelopment project, the structural BMP performance requirements and

hydromodification management requirements apply to redevelopment PDPs as follows:

(a) Where redevelopment results in the creation or replacement of impervious surface in an amount of less than fifty percent of the surface area of the previously existing development, then the structural BMP performance requirements of Provision E.3.c [of the MS4 Permit] apply only to the creation or replacement of impervious surface, and not the entire development; or

(b) Where redevelopment results in the creation or replacement of impervious surface in an amount of more than fifty percent of the surface area of the previously existing development, then the structural BMP performance requirements of Provision E.3.c [of the MS4 Permit] apply to the entire development.

These requirements for managing stormwater on an entire redevelopment project site are commonly referred to as the "50% rule". For the purpose of calculating the ratio, the surface area of the previously existing development shall be the area of impervious surface within the previously existing development. The following steps shall be followed to estimate the area that requires treatment to satisfy the MS4 Permit requirements:

1. How much total impervious area currently exists on the site?
2. How much existing impervious area will be replaced with new impervious area?
3. How much new impervious area will be created in areas that are pervious in the existing condition?
4. Total created and/or replaced impervious surface = Step 2 + Step 3.
5. **50% rule test**: Is step 4 more than 50% of Step 1? If yes, treat all impervious surface on the site. If no, then treat only Step 4 impervious surface and any area that comingles with created and/or replaced impervious surface area.

Note: Step 2 and Step 3 must not overlap as it is fundamentally not possible for a given area to be both "replaced" and "created" at the same time. Also activities that occur as routine maintenance shall not be included in Step 2 and Step 3 calculation.

For example, a 10,000 sq. ft. development proposes replacement of 4,000 sq. ft. of impervious area. The treated area is less than 50% of the total development area and only the 4,000 sq. ft. area is required to be treated.

1.8 Alternative Compliance Program[2]

MS4 Permit Provision E.3.c.(1).(b); E.3.c.(2).(c); E.3.c.(3)

PDPs may be allowed to participate in an alternative compliance program.

Copermittees have the discretion to independently develop an alternative compliance program for their jurisdiction. The alternative compliance program allows PDPs to participate in this program in

[2] The City of Encinitas does not currently have an Alternative Compliance Program.

lieu of meeting either the PDP structural BMP performance requirements for retention or a portion of DCV that is not retained onsite in conjunction with onsite mitigation.

At this time, the City of Encinitas does not have an Alternative Compliance Program. Project based (i.e. on a case-by-case basis) Alternative Compliance may be approved by the City provided that the proposed design has added water quality and hydromodification benefits for the City compared to on-site stormwater management. The proposed design for Alternative Compliance shall be in accordance with the Water Quality Equivalency Guidance approved by Water Quality Control Board, Region 9. If the City establishes an Alternative Compliance Program in the future, this section of the BMP Design Manual will be updated.

Participation in an alternative compliance program would allow a PDP to fulfill the requirement of providing retention and/or biofiltration pollutant controls onsite that completely fulfill the performance standards specified in Chapter 5 (pollutant controls) with onsite flow-thru treatment controls and offsite mitigation of the DCV not retained onsite.

PDPs may be allowed to participate in an alternative compliance program by using onsite BMPs to treat offsite runoff. The PDP utilizing the alternative compliance program would (at a minimum) provide flow-thru treatment control BMPs onsite, then fund, contribute to, or implement an offsite alternative compliance project deemed by the jurisdiction-specific alternative compliance program to provide a greater overall water quality benefit for the portion of the pollutants not addressed onsite through retention and/or biofiltration BMPs. Offsite alternative compliance program locations for the purpose of this manual are defined as location within the same watershed management area as the PDP. Participation in an alternative compliance program would also potentially relieve hydromodification management flow control obligations that are not provided onsite (see Chapter 6 for hydromodification management requirements). PDPs must consult the local jurisdiction for specific guidelines and requirements for participation in potential alternative compliance programs.

Figure 1-2 generally represents two potential pathways for participating in alternative compliance (i.e. offsite projects that supplement the PDPs onsite BMP obligations).

- The first pathway (illustrated using solid line, left side) ultimately ends at alternative compliance if the PDP cannot meet all of the onsite pollutant control obligations via retention and/or biofiltration. This pathway requires performing feasibility analysis for retention and biofiltration BMPs prior to participation in an alternative compliance project.

- The second pathway (illustrated using dashed line, right side) is a discretionary pathway along which jurisdictions may allow for PDPs to proceed directly to an alternative compliance project without demonstrating infeasibility of retention and/or biofiltration BMPs onsite.

Participation in an alternative compliance program also requires onsite flow-thru treatment control BMPs.

Participation in an offsite alternative compliance project **and** the obligation to implement flow-thru treatment controls for the DCV not reliably retained or biofiltered onsite, are linked and cannot be separated. Therefore, if a jurisdiction either does not have an alternative compliance program or does not allow the PDP to participate in the program or propose a project-specific offsite alternative

compliance project, then the PDP may not utilize flow-thru treatment control. The PDP should consult with the jurisdiction regarding processing requirements if this is the case.

PDPs may be required to provide temporal mitigation when participating in an alternative compliance program.

Finally, if the PDP is allowed to participate in an offsite alternative compliance project that is constructed after the completion of the development project, the PDP must provide temporal mitigation to address this interim time period. Temporal mitigation must provide equivalent or better pollutant removal and/or hydrologic control (as applicable) as compared to the case where the offsite alternative compliance project is completed at the same time as the PDP.

Water Quality Equivalency calculations must be accepted by the Regional Board

The Water Quality Equivalency (WQE) calculation must be accepted by the San Diego Water Board's Executive Officer prior to administering an alternative compliance program. The Water Quality Equivalency provides currency calculations to assess water quality and hydromodification management benefits for a variety of potential offsite project types and provides regional and technical basis for demonstrating a greater water quality benefit for the watershed.

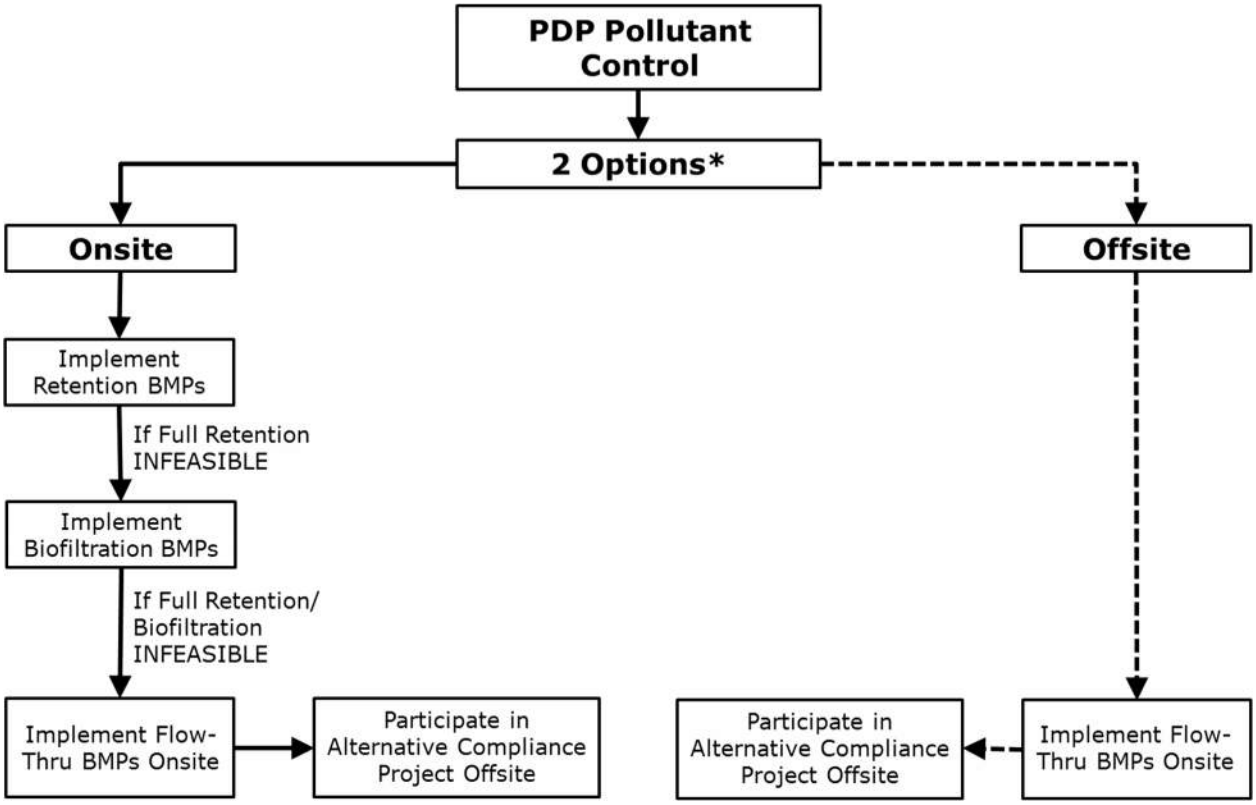


Figure 1-3. Pathways to Participating in Alternative Compliance Program

*PDP may be allowed to directly participate in an offsite project without demonstrating infeasibility of retention and/or biofiltration BMPs onsite. Consult the local jurisdiction for specific guidelines.

An Applicant Implemented Alternative Compliance Project may be allowed.[3]

The City may allow an applicant to implement an alternative compliance project in lieu of complying on site. In this scenario, the applicant is fully responsible for the alternative compliance project design, construction, operation and long-term maintenance. Applicant proposed alternative compliance projects shall not be authorized by the City prior to acceptance of the water quality equivalency calculations by the Regional Water Quality Board.

1.9 Relationship between this Manual and WQIPs

This manual is connected to other permit-specified planning efforts.

The MS4 Permit requires each Watershed Management Area within the San Diego Region to develop a **WQIP** that identifies priority and highest priority water quality conditions and strategies that will be implemented with associated goals to demonstrate progress towards addressing the conditions in the watershed. The MS4 Permit also provides an option to perform a **WMAA** as part of the WQIP to develop watershed specific requirements for structural BMP implementation in the watershed management area. PDPs should expect to consult either of these separate planning efforts as appropriate when using this manual as follows:

1. For PDPs that implement flow-thru treatment BMPs, selection of the type of BMP shall consider the pollutants and conditions of concerns. Among the selection considerations, the PDP must consult the highest priority water quality condition as identified in the WQIP for that particular watershed management area.
2. There may be watershed management area specific BMPs or strategies that are identified in WQIPs, for which PDPs should consult and incorporate as appropriate.
3. As part of the hydromodification management obligations that PDPs must comply with, PDPs shall consult the mapping of potential critical coarse sediment yield areas provided in the WMAA attachment to the WQIPs and design the project according to the procedures outlined in this manual if these sediments will be impacted by the project.
4. PDPs may be exempt from implementing hydromodification management BMPs (Chapter 6) based on the exemptions indicated in Section 1.6, and potentially from additional exemptions recommended in the WMAA attachment to the WQIPs. PDPs should consult the WMAA for recommended hydromodification management exemptions to determine if the project is eligible.
5. PDPs may have the option of participating in an alternative compliance program. Refer to Section 1.8.

These relationships between this manual and WQIPs are presented in Figure 1-3.

[3] The City of Encinitas does not currently have an Alternative Compliance Program.

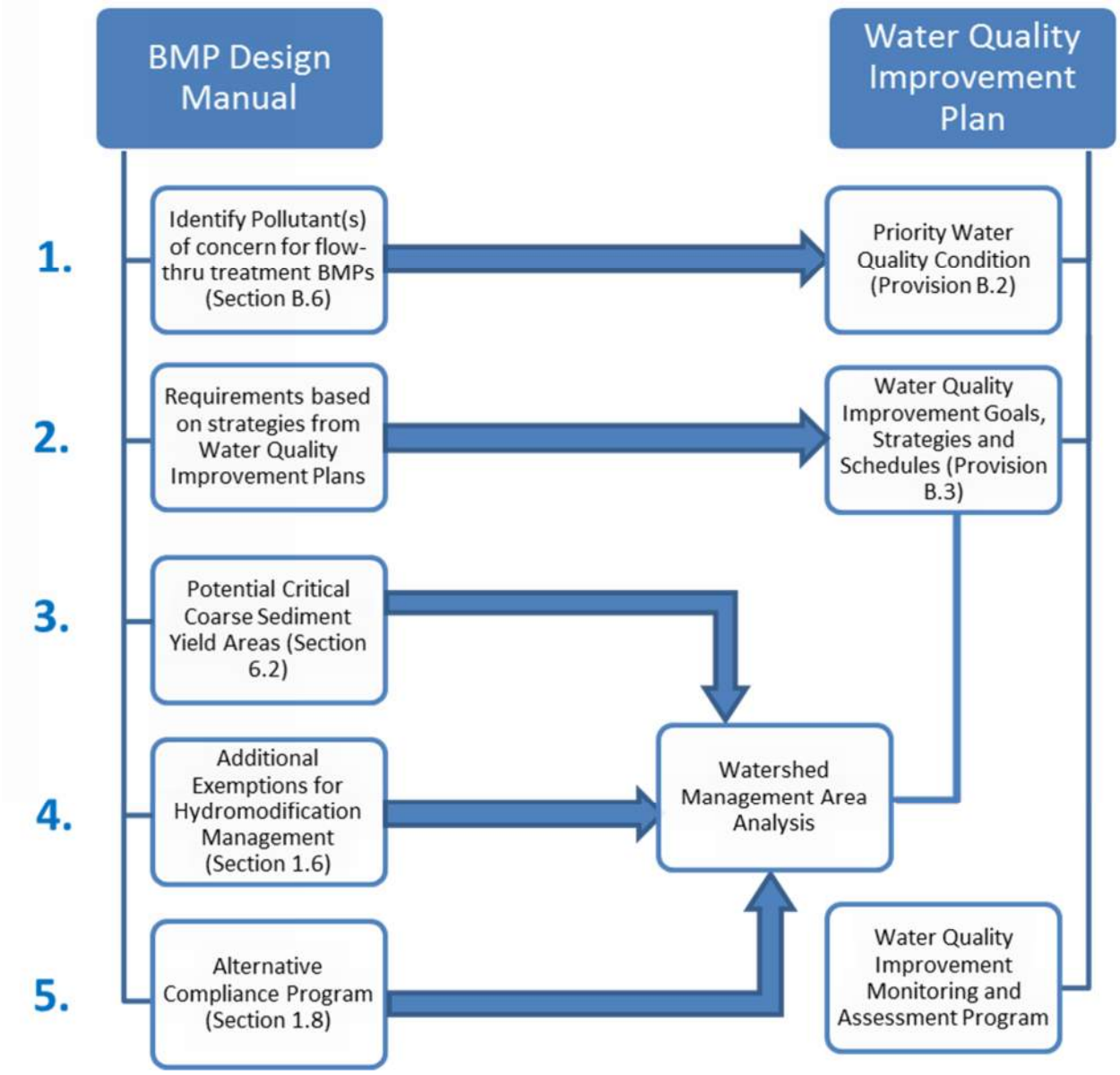


FIGURE 1-4. Relationship between this Manual and WQIP

The City of Encinitas is a Copermittee within the Carlsbad WMA. The Carlsbad WMA WQIP may be accessed at the Project Clean Water website (www.projectcleanwater.org).

1.10 Storm Water Requirement Applicability Timeline

MS4 Permit Provision E.3.e.(1)(a)

The City must require and confirm that all Priority Development Projects implement the requirements of Provision E.3 of the MS4 Permit. For project applicants that have received prior lawful approval before the effective date of this manual, the City has the discretion to allow previous land development requirements to apply under certain conditions. At the discretion of the City Engineer, the City will

allow previous land development requirements to apply to a Priority Development Project if the conditions of Provision E.3.e.(1) of the MS4 Permit are met.

1.11 Project Review Procedures

Local jurisdictions review project plans for compliance with applicable requirements of this manual and the MS4 Permit.

The project applicant must provide sufficient documentation to demonstrate that applicable requirements of the BMP Design Manual and the MS4 Permit will be met.

For Standard ~~and Basic~~ Projects, a Standard Project SWQMP must be completed prior to first plan check to document that the following general requirements of the MS4 Permit are met, and showing applicable features onsite grading, building, improvement and landscaping plans:

- BMP Requirements for All Development Projects, which includes general requirements, source control BMP requirements, and narrative (i.e. not numerically-sized) site design requirements (MS4 Permit Provision E.3.a).

For PDPs, a PDP SWQMP must be completed prior to first plan check to document that the following general requirements of the MS4 Permit are met, and showing applicable features onsite grading and landscaping plans:

- BMP Requirements for All Development Projects, which includes general requirements for siting of permanent, post-construction BMPs, source control BMP requirements, and narrative (i.e. not numerically-sized) site design requirements (MS4 Permit Provision E.3.a);
- Stormwater Pollutant Control BMP Requirements, for numerically sized onsite structural BMPs to control pollutants in stormwater (MS4 Permit Provision E.3.c.(1)); and
- Hydromodification Management BMP Requirements, which includes protection of critical sediment yield areas and numerically sized onsite BMPs to manage hydromodification that may be caused by stormwater runoff discharged from a project (MS4 Permit Provision E.3.c.(2)).

Detailed submittal requirements are provided in Chapter 8 of this manual. Documentation of the permanent, post-construction stormwater BMPs must be provided with the first submittal of a project. Stormwater requirements will directly affect the layout of the project. Therefore stormwater requirements must be considered from the initial project planning phases, and will be reviewed with each submittal, beginning with the first submittal.

1.12 PDP Structural BMP Verification

MS4 Permit Provision E.3.e.(1)

Structural BMPs must be verified by the local jurisdiction prior to project occupancy.

Pursuant to MS4 Permit Provision E.3.e.(1), each Copermittee must require and confirm the following with respect to PDPs constructed within their jurisdiction:

(a) Each Copermittee must require and confirm that appropriate easements and ownerships

are properly recorded in public records and the information is conveyed to all appropriate parties when there is a change in project or site ownership.

(b) Each Copermittee must require and confirm that prior to occupancy and/or intended use of any portion of the PDP, each structural BMP is inspected to verify that it has been constructed and is operating in compliance with all of its specifications, plans, permits, ordinances, and the requirements of the MS4 Permit.

For PDPs, this means that, the City inspector for the project will require the project owner's engineer to inspect and provide a certification that the site improvements for the project have been constructed in conformance with the approved stormwater management documents and drawings. A note stating this requirement must be placed on project plans.

Inspection of structural BMPs is required at each significant construction stage and at completion. If the need arises to modify a BMP during construction, the proposed change must be submitted to City plan check engineers for review and approval. Modifications must meet the permanent BMP sizing requirements in order to be approved. Following construction, the City may require an addendum to the SWQMP and As Builts to address any changes to the structural BMPs that occurred during construction that were approved by the City Engineer. The City may also require a final update to the O&M Plan, and/or execution of a maintenance agreement that will be recorded for the property. A maintenance agreement that is recorded with the property title can then be transferred to future owners.

Certification of structural BMPs, updates to reports, and recordation of a maintenance agreement must occur prior to project final and occupancy and/or intended use of the project. Specific procedures are provided in Chapter 8 of this manual.

2 Standards and Concepts

Projects must meet four separate performance standards, as applicable.

Performance standards are specific design objectives to be achieved through the implementation of BMPs. The MS4 Permit establishes separate performance standards for source control and site design practices; storm water pollutant control BMPs; and hydromodification management BMPs. Each development project must be designed to satisfy any of several potentially applicable performance standards. Four types of standards are addressed in this manual; the first applies to all development projects, while the remaining three apply only to PDPs. The specific applicability of all standards may vary depending on specific site conditions and design choices. Table 2-1 provides an overview of these standards and their potential applicability.

1. Baseline BMP Implementation (Sections 2.1.1.2 and 2.1.1.3)

Baseline Source Control and Site Design BMPs must be implemented for all development projects wherever it is applicable and feasible to do so. These BMPs help to prevent the onsite generation of pollutants and flows and to keep them from leaving the site. For example, covering trash storage areas prevents wastes from being washed into the MS4. Likewise, directing runoff from an impervious surface (e.g., a rooftop) to a pervious dispersion area (landscaping, etc.) provides infiltration of pollutants and flows into the soil.

Baseline BMP requirements are qualitative in that strict compliance with BMP sizing and/or specific design criteria is not required. Their selection and design should be guided by the feasibility of implementing them at all applicable locations. They include each of the BMPs described in BMPDM Sections 4.2 and 4.3, as well as any additional practices specified in applicable SWQMP Forms and instructions. Both the Standard and PDP SWQMP Forms require consideration of specific Baseline BMPs for each of the following categories:

- Existing Natural Site Features. This category addresses water bodies, drainage corridors, and other natural features with the following BMPs: Conserve Natural Features (SD-G), and Provide Buffers Around Waterbodies (SD-H)
- Outdoor Impervious Areas. This category addresses streets, sidewalks, driveways, and other common outdoor impervious features with the following BMPs: Direct runoff to pervious areas (SD-B), Construct Surfaces From Permeable Materials (SD-I), and Minimize the Size of Impervious Areas

TABLE 2-2-1. Applicability of Performance Standards for Different Project Types

<table>
<tr><th rowspan="2"></th><th colspan="2">1. Baseline BMP Implementation</th><th rowspan="2">2. DCV Reduction through Enhanced Site Design BMPs</th><th colspan="2">3. Compliance with Structural Performance Standards</th><th rowspan="2">4. Avoidance & Bypass of Critical Coarse Sediment</th></tr>
<tr><th>a. Source Control BMPs</th><th>b. Site Design BMPs</th><th>a. Pollutant Control</th><th>b. Hydromod. Management</th></tr>
<tr><td></td><td>Sections 2.1.1.2 & 4.2</td><td>Sections 2.1.1.3 & 4.3</td><td>Sections 2.1.1.4, 2.2.2.2 & Appendices B.1 & I.1</td><td>Sections 2.2 & 5</td><td>Sections 2.3, 2.4 & 6</td><td>Sections 2.3.3, 6.2 & Appendix H</td></tr>
<tr><td>~~Basic Projects~~</td><td colspan="2" rowspan="8">Required where applicable and feasible</td><td>~~NA~~</td><td>~~NA~~</td><td>~~NA~~</td><td>~~NA~~</td></tr>
<tr><td>Standard Projects</td><td colspan="2">~~Required per Section 1.4.3.1~~NA</td><td>NA</td><td>NA</td></tr>
<tr><td>PDP-exempted Projects</td><td rowspan="2">NA</td><td rowspan="2">NA</td><td rowspan="2">NA</td><td rowspan="2">NA</td></tr>
<tr><td>• New or retrofit paved sidewalks, bicycle lanes, or trails (Section 1.4.3)</td></tr>
<tr><td>• Retrofitting or redevelopment of paved alleys, streets or roads (Section 1.4.3)</td><td>NA</td><td>Required</td><td>NA</td><td>NA</td></tr>
<tr><td>PDPs</td><td rowspan="2">Optional</td><td rowspan="2">Required</td><td rowspan="2">Required</td><td rowspan="2">Required</td></tr>
<tr><td>• Without HMP Exemption (Section 1.4)</td></tr>
<tr><td>• With HMP Exemption (Section 6.1)</td><td>Optional</td><td>Required</td><td>NA</td><td>NA</td></tr>
</table>

- Rooftop Areas. This category addresses permanent impervious coverings on buildings and/or other structures such as patios or decks with the following BMPs: Direct Runoff to Pervious Areas (SD-B), Install Green Roofs (SD-C), Install Rain Barrels (SD-E)
- Landscaped Areas. This category addresses planting areas, turf areas (artificial or natural), and water features in a landscape design with the following BMP: Use Sustainable Landscaping (SD-K)
- Work and Storage Areas: This category addresses trash storage, materials and equipment storage, loading and unloading, fueling, maintenance and repair, vehicle and equipment cleaning, and other areas that have the potential to generate pollutants with the following BMPs: Overhead Covering (SC-A), Berms and Grade Breaks (SC-B), and Wind Protection (SC-C)
- Management of Stormwater Discharges: This category addresses management of discharges from outdoor work areas and where runoff may be routed to with the following BMPs: Sanitary Sewer (SC-D), Containment Areas (S-D), Stormwater S-BMP or SSD-BMP
- Management of Non-Stormwater Discharges: This category addresses non-stormwater discharges to prevent illicit discharges from entering the storm drain system with the following BMPs: Storm Drain Signage (SC-F), Educational BMP Signage (SC-G), and practices for interior work surfaces, floor drains and sumps, drain lines, and fire sprinkler test water

2. DCV Reduction through Enhanced Site Design BMPs (Sections 2.1.1.4, 2.2.2.2, & Appendix B.1)

An Enhanced Site Design BMP is any site design BMP used specifically to reduce the Design Capture Volume (DCV) within a Drainage Management Area (DMA). This can be achieved either by adjusting the impervious runoff factor of one or more surfaces (Attachment B.2.1) or by implementing BMPs that receive and mitigate a portion of the DCV (Attachment B.2.2). Since DCV reduction is not required, this performance standard is optional. However, implementation of Enhanced Site Design BMPs is strongly encouraged for all PDPs as a means of reducing or eliminating the need for other, more complex or costly BMPs needed to satisfy Structural Performance Standards for the remaining DCV (see below).

Examples of BMPs that can be used as Enhanced Site Design BMPs include Tree Wells (Fact Sheet SD-A), Impervious Area Dispersion (Fact Sheet SD-B), Green Roofs (Fact Sheet SD-C), Permeable Pavement (Fact Sheet SD-D) and Rain Barrels (Fact Sheet SD-E). These BMPS must be sized and constructed in accordance with applicable guidance provided in their respective Fact Sheets or as otherwise specified. DCV reductions may be determined using the DCV Worksheet B.1.1 in Appendix B or any other methodology acceptable to the City.

3. Compliance with Structural Performance Standards (Sections 2.2, 2.3, 2.4, 5; Chapters 5 and 6)

Structural Performance Standards are numeric design standards for reducing or eliminating stormwater flows and pollutant loads from Priority Development Project sites. They specifically address the remaining volume of runoff within a DMA (either the DCV or a greater volume) after the application of all other site design and source control BMPs described above.

Projects that are exempt from hydromodification management requirements must only satisfy the Pollutant Control Structural Performance Standard. All other projects must satisfy both the Pollutant

Control Structural Performance Standard and the Hydromodification Management Structural Performance Standard. The latter must mitigate an adjusted volume greater than the DCV.

Subject to all applicable design requirements, either standard may be fully satisfied through a variety of design approaches, including Structural BMPs (S-BMPs) and Significant Site Design BMPs (SSD-BMPs). SSD-BMPs are site design BMPs designed to fully retain the DCV for the DMA (Section 5.2.3). Tree Wells (Fact Sheet SD-A), Impervious Area Dispersion (Fact Sheet SD-B), or any other SSD-BMP acceptable to the City may be used. See Appendix I for more information on sizing SSD-BMPs.

4. Avoidance and Bypass of Critical Coarse Sediment (Sections 2.3.1, 6.2, & Appendix H)

For many Priority Development Project sites, additional BMPs may be needed to preserve the supply of critical coarse sediment to water bodies. Any PDP that is not exempt from hydromodification management requirements must either comply with critical coarse sediment requirements or demonstrate that they do not apply.

Performance standards can be met through an integrated approach.

While performance standards are defined separately in this Manual, an overlapping set of design features can be used as part of demonstrating conformance to each standard. Further discussion of the relationship between performance standards is provided in Section 2.4.

Source Control and Site Design Requirements for All Development Projects

2.1.1 Performance Standards

MS4 Permit Provision E.3.a

MS4 Permit Provision E.3.a defines performance standards for general, source control, and site design practices that are applicable to all projects (regardless of project type or size; both Standard Projects and PDPs) when City permits are issued.

2.1.1.1 General Requirements

All projects must meet the following general requirements:

(a) Onsite BMPs must be located so as to remove pollutants from runoff prior to its discharge to any receiving waters, and as close to the source as possible;

(b) Structural BMPs must not be constructed within waters of the United States (U.S.); and

(c) Onsite BMPs must be designed and implemented with measures to avoid the creation of nuisance or pollution associated with vectors (e.g. mosquitos, rodents, or flies).

2.1.1.2 Baseline Source Control Requirements

Baseline pollutant source control BMPs are features that must be implemented to address specific sources of pollutants.

The following source control BMPs must be implemented at all development projects where applicable and feasible:

(a) Prevention of illicit discharges into the MS4;

(b) Storm drain system stenciling or signage;

(c) Protection of outdoor material storage areas from rainfall, run-on, runoff, and wind dispersal;

(d) Protection of materials stored in outdoor work areas from rainfall, run-on, runoff, and wind dispersal;

(e) Protection of trash storage areas from rainfall, run-on, runoff, and wind dispersal; and

(f) Use of any additional BMPs determined to be necessary by the City to minimize pollutant generation at each project.

Further guidance is provided in Section 2.1.2 and Chapter 4.

2.1.1.3 Baseline Site Design Requirements

Baseline site design requirements are qualitative requirements that apply to the layout and design of ALL Development Project sites (Standard Projects and PDPs).

Site design performance standards define minimum requirements for how a site must incorporate LID BMPs, including the location of BMPs and the use of integrated site design practices. The following site design practices must be implemented at all Development Projects, where applicable and feasible:

(a) Maintenance or restoration of natural storage reservoirs and drainage corridors (including topographic depressions, areas of permeable soils, natural swales, and ephemeral and intermittent streams[4];

(b) Buffer zones for natural water bodies (where buffer zones are technically infeasible, require project applicant to include other buffers such as trees, access restrictions, etc.);

(c) Conservation of natural areas within the project footprint including existing trees, other vegetation, and soils;

(d) Construction of streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided public safety is not compromised;

(e) Minimization of the impervious footprint of the project;

(f) Minimization of soil compaction to landscaped areas;

(g) Disconnection of impervious surfaces through distributed pervious areas;

[4] Development Projects proposing to dredge or fill materials in waters of the U.S. must obtain a Clean Water Act Section 401 Water Quality Certification. Projects proposing to dredge or fill waters of the state must obtain waste discharge requirements.

(h) Landscaped or other pervious areas designed and constructed to effectively receive and infiltrate, retain and/or treat runoff from impervious areas, prior to discharging to the MS4;

(i) Small collection strategies located at, or as close as possible to, the source (i.e. the point where stormwater initially meets the ground) to minimize the transport of runoff and pollutants to the MS4 and receiving waters;

(j) Use of permeable materials for projects with low traffic areas and appropriate soil conditions;

(k) Landscaping with native or drought tolerant species; and

(l) Harvesting and using precipitation.

A key aspect of this performance standard is that these design features must be used where applicable and feasible. Responsible implementation of this performance standard depends on evaluating applicability and feasibility. Further guidance is provided in Section 2.1.2 and Chapter 4.

Additional site design requirements may apply to PDPs.

Site design decisions may influence the ability of a PDP to meet applicable performance standards for pollutant control and hydromodification management BMPs (as defined in Section 2.2 and 2.3). For example, the layout of the site drainage and reservation of areas for BMPs relative to areas of infiltrative soils may influence the feasibility of capturing and managing stormwater to meet stormwater pollutant control and/or hydromodification management requirements. As such, the City may require additional site design practices, beyond those listed above, to be considered and documented as part of demonstrating conformance to stormwater pollutant control and hydromodification management requirements.

Appendix K (Guidance for Green Infrastructure Projects) includes County of San Diego guidance for implementing green street and other green infrastructure project features and types. Applicants are encouraged to utilize Appendix K as a basis for designing and constructing low impact design and sustainable infrastructure features for their projects.

2.1.1.4 DCV Reduction through Enhanced Site Design BMPs (Sections 2.2.2.2 & Appendix B.1)

Enhanced site design BMPs reduce or eliminate the DCV within a DMA. Using them can decrease the number or size of other, more complex or costly BMPs needed to satisfy Structural Performance Standards.

Examples of Enhanced Site Design BMPs include Tree Wells (Fact Sheet SD-A), Impervious Area Dispersion (Fact Sheet SD-B), Green Roofs (Fact Sheet SD-C), Permeable Pavement (Fact Sheet SD-D), and Rain Barrels (Fact Sheet SD-E). Each BMP must be sized and constructed in accordance with applicable guidance provided in its respective Fact Sheet or as otherwise specified. DCV reductions are typically determined for larger projects using the DCV Worksheet B.1.1 in Appendix B and Worksheet J.1.1 in Appendix J. However, other worksheets, tables, calculators, or methods acceptable to the City may also be used. See section 2.2.2.2 for additional guidance on DCV calculation, and Appendices B.1 and J.1. for specific options and methodologies for achieving DCV reductions.

2.1.2 Concepts and References

Land development tends to increase the amount of pollutants in **stormwater** runoff.

Land development generally alters the natural conditions of the land by removing vegetative cover, compacting soil, and/or placement of concrete, asphalt, or other impervious surfaces. These impervious surfaces facilitate entrainment of urban pollutants in stormwater runoff (such as pesticides, petroleum hydrocarbons, heavy metals, and pathogens) that are otherwise not generally found in high concentrations in the runoff from the natural environment. Pollutants that accumulate on impervious surfaces and actively landscaped pervious surfaces may contribute to elevated levels of pollutants in runoff relative to the natural condition.

Land development also impacts site hydrology.

Impervious surfaces greatly affect the natural hydrology of the land because they do not allow natural infiltration, retention, evapotranspiration and treatment of stormwater runoff to take place. Instead, stormwater runoff from impervious surfaces is typically and has traditionally been directed through pipes, curbs, gutters, and other hardscape into receiving waters, with little treatment, at significantly increased volumes and accelerated flow rates over what would occur naturally. The increased pollutant loads, stormwater volume, discharge rates and velocities, and discharge durations from the MS4 adversely impact stream habitat by causing accelerated, unnatural erosion and scouring within creek beds and banks. Compaction of pervious areas can have a similar effect to impervious surfaces on natural hydrology.

Site Design LID involves attempting to maintain or restore the predevelopment hydrologic regime.

LID is a comprehensive land planning and engineering design approach with a goal of maintaining and enhancing the pre-development hydrologic regime of urban and developing watersheds. LID design seeks to control stormwater at the source, using small-scale integrated site design and management practices to mimic the natural hydrology of a site, retain stormwater runoff by minimizing soil compaction and impervious surfaces, and disconnecting stormwater runoff from conveyances to the storm drain system. Site Design LID BMPs may utilize interception, storage, evaporation, evapotranspiration, infiltration, and filtration processes to retain and/or treat pollutants in stormwater before it is discharged from a site. Examples of Site Design LID BMPs include using permeable pavements, rain gardens, rain barrels, grassy swales, soil amendments, and native plants.

Site design must be considered early in the design process.

Site designs tend to be more flexible in the early stages of project planning than later on when plans become more detailed. Because of the importance of the location of BMPs, site design should be considered as early as the planning/tentative design stage. Site design is critical for feasibility of storm water pollutant control BMPs (Section 2.2) as well as coarse sediment supply considerations associated with hydromodification management (introduced in Section 2.3).

Source control and site design (LID) requirements help avoid impacts by controlling pollutant sources and changes in hydrology.

Source control and site design practices prescribed by the MS4 Permit are the minimum management practices, control techniques and system, design and engineering methods to be included in the

planning procedures to reduce the discharge of pollutants from development projects, regardless of size or purpose of the development. In contrast to stormwater pollutant control BMPs and hydromodification control BMPs which are intended to mitigate impacts, source control and site design BMPs are intended to avoid or minimize these impacts by managing site hydrology, providing treatment features integrated within the site, and reducing or preventing the introduction of pollutants from specific sources. Implementation of site design BMPs will result in reduction in stormwater runoff generated by the site. Methods to estimate effective runoff coefficients and the stormwater runoff produced by the site after site design BMPs are implemented are presented in Appendix B.2. This methodology is applicable for PDPs that are required to estimate runoff produced from the site with site design BMPs implemented so that they can appropriately size stormwater pollutant control BMPs and hydromodification control BMPs.

The location of BMPs matters.

The site design BMPs listed in the performance standard include practices that either prevent runoff from occurring or manage runoff as close to the source as possible. This helps create a more hydrologically effective site and reduces the requirements that pollutant control and hydromodification control BMPs must meet, where required. Additionally, because sites may have spatially-variable conditions, the locations reserved for structural BMPs within the site can influence whether these BMPs can feasibly retain, treat, and/or detain stormwater to comply with structural pollutant control and hydromodification control requirements, where applicable. Finally, the performance standard specifies that onsite BMPs must remove pollutants from runoff prior to discharge to any receiving waters or the MS4, be located/constructed as close to the pollutant generating source as possible and must not be constructed within waters of the U.S.

The selection of BMPs also matters.

The lists of source control and site design BMPs specified in the performance standard must be used "where applicable and feasible." This is an important concept – BMPs should be selected to meet the R9-2013-0001 permit requirements and are feasible with consideration of site conditions and project type. By using BMPs that are applicable and feasible, the project can achieve benefits of these practices, while not incurring unnecessary expenses (associated with using practices that do not apply or would not be effective) or creating undesirable conditions (for example, infiltration-related issues, vector concerns including mosquito breeding, etc.).

Methods to select and design BMPs and demonstrate compliance with source control and site design requirements are presented in Chapter 4 of this Manual. Source control and site design fact sheets are also provided in Appendix E.

2.2 Storm Water Pollutant Control Requirements for PDPs

2.2.1 Storm Water Pollutant Control Performance Standard

MS4 Permit Provision E.3.c.(1)

Per MS4 Permit Provision E.3.c.(1), Storm Water Pollutant Control BMPs for PDPs must meet the following performance standards:

(a) Each PDP shall implement BMPs that are designed to retain (i.e. intercept, store, infiltrate, evaporate, and evapotranspire) onsite the pollutants contained in the volume of stormwater runoff produced from a 24-hour, 85th percentile storm event (Design Capture Volume (DCV)). The 24-hour, 85th percentile storm event shall be based on Figure B.1-1 in Appendix B or an approved site-specific rainfall analysis.

(i) If it is not technically feasible to implement retention BMPs for the full DCV onsite for a PDP, then the PDP shall utilize biofiltration BMPs or approved equivalent proprietary biofiltration systems for the remaining volume not reliably retained. Biofiltration BMPs must be designed as described in Appendix F to have an appropriate hydraulic loading rate to maximize stormwater retention and pollutant removal, as well as to prevent erosion, scour, and channeling within the BMP, and must be sized to:

[a]. Biofiltration BMPs must be designed as described in Appendix F to have an appropriate hydraulic loading rate to maximize storm water retention and pollutant removal, as well as to prevent erosion, scour, and channeling within the BMP, and must be sized to:

1. Treat 1.5 times the DCV not reliably retained onsite, OR
2. Treat the DCV not reliably retained onsite with a flow-thru design that has a total volume, including pore spaces and pre-filter detention volume, sized to hold at least 0.75 times the portion of the DCV not reliably retained onsite.

[b]. Approved equivalent proprietary biofiltration systems use a combination of treatment devices and additional site design BMPs that, as a system, have an equal or greater effectiveness than biofiltration BMPs. While these systems, unlike biofiltration BMPs, do not provide the full required amounts of both treatment and retention in the same device or site feature, because they are equally effective to biofiltration they meet the MEP standard as defined in Attachment C of the MS4 Permit. Approved equivalent compact proprietary biofiltrations systems must be designed as described below:

1. Demonstrate that the BMP meets applicable effectiveness certifications, e.g., Washington (State) Technology Acceptance Protocol-Ecology (TAPE), and the proposed use of the BMP is in accordance with criteria in the certification (e.g., treatment flow rate), as described in Appendix F.2.1, AND
2. Treat the DCV no reliably retained onsite with a flow-based sizing in accordance with Appendix F.2.2, AND
3. Incorporate additional site design BMPs as necessary to achieve stormwater retention equivalent to what would have been achieved using biofiltration BMPs as described earlier in this section, and as described in Appendices B and F.

(b) The City of Encinitas does not have an Alternative Compliance Program. Therefore, an applicant of a PDP may not participate in an alternative compliance program.

Demonstrations of feasibility findings and calculations to justify BMP selection and design must be provided by the project applicant in the SWQMP to the satisfaction of the City. Methodology to

demonstrate compliance with the performance standards, described above, applicable to stormwater pollutant control BMPs for PDPs is detailed in Chapter 5.

2.2.2 Concepts and References

Retention BMPs are the most effective type of BMPs to reduce pollutants discharging to MS4s when they are sited and designed appropriately.

Retention of the required DCV will achieve 100 percent pollutant removal efficiency (i.e. prevent pollutants from discharging directly to the MS4). Thus, retention of as much stormwater onsite as technically feasible is the most effective way to reduce pollutants in stormwater discharges to, and consequently from the MS4, and remove pollutants in stormwater discharges from a site to the MEP.

However, in order to accrue these benefits, retention BMPs must be technically feasible and suitable for the project. Retention BMPs that fail prematurely, under-perform, or result in unintended consequences as a result of improper selection or siting may achieve performance that is inferior to other BMP types while posing other issues for property owners and the City. Therefore, this manual provides criteria for evaluating feasibility and provides options for other types of BMPs to be used if retention is not technically feasible.

Biofiltration BMPs or approved equivalent compact proprietary biofiltrations systems can be sized to achieve approximately the same pollutant removal as retention BMPs.

In the case, where the entire DCV cannot be retained onsite because it is not technically feasible, PDPs are required to use biofiltration BMPs with specific sizing and design criteria listed in Appendices B and F or approved equivalent compact proprietary biofiltration systems. Sizing and design criteria for approved equivalent compact proprietary biofiltration systems are also included in Appendices B and F, and specific details included in Appendix F.2. These sizing and design criteria are intended to provide a level of long term pollutant removal that is reasonably equivalent to retention of the DCV.

Flow-thru treatment BMPs are required to treat the pollutant loads in the DCV not retained or biofiltered onsite to the MEP.

If the pollutant loads from the full DCV cannot feasibly be retained or biofiltered onsite, then PDPs are required to implement flow-thru treatment control BMPs to remove the pollutants to the MEP for the portion of the DCV that could not be feasibly retained or biofiltered. Flow-thru treatment BMPs may only be implemented to address onsite storm water pollutant control requirements if coupled with an offsite alternative compliance project that mitigates for the portion of the pollutant load in the DCV not retained or biofiltered onsite.

Offsite Alternative Compliance Program may be available.

The MS4 Permit allows the City the discretion to grant PDPs permission to utilize an offsite alternative compliance program for meeting the pollutant control performance standard. Onsite and offsite mitigation is required when a PDP is allowed to use an offsite alternative compliance program. The specific parameters of an offsite alternative compliance program will be specific to each jurisdiction if one is available (Refer to Section 1.8 and Appendix J).

Methods to design and demonstrate compliance with stormwater pollutant control BMPs are

presented in Chapter 5 of this Manual. Definitions and concepts that should be understood when sizing stormwater pollutant control BMPs to be in compliance with the performance standards are explained below:**Best Management Practices**

To minimize confusion, this Manual considers all references to "facilities," "features," or "controls" to be incorporated into development projects as BMPs.

2.2.2.2 DCV

The MS4 Permit requires pollutants be addressed for the runoff from the 24-hour 85th percentile storm event ("DCV") as the design standard to which PDPs must comply.

The 85th percentile, 24-hour storm event is the event that has a precipitation total greater than or equal to 85 percent of all storm events over a given period of record in a specific area or location. For example, to determine what the 85th percentile storm event is in a specific location, the following steps would be followed:

- Obtain representative precipitation data, preferably no less than 30-years period if possible.
- Divide the recorded precipitation into 24-hour precipitation totals.
- Filter out events with no measurable precipitation (less than 0.01 inches of precipitation).
- Of the remaining events, calculate the 85th percentile value (i.e. 15 percent of the storms would be greater than the number determined to be the 85th percentile, 24-hour storm).

The 85th percentile, 24-hour storm event depth is then used in hydrologic calculations to calculate the DCV for sizing storm water pollutant control BMPs. An exhibit showing the 85th percentile, 24-hour storm depth in the City of Encinitas is included in Appendix B.1.1. Guidance to estimate the DCV is presented in Appendix B.1.

See also Section 2.1.1.4 for description of options for reducing the DCV.

2.2.2.3 Implementation of Storm Water Pollutant Control BMPs

The MS4 Permit requires that the PDP applicants proposing to meet the performance standards onsite implement storm water pollutant control BMPs in the order listed below. That is, the PDP applicant first needs to implement **all** feasible onsite retention BMPs needed to meet the storm water pollutant control BMP requirements prior to installing onsite biofiltration BMPs, and then onsite biofiltration BMPs prior to installing onsite flow-thru treatment control BMPs.

PDP applicants may be allowed to participate in an offsite alternative compliance program. Refer to Section 1.8 for additional guidance.

Retention BMPs: Structural measures that provide retention (i.e. intercept, store, infiltrate, evaporate and evapotranspire) of storm water as part of pollutant control strategy. Examples include infiltration BMPs and cisterns, bioretention BMPs and biofiltration with partial retention BMPs.

Biofiltration BMPs: Structural measures that provide biofiltration of storm water as part of the pollutant control strategy.

Approved equivalent compact proprietary biofiltration systems: Approved equivalent compact

proprietary biofiltration systems that use a combination of treatment devices and additional site design BMPs that, as a system, have an equal or greater effectiveness than biofiltration BMPs. While theses systems, unlike biofiltration BMPs, do not provide the full required amounts of both treatment and retention in the same device or site feature, because they are equally effective to biofiltration they meet the MEP standard as defined in Attachment C of the MS4 Permit. The treatment devices in an approved equivalent compact proprietary biofiltration system must meet the requirements in Appendices B and F.

Flow-thru treatment control BMPs: Structural measures that provide flow-thru treatment as part of the pollutant control strategy. Examples include vegetated swales and media filters.

2.2.2.4 Technical Feasibility

MS4 Permit Requirement E.3.c.(5)

Analysis of technical feasibility is necessary to select the appropriate BMPs for a site.

PDPs are required to implement pollutant control BMPs in the order of priority in Section 2.2.2.3 based on determinations of technical feasibility. In order to assist the project applicant in selecting BMPs, this Manual includes a defined process for evaluating feasibility. Conceptually, the feasibility criteria contained in this Manual are intended to:

- Promote reliable and effective long term operations of BMPs by providing a BMP selection process that eliminates the use of BMPs that are not suitable for site conditions, project type or other factors;
- Minimize significant risks to property, human health, and/or environmental degradation (e.g. geotechnical stability, groundwater quality) as a result of selection of BMPs that are undesirable for a given site; and
- Describe circumstances under which regional and watershed-based strategies, as part of an approved WMAA **and** an offsite alternative compliance program developed by the jurisdiction where the project resides, may be selected.

Specific guidance related to geotechnical investigation guidelines for feasibility of stormwater infiltration and groundwater quality and water balance factors is provided in Appendices B and D, respectively.

2.2.2.5 Biofiltration BMPs

The MS4 Permit requires Biofiltration BMPs be designed to have an appropriate hydraulic loading rate to maximize stormwater retention and pollutant removal, as well as to prevent erosion, scour, and channeling within the BMP. Appendix F of this Manual has guidance for hydraulic loading rates and other biofiltration design criteria to meet these required goals. Appendix F also has a checklist that will need to be completed by the project SWQMP preparer during plan submittal. Guidance for sizing Biofiltration BMPs is included in Chapter 5 and Appendices B and F.

2.2.2.6 Flow-thru Treatment Control BMPs (for use with Offsite Alternative Compliance[5])

MS4 Permit Requirement E.3.d.2-3

The MS4 Permit requires that the flow-thru treatment control BMP selected by the PDP applicant be ranked with high or medium pollutant removal efficiency for the most significant pollutant of concern. Steps to select the flow-thru treatment control BMP include:

- Step 1: Identify the pollutant(s) of concern by considering the following at a minimum a) Receiving water quality; b) Highest priority water quality conditions identified in the Watershed Management Areas Water Quality Improvement Plan; c) Land use type of the project and pollutants associated with that land use type and d) Pollutants expected to be present onsite.
- Step 2: Identify the most significant pollutant of concern. A project could have multiple most significant pollutants of concerns and must include the highest priority water quality condition identified in the watershed WQIP and pollutants expected to be presented onsite/from land use.
- Step 3: Effectiveness of the flow-thru treatment control BMP for the identified most significant pollutant of concern.

Methodology for sizing flow-thru treatment control BMPs and the resources required to identify the pollutant(s) of concern and effectiveness of flow-thru treatment control BMPs are included in Chapter 5 and Appendix J.5.

2.3 Hydromodification Management Requirements for PDPs

2.3.1 Hydromodification Management Performance Standards

MS4 Permit Provision E.3.c.(2)

This section describes performance standards for hydromodification management, including flow control of post-project storm water runoff and protection of critical sediment yield areas, that must be met by all PDPs unless exempt from hydromodification management requirements per Section 1.6 of this Manual. Each PDP must implement onsite BMPs to manage hydromodification that may be caused by storm water runoff discharged from a project as follows:

(a) Post-project runoff conditions (flow rates and durations) must not exceed pre-development runoff conditions by more than 10 percent (for the range of flows that result in increased potential for erosion, or degraded instream habitat downstream of PDPs).

(i) In evaluating the range of flows that results in increased potential for erosion of natural (non-hardened) channels, the lower boundary must correspond with the critical channel

[5] The City of Encinitas does not currently have an Alternative Compliance Program.

flow that produces the critical shear stress that initiates channel bed movement or that erodes the toe of channel banks.

(b) Each PDP must avoid and allow bypass of critical sediment yield areas known to the City or identified by the optional WMAA pursuant to Provision B.3.b.(4) [of the MS4 Permit], or implement measures that allow critical coarse sediment to be discharged to receiving waters, such that there is no net impact to the receiving water. Refer to Section 6.2 and Appendix H for additional guidance.

(c) A PDP may be allowed to utilize offsite alternative compliance under Provision E.3.c.(3) [of the MS4 Permit] in lieu of complying with the performance requirements of Provision E.3.c.(2)(a). The PDP must mitigate for the post-project runoff conditions not fully managed onsite if Provision E.3.c.(3) is utilized. Refer to Section 1.8 and Appendix J for additional guidance.

Hydromodification management requirements apply to both new development and redevelopment PDPs, except those that are exempt based on discharging to downstream channels or water bodies that are not subject to erosion, as defined in either the MS4 Permit (Provision E.3.c.(2).(d)) or the WMAA for the watershed in which the project resides. Exemptions from hydromodification management requirements are described in Section 1.6 of this Manual.

For undisturbed sites, the existing condition should be taken to be the pre-development runoff condition. For redevelopment PDPs or sites that have been previously disturbed, pre-development runoff conditions must be approximated by applying the parameters of a pervious area rather than an impervious area to the existing site, using the existing onsite grade and assuming the infiltration characteristics of the underlying soil.

For San Diego area watersheds, the range of flows that result in increased potential for erosion or degraded instream habitat downstream of PDPs and the critical channel flow must be based on the "Final Hydromodification Management Plan Prepared for County of San Diego, California March 2011" (herein, "March 2011 Final HMP"). For PDPs subject to hydromodification management requirements, the range of flows to control depends on the erosion susceptibility of the receiving stream and must be:

- 0.1Q2 to Q10 for streams with high susceptibility to erosion (this is the default range of flows to control when a stream susceptibility study has not been prepared);
- 0.3Q2 to Q10 for streams with medium susceptibility to erosion and which has a stream susceptibility study prepared and approved by the City; or
- 0.5Q2 to Q10 for streams with low susceptibility to erosion and which has a stream susceptibility study prepared and approved by the City.

Tools for assessing stream susceptibility to erosion have been developed by Southern California Coastal Water Research Project (SCCWRP). The tools are presented in the March 2011 Final HMP and also available through SCCWRP's website. If a PDP applicant intends to select the 0.3Q2 or 0.5Q2 threshold, the SCCWRP screening tool must be completed and submitted with other project documentation.

The March 2011 Final HMP does not provide criteria for protection of critical sediment yield areas. The standard as presented in the MS4 Permit and shown above is: avoid and allow bypass of critical

sediment yield areas or implement measures that allow critical coarse sediment to be discharged to receiving waters, such that there is no net impact to the receiving water.

Methods to demonstrate compliance with hydromodification management requirements, including protection of critical coarse sediment yield areas and flow control for post-project runoff from the project site, are presented in Chapter 6 of this Manual. Hydromodification management concepts, theories, and references are described below.

2.3.2 Hydromodification Management Concepts and References

2.3.2.1 What is Hydromodification?

The MS4 Permit defines hydromodification as the change in the natural watershed hydrologic processes and runoff characteristics (i.e. interception, infiltration, overland flow, 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.

Typical impacts to natural watershed hydrologic processes and runoff characteristics resulting from new development and redevelopment include:

- Decreased interception and infiltration of rainfall at the project site due to removal of native vegetation, compaction of pervious area soils, and the addition of impervious area;
- Increased connectivity and efficiency of drainage systems serving the project site, including concentration of project-site runoff to discrete outfalls;
- Increased runoff volume, flow rate, and duration from the project site due to addition of impervious area, removal of native vegetation, and compaction of pervious area soils;
- Reduction of critical coarse sediment supply from the project site to downstream natural systems (e.g. streams) due to stabilization of developed areas, stabilization of streams, and addition of basins that trap sediment (either by design as a permanent desilting basin or stormwater quality treatment basin that settles sediment, or incidentally as a peak flow management basin); and
- Interruption of critical coarse sediment transport in streams due to stream crossings such as culverts or ford crossings that incidentally slow stream flow and allow coarse sediment to settle upstream of the crossing.

Any of these changes can result in increased potential for erosion, or degraded instream habitat downstream of PDPs. The changes to delivery of runoff to streams typically modify the timing, frequency, magnitude, and duration of both storm flows and baseflow. Changes to delivery of coarse sediment and transport of coarse sediment result in increased transport capacity and the potential for adverse channel erosion.

Note that this Manual is intended for design of permanent, post-construction BMPs, therefore this discussion is focused on the permanent, post-construction effects of development. The process of construction also has impacts, such as an increase in sediment load produced from surfaces exposed

by vegetation removal and grading, which is often deposited within stream channels, initiating aggradation and/or channel widening. Temporary construction BMPs to mitigate the sediment delivery are outside the purview of this Manual.

Channel erosion resulting from PDP stormwater discharge can begin at the point where runoff is discharged to natural systems, regardless of the distance from the PDP to the natural system. It could also begin some distance downstream from the actual discharge point if the stream condition is stable at the discharge point but more susceptible to erosion at a downstream location. The March 2011 HMP defines a domain of analysis for evaluation of stream susceptibility to erosion from PDP stormwater discharge.

2.3.2.2 How Can Hydromodification be Controlled?

In the big picture, watershed-scale solutions are necessary to address hydromodification. Factors causing hydromodification are watershed-wide, and all of San Diego's major watersheds include some degree of legacy hydromodification effects from existing development and existing channel modifications, which cannot be reversed by onsite measures implemented at new development and redevelopment projects alone. As recommended by SCCWRP in Technical Report 667, "Hydromodification Assessment and Management in California," dated April 2012, "management strategies should be tailored to meet the objectives, desired future conditions, and constraints of the specific channel reach being addressed," and "potential objectives for specific stream reaches may include: protect, restore, or manage as a new channel form."

Development of such management strategies and objectives for San Diego watersheds will evolve over successive MS4 Permit cycles. The current MS4 Permit requires the Copermittees to prepare WQIPs for all Watershed Management Areas within the San Diego Region. The WQIPs may include WMAAs which would assess watershed-wide hydrologic processes. These documents may be used to develop watershed-specific requirements for structural BMP implementation, including watershed-scale hydromodification management strategies.

This Manual addresses development and redevelopment project-level hydromodification management measures currently required for PDPs by the MS4 Permit. Until optional watershed-specific performance recommendations or offsite alternative compliance programs are developed, hydromodification management strategies for new development and redevelopment projects will consist of onsite measures designed to meet the performance requirements of Provisions E.3.c.(2).(a) and (b) of the MS4 Permit shown in Section 2.3.1. While development project-level measures alone will not reverse hydromodification of major streams, onsite measures are a necessary component of a watershed-wide solution, particularly while watershed-wide management strategies are still being developed. Also, development project-level measures are necessary to protect a project's specific stormwater discharge points, which are typically discharging in smaller tributaries not studied in detail in larger watershed studies. Typical measures for development projects include:

- Protecting critical sediment yield areas by designing the project to avoid and allow bypass of them or implementing measures that would allow coarse sediment to be discharged to receiving waters, such that the natural sediment supply is unaffected by the project;
- Using site design/LID measures to minimize impervious areas onsite and reduce post-project runoff; and

- Providing structural BMPs designed using continuous simulation hydrologic modeling to provide flow control of post-project runoff (e.g. BMPs that store post-project runoff and infiltrate, evaporate, harvest and use, or discharge excess runoff at a rate below the critical flow rate).

Structural BMPs for hydromodification management provide volume to control a range of flows from a fraction of Q2 to Q10. The volume determined for hydromodification management is different from the DCV for pollutant control. Methodology to demonstrate compliance with hydromodification management requirements are presented in Chapter 6 of this Manual. See Section 2.4 regarding the relationship between pollutant control and hydromodification management performance standards.

2.3.3 Avoidance and Bypass of Critical Coarse Sediment

For many Priority Development Project sites, additional BMPs may be needed to preserve the supply of critical coarse sediment to water bodies. Any PDP that is not fully exempt from hydromodification management requirements must either comply with critical coarse sediment requirements or demonstrate that they do not apply. Documentation of applicability and compliance options is required in SWQMP forms and corresponding attachments. See Section 6.2 and Appendix H for additional description of these requirements.

2.4 Relationship between Performance Standards

An integrated approach can provide significant cost savings by utilizing design features that meet multiple standards.

Site design/LID, stormwater pollutant control, and hydromodification management are separate requirements to be addressed in development project design. Each has its own purpose and each has separate performance standards that must be met. However, effective project planning involves understanding the ways in which these standards are related and how single suites of design features can meet more than one standard.

Site design features (aka LID) can be effective at reducing the runoff to downstream BMPs.

Site design BMPs serve the purpose of minimizing impervious areas and therefore reducing post-project runoff, and reducing the potential transport of pollutants offsite and reducing the potential for downstream erosion caused by increased flow rates and durations. By reducing post-project runoff through, site design BMPs, the amount of runoff that must be managed for pollutant control and hydromodification flow control can be reduced.

Single structural BMPs, particularly retention BMPs, can meet or contribute to both pollutant control and hydromodification management objectives.

The objective of structural BMPs for pollutant control is to reduce offsite transport of pollutants, and the objective of structural BMPs for hydromodification management is to control flow rates and durations for control of downstream erosion. In either case, the most effective structural BMP to meet the objective are BMPs that are based on retention of stormwater runoff where feasible. Both stormwater pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s). However, demonstrating that the separate performance requirements for pollutant control and hydromodification management are met must be shown

separately.

The design process should start with an assessment of the feasibility to retain or partially retain the DCV for pollutant control, then determine what kind of BMPs will be used for pollutant control and hydromodification management.

A typical design process for a single structural BMP to meet two separate performance standards at once involves (1) initiating the structural BMP design based on the performance standard that is expected to require the largest volume of stormwater to be retained, (2) checking whether the initial design incidentally meets the second performance standard, and (3) adjusting the design as necessary until it can be demonstrated that both performance standards are met.

3 Development Project Planning and Design

Compliance with source control/site design, pollutant control, and hydromodification management BMPs, as applicable, requires coordination of site, landscape, and project stormwater plans. It also involves provisions for operation and maintenance of structural BMPs. This chapter outlines a step-wise, systematic approach (Figure 3-1) to preparing a comprehensive stormwater management design for Standard~~, Basic~~ and Exempt Projects and PDPs.

STEP 1: **Coordinate Between Disciplines** Refer to Section 3.1	*Purpose:* Engage and coordinate with owner and other project disciplines (e.g. architect, engineer) early in the design and throughout the design process to support appropriate project decisions.
⇓	
STEP 2: **Gather Project Site Information** Refer to Section 3.2	*Purpose:* Gather information necessary to inform overall storm water planning process and specific aspects of BMP selection; determine the applicable storm water requirements for the project.
⇓	
STEP 3: **Develop Conceptual Site Layout and Storm Water Control Strategies** Refer to Section 3.3	*Purpose:* Use the information obtained in Step 2 to inform the preliminary site design and storm water management strategy. The scope of this step varies depending on whether the project is a Standard Project or a PDP.
⇓	
STEP 4: **Develop Complete Storm Water Management Design** Refer to Section 3.4	*Purpose:* Develop the complete storm water management design by incorporating the site design and storm water management strategies identified in Step 3 and conducting design level analyses. Integrate the storm water design with the site plan and other infrastructure plans.

FIGURE 3-1. Approach for Developing a Comprehensive Storm Water Management Design

Use of this step-wise approach is encouraged and has a number of advantages. First, it helps ensure that applicable requirements and design goals are identified early in the planning process. Second, it helps ensure that key data about the site, watershed, and project are collected at the appropriate time in the project development process, and the analyses are suited to the decisions that need to be made at each phase. Third, taking a systematic approach helps identify opportunities for retention of

stormwater that may not be identified in a less systematic process. Finally, a systematic approach helps ensure that constraints and unintended consequences are considered and used to inform BMP selection, design, and related project decisions.

3.1 Coordination Between Disciplines

Stormwater management design will affect the site layout and should therefore be coordinated among the project team as necessary from the start. The following list describes entities/disciplines that are frequently involved with stormwater management design and potential roles that these entities/disciplines may play.

Owner:

- Engage the appropriate disciplines needed for the project and facilitate exchange of information between disciplines.
- Identify who will be responsible for long term O&M of stormwater management features and initiate maintenance agreements when applicable.
- Ensure that whole lifecycle costs are considered in the selection and design of stormwater management features and a source of funding is provided for long-term maintenance.
- Identify the party responsible to inspect structural BMPs at each significant construction stage and at completion in order to provide certification of structural BMPs following construction.

Planner:

- Communicate overall project planning criteria to the team, such as planned development density, parking requirements, project-specific planning conditions, conditions of approval from prior entitlement actions (e.g. CEQA, 401 certifications) etc., and locations of open space and conservation easements, and environmentally sensitive areas that are protected from disturbance.
- Consider location of stormwater facilities early in the conceptual site layout process.
- Assist in developing the site plan.

Architect:

- Participate in siting and design (architectural elements) of stormwater BMPs.

Civil Engineer:

- Determine stormwater requirements applicable to the site (e.g. Standard~~, Basic~~, or Exempt Project or PDP).
- Obtain site-specific information (e.g. watershed information, infiltration rates) and develop viable stormwater management options.
- Reconcile stormwater management requirements with other site requirements (e.g. fire access, Americans with Disabilities Act accessibility, parking, open space).
- Develop preliminary and final design documents.
- Select and design BMPs; conduct and document associated analyses; prepare BMP design

sheets, details, and specifications.

- Prepare project SWQMP submittals.

Landscape Architect and/or Horticulturist/Agronomist:

- Select appropriate plants for vegetated stormwater features and prepare planting plans.
- Develop specifications for planting, vegetation establishment, and maintenance.
- Assist in developing irrigation plans/rates to minimize water application and non-stormwater runoff from the project site.

Geotechnical Engineer

- Assist in preliminary infiltration feasibility screening of the site to help inform project layout and initial BMP selection, including characterizing soil, groundwater, geotechnical hazards, and any other factors, as applicable for the site.
- Conduct detailed analyses at proposed infiltration BMP locations to confirm or revise feasibility findings and provide design infiltration rates.

Geomorphologist and/or Geologist

- Provide specialized services, as needed, related to sediment source assessment and/or channel stability or sensitivity assessment.

3.2 Gathering Project Site Information

In order to make decisions related to selection and design of stormwater management BMPs, it is necessary to gather relevant project site information. This could include physical site information, proposed uses of the site, whether the project is a Standard~~, Basic~~, or Exempt Project or a PDP, proposed stormwater discharge locations, potential/anticipated stormwater pollutants based on the proposed uses of the site, receiving water sensitivity to pollutants and susceptibility to erosion, hydromodification management requirements, and other site requirements and constraints.

The amount and type of information that should be collected depends whether the project is a Standard~~, Basic~~ or Exempt Project, a PDP subject to all requirements, or a PDP with only pollutant control requirements. Refer to Figure 1-1 in Chapter 1 to identify the project type.

Information should only be gathered to the extent necessary to inform the stormwater management design. In some cases, it is not necessary to conduct site specific analyses to precisely characterize conditions. For example, if depth to groundwater is known to be approximately 100 feet based on regional surveys, it is not necessary to also conduct site specific assessment of depth to groundwater to determine whether it is actually 90 feet or 110 feet on the project site. The difference between these values would not influence the stormwater management design. In other cases, some information will not be applicable. For example, on an existing development site, there may be no natural hydrologic features remaining, therefore these features do not need to be characterized. The lack of natural hydrologic features can be simply noted without further effort required.

Checklists (in Appendix J) and submittal templates (in Appendix A) are provided to facilitate gathering information about the project site for BMP selection and design. As part of planning for site

investigation, it is helpful to review the subsequent steps (Section 3.3 and 3.4) to gain familiarity with how the site information will be used in making decisions about site layout and stormwater BMP selection and design. This can help prioritize the data that are collected.

3.3 Developing Conceptual Site Layout and Storm Water Control Strategies

Once preliminary site information has been obtained, it is essential to identify potential locations for stormwater management features at a conceptual level during the site planning phase. Preliminary design of permanent stormwater BMPs is partially influenced by whether the project is a Standard Project or a PDP. Table 3-1 presents the applicability of different subsections in this chapter based on project type and must be used to determine which requirements apply to a given project.

TABLE 3-3-1. Applicability of Section 3.3 Sub-sections for Different Project Types

Project Type	Section 3.3.1	Section 3.3.2	Section 3.3.3	Section 3.3.4
~~Basic and~ Exempt Projects~*~	☑	NA	NA	NA
Standard Project	☑	NA	NA☑	NA☑~*~
PDP with only Pollutant Control Requirements	☑	NA	☑	☑
PDP with Pollutant and Hydromodification Management Requirements	☑	☑	☑	☑

~*Shall provide BMPs based on Section 1.4.3.1~

3.3.1 Preliminary Design Steps for All Development Projects

All projects must incorporate source control and site design BMPs. The following systematic approach outlines these site planning considerations for all development projects:

1 Review Chapter 4 of this manual to become familiar with the menu of source control and site design practices that are required.

2 Review the preliminary site information gathered in Section 3.2, specifically related to:

   a. Natural hydrologic features that can be preserved and/or protected;

   b. Soil information;

   c. General drainage patterns (i.e. general topography, points of connection to the storm drain or receiving water);

   d. Pollutant sources that require source controls; and

   e. Information gathered and summarized in the Site Information Checklist for Standard~, Basic~ and Exempt Projects (Appendix J-3A).

3 Create opportunities for source control and site design BMPs by developing an overall conceptual site layout that allocates space for site design BMPs and promotes drainage patterns that are effective for hydrologic control and pollutant source control. For example:
   a. Locate pervious areas down gradient from buildings where possible to allow for dispersion.
   b. Identify parts of the project that could be drained via overland vegetated conveyance rather than piped connections.
   c. Develop traffic circulation patterns that are compatible with minimizing street widths.
4 As part of Section 3.4, refine the selection and placement of source control and site design BMPs and incorporate them into project plans. Compliance with site design and source control requirements shall be documented as described in Chapter 4.

3.3.2 Evaluation of Critical Coarse Sediment Yield Areas

For PDPs that are required to meet hydromodification management requirements, evaluate whether critical coarse sediment yield areas exist within or upstream of the project site. Identification of critical coarse sediment yield areas is discussed in Chapter 6 of this manual, additional guidance on identification and protection of critical coarse sediment yield areas is provided in Appendix H. Conceptual layout of the project site must consider the following items:

   a. Have critical coarse sediment areas been identified within the project site? Does the proposed project impact these onsite critical coarse sediment areas? What measures are necessary to avoid impacts to these areas? What measures are necessary to convey critical coarse sediment from these areas through the site?
   b. Have critical coarse sediment areas been identified upstream of the project site? Does the proposed project impact upstream critical coarse sediment areas? What measures are necessary to avoid impacts to these areas or convey critical coarse sediment from these areas through the site?
   c. If impacts to onsite and offsite critical course sediment areas are not avoided, what mitigation practices will be implemented to ensure no net impact to the receiving water?

3.3.3 Drainage Management Areas

Drainage management areas (DMAs) provide an important framework for feasibility screening, BMP prioritization, and stormwater management system configuration. BMP selection, sizing, and feasibility determinations must be made at the DMA level; therefore delineation of DMAs is highly recommended at the conceptual site planning phase and is mandatory for completing the project design and meeting submittal requirements. This section provides guidance on delineating DMAs that is intended to be used as part of Section 3.3 and 3.4.

DMAs are defined based on the proposed drainage patterns of the site and the BMPs to which they drain. On site DMAs should not overlap and should be similar with respect to BMP opportunities and feasibility constraints. More than one DMA can drain to the same BMP, or to another DMA. However, because the BMP sizes are determined by the runoff from the DMA, a single DMA may not drain to more than one BMP. See Figure 3-2.

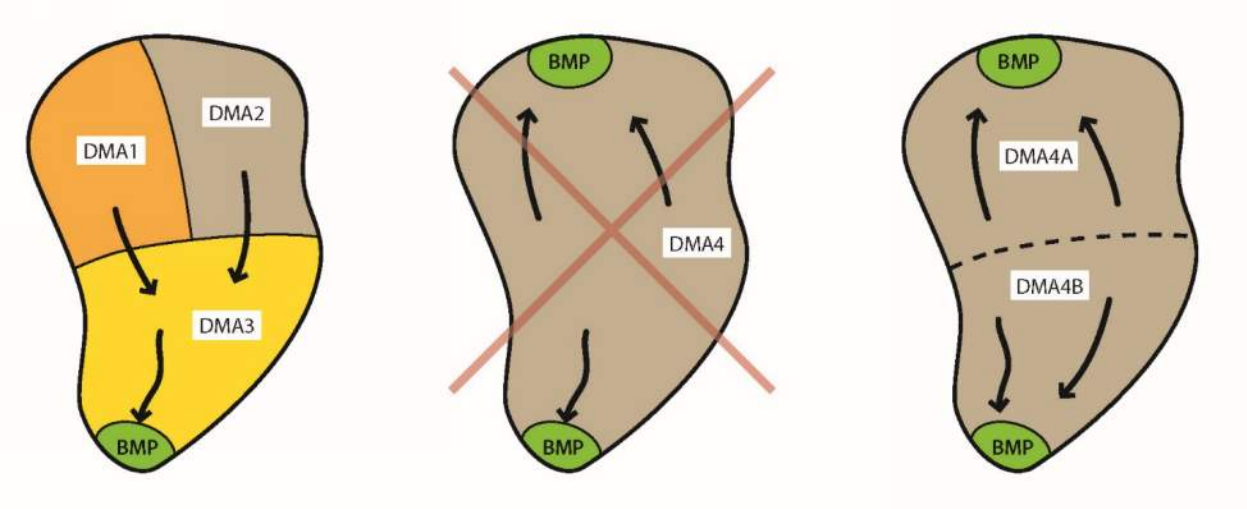


FIGURE 3-2. DMA Delineation

In some cases, in early planning phases, it may be appropriate to generalize the proposed treatment plan by simply assigning a certain BMP type to an entire planning area (e.g. Parking lot X will be treated with bioretention) and calculating the total sizing requirement without identifying the specific BMP locations at that time. This planning area would be later subdivided for design-level calculations. Section 5.2 provides additional guidance on DMA delineation. A runoff factor (similar to a "C" factor used in the rational method) should be used to estimate the runoff draining to the BMP. Appendix B.1 provides guidance in estimating the runoff factor for the drainage area draining to a BMP.

BMPs must be sized to treat the DCV from the total area draining to the BMP, including any offsite or onsite areas that comingle with project runoff and drain to the BMP. To minimize offsite flows treated by project BMPs, consider diverting upgradient flows subject to local drainage and flood control regulation. An example is shown in Figure 3-3.

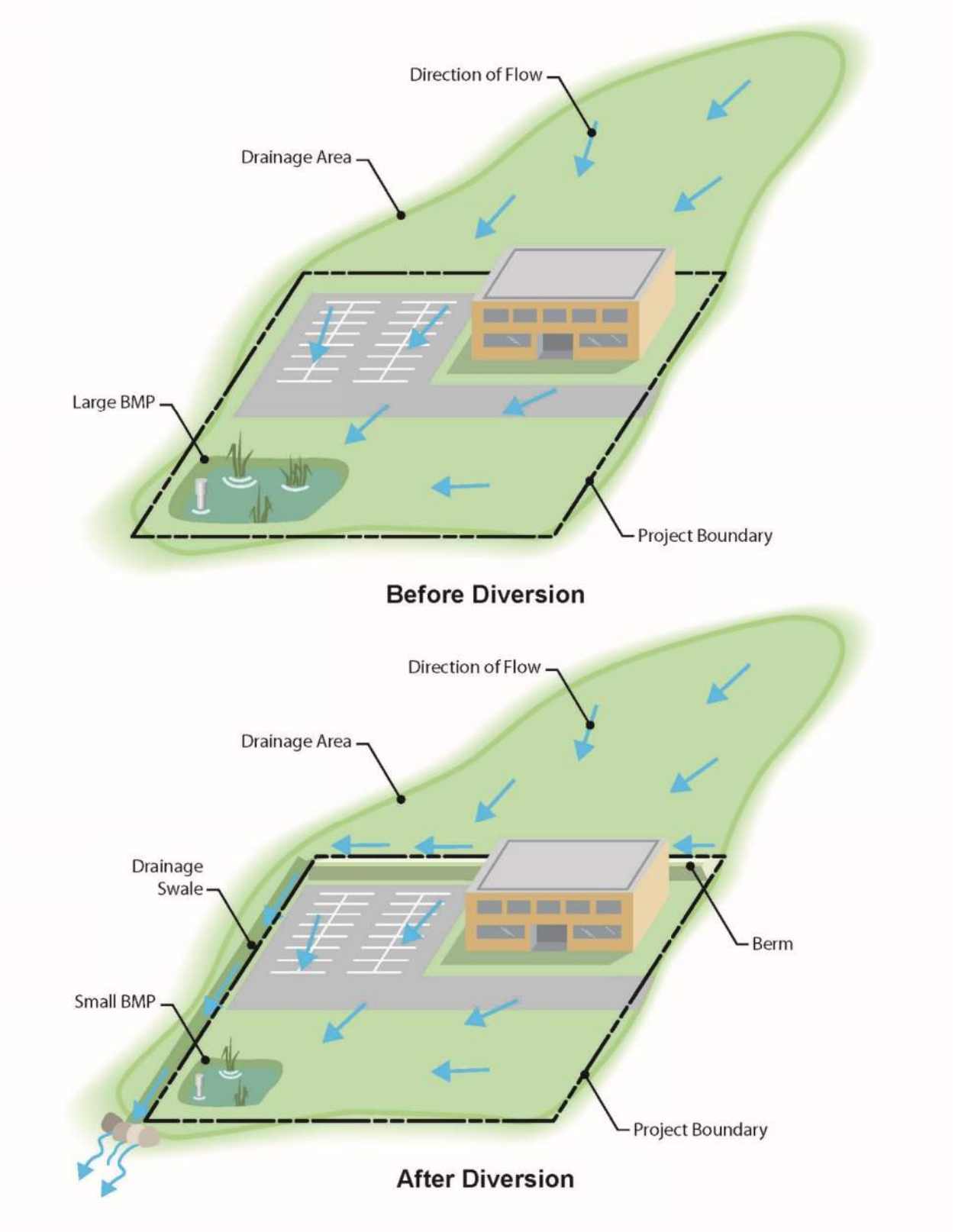


FIGURE 3-3. Tributary Area for BMP Sizing

3.3.4 Developing Conceptual Storm Water Control Strategies

This step applies to PDPs only. The goal of this step is to develop conceptual stormwater control strategies that are compatible with the site conditions, including siting and preliminary selection of structural BMPs. The end product of this step should be a general, but concrete understanding of the stormwater management parameters for each DMA, the compatibility of this approach with the site design, and preliminary estimates of BMP selection. For simpler sites, this step could be abbreviated in favor of skipping forward to design-level analyses in Section 3.4. However, for larger and/or more complex sites, this section can provide considerable value and help allow evaluation of stormwater management requirements on common ground with other site planning considerations.

The following systematic approach is recommended:

1. Review the preliminary site information gathered in Section 3.2, specifically related to information gathered and summarized in the Site Information Checklist for PDPs (Appendix J-3B).
2. Identify self-mitigating, de minimis areas, and/or potential self-retaining DMAs that can be isolated from the remainder of the site (See Section 5.2).
3. Estimate DCV for each of the remaining DMAs (See Appendix B.1).
4. Determine if there is a potential opportunity for harvest and use of stormwater from the project site. See Section 5.4.1 for harvest and use feasibility screening, which is based on water demand at the project site. For most sites, there is limited opportunity; therefore evaluating this factor early can help simplify later decisions.
5. Estimate potential runoff reduction and the DCV that could be achieved with site design BMPs (See Appendix B.1).
6. Based on the remaining runoff after accounting for steps 2 to 5, estimate BMP space requirements. Identify applicable structural BMP requirements (i.e. stormwater pollutant control versus hydromodification management) and conduct approximate sizing calculations to determine the overall amount of storage volume and/or footprint area required for BMPs. Use worksheets presented in Appendices B.4 and B.5 to estimate sizing requirements for different types of BMPs.
7. Conduct preliminary screening of infiltration feasibility conditions as part of site planning to identify areas that are more or less conducive to infiltration. Recommended factors to consider include:
    a. Soil types (determined from available geotechnical testing data, soil maps, site observations, and/or other data sources)
    b. Approximate infiltration rates at various points on the site, obtained via approximate methods (e.g. simple pit test), if practicable
    c. Groundwater elevations
    d. Proposed depths of fill
    e. New or existing utilities that will remain with development
    f. Soil or groundwater contamination issues within the site or in the vicinity of the site
    g. Slopes and other potential geotechnical hazards that are unavoidable as part of site development

h. Safety and accessibility considerations

This assessment is not intended to be final or account for all potential factors. Rather, it is intended to help in identifying site opportunities and constraints as they relate to site planning. After potential BMP locations are established, a more detailed feasibility analysis is necessary (see Section 3.4 and 5.4.2). Additionally, Appendix C provides methods for geotechnical and groundwater assessment applicable for screening at the planning level and design-level requirements. The jurisdiction may allow alternate assessment methods with appropriate documentation at the discretion of the City Engineer.

8. Identify tentative BMP locations based on preliminary feasibility screening, natural opportunities for BMPs (e.g. low areas of the site, areas near storm drain or stream connections), and other BMP sites that can potentially be created through effective site design (e.g. oddly configured or otherwise unbuildable parcels, easements, and landscape amenities including open space and buffers which can double as locations for bioretention or biofiltration facilities). **Centralized stormwater management BMPs that treat runoff from all portions of the project are required unless otherwise authorized by the City Engineer.**

9. Based on the results of feasibility screening and tentative DMA and BMP locations, determine the general infiltration feasibility condition at these locations. Categories are described in Section 5.4.2 and include:
    a. Full infiltration condition;
    b. Partial infiltration condition; and
    c. No infiltration condition.

    Adapt the site layout to attempt to achieve infiltration to the greatest extent feasible.

10. Consider how stormwater management BMPs will be accessed for inspection and maintenance and provide necessary site planning allowances (access roads, inspection openings, setbacks, etc.). On private projects, stormwater management BMPs are only allowed within the bounds of the private property unless otherwise authorized by the City Engineer.

11. In the SWQMP document site planning and opportunity assessment activities as a record of the decisions that led to the development of the final stormwater management plan. The SWQMP primarily will show the complete design rather than the preliminary steps in the process. However, to comply with the requirements of this manual, the applicant is required to describe how stormwater management objectives have been considered as early as possible in the site planning process and how opportunities to incorporate BMPs have been identified.

3.4 Developing Complete Storm Water Management Design

The complete stormwater management design consists of all of the elements describing the BMPs to be implemented as well as integration of the BMPs with the site design and other infrastructure. The scope of this step varies depending on whether the project is an Exempt Project, ~~a Basic Project~~, a Standard Project, a PDP with only pollutant control BMP requirements, or a PDP with pollutant

control and hydromodification management requirements. The following systematic approach is recommended to develop a final site layout and stormwater management design. Table 3-2 presents the applicability of different subsections based on project type and must be used to determine which requirements apply to a given project.

TABLE 3-3-2. Applicability of Section 3.4 Sub-sections for Different Project Types

Project Type	Section 3.4.1	Section 3.4.2	Section 3.4.3
~~Basic and~ Exempt Projects	☑	NA	NA
Standard Projects	☑	NA☑~~*~~	NA
PDP with only Pollutant Control Requirements	☑	☑	NA
PDP with Pollutant Control and Hydromodification Management Requirements	☑	NA	☑

~~*Shall provided BMPs based on section 1.4.3.1~~

3.4.1 Steps for All Development Projects

Standard~~, Basic~~ and Exempt Projects only need to satisfy the source control and site design requirements of Chapter 4 of this manual, and then proceed to Chapter 8 of this manual to determine submittal requirements.

1. Identify general requirements applicable to the selection and design of BMPs. See Section 4.1.
2. Select, identify and detail specific source control BMPs. See Section 4.2.
3. Select, identify and detail specific site design BMPs. See Section 4.3.
4. Document that all applicable source control and site design BMPs have been used. See Chapter 8.

3.4.2 Steps for PDPs with only Pollutant Control Requirements

The steps below primarily consist of refinements to the conceptual steps completed as part of Section 3.3, accompanied by design-level detail and calculations. More detailed instructions for selection and design of stormwater pollutant treatment BMPs are provided in Chapter 5.

1. Select locations for stormwater pollutant control BMPs, and delineate and characterize DMAs using information gathered during the site planning phase.
2. Determine retention requirements per Appendix B.2.
3. Based on the results of step 2, select the BMP category that is most appropriate for the

site.

4. Calculate required BMP sizes and footprints. See Appendix B (sizing methods) and Appendix E (design criteria).

5. Evaluate whether the required BMP footprints will fit within the site considering the site constraints; if not, then document infeasibility and move to the next step.

6. If using biofiltration BMPs, document conformance with the criteria for biofiltration BMPs found in Appendix F, including Appendix F.1.

7. If needed, implement flow-thru treatment control BMPs (for use with Alternative Compliance[7]) for the remaining DCV. See Section 5.5.4 and Appendix B.6 for additional guidance

8. If flow-thru treatment control BMPs (for use with Alternative Compliance[6]) were implemented, refer to Section 1.8.

9. Prepare SWQMP documenting site planning and opportunity assessment activities, final site layout, and stormwater management design. See Chapter 8.

10. Determine and document O&M requirements. See Chapters 7 and 8.

3.4.3 Steps for Projects with Pollutant Control and Hydromodification Management Requirements

The steps below primarily consist of refinements to the conceptual steps completed as part of Section 3.3, accompanied by design-level detail and calculations[7]. More detailed instruction for selection and design of stormwater pollutant treatment and hydromodification control BMPs are provided in Chapters 5 and 6, respectively.

1. If critical coarse sediment yield areas were determined to exist within or upstream of the project site (Section 3.3.2), incorporate on-site mitigation measures when applicable (Section 6.2).

2. Determine the point of compliance and evaluate the susceptibility to erosion of the downstream channel.

3. Select locations for stormwater pollutant control and hydromodification management BMPs. Delineate and characterize DMAs using information gathered during the site planning phase.

4. Conduct feasibility analysis for harvest and use BMPs. See Section 5.4.1.

5. Conduct feasibility analysis for infiltration to determine the infiltration condition. See Section 5.4.2.

[6] The City of Encinitas does not currently have an Alternative Compliance Program.
[7] Steps 8-10 only apply if the City of Encinitas has implemented an Alternative Compliance Program or approved a project based Alternative Compliance design.

6. Based on the results of steps 3 and 4, select the BMP category for pollutant treatment BMPs that is most appropriate for the site. See Section 5.5.

7. Develop the design approach for integrating stormwater pollutant treatment and hydromodification control. The same location(s) can serve both functions (e.g. a biofiltration area that provides both pollutant control and flow control), or separate pollutant control and flow control locations may be identified (e.g. several dispersed retention areas for pollutant control, with overflow directed to a single location of additional storage for flow control).

8. Calculate BMP sizing requirements for pollutant control and flow control. See Appendix B (sizing methods) and Appendix E (design criteria).

    a. When the same BMP will serve both functions, Section 6.3.6 of this manual provides recommendations for assessing the controlling design factor and initiating the design process.

9. Evaluate whether the required BMP footprints will fit within the site considering the site constraints:

    a. If they fit within the site, design BMPs to meet applicable sizing and design criteria. Document sizing and design separately for pollutant control and hydromodification management even when the same BMP is serving both functions.

    b. If they do not fit the site, document infeasibility and move to the next step.

10. Implement flow-thru treatment control BMPs (for use with Alternative Compliance[8]) for the remaining DCV. See Section 5.5.4 and Appendix B.6 for additional guidance.

11. If flow-thru treatment control BMPs (for use with Alternative Compliance) were implemented, refer to Section 1.8. [9]

12. Prepare a SWQMP documenting site planning and opportunity assessment activities, final site layout, stormwater pollutant control design, and hydromodification management design. See Chapter 8.

13. Determine and document O&M requirements. See Chapters 7 and 8.

3.5 Project Planning and Design Requirements Specific to Local Jurisdiction

For projects within the City of Encinitas, the following local project planning and design requirements must be met.

3.5.1 Maximum Ponding Depth

For all bioretention, partial retention and flow through BMPs, a maximum ponding depth of 18 inches must not be exceeded. The ponding depth is measured from the top opening of the grate inlet to the

[8]The City of Encinitas does not currently have an Alternative Compliance Program.

top of finished grade of the BMP. BMPs with ponding depths that exceed 18 inches tend to lose effectiveness more quickly over time and therefore are not allowed.

3.5.2 SCCWRP Analysis

SCCWRP analysis that was conducted for a nearby project may be used for your project at the discretion of the City Engineer on a case by case basis.

3.5.3 Location of BMPs on the project site

When water quality treatment and hydromodification management is deemed to be technically infeasible within given DMA, the City Engineer may authorize BMPs to be located within an alternate DMA on the within the project site, as long as both DMAs are tributary to the same downstream point of compliance and as long as the water quality benefit is equal to or greater than the treatment necessary for the of the infeasible area. For example, a project that is required to provide road widening along the property frontage where treatment of the runoff from the additional pavement is deemed infeasible, may be authorized to treat the runoff from another portion of the site in-lieu of the actual pavement being created, as long there is an equal or greater water quality benefit.

3.5.4 Centralized Facilities

Centralized structural BMPs that treat runoff from all portions of the project are required unless otherwise authorized by the City Engineer. Where BMPs are authorized on individual residential lots, BMPs must be located in the front yards unless otherwise authorized by the City Engineer. Centralized facilities must be maintained by a Homeowner's Association, unless otherwise authorized by the City Engineer. Adequate access for maintenance and inspection of the centralized facility shall be provided. Centralized facilities and their corresponding maintenance access shall be deed restricted to prevent future development of the land for any other purpose.

3.5.5 Impervious area calculations for subdivisions

When calculating the proposed impervious area on a proposed residential subdivision, a 15 percent contingency for hardscape added by future homeowners must be included in the proposed impervious area measurement.

3.5.6 Infiltration Testing

Infiltration testing on the existing site must be conducted at the discretionary review phase of PDPs. Results of infiltration testing must be included in the SWQMP submittal.

3.5.7 Temporary Improvements

Unforeseen circumstances may cause temporary improvements to be installed for much longer than anticipated. Examples of temporary improvements include parking lots for model home visitors and construction site management offices. At the discretion of the City Engineer, temporary improvements may require stormwater treatment to avoid downstream water quality impacts.

3.5.8 City Engineer has the final discretion

The City Engineer has the ultimate discretion to determine the project category (PDP, Standard, ~~Basic~~ or Exempt) and approve proposed stormwater management BMP sizing and design.

3.6 Phased Projects

Phased projects typically require a conceptual or master PDP SWQMP followed by more detailed submittals. See section 1.3 for more details regarding the definition of a project.

Chapter 4

4 Source Control and Site Design Requirements for All Development Projects

This chapter presents the source control and site design requirements to be met by Exempt Projects, ~~Basic Projects,~~ Standard Projects and PDPs. Checklists J-4 for source control and J-5 for site design included in Appendix J can be used by all project types to document conformance with the requirements.

4.1 General Requirements (GR)

GR-1: Onsite BMPs must be located so as to remove pollutants from runoff prior to its discharge to any receiving waters, and as close to the source as possible.

The location of the BMP affects the ability of the BMP to retain and/or treat the pollutants from the contributing drainage area. BMPs should be placed as close to the pollutant source as possible.

> **How to comply**: Projects shall comply by implementing source control (Section 4.2) and site design BMPs (Section 4.3) that are applicable to the project and site conditions.

GR-2: Structural BMPs must not be constructed within the Waters of the United States

The definition of Waters of the U.S. can be found in Clean Water Rule 40 CFR 230.2. Structural BMPs must not be constructed within navigable waters, impoundments, tributaries to navigable waters, wetlands, vernal pools, and the 100-year floodplain.

Construction, operation, and maintenance of a structural BMP in a water body can negatively impact the physical, chemical, and biological integrity of the water body, as well as its beneficial uses. However, alternative compliance[9] opportunities involving restoration of areas within Waters of the U.S. may be identified by local jurisdictions.

> **How to comply**: Projects shall demonstrate compliance with this requirement by showing

[9] The City of Encinitas does not currently have an Alternative Compliance Program.

the location of structural BMPs on project plans and describing or depicting the location of receiving waters.

GR-3: Onsite BMPs must be designed and implemented with measures to avoid the creation of nuisances or pollutants associated with vectors (e.g. mosquitos, rodents, and flies).

According to the California Department of Health, site design features and structural BMPs that retain standing water for over 96 hours may facilitate mosquito breeding.

> **How to comply**: Projects shall comply by incorporating design, construction, and maintenance principles to minimize standing water and to drain retained water within **96 hours**. Design calculations shall be provided to demonstrate that the potential for surface water ponding accessible to mosquitos has been addressed. This criterion is not applicable to ponding water that is not accessible to vectors, such as water retained in the amended soil of a biofiltration facility.

4.2 Source Control (SC) BMP Requirements

Source control BMPs avoid and reduce pollutants in stormwater runoff. Everyday activities such as recycling, trash disposal, and irrigation generate pollutants that have the potential to drain to the stormwater conveyance system. Source control BMPs are defined as activities that reduce the potential for stormwater runoff to come into contact with pollutants. An activity could include an administrative action, design of a structural facility, usage of alternative materials, and operation, maintenance and inspection of an area. Where applicable and feasible, all development projects are required to implement source control BMPs. Applicability and feasibility determinations and selection of source control BMPs will be reviewed and approved by the City during the plan check process. Source control BMPs are discussed below.

> **How to comply**: Projects must implement all source control BMPs that are applicable to their project. Applicability should be determined through a consideration of the development project's proposed features and the anticipated pollutant sources associated with them. Appendix D provides guidance for identifying source control BMPs applicable to a project. Table 2 "Baseline BMPs for Pollutant-Generating Sources" located in Standard and PDP SWQMPs must be used to document compliance with these requirements. Table 2 applies to all projects except for Small Residential Projects. Small Residential Projects are those requiring either: a Building Permit, Minor Residential Grading Permit, or site Plan Permit for a single family home; or a Tentative Parcel Map Permit for up to 4 single family homes and a remainder parcel.

Prevent illicit discharges into the MS4

An illicit discharge is any discharge to the MS4 that is not composed entirely of stormwater except discharges pursuant to a National Pollutant Discharge Elimination System permit and discharges resulting from emergency firefighting activities. Projects must effectively eliminate discharges of non-stormwater into the MS4.

For outdoor areas, exposure reduction generally requires work areas and storage areas to be covered to prevent rain exposure; graded to prevent stormwater run-on and run-off; and protected from the wind so that materials are not dispersed. See Fact Sheet BL-5 (Work and Storage Areas) in Appendix

C. If there are storm water discharges from outdoor areas work areas or storage areas, Fact Sheet BL-6 (Management of Stormwater Discharges) in Appendix C provides practices to prevent discharge of materials from these areas. For interior work surfaces, floor drains and sumps, drain lines, and fire sprinkler test water, exposure reduction generally requires directing the discharge to the sanitary sewer. See Fact Sheet BL-7 (Management of Non-Stormwater Discharges) in Appendix C. Fact Sheet BL-7 also discusses education for prevention of illicit discharges, which is discussed in more detail below in Section 4.2.2.

Identify the storm drain system using stenciling or signage

Storm drain signs and stencils are visible source controls typically placed adjacent to the inlets. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Stenciling shall be provided for all stormwater conveyance system inlets and catch basins within the project area. Inlet stenciling may include concrete stamping, concrete painting, placards, or other methods approved by the local municipality. In addition to storm drain stenciling, projects are encouraged to post signs and prohibitive language with graphical icons which prohibit illegal dumping at trailheads, parks, building entrances and public access points along channels and creeks within the project area.

Language associated with the stamping (e.g. "No Dumping-Drains to Ocean") must be satisfactory to the City Engineer. See Appendix E, fact sheet BL-7 for additional guidance.

Protect *outdoor material storage areas* from rainfall, run-on, runoff, and wind dispersal

Materials with the potential to pollute stormwater runoff shall be stored in a manner that prevents contact with rainfall and stormwater runoff. Contaminated runoff shall be managed for treatment and disposal (e.g. secondary containment directed to sanitary sewer). All development projects shall incorporate the following structural or pollutant control BMPs for outdoor material storage areas, as applicable and feasible:

- Storage areas must be paved and sufficiently impervious to contain leaks and spills, where necessary.
- The storage area must be sloped towards a sump or another equivalent measure that is effective to contain spills.
- Runoff from downspouts/roofs must be directed away from storage areas.
- The storage area must have a roof or awning that extends beyond the storage area to minimize collection of storm water within the secondary containment area. A manufactured storage shed may be used for small containers.
- Use other methods approved by the City.

See Fact Sheet BL-5 (Work and Storage Areas) in Appendix C for more information.

Protect *materials stored in outdoor work areas* from rainfall, run-on, runoff, and wind dispersal

Outdoor work areas have an elevated potential for pollutant loading and spills. All development projects shall include the following structural or pollutant control BMPs for any outdoor work areas with potential for pollutant generation, as applicable and feasible:

- Create an impermeable surface such as concrete or asphalt, or a prefabricated metal drip pan, depending on the size needed to protect the materials.
- Cover the area with a roof or other acceptable cover.
- Berm the perimeter of the area to prevent water from adjacent areas from flowing on to the surface of the work area.
- Directly connect runoff to sanitary sewer or other specialized containment system(s), as needed and where feasible. This allows the more highly concentrated pollutants from these areas to receive special treatment that removes particular constituents. Approval for this connection must be obtained from the appropriate sanitary sewer agency.
- Locate the work area away from storm drains or catch basins.
- Use other methods approved by the City.

See Fact Sheets BL-5 (Work and Storage Areas) and BL-6 (Management of Stormwater Discharges) in Appendix C for more information.

Protect *trash, grease, and manure storage areas* from rainfall, run-on, runoff, and wind dispersal

Stormwater runoff from areas where trash, cooking grease and horse manure is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. All development projects shall include the following structural or pollutant control BMPs, as applicable:

- Trash enclosure areas and manure storage areas must be walled and covered with a waterproof roof to prevent offsite transport of trash or manure and rainwater intrusion. Provide an impervious, non-combustible roof, on all trash enclosures and manure storage areas to minimize direct precipitation and prevent rainfall from entering the area. If there is an open area between the roof and the perimeter wall, the roof overhang shall be equal or larger than the opening width.
- Design trash enclosures areas and manure storage areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. Use a berm or wall to prevent run-on of stormwater. A berm or wall shall be installed at all openings to hold in any liquids that escape from the area and to prevent any flow of storm water through the containment area. The berm can be designed wide and flat to allow rolling of the dumpster in and out.
- The trash enclosure shall be lockable and locked when not in use.
- The trash enclosure shall have a drain that discharges through an adequately sized oil/ grease separator (if an oil/ grease separator is required by building code) and then is filtered through a City-approved hydrocarbon filter and discharged into the public sanitary sewer system and not to planters or the storm drain system. The trash enclosure finish floor shall be at least six inches higher than 100-year storm water surface elevation. The finished floor shall also be sloped at 2%, minimum, to the middle of the enclosure or the back wall, wherever the drain is located. A separate building permit may be required for this structure.
- Locate used grease storage bins inside restaurant facilities, if permitted by the City of Encinitas. If the grease bin must be located outside for health purposes, the bin must have secondary

containment for any potential spills and overhead coverage large enough to cover the bin and the secondary containment unit.

- Locate storm drains away from immediate vicinity of the trash storage, grease storage and manure storage areas and vice versa.
- Post signs on all dumpsters informing users that hazardous material are not to be disposed.
- Use other methods approved by the City.

See Fact Sheets BL-5 (Work and Storage Areas) and BL-6 (Management of Stormwater Discharges) in Appendix C for more information.

Use any additional BMPs determined to be necessary by the Copermittee to minimize pollutant generation at each project site

At its discretion, the City may determine that additional on-site controls are necessary to minimize pollutant generation. These determinations will be made on a project-specific basis. Appendix D provides guidance on permanent controls that are applicable at a project site based on potential sources of runoff pollutants at the project site. Applicants must implement all applicable and feasible source control BMPs listed in Appendix D.

4.3 Site Design (SD) BMP Requirements

Site design BMPs (also referred to as LID BMPs) are intended to reduce the rate and volume of stormwater runoff and associated pollutant loads. Site design BMPs include practices that reduce the rate and/or volume of stormwater runoff by minimizing surface soil compaction, reducing impervious surfaces, and/or providing flow pathways that are "disconnected" from the storm drain system, such as by routing flow over pervious surfaces. Site design BMPs may incorporate interception, storage, evaporation, evapotranspiration, infiltration, and/or filtration processes to retain and/or treat pollutants in stormwater before it is discharged from a site.

Appendix C also provides the following fact sheets to assist project applicants with designing BMPs to meet Site Design Requirements:

- BL-1 – Existing Natural Site Features
- BL-2 – Outdoor Impervious Areas
- BL-3 – Rooftop Areas
- BL-4 – Landscaped Areas

In addition, Appendix E also provides the following fact sheets to assist project applicants in Design Capture Volume (DCV) reduction using Enhanced Site Deign BMPs:

- SD-A – Tree Well;
- SD-B – Impervious Area Dispersion;
- SD-C – Green Roofs;
- SD-D – Permeable Pavement (Site Design BMP);
- SD-E – Rain Barrels; and

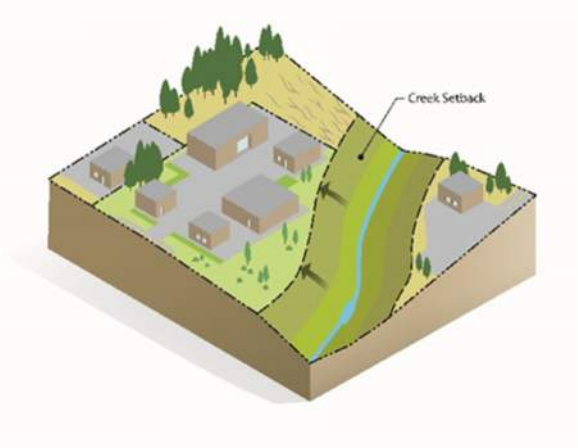
- SD-F – Amended Soil.

Site design BMPs shall be applied to all development projects as appropriate and practicable for the project site and project conditions. Site design BMPs are described in the following subsections.

> **How to comply**: Projects must comply with this requirement by using all of the site design BMPs listed in this section that are applicable and practicable to their project type and site conditions. Applicability of a given site design BMP should be determined based on project type, soil conditions, presence of natural features (e.g. streams), and presence of site features (e.g. parking areas). Applicants must provide an explanation for any site design BMP they do not consider to be applicable and feasible. Site plans must identify site design BMPs and provide adequate supporting detail to ensure their effective implementation. Table 1 "Baseline BMPs for Existing and Proposed Site Features" which is part of both the Standard SWQMP and the PDP SWQMP listed in Appendix A, should be used to document compliance with site design BMP requirements. Table 1 applies to all development projects.

Maintain natural drainage pathways and hydrologic features

- ☐ Maintain or restore natural storage reservoirs and drainage corridors (including topographic depressions, areas of permeable soils, natural swales, and ephemeral and intermittent streams)
- ☐ Buffer zones for natural water bodies (where buffer zones are technically infeasible, require project applicant to include other buffers such as trees, access restrictions, etc.)



During the site assessment, natural drainages must be identified along with their connection to creeks and/or streams, if any. Natural drainages offer a benefit to stormwater management as the soils and habitat already function as a natural filtering/infiltrating swale. When determining the development footprint of the site, natural drainages should be avoided. By providing a development envelope set back from natural drainages, the drainage can retain some water quality benefits to the watershed. In some situations, site constraints, regulations, economics, or other factors may not allow avoidance of drainages and sensitive areas. Projects proposing to dredge or fill materials in Waters of the U.S. must obtain Clean Water Act Section 401 Water Quality Certification. Projects proposing to dredge or fill waters of the State must obtain Waste Discharge Requirements. Both the 401 Certification and the Waste Discharge Requirements are administered by the San Diego Water Board. The project applicant shall consult the local jurisdiction for other specific requirements.

Per Encinitas Municipal Code Section 30.34.040, when planning out your project, a buffer of 100 feet in width shall be maintained around all identified coastal lagoons and wetland areas. In addition, all riparian areas require a minimum 50-foot-wide buffer.

Projects can incorporate this into a project by implementing the following planning and design phase techniques as applicable and practicable:

- Evaluate surface drainage and topography in considering selection of Site Design BMPs that

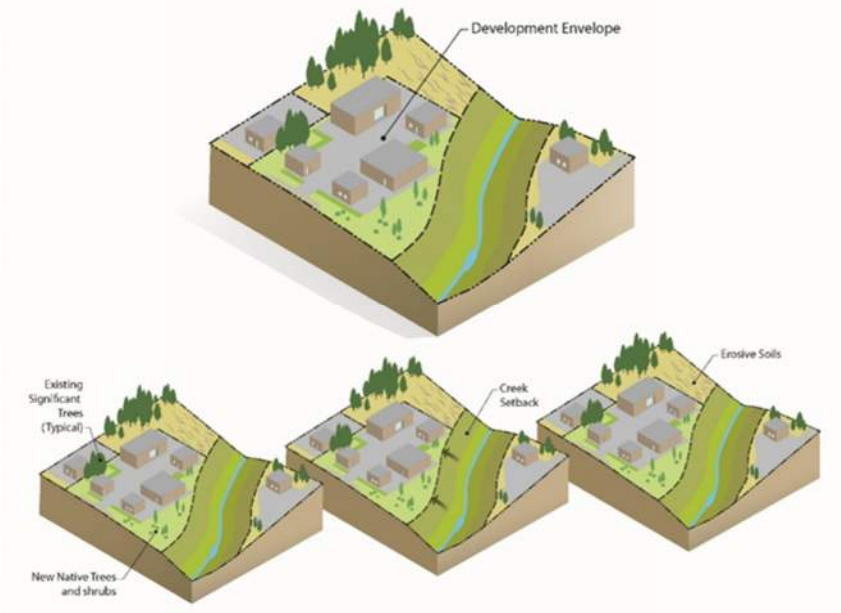
will be most beneficial for a given project site. Where feasible, maintain topographic depressions for infiltration.

- Optimize the site layout and reduce the need for grading. Where possible, conform the site layout along natural landforms, avoid grading and disturbance of vegetation and soils, and replicate the site's natural drainage patterns. Integrating existing drainage patterns into the site plan will help maintain the site's predevelopment hydrologic function.
- Preserve existing drainage paths and depressions, where feasible and applicable, to help maintain the time of concentration and infiltration rates of runoff, and decrease peak flow.
- Structural BMPs cannot be located in buffer zones if a State and/or Federal resource agency (e.g. SDRWQCB, California Department of Fish and Wildlife; U.S. Army Corps of Engineers, etc.) prohibits maintenance or activity in the area.
- See Fact Sheet BL-1 (Existing Natural Site Features) in Appendix C for more information.

Conserve natural areas, soils and vegetation

- Conserve natural areas within the project footprint including existing trees, other vegetation, and soils

To enhance a site's ability to support source control and reduce runoff, the conservation and restoration of natural areas must be considered in the site design process. By conserving or restoring the natural drainage features, natural processes are able to intercept stormwater, thereby reducing the amount of runoff.



The upper soil layers of a natural area contain organic material, soil biota, vegetation, and a configuration favorable for storing and slowly conveying stormwater and establishing or restoring vegetation to stabilize the site after construction. The canopy of existing native trees and shrubs also provide a water conservation benefit by intercepting rain water before it hits the ground. By minimizing disturbances in these areas, natural processes are able to intercept stormwater, providing a water quality benefit. By keeping the development concentrated to the least environmentally

sensitive areas of the site and set back from natural areas, stormwater runoff is reduced, water quality can be improved, environmental impacts can be decreased, and many of the site's most attractive native landscape features can be retained. In some situations, site constraints, regulations, economics, and/or other factors may not allow avoidance of all sensitive areas on a project site. Project applicant shall consult the local municipality for jurisdictional specific requirements for mitigation of removal of sensitive areas.

When a proposed project is reviewed by the Encinitas Planning Department, the project must comply with regulations identified in the following policies:

- Hillside Bluff Overlay Zone: EMC 30.34.030
- General Plan Resource Management Element Policies
- Urban Forest Management Plan
- Multiple Habitat Conservation Program
- Draft Encinitas Subarea Plan
- CEQA

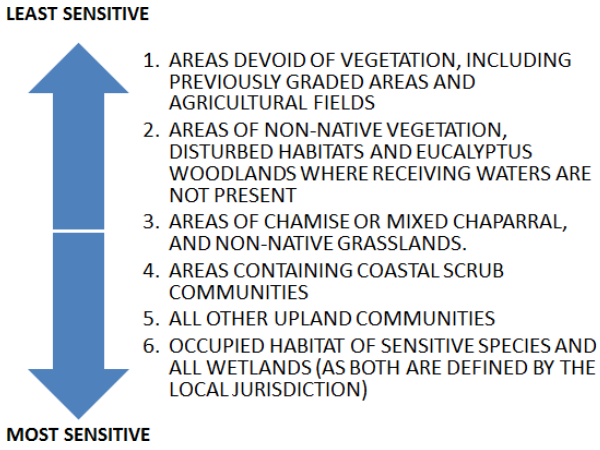
Projects can incorporate this by implementing the following planning and design phase techniques as applicable and practicable:

- Identify areas most suitable for development and areas that must be left undisturbed. Additionally, reduced disturbance can be accomplished by increasing building density and increasing height, if possible.

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.

- Avoid areas with thick, undisturbed vegetation. Soils in these areas have a much higher capacity to store and infiltrate runoff than disturbed soils,

- and reestablishment of a mature vegetative community can take decades. Vegetative cover can also provide additional volume storage of rainfall by retaining water on the surfaces of leaves, branches, and trunks of trees during and after storm events.



- Preserve trees, especially native trees and shrubs, and identify locations for planting additional native or drought tolerant trees and large shrubs. Refer to Appendix E, factsheet SD-A Tree Wells, for additional guidance on implementing this as a site design BMP.

- In areas of disturbance, topsoil should be removed before construction and replaced after the project is completed. When handled carefully, such an approach limits the disturbance to

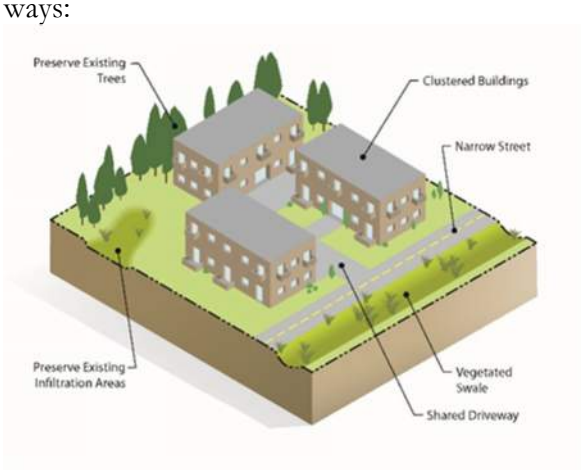
native soils and reduces the need for additional (purchased) topsoil during later phases.

- Sensitive areas, such as wetlands, biological open space areas, biological mitigation sites, streams, floodplains, or particular vegetation communities, such as coastal sage scrub and intact forest must be avoided. Areas that are habitat for sensitive plants and animals— particularly those State or federally listed as endangered, threatened or rare—must be avoided. Development in these areas is restricted by federal, state and local laws.
- See Fact Sheet BL-1 (Existing Natural Site Features) in Appendix C for more information.

Minimize impervious area

- ☐ Construct streets, sidewalks or parking lots aisles to the minimum widths necessary, provided public safety is not compromised
- ☐ Minimize the impervious footprint of the project

One of the principal causes of environmental impacts by development is the creation of impervious surfaces. Imperviousness links urban land development to degradation of aquatic ecosystems in two ways:



- First, the combination of paved surfaces and piped runoff efficiently collects urban pollutants and transports them, in suspended or dissolved form, to surface waters. These pollutants may originate as airborne dust, be washed from the atmosphere during rains, or may be generated by automobiles and outdoor work activities.
- Second, increased peak flows and runoff durations typically cause erosion of stream banks and beds, transport of fine sediments, and disruption of aquatic habitat. Measures taken to control stream erosion, such as hardening banks with riprap or concrete, may permanently eliminate habitat.

Impervious cover can be minimized through identification of the smallest possible land area that can be practically impacted or disturbed during site development. Reducing impervious surfaces retains the permeability of the project site, allowing natural processes to filter and reduce sources of pollution.

Projects can incorporate this by implementing the following planning and design phase techniques as applicable and practicable:

- Decrease building footprint through (the design of compact and taller structures when allowed by local zoning and design standards and provided public safety is not compromised.
- Construct walkways, trails, patios, overflow parking lots, alleys and other low-traffic areas with permeable surfaces. Refer to Appendix E, factsheet SD-D Permeable Pavement for guidance on implementing this as a Site Design BMP.
- Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and alternative transportation (e.g. pedestrians, bikes) are not compromised.

- Consider the implementation of shared parking lots and driveways where possible.
- Landscaped area in the center of a cul-de-sac can reduce impervious area depending on configuration. Design of a landscaped cul-de-sac must be coordinated with fire department personnel to accommodate turning radii and other operational needs.
- Design smaller parking lots with fewer stalls, smaller stalls, more efficient lanes.
- Design indoor or underground parking.
- Minimize the use of impervious surfaces in the landscape design.

See Fact Sheets BL-2 (Outdoor Impervious Area), BL-3 (Rooftop Areas), and BL-4 (Landscaped Areas) in Appendix C for more information.

In addition, the following Fact Sheets provided in Appendix E describe ways to reduce impervious areas:

- SD-B – Impervious Area Dispersion;
- SD-C – Green Roofs; and
- SD-D – Permeable Pavement (Site Design).

Minimize soil compaction

- Minimize soil compaction in landscaped areas

  The upper soil layers contain organic material, soil biota, and a configuration favorable for storing and slowly conveying stormwater down gradient. By protecting native soils and vegetation in appropriate areas during the clearing and grading phase of development the site can retain some of its existing beneficial hydrologic function. Soil compaction resulting from the movement of heavy construction equipment can reduce soil infiltration rates. It is important to recognize that areas adjacent to and under building foundations, roads and manufactured slopes must be compacted with minimum soil density requirements in compliance with local building and grading ordinances.

Projects can incorporate this by implementing the following planning and design phase techniques as applicable and practicable:

- Avoid disturbance in planned green space and proposed landscaped areas where feasible. These areas that are planned for retaining their beneficial hydrological function should be protected during the grading/construction phase so that vehicles and construction equipment do not intrude and inadvertently compact the area.
- In areas planned for landscaping where compaction could not be avoided, re-till the top 8 inches of soil surface to allow for better infiltration capacity. Soil amendments are recommended and may be necessary to increase permeability and organic content. Soil stability, density requirements, and other geotechnical considerations associated with soil compaction must be reviewed by a qualified landscape architect or licensed geotechnical, civil or other professional engineer. Refer to factsheet SD-F in Appendix E for additional guidance on implementing amended soils within the project footprint.

- See Fact Sheets BL-1 (Existing Natural Site Features) and BL-4 (Landscaped Areas) in Appendix C for more information.

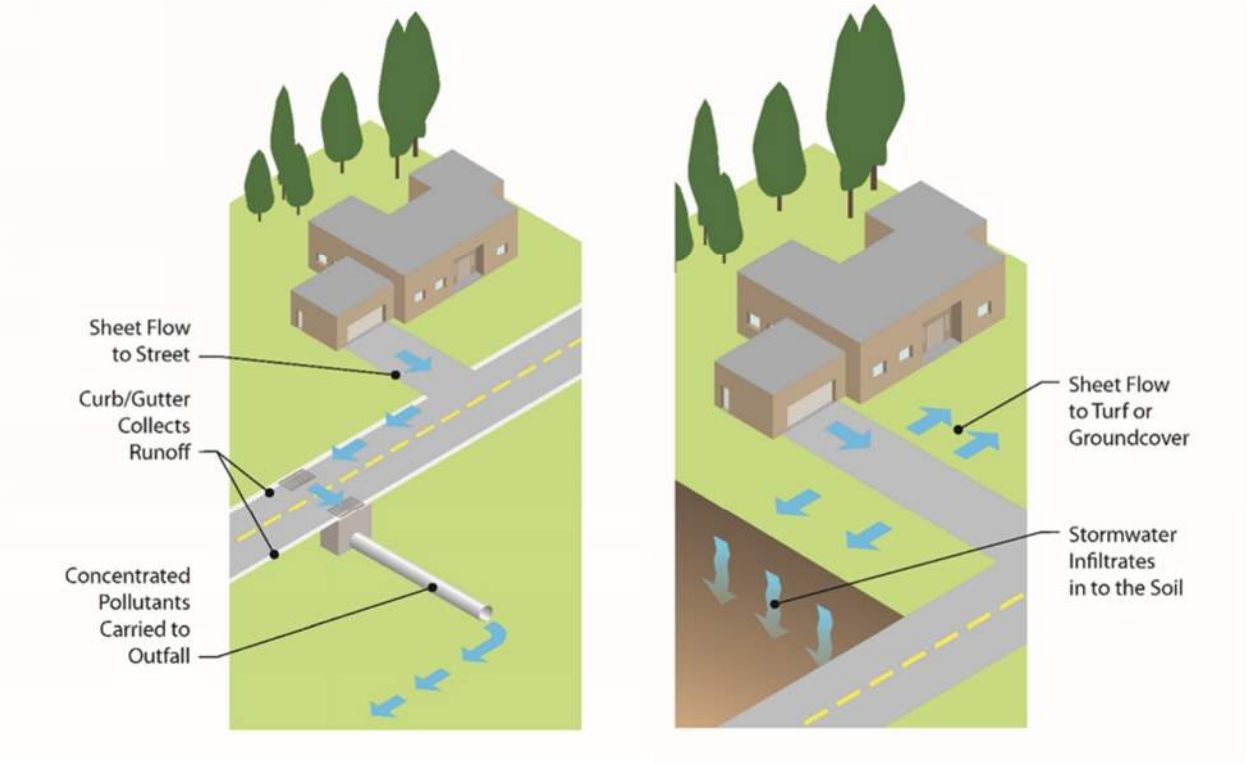
Disperse impervious areas

- Disconnect impervious surfaces through distributed pervious areas
- Design and construct landscaped or other pervious areas to effectively receive and infiltrate, retain and/or treat runoff from impervious areas prior to discharging to the MS4

Impervious area dispersion (dispersion) refers to the practice of disconnecting impervious areas from directly draining to the storm drain system by routing runoff from impervious areas such as rooftops, walkways, and driveways onto the surface of adjacent pervious areas. The intent is to slow runoff discharges and reduce volumes while achieving incidental treatment. Volume reduction from dispersion is dependent on the infiltration characteristics of the pervious area and the amount of impervious area draining to the pervious area. Treatment is achieved through filtration, shallow sedimentation, sorption, infiltration, evapotranspiration, biochemical processes and plant uptake.

The effects of imperviousness can be mitigated by disconnecting impervious areas from the drainage system and by encouraging detention and retention of runoff near the point where it is generated. Detention and retention of runoff reduces peak flows and volumes and allows pollutants to settle out or adhere to soils before they can be transported downstream. Disconnection practices may be applied in almost any location, but impervious surfaces must discharge into a suitable receiving area for the practices to be effective. Information gathered during the site assessment will help determine appropriate receiving areas.

Project designs should direct runoff from impervious areas to adjacent landscaping areas that have higher potential for infiltration and surface water storage. This will limit the amount of runoff generated, and therefore the size of the mitigation BMPs downstream. The design, including consideration of slopes and soils, must reflect a reasonable expectation that runoff will soak into the soil and produce no runoff of the DCV. On hillside sites, drainage from upper areas may be collected in conventional catch basins and piped to landscaped areas that have higher potential for infiltration. Or use low retaining walls to create terraces that can accommodate LID areas.



Projects can incorporate SD-5 by implementing the following planning and design phase techniques as applicable and practicable:

- Implement design criteria and considerations listed in impervious area dispersion fact sheet (SD-B) presented in Appendix E.
- Drain rooftops into adjacent landscape areas.
- Drain impervious parking lots, sidewalks, walkways, trails, and patios into adjacent landscape areas.
- Reduce or eliminate curb and gutters from roadway sections, thus allowing roadway runoff to drain to adjacent pervious areas.
- Replace curbs and gutters with roadside vegetated swales and direct runoff from the paved street or parking areas to adjacent LID facilities. Such an approach for alternative design can reduce the overall capital cost of the site development while improving the stormwater quantity and quality issues and the site's aesthetics.
- Plan site layout and grading to allow for runoff from impervious surfaces to be directed into distributed permeable areas such as turf, landscaped or permeable recreational areas, medians, parking islands, planter boxes, etc.
- Detain and retain runoff throughout the site. On flatter sites, landscaped areas can be interspersed among the buildings and pavement areas. On hillside sites, drainage from upper areas may be collected in conventional catch basins and conveyed to landscaped areas in lower areas of the site.
- Pervious area that receives run on from impervious surfaces should have a minimum width of

10 feet and a maximum slope of 5%.

See Fact Sheets BL-2 (Outdoor Impervious Areas), BL-3 (Rooftop Areas) and BL-4 (Landscaped Areas) in Appendix C for more information.

In addition, the following fact sheet in Appendix E describes ways to reduce the impact of runoff from impervious areas:

- SD-B- Impervious area dispersion

Collect runoff

- Use small collection strategies located at, or as close to as possible to the sources (i.e. the point where stormwater initially meets the ground) to minimize the transport of runoff and pollutants to the MS4 and receiving waters
- Use permeable material for projects with low traffic areas and appropriate soil conditions. Refer to factsheet SD-D in Appendix E for additional guidance on implementing permeable pavement as a Site Design BMP.

Distributed control of stormwater runoff from the site can be accomplished by applying small collection techniques (e.g. SD-C Green Roofs), or integrated management practices, on small sub-catchments or on residential lots. Small collection techniques foster opportunities to maintain the natural hydrology provide a much greater range of control practices. Integration of stormwater management into landscape design and natural features of the site, reduce site development and long-term maintenance costs, and provide redundancy if one technique fails. On flatter sites, it typically works best to intersperse landscaped areas and integrate small scale retention practices among the buildings and paving.

Permeable pavements contain small voids that allow water to pass through to a gravel base. They come in a variety of forms; they may be a modular paving system (concrete pavers, grass-pave, or gravel-pave) or poured in place pavement (porous concrete, permeable asphalt). Project applicants should identify locations where permeable pavements could be substituted for impervious concrete or asphalt paving. The O&M plan for the site must ensure that permeable pavements will not be sealed in the future. In areas where infiltration is not appropriate, permeable paving systems can be fitted with an under drain to allow filtration, storage, and evaporation, prior to drainage into the storm drain system.

Projects can incorporate this by implementing the following planning and design phase techniques as applicable and practicable:

- Implementing distributed small collection techniques to collect and retain runoff
- Installing permeable pavements (see SD-D in Appendix E)

See Fact Sheets BL-2 (Outdoor Impervious Areas) and BL-3 (Rooftop Areas) in Appendix C for more information.

Landscape with native or drought tolerant species

All development projects are required to select a landscape design and plant palette that minimizes required resources (irrigation, fertilizers and pesticides) and pollutants generated from landscape areas.

Native plants require less fertilizers and pesticides because they are already adapted to the rainfall patterns and soils conditions. Plants should be selected to be drought tolerant and not require watering after establishment (2 to 3 years). Watering should only be required during prolonged dry periods after plants are established. Final selection of plant material needs to be made by a landscape architect experienced with LID techniques. Microclimates vary significantly throughout the region and consulting local municipal resources will help to select plant material suitable for a specific geographic location.

Projects can incorporate SD-7 by landscaping with native and drought tolerant species. Recommended plant list is included in Appendix E (Fact Sheet PL) as well as by referring to Fact Sheet BL-4 (Landscaped Areas) in Appendix C.

Harvest and use precipitation

Harvest and use BMPs capture and store stormwater runoff for later use. Harvest and use can be applied at smaller scales (Standard Projects) using rain barrels or at larger scales (PDPs) using cisterns. This harvest and use technique has been successful in reducing runoff

Photograph Courtesy of Arid Solutions, Inc.

discharged to the storm drain system conserving potable water and recharging groundwater. PDPs would still need to meet hydromodification management requirements, as applicable.

Rain barrels are above ground storage vessels that capture runoff from roof downspouts during rain events and detain that runoff for later reuse for irrigating landscaped areas. The temporary storage of roof runoff reduces the runoff volume from a property and may reduce the peak runoff velocity for small, frequently occurring storms. In addition, by reducing the amount of stormwater runoff that flows overland into a stormwater conveyance system (storm drain inlets and drain pipes), less pollutants are transported through the conveyance system into local creeks and the ocean. The reuse of the detained water for irrigation purposes leads to the conservation of potable water and the recharge of groundwater. SD-E fact sheet in Appendix E provides additional detail for designing Harvest and Use BMPs. Projects can incorporate SD-8 by installing rain barrels or cisterns, as applicable.

Chapter 5

5 Storm Water Pollutant Control Requirements for PDPs

PDPs are required to implement storm water pollutant control BMPs to maximize retention of stormwater and reduce the quantity of pollutants in storm water discharges. This chapter outlines the process for PDPs to demonstrate compliance with these requirements.

This chapter should be followed after referencing project planning elements and site design/source control elements discussed in Chapters 3 and 4 respectively. The steps in this chapter pertain specifically to storm water pollutant control BMPs. These criteria must be met regardless of whether hydromodification management applies; however, the overall sequencing of project development may be different if hydromodification management applies. For guidance on how to integrate both hydromodification management and pollutant control BMPs (in cases where both requirements apply), see Sections 3.4.3, 5.4 and Chapter 6.

5.1 Steps for Selecting and Designing Storm Water Pollutant Control BMPs

Step 1. Determine DCV per Appendix B.1

A. Determine rainfall depth per Appendix B.1.1.

B. Delineate tributary areas per Appendix B.1.2.

C. Determine runoff factors per Appendix B.1.3.

D. Determine site design volume reductions per Appendix B.1.4

Step 2. Determine Retention Requirements Appendix B.2

A. Determine if capture and use analysis is required per Appendix B.2.1

B. Evaluate infiltration restrictions per Appendix B.2.2

C. Determine design infiltration rate per Appendix B.2.3

D. Determine retention requirements per Appendix B.2.4

Step 3. Determine BMP Performance per Appendix B.3

A. Identify proposed BMP characteristics per Appendix B.3.1.

B. Calculate retention processes per Appendix B.3.2

C. Calculate biofiltration processes per Appendix B.3.3

D. Satisfaction of pollutant control requirements per Appendix B.3.4

E. Satisfaction of minimum retention requirements per Appendix B.3.5

5.2 DMAs Excluded from DCV Calculation / Options for Meeting Structural Performance Standards

Applicants may exclude DMAs from DCV calculations if they meet the criteria specified below. However, each DMA must implement source control and site design BMPs as applicable and feasible. These exemptions will be evaluated on a case-by-case basis at the discretion of the City.

5.2.1 Self-mitigating DMAs

Self-mitigating DMAs consist of natural or landscaped areas that drain directly offsite or to the public storm drain system. Self-mitigating DMAs must meet **ALL** of the following to be eligible for exclusion:

- Vegetation in the natural or landscaped area is native and/or non-native/non-invasive drought tolerant species that do not require regular application of fertilizers and pesticides.
- Soils are undisturbed native topsoil, or disturbed soils that have been amended and aerated to promote water retention characteristics equivalent to undisturbed native topsoil.
- The incidental impervious areas are less than 5 percent of the self-mitigating area.
- Impervious area within the self-mitigated area should not be hydraulically connected to other impervious areas unless it is a storm water conveyance system (such as a brow ditch).
- The self-mitigating area is hydraulically separate from DMAs that contain permanent storm water pollutant control BMPs.

Figure 5-1 illustrates the concept of self-mitigating DMAs.

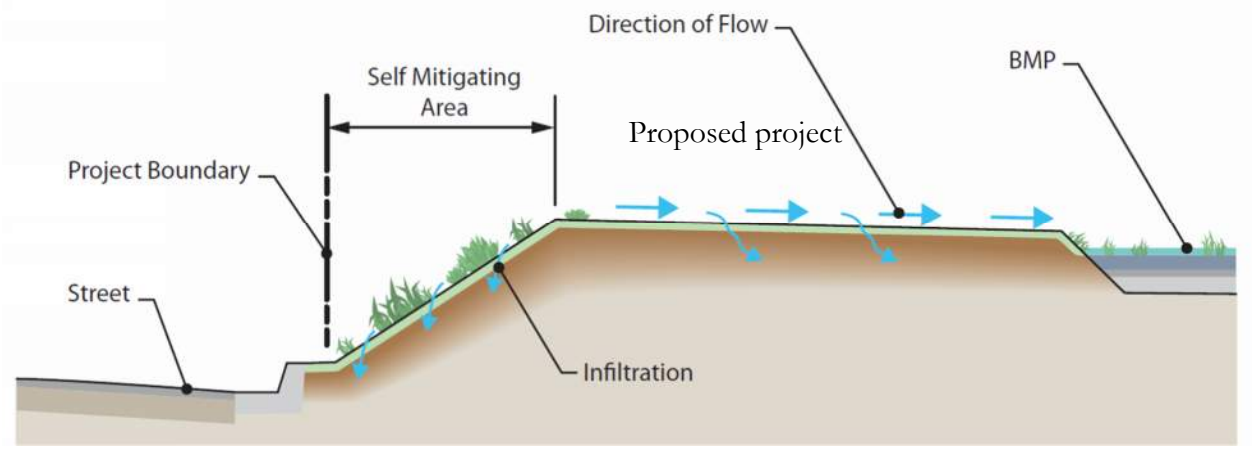


FIGURE 5-1. Self-mitigating Area

5.2.2 De Minimis DMAs

De minimis DMAs consist of areas that are very small, and therefore are not considered to be significant contributors of pollutants, and are considered by the City not practicable to drain to a BMP. It is anticipated that only a small subset of projects will qualify for a de minimis DMA exclusion. Examples include driveway aprons connecting to existing streets, portions of sidewalks, retaining walls at the external boundaries of a project, and similar features. De minimis DMAs must meet **ALL** of the following to be eligible for exclusion:

- Areas abut the perimeter of the development site.
- Topography and land ownership constraints make BMP construction to reasonably capture runoff technically infeasible.
- The portion of the site falling into this category is minimized through effective site design.
- Each DMA should be less than 250 square feet and the sum of all de minimis DMAs should represent less than 2 percent of the total added or replaced impervious surface of the project. Except for projects where 2 percent of the total added or replaced impervious surface of the project is less than 250 square feet, a de minimis DMA of 250 square feet or less may be allowed.
- Multiple de minimis DMAs cannot be adjacent to each other and hydraulically connected.

The SWQMP must document the reason that each de minimis area could not be included in DMA calculations.

5.2.3 Self-retaining DMAs via Qualifying Site Design BMPs

Self-retaining DMAs are areas that utilize qualifying site design BMPs to retain runoff to a level determined to constitute full retention of, at a minimum, the entire DCV. Figure 5-2 illustrates the concept of self-retaining DMAs.

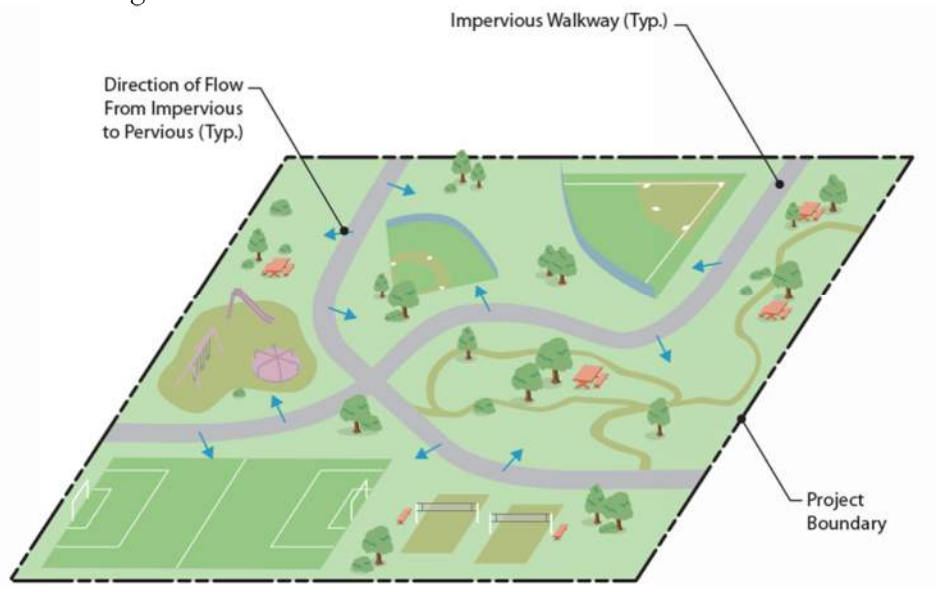


FIGURE 5-2. Self-retaining Site

To satisfy pollutant control requirements only, self-retaining means retention of the entire DCV. However, under some circumstances, a DMA may also satisfy hydromodification management requirements by implementing BMPs that retain a greater volume of runoff. BMPs used to satisfy either standard within a DMA are classified as Significant Site Design BMPs, or SSD-BMPs. Sizing requirements for SSD-BMPs both for pollutant control and hydromodification management are addressed in their respective BMP Fact Sheets as applicable.

Two types of site design BMPs may currently be used in the design of self-retaining DMAs. Basic performance criteria are summarized below.

1. Tree Wells (SD-A in Appendix E),

A DMA can be designed using tree wells to satisfy both pollutant control and hydromodification management performance standards.

- For pollutant control only, the DMA must retain the entire DCV.
- For hydromodification management, the DMA must retain the required retention volume (RRV), where RRV is DCV increased by a DCV multiplier provided in SD-A.

Appendix I provides additional information for design of tree wells as SSD-BMPs.

2. Impervious Area Dispersion (SD-B in Appendix E)

The following apply if the dispersion area is native soil (SD-B in Appendix E):

- For pollutant control only, the DMA is considered self-retaining if the impervious to pervious ratio is:
    - 2:1 when the pervious area is composed of Hydrologic Soil Group A
    - 1:1 when the pervious area is composed of Hydrologic Soil Group B

The following applies if the dispersion area includes amended soil (SD-B in Appendix E):

- DMAs using impervious area dispersion can be considered to meet both pollutant control and hydromodification flow control requirements if the impervious to pervious area ratio is 1:1 or less and all other design requirements of SD-B are satisfied, including 11 inches of amended soil.

Appendix I provides additional information for design of native soil or amended soil dispersion areas as SSD-BMPs.

Permeable pavement may also be used as dispersion area to satisfy pollutant control requirements only. The following apply if the dispersion area is permeable pavement (SD-D in Appendix E):

- For pollutant control only, a DMA is considered self-retaining if the ratio of total drainage area (including permeable pavement) to area of permeable pavement is 1.5:1 or less, and all other design requirements of SD-D are satisfied.
- Hydromodification management performance standards can be satisfied using permeable pavement only if constructed to Structural BMP specifications. In this case, the permeable pavement must be sized and constructed in accordance with the requirements of INF-3.

All of the criteria described above are conservatively developed to anticipate potential changes in

DMA characteristics with time. Each BMP must de designed in accordance with the requirements and limitations described in its applicable BMP Fact Sheet (Appendix E). The City may accept or reject a proposed self-retaining DMA meeting these criteria at its discretion. Examples of rationales for rejection may include the potential for negative impacts (such as infiltration or vector issues), potential for significant future alteration of this feature, or inability to visually inspect and confirm the feature. A project may use more than one type of SSD-BMP across the project to satisfy requirements. However, the SSD-BMPs must be sized individually by DMA because their sizing factors cannot be combined. Each DMA's requirements must be fully satisfied by either the proposed dispersion area or the proposed tree well(s). Dispersion areas meeting the SSD-BMP criteria do not need an additional downstream BMP. Dispersion areas not meeting the SSD-BMP criteria can be used as regular site design BMPs to reduce the DCV draining to a downstream BMP such as a tree well sized as an SSD-BMP or a structural BMP. Tree wells meeting the SSD-BMP criteria do not need an additional downstream BMP. Tree wells not meeting the SSD-BMP criteria can be used as regular site design BMPs to reduce the DCV draining to a downstream structural BMP. See Appendix I for additional information about sizing dispersion areas and/or tree wells as SSD-BMPs. See Appendix B for additional information about using dispersion areas and/or tree wells to reduce DCV draining to a downstream structural BMP.

Site design BMPs used as part of a self-retaining DMA or as part of reducing DCV draining to a downstream BMP must be clearly called out on project plans and in the SWQMP.

For PDPs subject to hydromodification requirements and using structural BMPs to satisfy hydromodification flow control requirements, please note that Self-retaining DMAs not designed as SSD-BMPs must be included in the hydromodification analysis. When a project uses a combination of SSD-BMPs and structural BMPs to meet hydromodification requirements, the SSD-BMPs need not be included in the hydromodification analysis if the DMAs served by the SSD-BMPs are hydraulically separate from, not draining through, the structural BMPs.

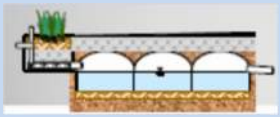
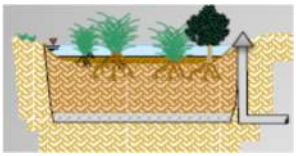
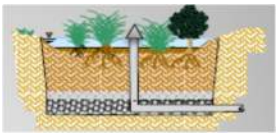
Other site design BMPs can be considered self-retaining for meeting storm water pollutant control obligations if the long-term annual runoff volume (estimated using continuous simulation following guidelines listed in Appendix G) from the DMA is reduced to a level equivalent to pervious land and the applicant provides supporting analysis and rationale for the reduction in long term runoff volume.

Analysis of proposals for satisfying applicable hydromodification management requirements may also be considered if supported by continuous simulation analysis. Approval of other self-retaining areas is at the discretion of the City.

5.3 BMP Selection and Design

The BMP designs described in the BMP Fact Sheets (Appendix E) constitute allowable storm water pollutant control BMPs for the purpose of meeting storm water management requirements. Table 5-1 maps the BMP category to the fact sheets provided in Appendix E. Criteria specifically described in these fact sheets override guidance contained in outside referenced source documents. Where criteria are not specified, the applicant and the project review staff should use best professional judgment based on the recommendations of the referenced guidance material or other published and generally accepted sources. When an outside source is used, the preparer must document the source in the SWQMP.

TABLE 5-5-1. Permanent Structural BMPs for PDPs

BMP Category	Components	BMPs	Generic Illustration
Harvest & Use (HU)		HU-1: Cistern	
Infiltration (INF)	Soil Media: Optional Underdrain: No Bottom Liner: No	INF-1: Infiltration basin INF-2: Bioretention INF-3: Permeable pavement	
Unlined Biofiltration	Soil Media: BSM Underdrain: Yes Bottom Liner: No	PR-1: Biofiltration with partial infiltration	
Lined Biofiltration	Soil Media: BSM Underdrain: Yes Bottom Liner: Yes	BF-1: Biofiltration BF-2: Nutrient Sensitive Media Design BF-3: Proprietary Biofiltration	
Flow-thru treatment		FT-1: Vegetated swales FT-2: Media filters FT-3: Sand filters FT-4: Dry extended detention basins FT-5: Proprietary flow-thru treatment control	

5.4 Documenting Storm Water Pollutant Control BMP Compliance when Hydromodification Management Applies

The steps and guidance presented in Chapter 5 apply to all PDPs for demonstrating conformance with stormwater pollutant control requirements regardless of whether hydromodification management applies. However, when hydromodification management applies, the approach for project design may be different. The following process can be used to document compliance with stormwater pollutant control BMPs in cases when hydromodification management also applies:

1. Develop a combined BMP or treatment train (BMPs constructed in series) based on both stormwater pollutant control and hydromodification management requirements. Appendix E provides specific examples of how stormwater pollutant control BMPs can be configured to also address hydromodification management.
2. Dedicate a portion of the combined BMP or treatment train as the portion that is intended to comply with stormwater pollutant control requirements.
3. Follow all of the steps in this chapter related to demonstrating that the dedicated portion of the BMP or treatment train meets the applicable stormwater pollutant control criteria.
4. Check BMP design criteria in Appendix E and F to ensure that the hydromodification management design features (additional footprint, additional depth, modified outlet structure, lower discharge rates, etc.) do not compromise the treatment function of the BMP.
5. On project plans and in the maintenance plan, clearly denote the portion of the BMP that serves the stormwater pollutant control function.

Alternative approaches that meet both the stormwater pollutant control and hydromodification management requirements may be acceptable at the discretion of the City and must be documented in the SWQMP. Also refer to Section 6.3.6 for additional guidance.

Chapter 6

6 Hydromodification Management Requirements for PDPs

The purpose of hydromodification management requirements for PDPs is to minimize the potential of stormwater discharges from the MS4 from causing altered flow regimes and excessive downstream erosion in receiving waters. Hydromodification management implementation for PDPs includes two components: protection of critical coarse sediment yield areas and flow control for post-project runoff from the project site. For PDPs subject to hydromodification management requirements, this chapter provides guidance to meet the performance standards for the two components of hydromodification management.

Within this chapter, Appendix G, and the WMAA, the civil engineer preparing the hydromodification management study for a project will find and all the information necessary to meet the MS4 Permit standards. Should unique project circumstances require an understanding beyond what is provided in this manual, then consult the March 2011 Final HMP, which documents the historical development of the hydromodification management requirements.

Guidance for flow control of post-project runoff is based on the March 2011 Final HMP, with modifications in this manual based on updated requirements in the MS4 Permit. The March 2011 Final HMP was prepared based on the 2007 MS4 Permit, not the current MS4 Permit that drives this manual. In instances where there are changes to hydromodification management criteria or procedures based on the MS4 Permit, the criteria and procedures presented in this manual supersede the March 2011 Final HMP.

Protection of critical coarse sediment yield areas is a new requirement of the MS4 Permit and is not covered in the March 2011 Final HMP. The standards and management practices for protection of critical coarse sediment yield areas are presented here in this manual.

6.1 Hydromodification Management Applicability and Exemptions

As noted in Chapter 1, Section 1.6 a project may be exempt from hydromodification management requirements if it meets any one of the following conditions:

- The project is not a PDP;

- The proposed project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean;
- The proposed project will discharge runoff directly to conveyance channels whose bed and bank are concrete lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean; or
- The proposed project will discharge runoff directly to an area identified by the Copermittees as appropriate for an exemption by the WMAA for the watershed in which the project resides.

The above criteria reflect the latest list of exemptions that are allowed under the MS4 Permit and therefore supersede criteria found in earlier publications.

To qualify for the potential exemption, the outlet elevation of the stormwater conveyance system discharging to the water storage reservoir or lake must be at or below either the normal operating water surface elevation, the reservoir spillway elevation, or at the elevation of the beach sand and properly designed energy dissipation must be provided.

DMAs Excluded from Hydromodification Management Flow Control Requirements

When hydromodification management requirements apply to a project, protection of critical coarse sediment yield areas applies to all of the project area (all DMAs); however, certain DMAs may be excluded from the hydromodification management flow control analysis, pursuant to the criteria below.

Self-mitigating DMAs (defined in Section 5.2.1) must be evaluated on a case by case basis. Even when self-mitigating DMAs do not add impervious area, increased flow rates and durations can occur if the project's drainage layout increases the total area draining to a natural system, or if the project creates a new concentrated discharge point in natural terrain in a location where runoff is not concentrated in the pre-development condition (e.g., a new outfall located on a hillside without defined natural channels). Additionally, if the self-mitigating area is contributing runoff to a flow control point of compliance, POC, (see Section 6.3.1 for guidelines to identify POCs), then it must be included in the sizing factor analysis or project-specific continuous simulation model. This is necessary to ensure accurate accounting of area draining to the POC and calculation of total flow rates and durations at the POC. Self-mitigating DMAs may only be excluded from flow control analyses if the following conditions are met:

- The self-mitigating area does not contribute runoff to a flow control POC.
- The self-mitigating DMA does not concentrate runoff in a new location where runoff is not concentrated in the pre-development condition.
- The self-mitigating DMA does not increase the total area draining to the same discharge point compared to the pre-development condition.

De minimis DMAs meeting the restrictions defined in Section 5.2.2 may always be excluded from the flow control analysis. Subtract the de minimis area from both the pre-development and post-project footprint when conducting sizing factor calculations (Section 6.3.5.1) or project-specific continuous simulation modeling (Section 6.3.5.2).

Self-retaining DMAs via qualifying site design BMPs (defined in Section 5.2.3) must be included in

the hydromodification management analysis. Reductions in DCV realized through site design BMPs are applicable to pollutant control only and do not relax hydromodification management requirements. The self-retaining area geometry may be included in a project-specific continuous simulation model as it may provide some flow control benefit that would reduce the size of flow control structural BMP(s). Sizing factor calculations do not consider self-retaining area geometry; therefore any flow control benefit from the self-retaining area will not be realized in the sizing factor results. The exception to this rule is for DMAs that are self-retaining through the use of impervious area dispersion when the ratio of impervious to pervious area is 1:1 or less and the DMA meets all the requirements of fact sheet SD-B: Impervious Area Dispersion (Appendix E.7). These DMAs are considered to meet both the pollutant control and hydromodification flow-duration control performance standard and shall be subtracted from both the pre-development and post-project area when performing hydromodification sizing calculations.

6.2 Protection of Critical Coarse Sediment Yield Areas

When hydromodification management requirements are applicable, the applicant must determine if the project will impact any areas that are determined to be critical coarse sediment yield areas (CCSYAs). A CCSYA is an area that has been identified as an active or potential source of coarse sediment to downstream channel reaches. The process for demonstrating that the PDP does not impact CCSYAs is illustrated in Figure 6-1 below, and supplemented with detailed methodologies presented in Appendix H of this manual. PDPs complying with this MS4 Permit requirement are not subject to the provisions of the Total Maximum Daily Load for Sediment in Los Peñasquitos Lagoon, post construction. However, PDPs may be subject to Total Maximum Daily Load requirements during construction.

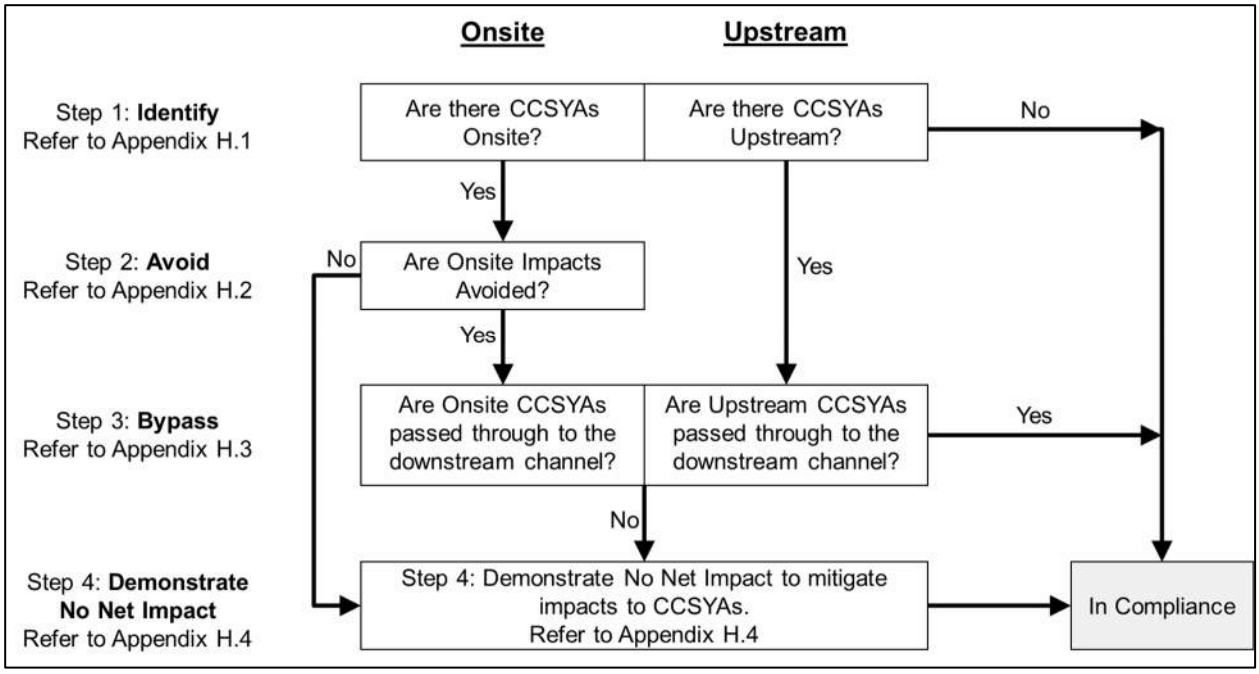


Figure 6-1 . Pathways to meet CCSYA requirements

Description of Steps:

Step 1. Applicants must identify CCSYAs located onsite and/or upstream of the project's property boundary per the guidance presented in Appendix H.1. If no CCSYAs are identified in this step, no further consideration of critical coarse sediment supply is necessary.

Step 2. Applicants should avoid impacts to onsite CCSYAs through effective site design techniques discussed in Appendix H.2.

Step 3. Applicants should bypass bed sediment from onsite and/or upstream CCSYAs to downstream receiving waters per guidance presented in Appendix H.3.

Step 4. When impacts to CCSYAs are not avoided or bypassed through the site, the applicant must demonstrate that the project generates no net impact to the receiving water per guidance presented in Appendix H.4

6.3 Flow Control for Hydromodification Management

PDPs subject to hydromodification management requirements must provide flow control for post-project runoff to meet the flow control performance standard.

This is typically accomplished using structural BMPs that may include any combination of infiltration basins; bioretention, biofiltration with partial retention, or biofiltration basins; or detention basins. This section will discuss design of flow control measures for hydromodification management. This section is intended for use following the source control and site design processes described in Chapter 4 and the stormwater pollutant control design process described in Chapter 5.

The flow control performance standard is as follows (adapted from the March 2011 Final HMP, with modifications to meet the requirements of the MS4 Permit):

1 For flow rates ranging from 10 percent, 30 percent or 50 percent of the pre-development 2-year runoff event ($0.1Q_2$, $0.3Q_2$, or $0.5Q_2$) to the pre-development 10-year runoff event (Q_{10}), the post-project discharge rates and durations shall not deviate above the pre- development rates and durations by more than 10 percent over and more than 10 percent of the length of the flow duration curve. The specific lower flow threshold will depend on the erosion susceptibility of the receiving stream for the project site (see Section 6.3.4).

In this context, Q_2 and Q_{10} refer to flow rates determined based on continuous simulation hydrologic modeling or the following approved regression equation:

$$Q_2 = 3.60 \times A^{0.672} \times P^{0.753}$$

$$Q_{10} = 6.56 \times A^{0.783} \times P^{1.07}$$

where:

Q_2 = 2-year recurrence interval discharge in cubic feet per second

Q_{10} = 10-year recurrence interval discharge in cubic feet per second

A = Drainage area in square miles

P = Mean annual precipitation in inches (Refer to Table 6-1)

When determining Q_2 and Q_{10} the same methodology must be applied to determination of both flow rates (i.e. cannot mix and match methods at a POC), and be consistent across all POCs for the project (i.e. cannot mix and match methods between multiple POCs).

TABLE 6-6-1. Mean Annual Precipitation

Gage	Latitude	Longitude	Mean Annual Precipitation (inches)
Oceanside	33.2105556	-117.353333	12.29
Encinitas	33.044567	-117.277213	10.73
Kearney Mesa	32.835118	-117.128456	11.43
Fashion Valley	32.7652778	-117.1758333	10.75
Bonita	32.6561111	-117.0341667	10.88
Poway	32.9522222	-117.0472222	13.08
Fallbrook AP	33.354669	-117.251279	16.18
Lake Wohlford	33.166423	-117.004955	16.63
Ramona	33.0480556	-116.8608333	16.57
Lake Henshaw	33.2386111	-116.7616667	21.58
Borrego	33.2211111	-116.3369444	4.00
Lindbergh	32.7337	-117.1767	10.75

Gage	Latitude	Longitude	Mean Annual Precipitation (inches)
Escondido	33.1197222	-117.095	14.67
Flinn Springs	32.847104	-116.857801	15.55
Lake Cuyamaca	32.9894	-116.5867	31.30
Lower Otay	32.6111	-116.9319	11.90
San Onofre	33.3513889	-117.5319444	11.13
San Vicente	32.912082	-116.926513	16.47
Santee	32.839016	-117.024857	13.15

The range from a fraction of Q_2 to Q_{10} represents the range of geomorphically significant flows for hydromodification management in San Diego. The upper bound of the range of flows to control is pre-development Q_{10} for all projects. The lower bound of the range of flows to control, or "lower flow threshold" is a fraction of pre-development Q_2 that is based on the erosion susceptibility of the stream and depends on the specific natural system (stream) that a project will discharge to. Tools have been developed in the March 2011 Final HMP for assessing the erosion susceptibility of the stream (see Section 6.3.4 below for further discussion of the lower flow threshold).

When selecting the type of structural BMP to be used for flow control, consider the types of structural BMPs that will be utilized onsite for pollutant control.

Both stormwater pollutant control and flow control for hydromodification management can be achieved within the same structural BMPs. For example, a full infiltration BMP that infiltrates the DCV for pollutant control could include additional storage volume above or below ground to provide either additional infiltration of stormwater or control of outflow for hydromodification management. If possible, the structural BMPs for pollutant control should be modified to meet flow control performance standards in addition to the pollutant control performance standards. See Section 6.3.6 for further discussion of integrating structural BMPs for pollutant control and flow control.

6.3.1 Point(s) of Compliance

For PDPs subject to hydromodification management requirements, the flow control performance standard must be met for each natural or un-lined channel that will receive runoff from the project.

This may require multiple structural BMPs within the project site if the project site discharges to multiple discrete outfalls. When runoff is discharged to multiple natural or un-lined channels within a project site, each natural or un-lined channel must be considered separately and points of compliance (POCs) for flow control must be provided for each natural or un-lined channel, including situations where the channels will confluence before leaving the project boundary. When runoff from the project site does not meet a natural or un-lined channel onsite, instead traveling some distance downstream of the project in storm drain systems or lined channels prior to discharge to natural or un-lined channels, the POC(s) for flow control analysis shall be placed at the project boundary (i.e., comparing

the pre-development and post-project flows from the project area only, not analyzing the total watershed draining to the offsite POC), unless the project is draining to and accommodated by an approved master planned or regional flow control BMP.

For projects with multiple POCs, care should be taken to avoid the diversion of flow from one POC to another. In addition to water balance issues, flow diversion between points of compliance increases the size of the required flow control measures because the post-project drainage area is larger than the pre-development area. Consider the effect of grading changes and conveyances on potential diversions.

For individual projects draining to approved central or regional flow control BMPs, the POC for flow control analysis may be offsite of the specific project application.

In these instances, the individual project draining to a central or regional flow control BMP shall reference the approved design documents for the BMP, and shall demonstrate that either (a) the individual project design is consistent with assumptions made for imperviousness and features of the project area when the central or regional BMP was designed, or (b) the central or regional BMP still meets performance standards when the actual proposed imperviousness and features of the project area are considered.

Guidelines for Drainage Layout for Effective Hydromodification Management

The following guidelines for drainage layout will assist PDPs in effectively managing site runoff for more efficient hydromodification flow control management. By following these guidelines, the total number and size of structural BMPs necessary for flow control can be minimized.

- Identify existing (pre-development) drainage concentration points and use the existing concentration points for storm water discharge in the proposed design.
- Avoid creating new concentrated discharge points (storm drain outfalls) on hillsides or other locations where drainage is not naturally concentrated.
- Avoid diversion. Diversion means changing the discharge location of storm water runoff from a given land area from one concentration point to another (i.e., change in POC drainage area between pre-development and post-project condition). In the context of hydromodification management, diversion is measured with respect to each natural drainage system that is subject to erosion (i.e., at each POC), rather than at a property boundary. A diversion area is created when area that originally drains to one discharge location (e.g., "POC A") is changed to discharge to a different location (e.g., "POC B") as a result of grading and land development. Note that when the proposed project design will create a diversion area, the project must provide mitigation to match the pre-development runoff from the existing (pre-development) area. This means that if the proposed project will discharge runoff from 5 acres to a location that had a pre-development drainage area of 4 acres, the proposed project must provide mitigation to match the pre-development runoff flow rates and durations from the pre-development drainage area of 4 acres. When there is a diversion area, project-specific continuous simulation modeling is required to demonstrate that the flow control performance standard is met (Section 6.3.5.2). Sizing factor calculations (Section 6.3.5.2) are not applicable when there is a diversion area.

6.3.2 Offsite Area Restrictions

Runoff from offsite undeveloped areas should be routed around structural BMPs for flow control whenever feasible.

Methods to route flows around structural BMPs include designing the site to avoid natural drainage courses, or using parallel storm drain systems. If geometric constraints prohibit the rerouting of flows from undeveloped areas around a structural BMP, a detailed description of the constraints must be submitted to the [City Engineer].

Structural BMPs for flow control must be designed to avoid trapping sediment from natural areas regardless of whether the natural areas are critical coarse sediment yield areas or not.

Reduction in coarse sediment supply contributes to downstream channel instability. Capture and removal of natural sediment from the downstream watercourse can create "hungry water" conditions and the increased potential for downstream erosion. Additionally, coarse or fine sediment from natural areas can quickly fill the available storage volume in the structural BMP and/or clog a small flow control outlet, which can cause the structural BMP to overflow during events that should have been controlled, and will require frequent maintenance. Failure to prevent clogging of the principal control orifice defeats the purpose of a flow control BMP, since basin inflows would simply overtop the control structure and flow unattenuated downstream, potentially worsening downstream erosion.

6.3.3 Requirement to Control to Pre-Development (Not Pre-Project) Condition

The MS4 Permit requires that post-project runoff must be controlled to match pre-development runoff conditions, not pre-project conditions, for the range of flow rates to be controlled.

Pre-development runoff conditions are defined in the MS4 Permit as "approximate flow rates and durations that exist or existed onsite before land development occurs."

- **Redevelopment PDPs:** Use available maps or development plans that depict the topography of the site prior to development; otherwise use existing onsite grades if historic topography is not available. Assume the infiltration characteristics of the underlying soil. Use available information pertaining to existing underlying soil type such as soil maps published by the Natural Resource Conservation Service (NRCS). Do not use runoff parameters for concrete or asphalt to estimate pre-development runoff conditions.
- **New development PDPs:** The pre-development condition typically equates to runoff conditions immediately before project construction. However if there is existing impervious area onsite, as with redevelopment, the new development project must not use runoff parameters for concrete or asphalt to estimate pre-development runoff conditions.

When it is necessary for runoff from offsite impervious area (not a part of the project) to co-mingle with project site runoff and be conveyed through a project's structural flow control BMP, the offsite impervious area may be modeled as impervious in both the pre- and post- condition models. A project is not required to provide flow control for stormwater from offsite. This also means that for redevelopment projects not subject to the 50% rule (i.e., redevelopment projects that result in the creation or replacement of impervious surface in an amount of less than 50% of the area of impervious

surface of the previously existing development), comingled runoff from undisturbed portions of the previously existing development (i.e., areas that are not a part of the project) will not require flow control. Flow control facilities for comingled offsite and onsite runoff would be designed to process the total volume of the comingled runoff through the facility, but would provide mitigation for the excess runoff (difference of developed to pre-developed condition) based on onsite impervious areas only. The project applicant must clearly explain why it was not feasible or practical to provide a bypass system for stormwater from offsite. The City Engineer may request that the project applicant provide a supplemental analysis of onsite runoff only (i.e., supplemental model of the project area only).

6.3.4 Determining the Low Flow Threshold for Hydromodification Flow Control

The range of flows to control for hydromodification management depends on the erosion susceptibility of the receiving stream.

The range of flows to control is either:

- $0.1Q_2$ to Q_{10} for projects discharging to streams with high susceptibility to erosion (and this is the default range of flows to control when a stream susceptibility study has not been prepared),
- $0.3Q_2$ to Q_{10} for projects discharging to streams with medium susceptibility to erosion as determined by a stream susceptibility study approved by the City Engineer, or
- $0.5Q_2$ to Q_{10} for projects discharging to streams with low susceptibility to erosion as determined by a stream susceptibility study approved by the City Engineer.

The project applicant may opt to design to the default low flow threshold of 0.1Q2, or provide assessment of the receiving stream ("channel screening" a.k.a. "geomorphic assessment"), which may result in a higher low flow threshold of 0.3Q2 or 0.5Q2 for project hydromodification management.

Use of a higher low flow threshold of 0.3Q2 or 0.5Q2 must be supported by a channel screening report. Channel screening is based on a tool developed by the Southern California Coastal Water Research Project (SCCWRP), documented in SCCWRP's Technical Report 606 dated March 2010, "Hydromodification Screening Tools: Field Manual for Assessing Channel Susceptibility." The SCCWRP channel screening tool considers channel conditions including channel braiding, mass wasting, and proximity to the erosion threshold. SCCWRP's Technical Report 606 is included in Appendix B of the March 2011 Final HMP, and can also be accessed through SCCWRP's website. The result of applying the channel screening tool will be classification of high, medium, or low susceptibility to erosion, corresponding to low flow thresholds of 0.1Q2, 0.3Q2, and 0.5Q2, respectively, for the receiving stream. Note that the City Engineer may require that the channel screening study has been completed within a specific time frame prior to their review, and/or may apply a sunset date to their approval of a channel screening study. Other projects may rely on previously approved SCCWRP analyses at the discretion of the City Engineer.

The receiving stream is the location where runoff from the project is discharged to natural or un-lined channels.

The receiving stream may be onsite or offsite. The POC for channel screening is the point where

runoff initially meets an un-lined or natural channel, regardless of whether the POC for flow control facility sizing is at or within the project boundary or is offsite. A project may have a different POC for channel screening and flow control facility sizing if runoff from the project site is conveyed in hardened systems from the project site to the un-lined or natural channel. The erosion susceptibility of the receiving stream must be evaluated at the POC for channel screening, and for an additional distance known as the domain of analysis, defined in SCCWRP's Technical Report 606.

6.3.5 Designing a Flow Control Facility

Flow control facilities for hydromodification management must be designed based on continuous simulation hydrologic modeling.

Continuous simulation hydrologic modeling uses an extended time series of recorded precipitation data and evapotranspiration data as input and generates hydrologic output, such as surface runoff, groundwater recharge, and evapotranspiration, for each model time step. Using the continuous flow output, peak flow frequency and duration statistics can be generated for the pre-development and post-project conditions for the purpose of matching pre-development hydrologic conditions in the range of geomorphically significant flow rates. Peak flow frequency statistics estimate how often flow rates will exceed a given threshold. Flow duration statistics determine how often a particular flow rate is exceeded. To determine if a flow control facility meets hydromodification management performance standards, peak flow frequency and flow duration curves must be generated and compared for pre-development and post-project conditions.

Flow control facilities may be designed using either sizing factors presented in Appendix B of this manual, or using project-specific continuous simulation modeling. The sizing factors were developed based on unit-area continuous simulation models. This means the continuous simulation hydrologic modeling has already been done and the project applicant needs only to apply the sizing factors to the project's effective impervious area to size a facility that meets flow control performance standards. The sizing factor method is intended for simple studies that do not include diversion, do not include significant offsite area draining through the project from upstream, and do not include offsite area downstream of the project area. Use of the sizing factors is limited to the specific structural BMPs for which sizing factors were prepared. Project-specific continuous simulation modeling offers the most flexibility in the design, but requires the project applicant to prepare and submit a complete continuous simulation hydrologic model for review.

6.3.5.1 Sizing Factor Method

A project applicant may use sizing factors that were created to facilitate sizing of certain specific BMPs for hydromodification management.

The sizing factors included in G.2 have been updated based on the requirements in the 2013 MS4 permit and are different than the sizing factors presented in previous manuals. These updated values replace the previous sizing factors which shall no longer be used for sizing of hydromodification flow control BMPs. A discussion of the rational for the update is included in Appendix G.2.

The sizing factor method is intended for simple studies that do not include diversion, do not include significant offsite area draining through the project from upstream, and do not include offsite area downstream of the project area. Use of the sizing factors is limited to the specific structural BMPs described in Appendix G.2.

6.3.5.2 Project-Specific Continuous Simulation Modeling

A project applicant may prepare a project-specific continuous simulation model to demonstrate compliance with hydromodification management performance standards.

This option offers the most flexibility in the design. In this case, the project applicant shall prepare continuous simulation hydrologic models for pre-development and post-project conditions, and compare the pre-development and post-project (with hydromodification flow control BMPs) runoff peaks and durations until compliance with the flow control performance standards is demonstrated. The project applicant will be required to quantify the long-term pre-development and post-project runoff response from the site and establish runoff routing and stage-storage-discharge relationships for the planned flow control BMPs. There are several available hydrologic models that can perform continuous simulation analyses. Refer to Appendix G.1 of this manual for guidance for continuous simulation hydrologic modeling.

6.3.6 Integrating HMP Flow Control Measures with Pollutant Control BMPs

Both stormwater pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s) or by a series of structural BMP(s).

The design process should start with an assessment of the controlling design factor, then the typical design process for an integrated structural BMP or series of BMPs to meet two separate performance standards at once involves (1) initiating the design based on the performance standard that is expected to require the largest volume of stormwater to be retained, (2) checking whether the initial design incidentally meets the second performance standard, and (3) adjusting the design as necessary until it can be demonstrated that both performance standards are met. The following are recommendations for initiating the design process:

- **Full infiltration condition:** retention for pollutant control performance standard is the controlling design factor. For a system that is based on full retention for stormwater pollutant control, first design an initial retention area to meet stormwater pollutant control standards for retention, then check whether the facility meets flow control performance standards. If the initial retention facility does not meet flow control performance standards: increase the volume of the facility, increasing retention if feasible or employing outflow control for runoff to be discharged from the facility; as needed to meet the flow control performance standards.
- **Partial infiltration condition:** retention for pollutant control performance standard is the controlling design factor. For a system that is based on partial retention for stormwater pollutant control, first design the retention area to maximize retention as feasible. Then design an additional runoff storage area with outflow control for runoff to be discharged from the facility; as needed to meet the flow control performance standards. Then address pollutant control needs for the portion of the stormwater pollutant control DCV that could not be retained onsite.
- **No infiltration condition:** flow control for hydromodification management standard is the controlling design factor. For a system that is based on biofiltration with no infiltration for stormwater pollutant control, first design the facility to meet flow control performance standards, then check whether the facility meets biofiltration design standards for stormwater pollutant control. If the flow control biofiltration facility does not meet performance standards

for stormwater pollutant control by biofiltration, increase the volume of the biofiltration facility as needed to meet pollutant control performance standards, or identify other methods to address pollutant control needs for the portion of the stormwater pollutant control DCV that could not be processed with biofiltration onsite.

When an integrated structural BMP or series of BMPs is used for both stormwater pollutant control and flow control for hydromodification management, separate calculations are required to demonstrate that pollutant control performance standards and hydromodification management standards are met.

When an integrated structural BMP or series of BMPs is proposed to meet the stormwater pollutant control and flow control for hydromodification management obligations, the applicant shall either:

- Perform separate calculations to show that both hydromodification management and pollutant control performance standards are met independently by using guidance from Appendices B and G. Calculations performed shall be documented in the SQWMP. **or**
- Develop an integrated design that meets the separate performance standards presented in Chapter 2 for both hydromodification management and pollutant control. In this option the BMP requirements to meet the pollutant control performance standard are optimized to account for the BMP storage provided for flow control, and vice versa. Calculations performed to develop an integrated design shall be documented in the SQWMP. Project approval when this option is selected is at the discretion of the City Engineer.

6.3.7 Drawdown Time

The maximum recommended drawdown time for hydromodification management facilities is 96 hours based on Section 6.4.6 of the March 2011 Final HMP.

This is based on instruction from the County of San Diego Department of Environmental Health for mitigation of potential vector breeding issues and the subsequent risk to human health. This standard applies to, but is not limited to, detention basins, underground storage vaults, and the above-ground storage portion of LID facilities. When this standard cannot be met due to large stored runoff volumes with limited maximum release rates, a vector management plan may be an acceptable solution if approved by the governing municipality.

In cases where a Vector Management Plan is necessary, it shall be incorporated into the SWQMP as an attachment. A Vector Management Plan will only be accepted after the applicant has proven infeasibility of meeting the required drawdown time using any and all allowable BMPs. The information included in the plan will vary based on the nature, extent and variety of potential vector sources. It is recommended that preparers consult with the Department of Environmental Health Vector Control Program for technical guidance. Plans should include the following information at a minimum:

- Project identification information;
- A description of the project, purpose of the report, and existing environmental conditions;
- A description of the management practices that will be employed to minimize vector breeding sources and any associated employee education required to run facilities and operations;

- A discussion of long term maintenance requirements;
- A summary of mitigation measures;
- References; and
- A list of persons and organizations contacted (project proponents are expected to obtain review and concurrence of proposed management practices from Department of Environmental Health Vector control program staff prior to submission).

The property owner and applicant must include and sign the following statement: "The measures identified herein are considered part of the proposed project design and will be carried out as part of project implementation. I understand the breeding of mosquitoes in unlawful under the State of California Health and Safety Code Section 2060-2067. I will permit the Vector Surveillance and Control program to place adult mosquito monitors and to enforce this document as needed."

Refer to the sources below for additional guidance:

Report Guidance: http://www.sandiegocounty.gov/dplu/docs/Vector_Report_Formats.pdf

Department of Environmental Health Vector Control Program:
http://www.sandiegocounty.gov/deh/pests/vector_disease.html

It should be noted that other design factors may influence the required drawdown when hydromodification management BMPs are integrated with stormwater pollutant control BMPs. Since hydromodification flow control BMPs are designed based on continuous simulation modeling, which is based on a continuous rainfall record and analyzes a continuous inflow and outflow of the BMPs, inter-event drawdown time and availability of the BMP for subsequent event inflow has been accounted for in the sizing. Therefore, drawdown recommendations for hydromodification management are based on public safety, not availability of the BMP for the next inflow event. Stormwater pollutant control BMPs are designed on a single-event basis for a DCV (the 85th percentile storm event). Some of the design standards presented in Chapter 5 or Appendix B require that the pollutant control portion of the BMP drain within a specific time frame to ensure the pollutant control portion of the BMP is available for subsequent storm events. When hydromodification management BMPs are integrated with stormwater pollutant control BMPs, the designer must evaluate drawdown time based on both standards.

6.4 In-Stream Rehabilitation

An alternative to onsite flow control for post-project runoff may be in-stream rehabilitation.

Project applicant may be allowed to participate in an in-stream rehabilitation project in lieu of implementing onsite flow control BMPs. Refer to section 1.8 to determine if this option is available in the project watershed[10].

[10] The City of Encinitas does not currently have an Alternative Compliance Program.

Chapter 7

7 Long Term Operation & Maintenance

Permanent structural BMPs require on-going inspection and maintenance into perpetuity to preserve the intended pollution control and/or flow control performance.

This chapter addresses procedural requirements for implementation of a long-term Stormwater Maintenance Agreement and an Operation & Maintenance (O&M) Plan. This chapter also explains the typical maintenance requirements of structural BMPs presented in the manual. Specific requirements for O&M Plans will be discussed in Chapter 8 with the Submittal Requirements.

7.1 Need for Permanent Inspection and Maintenance

7.1.1 MS4 Permit Requirements

The MS4 Permit requires that each Copermittee implement a program that requires and confirms structural BMPs on all PDPs are designed, constructed, and maintained to remove pollutants in stormwater to the MEP.

Routine inspection and maintenance of BMPs will preserve the design and MS4 Permit objective to remove pollutants in stormwater to the MEP. The MS4 Permit requirement specifically applies to PDP structural BMPs; however, poor maintenance of source control, site design, or LID BMPs can lead to clogging or failure of structural BMPs due to greater delivery of runoff and pollutants than intended. Therefore, the City Engineer may also confirmation of maintenance of source control BMPs and site design / LID BMPs as part of the PDP structural BMP maintenance documentation requirements, as applicable (see Section 7.4).

7.1.2 Practical Considerations

Why do permanent structural BMPs require on-going inspection and maintenance into perpetuity?

By design, structural BMPs will trap pollutants transported by stormwater. Structural BMPs are subject to deposition of solids such as sediment, trash, pollutants, and other debris as well as to vegetation overgrowth. All components of the BMP, including both the surface and any sub-surface components, must be properly maintained to ensure ongoing pollutant capture capacity and to prevent flooding, standing water, and associated vector issues.

Vegetated structural BMPs, including vegetated infiltration or partial infiltration BMPs, and above ground detention basins, also require routine maintenance so that they don't inadvertently become wetlands, waters of the state, or sensitive species habitat under the jurisdiction of the United States Army Corps of Engineers, SDRWQCB, California Department of Fish and Wildlife, or the United States Fish and Wildlife Service. A structural BMP that is constructed in the vicinity of, or connected to, an existing jurisdictional water or wetland could inadvertently result in creation of expanded waters or wetlands. Proper placement and routine maintenance of structural BMPs are key to preventing this scenario and the need for specific resource agency permits and costly mitigation to perform maintenance of the structural BMP.

7.2 Summary of Steps to Maintenance Agreement

Ownership and maintenance responsibility for structural BMPs should be discussed at the beginning of project planning, typically at the pre-application meeting with the planning and zoning agency.

Structuring provisions to finance and implement maintenance of BMPs can be a major stumbling block to project approval**.** A maintenance agreement must be completed prior to the issuance of any construction, grading, building permit, site development permit, or any other applicable permit. The Operation and Maintenance plan is an attachment to the Stormwater Maintenance Agreement. Below are the typical steps and schedule for establishing a plan to ensure on-going maintenance of structural BMPs.

Table 7-1. Schedule for Developing O&M Plan and Agreement

Item	Description	Time Frame
1	Determine structural BMP ownership, party responsible for permanent O&M, and maintenance funding mechanism.	Prior to first submittal of a project application – discuss with staff at pre-application meeting.
2	Identify expected maintenance actions.	First submittal of a project application – identify in SWQMP.
3	Develop detailed O&M Plan and submit to City for review and approval.	Prior to issuance of construction, grading, building, site development, or other applicable permits.
4	Prepare and record a Stormwater Maintenance Agreement (legal agreement to be recorded against the property by the County Recorder) with the O&M Plan attached.	Prior to issuance of permit and/or recordation of parcel/final map.
5	Upon completion of construction, at the discretion of the City Engineer, the Stormwater Maintenance Agreement may be revised and rerecorded if conditions warrant.	Prior to final and release of securities.

7.3 Maintenance Responsibility

The property owner is responsible for the maintenance of the permanent structural BMPs into

perpetuity.

The property owner is responsible to ensure inspection and O&M of permanent structural BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district. When property ownership changes (i.e. the property is sold or otherwise transferred to a new owner), maintenance responsibility runs with the land and automatically transfers to the new owner. For structural BMPs that will be transferred to an agency, community facilities district, homeowners association, property owners association, or other special district, there may be an interim period during which the property owner is responsible until maintenance responsibility is formally transferred.

In the City of Encinitas, a Stormwater Maintenance Agreement must be prepared for all PDPs. The Stormwater Maintenance Agreement and attached O&M Plan must document the following:

- Property ownership and maintenance responsibility,
- Transfer of ownership/maintenance responsibility upon sale of the property,
- Structural BMPs that were installed per plan, and
- Required maintenance activities and frequency.

The Stormwater Maintenance Agreement is a legal agreement to be recorded against the property by the County Recorder. The City of Encinitas maintains four different maintenance agreement templates, depending on the property ownership arrangement. The four types of maintenance agreements include:

- Agreement for Maintenance by a Homeowner
- Agreement for Maintenance by a Homeowners' Association
- Agreement for Maintenance by an Agent
- Agreement for Maintenance by an Agent of a Commercial Facility

7.4 Long-Term Maintenance Documentation

As part of on-going structural BMP maintenance into perpetuity, property owners are required to provide documentation of maintenance for the structural BMPs on their property on an annual basis to support the Copermittees' reporting requirements to the SDRWQCB.

The MS4 Permit requires each Copermittee to verify that structural BMPs on each PDP "are adequately maintained, and continue to operate effectively to remove pollutants in stormwater to the MEP through inspections, self-certifications, surveys, or other equally effective approaches."

Based on these MS4 Permit requirements, the City Engineer requires that all permanent structural BMPs installed at PDPs be inspected by the property owner and maintained as necessary. Inspection and proper maintenance of all permanent structural BMPs shall be verified annually by the party responsible for maintenance. The City sends annual reminder letters to the responsible party for each site in the City's PDP inventory. Annual verification documentation can conveniently be submitted via a specially designed City website, http://cleanwaterbmp.cityofencinitas.org/. Maintenance verification submitted via email, mail or

in person are also accepted.

In addition to the mandatory annual self-verifications, the City conducts inspections of all permanent structural BMPs at the PDP site to verify that each BMP is working, being maintained properly, and is in compliance with all applicable City ordinances and permits. Inspection frequencies vary with the established project inspection priority. Table 4-3 below presents structural BMP priorities and their corresponding inspection frequencies. For instance, all PDPs designated as High priority for inspection, as determined in Section 4.5.2, are inspected by City staff on an annual basis prior to October 1.

Table 7-2. Permanent BMP Maintenance Verification and Inspection Requirements

Project Inspection Priority	Maintenance Verification	Inspection Frequency
High	Required from all projects annually	100% inspected annually by City staff prior to the start of the rainy season (October 1)
Low	Required from all projects annually	Inspected by City staff if verification documentation is not provided or is not adequate.

7.5 Inspection and Maintenance Frequency

How often is a property owner required to inspect and maintain permanent structural BMPs on their property?

The minimum inspection and maintenance frequency is once per year, reported annually. However, maintenance needs depend on the amount and quality of runoff delivered to the structural BMP, and annual maintenance is not always sufficient. Maintenance must be performed each time the maintenance threshold for removal of materials (sediment, trash, debris or overgrown vegetation) is met; maintenance indicators are presented in Section 7.7. If the annual inspection reveals that the maintenance threshold has already been exceeded, then the structural BMP has been operating at a reduced capacity; more frequent inspections and maintenance will be necessary in the future to avoid expensive rehabilitation of such inadequately maintained BMPs.

During the first year of normal operation of a structural BMP (i.e. when the project is fully built out and occupied), inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during and after a storm event is also recommended to verify proper BMP function. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined, based on the results of the first year inspections.

7.6 Measures to Control Maintenance Costs

Because structural BMPs must be maintained into perpetuity, it is essential to include measures to control maintenance costs.

The most effective way to reduce maintenance of structural BMPs is to reduce the pollutants they

receive by implementing source control and site design BMPs onsite, as required and described in Chapter 4. In addition, structural BMPs should include design features to facilitate maintenance, as listed below.

Considerations for placement of vegetated BMPs:

- Locate structural BMPs outside of floodway, floodplain, and other jurisdictional areas.
- Avoid direct connection to a natural surface water body.
- Discuss the location of the structural BMP with a wetland biologist to avoid placing a structural BMP in a location where it could become a jurisdictional wetland or be connected to a jurisdictional wetland area.

Measures to facilitate collection of the trapped pollutants:

- Design a forebay to trap gross pollutants in a contained area that is readily accessible for maintenance. A forebay may be a dedicated area at the inlet entrance to an infiltration BMP, biofiltration BMP, or detention basin, or may be a gross pollutant separator installed in the storm drain system that drains to the primary structural BMP.

Measures to access the structural BMP:

- The BMP must be accessible to equipment needed for maintenance. Access requirements for maintenance will vary with the type of facility selected.
- Infiltration BMPs and biofiltration BMPs typically require routine landscape maintenance using the same equipment that is used for general landscape maintenance. At times these BMPs may require excavation of clogged media (e.g. bioretention soil media, or sand for the sand filter), and should be accessible to appropriate equipment for excavation and removal/replacement of media.
- Above-ground detention basins should include access ramps for trucks to enter the basin to bring equipment and to remove materials.
- Underground BMPs such as detention vaults, media filters, or gross pollutant separators used as forebays to other BMPs, typically require access for a vactor truck to remove materials. Proprietary BMPs such as media filters or gross pollutant separators may require access by a forklift or other truck for delivery and removal of media cartridges or other internal components. Access requirements must be verified with the manufacturer of proprietary BMPs.
- Vactor trucks are large, heavy, and difficult to maneuver. Structural BMPs that are maintained by vactor truck must include a level pad adjacent to the structural BMP, preferably with no vegetation or irrigation system (otherwise vegetation or irrigation system may be destroyed by the vactor truck).
- The sump area of a structural BMP should not exceed 20 feet in depth due to the loss of efficiency of a vactor truck. The water removal rate is three to four times longer when the depth is greater than 20 feet. Deep structures may require additional equipment (stronger vactor trucks, ladders, more vactor pipe segments).
- All manhole access points to underground structural BMPs must include a ladder or steps.

Measures to facilitate inspection of the structural BMP:

- Structural BMPs shall include inspection ports for observing all underground components that require inspection and maintenance.
- Silt level posts or other markings shall be included in all BMP components that will trap and store sediment, trash, and/or debris, so that the inspector may determine how full the BMP is, and the maintenance personnel may determine where the bottom of the BMP is. Posts or other markings shall be indicated and described on structural BMP plans.
- Vegetation requirements including plant type, coverage, and minimum height when applicable shall be provided on the structural BMP and/or landscaping plans as appropriate or as required by the City Engineer.
- Signage indicating the location and boundary of the structural BMP is recommended.

When designing a structural BMP, the engineer should review the typical structural BMP maintenance actions listed in Section 7.7 to determine the potential maintenance equipment and access needs.

When selecting permanent structural BMPs for a project, the engineer and project owner should consider the long-term cost of maintenance and what type of maintenance contracts a future property owner, homeowners association or property owners association will need to manage. The types of materials used (e.g. proprietary vs. non-proprietary parts), equipment used (e.g. landscape equipment vs. vactor truck), actions/labor expected in the maintenance process and required qualifications of maintenance personnel (e.g. confined space entry) affect the cost of long term O&M of the structural BMPs.

7.7 Maintenance Indicators and Actions for Structural BMPs

This section presents typical maintenance indicators and routine and corrective maintenance actions for typical structural BMPs.

Structural BMPs are grouped into four categories based on common maintenance requirements:

- Vegetated infiltration or filtration BMPs
- Non-vegetated infiltration BMPs
- Non-vegetated filtration BMPs
- Detention BMPs

The components of the structural BMP will determine its maintenance category and therefore the applicable maintenance indicators. Maintenance indicators and actions shall be shown in the project-specific O&M Plan.

During inspection, the inspector checks the maintenance indicators. If one or more thresholds are met or exceeded, maintenance must be performed to ensure the structural BMP will function as designed during the next storm event. At a minimum, maintenance shall be performed once annually. Table 7-3 to Table 7-6 present generalized maintenance actions based on the BMP categories. Additional guidance is provided in Appendix E in the factsheets for each BMP.

7.7.1 Maintenance of Vegetated Infiltration or Filtration BMPs

"Vegetated infiltration or filtration BMPs" are BMPs that include vegetation as a component of the BMP. Applicable Fact Sheets may include INF-2 (bioretention), PR-1 (biofiltration with partial retention), BF-1 (biofiltration) or FT-1 (vegetated swale). The vegetated BMP may or may not include amended soils, subsurface gravel layer, underdrain, and/or impermeable liner. Maintenance indicators and associated actions for vegetated infiltration and filtration BMPs are presented below.

Table 7-3. Maintenance Indicators and Actions for Vegetated BMPs

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation. Examine the DMA draining to the BMP to determine the source of the sediment. Implement corrective measures as applicable to minimize the sediment supply.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans. Evaluate proper functioning of irrigation system, if applicable.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas. If necessary, perform minor re-grading to restore proper drainage according to the original plan. Adjust the irrigation system to prevent further erosion.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, contact the City Engineer prior to any additional repairs or reconstruction.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting the irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading, to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, contact the City Engineer prior to any additional repairs or reconstruction. Repair/re-seed/re-plant per the original plans any damaged vegetation in need of replacement.

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm event*	Make appropriate corrective measures such as adjusting the irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, clearing any underdrains, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, contact the City Engineer prior to any additional repairs or reconstruction. Repair/re-seed/re-plant per the original plans any damaged vegetation in need of replacement.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

7.7.2 Maintenance of Non-Vegetated Infiltration BMPs

"Non-vegetated infiltration BMPs" are BMPs that store stormwater runoff until it infiltrates into the ground, and do not include vegetation as a component of the BMP (refer to the "vegetated BMPs" category for infiltration BMPs that include vegetation). Non-vegetated infiltration BMPs generally include non-vegetated infiltration trenches and infiltration basins, dry wells, underground infiltration galleries, and permeable pavement with underground infiltration gallery. Applicable Fact Sheets may include INF-1 (infiltration basin) or INF-3 (permeable pavement). The non-vegetated infiltration BMP may or may not include a pre-treatment device, and may or may not include above-ground storage of runoff. Maintenance indicators and associated actions for non-vegetated infiltration BMPs are presented below.

Table 7-4. Maintenance Indicators and Actions for Non-Vegetated Infiltration BMPs

Typical Maintenance Indicator(s) for Non-Vegetated Infiltration BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris in infiltration basin, pretreatment device, or on permeable pavement surface	Remove and properly dispose accumulated materials. Examine the DMA draining to the BMP to determine the source of the sediment. Implement corrective measures as applicable to minimize the sediment supply.
Standing water in infiltration basin without subsurface infiltration gallery for longer than 96 hours following a storm event	Remove and replace clogged surface soils.
Standing water in subsurface infiltration gallery for longer than 96 hours following a storm event	This condition requires investigation of why infiltration is not occurring. If feasible, corrective action shall be taken to restore infiltration (e.g. flush fine sediment or remove and replace clogged soils). BMP may require retrofit if infiltration cannot be restored. If retrofit is necessary, the City Engineer shall be contacted prior to any repairs or reconstruction.
Standing water in permeable paving area	Flush fine sediment from paving and subsurface gravel. Provide routine vacuuming of permeable paving areas to prevent clogging.
Damage to permeable paving surface	Repair or replace damaged surface as appropriate.
Note: When inspection or maintenance indicates sediment is accumulating in an infiltration BMP, the DMA draining to the infiltration BMP should be examined to determine the source of the sediment, and corrective measures should be made as applicable to minimize the sediment supply.	

7.7.3 Maintenance of Non-Vegetated Filtration BMPs

"Non-vegetated filtration BMPs" include media filters (FT-2). These BMPs function by passing runoff through the media to remove pollutants. Maintenance indicators and associated actions for non-vegetated filtration BMPs are presented below.

Table 7-5. Maintenance Indicators and Actions for Filtration BMPs

Typical Maintenance Indicator(s) for Filtration BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose accumulated materials. Examine the DMA draining to the BMP to determine the source of the sediment. Implement corrective measures as applicable to minimize the sediment supply.
Obstructed inlet or outlet structure	Clear obstructions.
Clogged filter media	Remove and properly dispose filter media, and replace with fresh media.

Damage to components of the filtration system	Repair or replace as applicable.
Note: For proprietary media filters, refer to the manufacturer's maintenance guide.	

7.7.4 Maintenance of Detention BMPs

"Detention BMPs" include basins, cisterns, vaults, and underground galleries that are primarily designed to store runoff for controlled release to downstream systems. For the purpose of the maintenance discussion, this category does not include an infiltration component (refer to "vegetated infiltration or filtration BMPs" or "non-vegetated infiltration BMPs" above). Applicable Fact Sheets may include HU-1 (cistern) or FT-4 (extended detention basin). Maintenance indicators and associated actions for detention BMPs are presented below.

Table 7-6. Maintenance Indicators and Actions for Detention BMPs

Typical Maintenance Indicator(s) for Detention Basins	Maintenance Actions
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans. Evaluate proper functioning of irrigation system, if applicable.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. effective function may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas. If necessary, perform minor re-grading to restore proper drainage according to the original plan. Adjust the irrigation system to prevent further erosion.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, contact the City Engineer prior to any additional repairs or reconstruction.
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials. Examine the DMA draining to the BMP to determine the source of the sediment. Implement corrective measures as applicable to minimize the sediment supply.
Standing water	Make appropriate corrective measures such as adjusting the irrigation system, removing obstructions of debris or invasive vegetation, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, contact the City Engineer prior to any additional repairs or reconstruction. Repair/re-seed/re-plant per the original plans any damaged

	vegetation in need of replacement.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.

Chapter 8

8 Submittal Requirements

The City Engineer will review project plans for compliance with applicable requirements of this manual and the MS4 Permit.

The review process must verify that stormwater management objectives were considered in the project planning process and that opportunities to incorporate BMPs have been identified. The review process must confirm the site plan, landscape plan, and project stormwater documents are congruent. Therefore, the City of Encinitas requires a submittal documenting the stormwater management design for every project that is subject to the requirements of this manual. Herein the submittal is called a Stormwater Quality Management Plan (SWQMP). A complete and thorough project submittal will facilitate and expedite the review and approval, and may result in fewer submittals by the applicant. The sections below discuss submittal requirements. The project applicant must provide sufficient documentation to demonstrate that applicable requirements of this manual and the MS4 Permit will be met.

8.1 Submittal Requirement for Standard Projects

8.1.1 Standard Project SWQMP

For Standard Projects, the project submittal shall include a "Standard Project SWQMP."

The Standard Project SWQMP is a compilation of checklists that document that all permanent source control and site design BMPs have been considered for the project and implemented where feasible. All applicable features shall be shown on site plans and landscaping plans. The Standard Project SWQMP shall consist of the following forms and/or checklists included in Appendix J of this manual:

- Form J-1: Applicability of Permanent BMP Requirements
- Form J-2: Project Type Determination (Standard Project or PDP)
- Form J-3A: Site Information for Standard Projects
- Form J-4: Source Control BMP Checklist
- Form J-5: Site Design BMP Checklist

The Standard Project SWQMP shall also include copies of the relevant plan sheets showing source

control and site design BMPs.

8.2 Submittal Requirements for PDPs

8.2.1 PDP SWQMP

For PDPs, the project submittal shall include a "PDP SWQMP."

The PDP SWQMP shall document that all permanent source control and site design BMPs have been considered for the project and implemented where feasible; document the planning process and the decisions that led to the selection of structural BMPs; provide the calculations for design of structural BMPs to demonstrate that applicable performance standards are met by the structural BMP design; identify O&M requirements of the selected structural BMPs; and identify the maintenance mechanism (see Sections 7.2 and 7.3) for long term O&M of structural BMPs. PDPs shall use the PDP SWQMP Template provided in Appendix A, which will include forms and/or checklists included in Appendix J of this manual as well as checklists for documentation of pollutant control and hydromodification management structural BMP design. The PDP SWQMP shall include copies of the relevant plan sheets showing site design, source control, and structural BMPs, and structural BMP maintenance requirements.

A PDP SWQMP must be provided with the first submittal of a project application, including all backup documentation. If a project's stormwater treatment design relies on continuous simulation modeling or a SCCWRP channel assessment, the corresponding reports must be included with the first project submittal.

Stormwater requirements will directly affect the layout of the project. Stormwater requirements must be considered from the initial project planning or in project concept stage, and will be reviewed upon each submittal, beginning with the first submittal. The process from initial project application through approval of the project plans often includes design changes to the site layout and features. Changes may be driven by stormwater management requirements or other site requirements. Each time the site layout is adjusted, whether the adjustment is directly due to stormwater management requirements identified during the City Engineer's review of the stormwater submittal, or is driven by other site requirements, the stormwater management design must be revisited to ensure the revised project layout and features meet the requirements of this manual and the MS4 Permit. An updated PDP SWQMP must be provided with each submittal of revised project plans. The updated PDP SWQMP should include documentation of changes to the site layout and features, and reasons for the changes. In the event that other site requirements identified during plan review render certain proposed stormwater features infeasible (e.g. if fire department access requirements were identified that precluded use of certain surfaces or landscaping features that had been proposed), this must be documented as part of the decisions that led to the development of the final stormwater management design.

8.2.1.1 PDP O&M Plan

While the PDP SWQMP must include general O&M requirements for structural BMPs, the PDP SWQMP may not be the final O&M Plan.

The O&M requirements documented in the PDP SWQMP must be sufficient to show that O&M requirements have been considered in the project planning and design. However, a final O&M Plan

should reflect actual constructed structural BMPs to be maintained. Photographs and as-built plans for the constructed structural BMPs should be included. See Section 8.2.3 for project closeout procedures including local requirements for final O&M Plans, and Section 8.2.4 for additional requirements for private entity O&M of structural BMPs.

8.2.2 Requirements for Construction Plans

8.2.2.1 BMP Identification and Display on Construction Plans

Plans for construction of the project (grading plans, improvement plans, and landscaping plans, as applicable) must show all permanent site design, source control, and structural BMPs, and must be congruent with the PDP SWQMP.

8.2.2.2 Structural BMP Maintenance Information on Construction Plans

Plans for construction of the project must provide applicable detail to support maintenance activities for structural BMPs.

For the purpose of long term O&M, the project plans must identify the following:

- How to access the structural BMP to inspect and perform maintenance;
- Features that are provided to facilitate inspection (e.g. observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds);
- Manufacturer and part number for proprietary parts.

8.2.3 Design Changes During Construction and Project Closeout Procedures

8.2.3.1 Design Changes During Construction

Prior to occupancy and/or intended use of any portion of a PDP, the site must be in compliance with the requirements of this manual and the MS4 Permit.

During construction, any changes that affect the design of stormwater management features must be reviewed and approved by the City Engineer prior to implementation of any changes during construction. This might include changes to drainage patterns that occurred based on actual site grading and construction of stormwater conveyance structures or modifications to stormwater management features. The proposed changes will be reviewed to ensure the revised project layout and features meet the requirements of this manual and the MS4 Permit.

8.2.3.2 Certification of Constructed BMPs

As part of the "Structural BMP Approval and Verification Process" required by the MS4 Permit, each structural BMP must be inspected by the City inspector and the project owner's engineer to verify that it has been constructed and is operating in compliance with all of its specifications, plans, permits, ordinances, and the requirements of the MS4 Permit.

The City inspector for the project will require the project owner's engineer to inspect and provide

certification that the site improvements for the project have been constructed in conformance with the approved stormwater management documents and drawings. A note stating this requirement must be placed on project plans.

Since some portions of the structural BMP will not be readily visible after completion of construction (e.g. subsurface layers), the City Engineer will require inspections at each significant phase of construction, photographs taken during construction, and certification by the project owner's engineer that the BMP has been constructed in conformance with the approved plans. The City Engineer may require forms or other documentation be submitted prior to the City inspection in order to facilitate the structural BMP inspection. Specific requirements for this process during construction may vary by project. Typical documentation that may be required includes: certified engineered soil specification, proprietary BMP activation report, proof of washed rock size install, etc.

8.2.3.3 Final O&M Plan

If any approved construction changes will result in modifications to O&M procedures, the City Engineer will require a revised final O&M Plan to be submitted.

A final O&M Plan shall reflect project-specific constructed structural BMPs with project-specific drawings, photographs, and maps, and identify specific maintenance requirements and actions for the constructed structural BMPs. Project bonds will not be released until the final O&M Plan is submitted and approved.

8.2.4 Additional Requirements for Private Entity O&M

This section discusses private structural BMPs to be operated and maintained on private property by the property owner or manager.

8.2.4.1 Agreements for Private Structural BMP Maintenance

For privately owned and operated structural BMPs, the local jurisdiction requires execution of a Stormwater BMP Maintenance Agreement.

A Stormwater BMP Maintenance Agreement is a recorded document signed by the property owner committing the property owner and any future property owners to maintain the permanent structural BMPs into perpetuity. Prior to final approval of the project a BMP maintenance agreement will have been required to be recorded. If any approved construction changes will result in modifications to structural BMPs or O&M procedures, the City Engineer may require an updated BMP Maintenance agreement to be recorded with the County Recorder.

8.2.4.2 Interim Security Period of Maintenance Funding for Private Structural BMP Maintenance

At the discretion of the City Engineer, an interim security period of maintenance funding may be required. Prior to project final and security release, the developer shall notify the City of the person or party responsible for long-term BMP maintenance. The following information must be provided to the City, including:

- HOA Name
- Property Management Company Name

- Contact Person
- Mailing Address
- Phone Number
- Email

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