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Abstract

This ordinance is designed as a manual for selection, design, and incorporation of storm water Best Management Practices (BMPs) into the project's design plan. It requires identification of pollutants of concern from land use activities and pollutants and conditions of concern in receiving waters. The manual additionally requires pollution prevention throughout. One example is pollution prevention through pest control in the design of a site to avoid pesticide application.

Resource

San Diego Municipal Code
Land Development Manual
Storm Water Standards
A Manual for Construction & Permanent
Storm Water Best Management Practices Requirements
Revised May 30, 2003

LAND DEVELOPMENT MANUAL – STORM WATER STANDARDS MAY 2003

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I. INTRODUCTION

1. Storm Water Standards Manual Organization

This manual provides information to applicants for projects processed through the

Development Services Department (DSD), on how to comply with the permanent and construction storm water quality requirements for new development projects in the City of San Diego. This manual further guides the project applicant through the selection, design,

and incorporation of storm water Best Management Practices (BMPs) into the project's design plan.

Section 1, "Introduction," describes storm water pollution background information and legal or regulatory requirements associated with storm water pollution control. Section II, "Project Review & Permitting Process," outlines the project plan review and approval process for both discretionary actions and construction permits for new development projects. Applicants should use Section II as the roadmap to navigate through this manual and ensure storm water requirements are incorporated into their projects during project review. The remaining sections (Sections III-V and Appendices) provide technical information necessary to incorporate the storm water requirements in the review process outlined in Section II. Section III, "Permanent Storm Water BMP Selection Procedure," lists the permanent storm water BMP requirements, which are organized in a progression intended to dovetail with a typical project planning and design process and maximize storm water protection while minimizing project costs. Section IV, "Construction Storm Water BMP Performance Standards," describes the City's construction storm water BMP standards. Section V, "Implementation & Maintenance of Requirements," describes how implementation and maintenance of construction and permanent BMPs must be assured for both construction permits and discretionary actions. For permanent BMPs, this section provides a process and requirements for executing a maintenance agreement with the City. The Appendices to the Storm Water Standards manual contain information either necessary or designed to provide guidance in completing the storm water requirements in this manual.

2. Background

Urban runoff discharged from municipal storm water conveyance systems has been identified by local, regional, and national research programs as one of the principal causes of water quality problems in most urban areas. The City of San Diego's storm water conveyance system, which collects runoff from our streets, rooftops, driveways, parking lots, and other impervious areas, flows directly to our beaches and bays without receiving treatment (our storm water conveyance system is separate from our sanitary sewer system). Urban runoff potentially contains a host of pollutants like trash and debris, bacteria and viruses, oil and grease, sediments, nutrients, metals, and toxic chemicals. These contaminants can adversely affect receiving and coastal waters, associated wildlife, and public health. Urban runoff pollution is not only a problem during rainy seasons, but also year-round due to many types of urban water use that discharge runoff (dry weather flow) to the storm water conveyance system. Land development and construction activities significantly alter drainage patterns and contribute pollutants to urban runoff primarily through erosion and removal or change of existing natural vegetation during construction, and the creation of new impervious surfaces, such as parking lots, which often permanently contribute pollutants throughout the "use" of the project site. When homes, work places, recreational areas, roads, parking lots, and structures are built, new impervious areas are built- creating the potential for an impact to water quality. The natural landscape's ability to infiltrate and cleanse storm water and urban runoff is "capped" by the impervious surfaces. As impervious surfaces increase, water that normally would have percolated into the soil now flows over the land surface directly to downstream wetlands, creeks, and eventually the

Pacific Ocean. Accordingly, increases in impervious cover can increase the frequency and intensity of storm water flows. Second, new impervious surfaces often become a source of pollutants associated with development, such as automotive fluids, cleaning solvents, toxic or hazardous chemicals, detergents, sediment, metals, pesticides, oil and grease, and food wastes. These pollutants, which are often temporarily captured on impervious surfaces, are transported to the storm water conveyance system by storm water and urban runoff. The pollutants flow untreated through the storm water conveyance system and ultimately into our creeks, rivers, beaches, and bays. With the growing concerns of urban runoff and storm water pollution, local, state, and federal agencies devised regulations requiring development planning and construction controls to treat storm water-related pollution from new development projects before it reaches any receiving waters.

The Municipal Storm Water National Pollutant Discharge Elimination System (NPDES) Permit (Municipal Permit), issued on February 21, 2001 to the City of San Diego, the County of San Diego, the Port of San Diego, and 17 other cities in the region by the San Diego Regional Water Quality Control Board (Regional Board), requires the development and implementation of storm water regulations addressing storm water pollution issues in development planning and construction associated with private and public development projects. Specifically, development projects are required to include storm water best management practices (BMPs) both during construction, and in the projects permanent design, to reduce pollutants discharged from the project site, to the maximum extent practicable (see Appendix H for a detailed description of the various types and categories of BMPs discussed in this manual). The primary objectives of the Storm Water Standards manual requirements are to: (1) Effectively prohibit non-storm water discharges; and (2) Reduce the discharge of pollutants from storm water conveyance systems to the Maximum Extent Practicable (MEP statutory standard) both during construction and throughout the use of a developed site. To address pollutants that may be generated from new development once the site is in use, the Municipal Permit further requires that the City to implement a series of permanent BMPs described in a document called the Model Standard Urban Storm Water Mitigation Plan, or SUSMP (pronounced "sue-sump"), which was approved by the Regional Board on June 12, 2002.

The City's Storm Water Standards manual provides information on how to comply with all of the City's permanent and construction storm water BMP requirements, including the Model SUSMP, for new development projects in the City of San Diego. The effective date of the Storm Water Standards manual is December 2, 2002, and applies to all projects requiring any permit approvals on or after December 2, 2002, even if the project is currently under review or if previous approvals have been obtained.

3. Legal Framework

The requirement to implement storm water BMP requirements for development projects is based on Section 402 (p) of the Clean Water Act. The Federal Clean Water Act amendments of 1987 established a framework for regulating storm water discharges from municipal, industrial, and construction activities under the NPDES program. Under the Federal Clean Water Act, municipalities throughout the nation are issued a Municipal NPDES Permit. The

primary goal of the Municipal Permit is to stop polluted discharges from entering the storm water conveyance system and local receiving and coastal waters.

In California, the State Water Resources Control Board (SWRCB), through the nine Regional Boards, administers the NPDES storm water municipal permitting program. Based on the San Diego Municipal Permit issued by the San Diego Regional Board, the City is required to develop and implement construction and permanent storm water BMPs addressing pollution from new development projects.

II. PROJECT REVIEW & PERMITTING PROCESS

The City of San Diego's Storm Water Management and Discharge Control Ordinance (San Diego Municipal Code Section 43.03, et seq.), requires that all new development and redevelopment activities comply with the storm water pollution prevention requirements in Chapter 14, Article 2, Division 1 (Grading Regulations) and Chapter 14, Article 2, Division 2 (Storm Water Runoff Control and Drainage Regulations) of the Land Development Code. These storm water pollution prevention requirements, which are described in detail in Sections III, "Permanent Storm Water Best Management Practices Selection Procedure," and Section IV, "Construction Storm Water Best Management Practices Performance Standards," are site specific and vary based on the project's potential impact on receiving water quality. The steps below describe the elements of the plan review and permitting processes for storm water best management practice (BMP) requirements. The flow chart in Figure 1, "Review Process For Discretionary Actions" demonstrates how storm water requirements are incorporated into projects requiring subdivision approvals, development permits or other discretionary actions. The flow chart in Figure 2, "Construction Permit Review & Approval Process" describes how storm water requirements are incorporated into projects during the construction permit review process.

Step 1: Determine Applicable Storm Water BMP Requirements

Prior to submittal, applicants must complete the "Storm Water Requirements Applicability Checklist" in Appendix A1, to determine if their project is subject to permanent and construction storm water best management practice (BMP) requirements. (Note: this form must be completed for all permit applications, even if previous approvals exist. Projects requesting additional construction permits or discretionary approvals, even though previous permits and/or approvals have been obtained, will be required to comply with the storm water requirements in this document). This checklist must be completed, signed by the responsible party for the project, and submitted with your permit application. Applicants may also verify the project's storm water BMP requirements through a single discipline preliminary review of the project (see Development Services Department Information Bulletin No. 513).

The project design must include all required permanent BMPs (as determined from the Storm Water Requirements Applicability Checklist in Appendix A), prior to deeming the application package complete.

1 The Storm Water Requirements Applicability Checklist may also be obtained from the Development Services Department's News & Updates website (http://www.sannet.gov/developmentservices/news/newslist.shtml).

A. Permanent Storm Water BMP Requirements

i. Standard Requirements. Projects subject to standard permanent storm water requirements must incorporate the site design and source control requirements identified in Sections III.2.A and B (requirements 1 through 17), into the project (see Table 1). Refer to Step 2: "Prepare & Submit Appropriate Plans," for guidance in the BMP design process.

ii. Priority Project Requirements. Projects subject to priority project permanent storm water requirements must incorporate all applicable requirements in Section III.2, "Establish Permanent Storm Water Best Management Practices," (requirements 1 through 35) into the project design. This includes the site design and source control BMPs, BMPs applicable to individual priority project categories, and treatment control BMP requirements. If a priority project meets more than one priority project category definition, as shown in Table 1, the project is subject to all BMPs applicable to individual priority project categories that apply. For example, if a project is proposing to build 50 attached residential units and a 6,000 square foot restaurant with a 70-space surface parking lot, the project would be subject to the individual priority project category BMP requirements for "Attached Residential Development," "Restaurants," and "Parking Lots," as shown in Table 1, below. Refer to Step 2: "Prepare & Submit Appropriate Plans," for guidance in the permanent BMP design process.

Table 1. Standard Development Project & Priority Project Storm Water BMP Requirements Matrix.

BMPs Applicable to Individual Priority Project Categories(3)	Site Design BMPs(1)	Source Control BMPs(2)
a. Private Roads		
b. Residential Driveways & Guest Parking		
c. Dock Areas		
d. Maintenance Bays		
e. Vehicle Wash Areas		

f. Equipment Wash Areas
g. Outdoor Processing
Areas
h. Surface Parking
Areas
i. Fueling Areas
j. Hillside Landscaping
Treatment
Control
BMPs(4)
Standard Projects R R O O O O O O O O O O
Priority Projects:
Detached Residential
Development R R R R R S
Attached Residential
Development R R R S
Commercial
Development greater than 100,000 ft2
R R R R R R S
Automotive Repair
Shop R R R R R R R S
Restaurants R R R R S
Steep Hillside
Development greater than 5,000 ft2
R R R R S
Parking Lots R R R(5) S
Streets, Highways &
Freeways R R S

R = Required; select one or more applicable and appropriate BMPs from the applicable steps in

Section III.2.A-D, or equivalent as identified in Appendix C.

O = Optional/ or may be required by City staff. As appropriate, applicants are encouraged to incorporate treatment control BMPs and BMPs applicable to individual priority project categories into the project design. City staff may require one or more of these BMPs, where appropriate.

S = Select one or more applicable and appropriate treatment control BMPs from Appendix C.

(1) Refer to Section III.2.A.

(2) Refer to Section III.2.B.

(3) Priority project categories must apply specific storm water BMP requirements, where applicable. Priority projects are subject to the requirements of all priority project categories that apply.

(4) Refer to Section III.2.D.

(5) Applies if the paved area totals >5,000 square feet or with >15 parking spaces and is potentially exposed to urban runoff.

B. Construction Storm Water BMP Requirements

Projects subject to the construction storm water best management practices requirements must comply with the standards included in Section IV, "Construction Storm Water BMP Performance Standards," as appropriate depending on the site conditions, season, and project design, and construction methods. Each project must be given a priority ranking (high, medium or low) for the construction phase (see Appendix A). The prioritization will determine the inspection frequency by City staff but will not change the construction BMP requirements. Refer to Step 2: "Prepare & Submit Appropriate Plans," for guidance in navigating through this manual to ensure construction BMP performance standards are met. Step 2 – Prepare & Submit Appropriate Plans.

After determining the general categories of storm water requirements that apply to the project in Step 1 (e.g., construction BMPs, standard permanent BMPs, and/or priority project permanent BMPs), refer to the instructions in this step (see below) to determine what analysis and/or specific BMP requirements in Sections III and IV of the Storm Water Standards manual must be provided and/or incorporated into the project.

NOTE: Projects are only required to provide applicable BMPs. For example, an attached residential development project subject to the priority project requirements would not have to meet the "private road" requirements in this manual if no private roads were proposed. In addition, the City Engineer may approve proposed alternatives to any of the BMP requirements in this manual if they are determined to be applicable and equally effective. In all cases, priority projects shall meet the numeric sizing treatment standards in Table 3.

A. Permanent Storm Water BMPs

i. Standard Requirements. Projects (requiring either discretionary actions or construction permits), subject to only standard permanent BMP requirements need only to complete the "Identify Pollutants from the Project Area" procedure in Section III.1.A, and then incorporate the requirements in Section III.2.A, "Site Design BMPs" and Section III.2.B, "Source Control BMPs" (requirements 1-17) into the project. Applicants must incorporate all necessary permanent BMPs into the project plans prior to submittal, regardless of project type. Analysis of the project's anticipated pollutants of concern must also be included with the project submittal.

ii. Priority Project Requirements. Projects (requiring either discretionary actions or construction permits), subject to the priority project permanent BMP requirements must complete all of the analyses required in Section III.1, "Identify Pollutants and Conditions of Concern," and incorporate all of the applicable BMP requirements in Section III.2, "Establish Storm Water BMP Requirements" (requirements 1-35). Applicants must incorporate all necessary permanent BMPs into the project plans prior to submittal, regardless of project type. In addition, projects subject to priority project requirements must prepare and submit a Water Quality Technical Report in accordance with Appendix D. Analysis of the project's anticipated pollutants of concern, anticipated pollutants of concern in downstream receiving waters, and conditions of concern, must also be included in the Water Quality Technical Report as part of the project submittal.

B. Construction Storm Water BMPs

Section IV, "Construction Storm Water BMP Performance Standards," describes the construction site management requirements that contractors must comply with. In addition, Section IV lists the performance standards that construction sites must meet, and provides a list of erosion control, sediment control, and materials management BMPs for reference. Additionally, each project must be given a priority of high, medium or low (see Appendix A).

i. Construction Projects Over 5 Acres (until March 10, 2003 – see below). Those projects that have been determined to require construction BMPs in Step 1 must identify the construction BMPs to be implemented in accordance with the performance standards in Section IV, "Construction Storm Water BMP Performance Standards." If a project disturbs 5-acres or more (to be reduced to 1-acre on March 10, 2003), the applicant must provide a Storm Water Pollution Prevention Plan (SWPPP), which identifies all construction BMP requirements required by Section IV, in accordance with Order No. 99-08-DWQ of the State General Permit for Storm Water Discharges Associated with Construction Activity (State General Construction Permit). Consistent with the State General Construction Permit, the City will require that both erosion and sediment control BMPs be installed and maintained for all applicable projects in addition to good housekeeping and site and materials management. Additionally, the State General Construction Permit has a requirement for a sampling and monitoring program to be implemented. Appendix F provides general guidelines for preparation of a SWPPP as well as a more detailed checklist to meet the requirements.

ii. Construction Projects Under 5 Acres (until March 10, 2003 – see below). Those projects that have been determined to require construction BMPs in Step 1 must identify the construction BMPs to be implemented in accordance with the performance standards in Section IV, "Construction Storm Water BMP performance Standards." For projects that disturb less than 5-acres (to be reduced to 1-acre on March 10, 2003), and are determined to have a potential to impact water quality during construction, the applicant must provide a Water Pollution Control Plan (WPCP), which identifies all construction BMP requirements required by Section IV,

with the project submittal. The WPCP shall depict the BMPs to be implemented during construction to reduce/eliminate discharges of pollutants to the storm drain conveyance system. The WPCP shall include but not be limited to erosion and sediment control BMPs, good housekeeping measures and site and materials management.

After preparing plans and supporting documents according to the requirements in this manual, submit plans to the Development Services Department for review (See Step 3).

Step 3 – Determine Adequacy of Proposed Plans.

Under the authority of the City Engineer, Development Services staff will review submitted plans for compliance with the applicable storm water requirements contained in this manual. The City Engineer may approve proposed alternatives to the BMP requirements in this manual if they are determined to be applicable and equally effective. Additional analysis or information may be required to enable staff to determine the adequacy of proposed BMPs, and will be requested through a project issues report following the conclusion of a staff review cycle. After all storm water requirements have been approved by the City Engineer, proceed to Step 4 to assure implementation and maintenance of the approved BMPs through permit conditions, plan notes, and if necessary, maintenance agreements.

Step 4 -- Assure Implementation & Maintenance of Requirements.

Applicants must provide assurances that permanent storm water BMPs will be constructed and permanently maintained throughout the use of a developed site, and that construction BMPs will be implemented and maintained until construction is complete. The summaries below describe how construction and permanent BMP requirements must be assured during both discretionary actions and construction permit review processes. After the City Engineer has approved all construction and/or permanent BMPs, refer to Section V, "Implementation & Maintenance Of Requirements" to determine how construction and permanent BMP implementation and maintenance will be assured.

A. Discretionary Action

For any discretionary action, permanent storm water requirements shall be incorporated into the project design and be shown on the plans. In addition, project shall be conditioned to execute a maintenance agreement for ongoing permanent BMP maintenance, satisfactory to the City Engineer, prior to the issuance of any construction permits. This requirement shall be noted on the plans for the discretionary action. If the project will be required to provide construction BMPs, the permit/approval shall include the "Standard Construction BMP Implementation And Maintenance Condition" listed in Section V, "Implementation & Maintenance Of Requirements".

B. Construction Permits

For projects requiring construction permits, construction and permanent BMP requirements shall be incorporated into the project design and shown on the plans prior to the issuance of any permits. The project applicant shall execute a permanent BMP maintenance agreement, satisfactory to the City Engineer, prior to issuance of any construction permits. Construction maintenance requirements and the specific permanent BMP maintenance procedures shall be noted on the plans. Any construction BMP requirements that cannot be shown graphically must be noted on the plans.

III. PERMANENT BEST MANAGEMENT PRACTICES SELECTION PROCEDURE

Where referred to this Section by Step 2 of Section II, complete the analysis required for your project in the subsections of Section III.1 below.

1. IDENTIFY POLLUTANTS & CONDITIONS OF CONCERN

A. Identify Pollutants from the Project Area

Using Table 2, below, identify the project's anticipated pollutants by determining which general project category most closely fits the project type. Projects meeting the definition of more than one general project category shall identify all general pollutant categories that apply. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern. Descriptions of the general pollutant categories listed in table 2 are listed in Appendix I under the definition of "pollutants of concern."

Table 2. Anticipated and Potential Pollutants Generated by Land Use Type.

General Pollutant Categories
General
Project
Categories Sediments Nutrients
Heavy Metals
Organic Compounds
Trash & Debris
Oxygen Demanding Substances
Oil & Grease
Bacteria & Viruses Pesticides
Detached Residential Development
X X X X X X X
Attached Residential Development
X X X P(1) P(2) P(1) X
Commercial Development P(1) P(1) P(2) X P(5) X P(3) P(5)
Automotive Repair Shops X X(4)(5) X X
Restaurants X X X X
Steep Hillside Development X X X X X X
Parking Lots P(1) P(1) X X P(1) X P(1)

Streets, Highways & Freeways
X P(1) X X(4) X P(5) X
X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

B. Identify Pollutants of Concern in Receiving Waters

For priority projects, the following analysis shall be conducted and reported in the project's Water Quality Technical Report:

1. For each of the proposed project discharge points, identify the receiving water(s), including hydrologic unit basin number(s), as identified in the most recent version of the Water Quality Control Plan for the San Diego Basin2, prepared by the San Diego Regional Water Quality Control Board.

2. Identify any receiving waters, into which the developed area would discharge to, included in the 2002 CWA Section 303(d) List of Water Quality Limited Segments approved by the State Water Resources Control Board on February 4, 20033. List any and all pollutants for which the receiving waters are impaired. To assist in determining a project's pollutants of concern, the City of San Diego created a reference map showing 303d listed water bodies and associated pollutants. This map, titled, "2002 Clean Water Act Section 303(d) Water Quality Limited Segments," is provided for reference on the SANGIS website4. A reduced copy of the map is also included in Appendix J.

Note: Some 303(d) listings do not identify a pollutant causing impairment, butinstead identify a condition, such as Eutrophic, Benthic Community Degradation,

Toxicity, or Sediment Toxicity. To assist in determining the pollutant that would likely be the cause of the 303(d) listing, the following table identifies probable pollutants associated with impairments identified in 2002 CWA Section 303(d) List of Water Quality Limited Segments.

Table 3. Probable Pollutants Causing Clean Water Act Section 303(d) Impairment Listing 303(d) Impairment Listing Probable Pollutants Eutrophic

Benthic Community Degradation
Sediment
Toxicity
Toxicity (in Storm Water Runoff)
Low Dissolved Oxygen
Sediment

Nutrients X X
Heavy Metals X X
Organic Compounds X X X
Trash and Debris X
Oxygen Demanding
Substances X X
Oil and Grease
Bacteria and Viruses
Pesticides X

2 To view a copy of the Basin Plan, go to: http://www.swrcb.ca.gov/rwqcb9/programs/basinplan.html

3 To view the 2002 303(d) List of Impaired Water Bodies, go to: www.swrcb.ca.gov/303dupdate.html

4 To view the City's map titled, "2002 Clean Water Act Section 303(d) Water Quality Limited Segments,"go to: www.sangis.org

C. Identify Conditions of Concern

For priority projects, the following analysis shall be conducted and reported in the project's Water Quality Technical Report:

1. Evaluate the project's conditions of concern in a drainage study report prepared by a civil engineer, hydrologist, or hydrogeologist registered in the State of California, with experience in the science of stream and river generated surface features (i.e., fluvial geomorphology) and water resources management, satisfactory to the City Engineer. The report shall consider the project area's location (from the larger watershed perspective), topography, soil and vegetation conditions, percent impervious area, natural and infrastructure drainage features, and any other relevant hydrologic and environmental factors to be protected specific to the project area's watershed.

2. As part of the drainage study, the applicant's civil engineer shall conduct a field reconnaissance to observe and report on downstream conditions, including undercutting erosion, slope stability, vegetative stress (due to flooding, erosion, water quality degradation, or loss of water supplies) and the area's susceptibility to erosion or habitat alteration as a result of any future upstream development.

3. The Drainage study shall compute rainfall runoff characteristics from the project area including at a minimum, peak runoff, time of concentration, and detention volume (if appropriate). These characteristics shall be developed for the two-year and 10-year frequency, six-hour or 24-hour, type B storm for the coastal areas of San Diego County (as described in the San Diego County Hydrology Manual, September 2002). The 6-hour Type B storm yields larger peak discharges for certain smaller

drainage areas (usually less than 10 square miles, depending upon area, time to peak, CN, frequency, etc.). The 24-hour Type B storm yields larger peak discharges for larger drainage areas (usually greater than 10 square miles, depending upon area, time to peak, CN, frequency, etc.). The largest peak flow should be included in the report. The report shall also report the project's conditions of concern based on the hydrologic and downstream conditions discussed above. Where downstream conditions of concern have been identified, the drainage study shall establish that pre-project hydrologic conditions that minimize impacts on those downstream conditions of concern would be either improved or maintained by the proposed project, satisfactory to the City Engineer, by incorporating the permanent BMP requirements identified in Section III.2, below.

2. ESTABLISH PERMANENT STORM WATER BEST MANAGEMENT PRACTICES

After identifying the project's pollutants of concern, and conditions of concern (for priority projects), in Section III.1, projects subject to standard or priority project requirements shall implement all applicable site design, and source control BMPs listed below. Projects subject to priority project requirements must also implement the BMPs applicable to individual priority project categories and structural treatment control BMPs. Applicants may employ alternative comparable and equally effective site design and source control BMPs (including requirements applicable to individual priority project categories), satisfactory to the City Engineer. Projects are encouraged to address these objectives through the creation of a hydrologically functional project design that attempts to mimic the natural hydrologic regime. Mimicking a site's natural hydrologic regime can be pursued by:

 Reducing imperviousness (such as, new surface parking lots), conserving natural resources and areas, maintaining and using natural drainage courses in the storm water conveyance system, and minimizing clearing and grading.

 Providing runoff storage measures dispersed throughout a site's landscape with the use of a variety of detention, retention, and runoff practices.

 Implementing on-lot hydrologically functional landscape design and management practices. These design principles offer an innovative approach to urban storm water management, one that does not rely on the conventional end-of-pipe or in-the-pipe structural methods but instead strategically integrates storm water controls throughout the urban landscape. Useful resources for applying these principles, referenced in the appendix, include Start at the Source (1999), and Low-Impact Development Design Strategies (1999) (see Appendix F). Effective source controls offer another strategy to reduce a project's need for treatment. Applicants are encouraged to design projects so that runoff is treated by site design BMPs, such as rooftop runoff treated in landscaping, so that it may be applied towards the numeric sizing treatment standards, satisfactory to the City Engineer. Therefore, projects shall incorporate, where applicable, storm water BMPs into the project design, in the following progression:

- Site Design BMPs
- Source Control BMPs
- BMPs for Individual Priority Project Categories (these are site design and source control BMPs)
- Treatment Control BMPs

The series of best management practices listed in Section III.2 have been organized sequentially to allow the applicant and design professional to incorporate the site design, source control BMPs, and where necessary, requirements applicable to individual priority project categories and treatment control BMPs in this progression.

A. Site Design BMPs

Maintain Pre-Development Rainfall Runoff Characteristics

Control post-development peak storm water runoff discharge rates and velocities to maintain or reduce pre-development development downstream erosion by applying the following concepts:

1. Minimize impervious footprint. (1) Increase building density (number of stories

above or below ground); (2) construct walkways, trails, patios, overflow parking lots and alleys and other low-traffic areas with permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials; (3) construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walkable environment for pedestrians are not compromised; and (4) minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.

2. Conserve natural areas and provide buffer zones between natural water bodies and the project footprint. (1) Concentrate or cluster development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition; and (2) Use natural drainage systems to the maximum extent practicable (natural drainages and vegetated swales are preferred over using lined channels or underground storm drains. Refer to the Environmentally Sensitive Lands regulations of the Land Development Code (LDC § 142.01, et. seq.) for more guidance in protecting environmentally sensitive lands.

3. Minimize Directly Connected Impervious Areas. (1) Where landscaping is proposed, drain rooftops into adjacent landscaping prior to discharging to the storm water conveyance system; and (2) where landscaping is proposed, drain impervious parking lots, sidewalks, walkways, trails, and patios into adjacent landscaping.

4. Maximize canopy interception and water conservation. (1) Preserve existing native trees and shrubs; and (2) plant additional native or drought tolerant trees and large shrubs in place of non-drought tolerant exotics.

Protect Slopes and Channels

5. Convey runoff safely from the tops of slopes.

6. Vegetate slopes with native or drought tolerant vegetation.

7. Stabilize permanent channel crossings.

8. Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.

B. Source Control BMPs

Design Outdoor Material Storage Areas to Reduce Pollution Introduction

9. Hazardous materials with the potential to contaminate urban runoff shall be: (1) placed in an enclosure such as, but not limited to, a cabinet, shed, or similar structure that prevents contact with rain, runoff or spillage to the storm water conveyance system; and (2) protected by secondary containment structures such as berms, dikes, or curbs. The storage area shall be paved and sufficiently impervious to contain leaks and spills, and have a roof or awning to minimize direct precipitation within the secondary containment area.

Design Trash Storage Areas to Reduce Pollution Introduction

10. Trash storage areas shall be: (1) paved with an impervious surface, designed not to allow run-on from adjoining areas, and screened or walled to prevent off-site transport of trash; and, (2) contain attached lids on all trash containers that exclude rain; or (3) contain a roof or awning to minimize direct precipitation.

Limited exclusion: detached residential homes.

Employ Integrated Pest Management Principles

Integrated pest management (IPM) is an ecosystem-based pollution prevention strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant plant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-

target organisms, and the environment. More information may be obtained at the UC Davis website (http://www.ipm.ucdavis.edu/WATER/U/index.html).

11. Eliminate and/or reduce the need for pesticide use in the project design by: (1) Plant pest-resistant or well-adapted plant varieties such as native plants; and (2) Discourage pests by modifying the site and landscaping design. Pollution prevention is the primary "first line of defense" because pollutants that are never used do not have to be controlled or treated (methods which are inherently less efficient).

12. Distribute IPM educational materials to future site residents/tenants. Minimally, educational materials must address the following topics: (1) Keeping pests out of buildings and landscaping using barriers, screens, and caulking; (2) Physical pest elimination techniques, such as, weeding, squashing, trapping, washing, or pruning out pests; (3) Relying on natural enemies to eat pests; (4) Proper use of pesticides as a last line of defense. More information may be obtained at the UC Davis website (http://www.ipm.ucdavis.edu/WATER/U/index.html).

Use Efficient Irrigation Systems & Landscape Design

Requirements 13-15 Limited exclusion: detached residential homes.

13. Employ rain shutoff devices to prevent irrigation during and after precipitation.

14. Design irrigation systems to each landscape area's specific water requirements.

15. Use flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.

Provide Storm Water conveyance System Stenciling and Signage

16. Provide concrete stamping, or equivalent, of all storm water conveyance system inlets and catch basins within the project area with prohibitive language (e.g., "No Dumping – I Live in <<name receiving water>>"), satisfactory to the City Engineer. Stamping may also be required in Spanish.

17. Post signs and prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area, trailheads, parks and building entrances.

C. BMPs Applicable to Individual Priority Project Categories

Where identified in Table 1, the following requirements shall be incorporated into applicable priority projects. Projects shall adhere to each of the individual priority project category requirements that apply to the project (e.g., a restaurant with more than 15 parking spaces would be required to incorporate the requirements for 'c. Dock Areas', 'f. Equipment Wash Areas', and 'h. Surface Parking Areas' into the project design).

a. Private Roads

18. The design of private roadway drainage shall use at least one of the following (for further guidance, see Start at the Source [1999]): (1) rural swale system- street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings; (2) urban curb/swale system- street slopes to curb, periodic swale inlets drain to vegetated swale/biofilter; or (3) dual drainage system- first flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder.

b. Residential Driveways & Guest Parking

19. Driveways shall have one of the following: (1) shared access; (2) flared entrance (single lane at street); (3) wheelstrips (paving only under tires); (4) porous paving; or (5) designed to drain into landscaping prior to discharging to the storm water conveyance system.

20. Uncovered temporary or guest parking on private residential lots shall be: (1) paved with a permeable surface; or (2) designed to drain into landscaping prior to discharging to the storm water conveyance system.

c. Dock Areas

21. Loading/unloading dock areas shall include the following: (1) cover loading dock areas, or design drainage to preclude urban run-on and runoff; and (2) An acceptable method of containment and pollutant removal, such as a shut-off valve and containment area. Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.

d. Maintenance Bays

22. Maintenance bays shall include at least one of the following: (1) repair/maintenance bays shall be indoors; or, (2) designed to preclude urban run-on and runoff.

23. Maintenance bays shall include a repair/maintenance bay drainage system to capture all wash water, leaks and spills. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm water conveyance system is prohibited.

e. & f. Vehicle & Equipment Wash Areas

24. Areas for washing/steam cleaning of vehicles and areas for outdoor equipment/accessory washing and steam cleaning shall be: (1) self-contained to preclude run-on and run-off, covered with a roof or overhang, and equipped with a clarifier or other pretreatment facility; and (2) properly connected to a sanitary sewer.

g. Outdoor Processing Areas

25. Outdoor processing areas shall: (1) cover or enclose areas that would be the most significant source of pollutants; or, (2) slope the area toward a dead-end sump; or, (3) discharge to the sanitary sewer system.

26. Grade or berm processing area to prevent run-on from surrounding areas.

27. Installation of storm drains in areas of equipment repair is prohibited.

h. Surface Parking Areas

28. Where landscaping is proposed in surface parking areas (both covered and uncovered), incorporate landscape areas into the drainage design.

29. Overflow parking (parking in excess of the project's minimum parking requirements) may be constructed with permeable paving.

i. Non-Retail Fueling Areas

Non-Retail fueling areas shall be designed with the following:

30. Fuel dispensing area that is: (1) paved with Portland cement concrete or equivalent smooth impervious surface (asphalt concrete is prohibited); (2) designed to extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less; (3) sloped to prevent ponding; (4) separated from the rest of the site by a grade break that prevents run-on of urban runoff; and (5) designed to drain to the project's treatment control BMP(s) prior to discharging to the storm water conveyance system.

31. Overhanging roof structure or canopy that is: (1) equal to or greater than the area within the fuel dispensing area's grade break; and (2) designed not to drain onto or across the fuel dispensing area.

j. Steep Hillside Landscaping

32. Steep hillside areas disturbed by project development shall be landscaped with deep-rooted, drought tolerant plant species selected for erosion control, in accordance with the Landscape Technical Manual.

D. Treatment Control BMPs

33. Where identified in Table 1, and after site design and source control BMPs have been incorporated into the project, applicants of priority projects shall design a single or combination of treatment control BMPs designed to infiltrate, filter, and/or treat runoff from the project footprint to one of the “Numeric Sizing Treatment Standards” listed in Table 3, below. Applicants must use the Structural Treatment BMP Selection Procedure outlined in Section III.2.D.i, below to select appropriate treatment control BMPs. Applicants are

encouraged to design projects so that runoff is treated by site design BMPs, such as rooftop runoff treated in landscaping, so that it may be applied towards the numeric sizing treatment standards, satisfactory to the City Engineer. Treatment efficiencies can also be realized by locating treatment controls strategically within a drainage basin without being limited by the project boundary.

In all instances, structural treatment BMP(s) may be located on- or off-site, used singly or in combination, or shared by multiple new developments, pursuant to the following criteria:

(a) All structural treatment control BMPs shall infiltrate, filter, and/or treat the required runoff volume or flow prior to discharging to any receiving water body supporting beneficial uses;

(b) Post-construction structural treatment control BMPs for a single priority project shall collectively be designed to comply with the numeric sizing treatment standards;

(c) Shared BMPs shall be operational prior to the use of any dependent development or phase of development. The shared BMPs shall only be required to treat the dependent developments or phases of development that are in use;

(d) Interim storm water BMPs that provide equivalent or greater treatment than is required may be implemented by a dependent development until each shared BMP is operational. If interim BMPs are selected, the BMPs shall remain in use until permanent BMPs are operational.

Application of Localized Equivalent Area Drainage (LEAD) Method

The Localized Equivalent Area Drainage (LEAD) method was developed by the City of San Diego as a holistic approach to addressing water quality within already urbanized areas. The LEAD method is a process, not designed specifically to comply with the Municipal Storm Water Permit but to obtain clean water quicker within existing urbanized areas. The City of San Diego, under authorization from the Regional Water Quality Control Board, may approve up to three projects using the LEAD method to meet the project's treatment requirements. Under the LEAD method, a project would treat an equivalent or greater area in the project vicinity in place of treating the entire project footprint, to achieve equal or greater pollutant reduction with more efficient treatment design. The City of San Diego Storm Water Pollution Prevention Program is responsible for the LEAD pilot projects. Only redevelopment or infill projects will be selected that meet the following criteria:

- The alternative treatment area shall be located within the proximity of the project

- The alternative treatment area shall discharge to the same receiving water as the project

- The alternative treatment area shall be equivalent or greater than the project footprint

- The alternative treatment area shall have an equivalent or greater impervious surface area than the project

Interested applicants may request an evaluation of their project's potential for participating in the LEAD pilot program through the Preliminary Review Process.

Table 4. Numeric Sizing Treatment Standards.

Volume

1. Volume-based BMPs shall be designed to mitigate (infiltrate, filter, or treat) either:

i. The volume of runoff produced from an 85th percentile storm event. Isopluvial maps for the 85th percentile storm event are contained in the County of San Diego Hydrology Manual (0.6 inch approximate average for the San Diego County area). See the County of San Diego's 85th percentile isopluvial map at www.sdcounty.ca.gov/dpw/docs/pct85.pdf. [Note: Applicants may calculate the 85th percentile storm event using local rain data, when available.]; or

ii. The volume of runoff produced by the 85th percentile storm event, determined as the maximized capture urban runoff volume for the area, from the formula recommended in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ ASCE Manual of Practice No. 87, page 175 Equation 5.2; (1998); or

iii. The volume of annual runoff based on unit basin storage volume, to achieve 90 percent or more volume treatment by the method recommended in the latest edition of the California Stormwater Best Management Practices Handbook;

OR

Flow

2. Flow-based BMPs shall be designed to mitigate (infiltrate, filter, or treat) either:

i. The maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour for each hour of a storm event; or

ii. The maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity, as determined from the local historical rainfall record, multiplied by a factor of two; or

iii. The maximum flow rate of runoff, as determined from the local historical rainfall record, that achieves approximately the same reduction in pollutant loads and flows as achieved by mitigation of the 85th percentile hourly rainfall intensity multiplied by a factor of two.

i. Structural Treatment BMP Selection Procedure

Priority projects shall select a single or combination of treatment BMPs from the categories in Table 4 that maximize pollutant removal for the particular pollutant(s) of concern.

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a. Determine if the project would discharge to a Clean Water Act Section 303(d) impaired receiving water. If any receiving waters for the project are impaired, note pollutant(s) receiving water(s) is/are listed for.

b. If the project is anticipated to generate a pollutant (per Table 2) that the receiving water is listed for, select one or more BMPs from Table 4 that maximize the pollutant removal for that pollutant. Any pollutants the project is expected to generate that are also causing a Clean Water Act section 303(d) impairment of the downstream receiving waters of the project shall be given top priority in selecting treatment BMPs

c. If none of the project's receiving waters are listed as impaired, select one or more BMPs from Table 4 that maximize the removal of the pollutants the project is anticipated to generate. Alternative storm water BMPs not identified in Table 4 may be approved at the discretion of the City Engineer, provided the alternative BMP is as effective in removal of pollutants of concern as other feasible BMPs listed in Table 4.

Table 5. Structural Treatment Control BMP Selection Matrix.

Pollutant of
Concern Treatment Control BMP Categories
Biofilters Detention
Basins
Infiltration
Basins(1)
Wet Ponds
or Wetlands
Drainage
Inserts
Filtration Hydrodynamic
Separator
Systems(2)
Sediment M H H H L H M
Nutrients L M M M L M L
Heavy Metals M M M H L H L
Organic Compounds U U U U L M L
Trash & Debris L H U U M H M
Oxygen Demanding
Substances L M M M L M L
Bacteria U U H U L M L

Oil & Grease M M U U L H L
Pesticides U U U U L U L
(1) Including trenches and porous pavement.
(2) Also known as hydrodynamic devices and baffle boxes.
L: Low removal efficiency
M: Medium removal efficiency
H: High removal efficiency
U: Unknown removal efficiency

Sources: Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (1993), National Stormwater Best Management Practices Database (2001), and Guide for BMP Selection in Urban Developed Areas (2001).

ii. Restrictions on the Use of Infiltration Treatment BMPs

34. Treatment control BMPs that are designed to primarily function as infiltration devices shall meet the following conditions (these conditions do not apply to treatment BMPs which allow incidental infiltration and are not designed to primarily function as infiltration devices, such as grassy swales, detention basins, vegetated buffer strips, constructed wetlands, etc.): (1) urban runoff from commercial

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developments shall undergo pretreatment to remove both physical and chemical contaminants, such as sedimentation or filtration, prior to infiltration; (2) all dry weather flows shall be diverted from infiltration devices except for those non-storm water discharges authorized pursuant to 40 CFR 122.26(d)(2)(iv)(B)(1): diverted stream flows, rising ground waters, uncontaminated ground water infiltration [as defined at 40 CFR 35.2005(20)] to storm water conveyance systems, uncontaminated pumped ground water, foundation drains, springs, water from crawl space pumps, footing drains, air conditioning condensation, flow from riparian habitats and wetlands, water line flushing, landscape irrigation, discharges from potable water sources other than water main breaks, irrigation water, individual residential car washing, and dechlorinated swimming pool discharges; (3) pollution prevention and source control BMPs shall be implemented at a level appropriate to protect groundwater quality at sites where infiltration structural treatment BMPs are to be used; (4) the vertical distance from the base of any infiltration structural treatment BMP to the seasonal high groundwater mark shall be at least 10 feet. Where groundwater does not support beneficial uses, this vertical distance criterion may be reduced, provided groundwater quality is maintained; (5) the soil through which infiltration is to occur shall have physical and chemical characteristics that are adequate for proper infiltration durations and treatment of urban runoff for the protection of groundwater beneficial uses; (6) the horizontal distance between the base of any infiltration structural BMP and any water supply wells shall be 100 feet or as determined appropriate by the City Engineer.

35. Notification to neighboring jurisdictions may be required where staff determines the infiltration BMP(s) may impact the groundwater in a neighboring jurisdiction.

Structural Treatment Limited Exclusions

(a.) Proposed restaurants, where the land area for development or redevelopment is less than 5,000 square feet, are excluded from the numerical sizing criteria requirements listed in Table 3.

(b.) Where significant redevelopment results in an increase of less than 50 percent of the impervious surfaces of a previously existing development, and the existing development was not subject to priority project requirements, the numeric sizing criteria apply only to the addition, and not to the entire development.

5 Soils at infiltration sites must have the following properties: Organic Content (OC) > 5%, pH between 6-8, Cation exchange capacity (CEC) > 5 meq/100g soil, in drill-hole conductivity valve of 0.5 in/hr orgreater.

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IV. CONSTRUCTION STORM WATER BMP PERFORMANCE STANDARDS

Those projects that have been determined to require construction BMPs in Steps 1 and 2 of Section II, must identify the construction BMPs to be implemented in accordance with the performance standards in this section. The construction BMPs must be identified in a Storm Water Pollution Prevention Plan or Water Pollution Control Plan for projects disturbing more than or less than 5 acres, respectively (to be reduced to 1-acre on March 10, 2003). Because all projects require BMPs during construction, those projects that disturb less than 5-acres (to be reduced to 1-acre on March 10, 2003) are required to have a Water Pollution Control Plan (WPCP) which identifies the pollution prevention measures that will be taken. These plans must be prepared in accordance with the guidelines in Appendix E. It is the responsibility of the property owner or his/her designee to select, install and maintain appropriate BMPs. A list of construction BMPs is provided for reference in Appendix F. BMPs must be installed in accordance with an industry recommended standard or in accordance with the requirements of the State General Construction Permit. More information about BMPs is provided in the Model Construction Program for San Diego Copermittees, the City of Los Angeles "Reference Guide for Stormwater Best Management Practices," State Storm Water BMP Manuals, and Caltrans Standard BMP handbook.

BMP requirements differ between the wet season (Oct. 1 – Apr. 30) and the dry season (May 1 – Sept. 30), the type of the project and topography of the site, as described below.

1. Site Management Requirements

Construction is a dynamic operation where changes are expected. Storm water BMPs for construction sites are usually temporary measures that require frequent maintenance to maintain their effectiveness and may require relocation, revision and reinstallation, particularly as project grading progresses. Therefore, owner/contractor selfinspections are required. They shall be performed by the owner's/contractor's Qualified Contact Person specifically trained in storm water pollution prevention site management and storm water BMPs, including the installation and maintenance of sediment and erosion control measures. Additional qualified persons may assist with the inspection activities under the direction of the Qualified Contact Person. A Qualified Contact Person is required for all sites during both wet and dry weather conditions.

There are four primary purposes of the self-inspections conducted by owners and contractors:

· To ensure that the owners/contractors take full responsibility for managing storm water pollution caused by their activities.

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· To ensure that storm water BMPs are properly documented and implemented and are functioning effectively.

· To identify maintenance (e.g., sediment removal) and repair needs.

· To ensure that the project proponents implement their storm water management plans.

A self-inspection checklist, noting date, time, conditions and inspection date, must be kept on-site and made available for inspection, if requested (note: the State General Construction Permit has additional inspection requirements that must be met to comply with the permit). Self-inspections must be performed by a Qualified Contact Person according to the following schedule:

· Daily forecasting at all times

· At 24-hour intervals during extended rainfall events

· Daily evaluations as earth moving/grading is being conducted during the wet season

· Weekly (every 7 days) in the dry season as earth moving/grading is progressing

Storm water pollution prevention site management requirements include:

A. A qualified person who is trained and competent in the use of BMPs shall be on site daily, although not necessarily full time, to evaluate the conditions of the site with respect to storm water pollution prevention. This qualified contact person shall represent the contractor/ owner on storm water issues.

B. The qualified person shall implement the conditions of the Storm Water Pollution Prevention Plan, contract documents and/or local ordinances with respect to erosion and sediment control and other waste management regulations.

C. The qualified person is responsible for monitoring the weather and implementation of any emergency plans as needed. The weather shall be monitored on a 5-day forecast plan and a full BMP protection plan shall be activated when there is a 40% chance of rain.

D. The qualified person is responsible for overseeing any site grading and operations and evaluating the effectiveness of the BMPs. This person shall modify the BMPs as necessary to keep the dynamics of the site in compliance. This person or other qualified persons are responsible for checking the BMPs routinely for maintenance and documenting the BMPs being implemented.

2. Performance Standards

The City of San Diego will evaluate the adequacy of the owner's/contractor's site management for storm water pollution prevention, inclusive of BMP implementation, on construction sites based on performance standards for storm water BMPs. Poor BMP

practices shall be challenged. Performance standards shall include:

A. No measurable increase of pollution (including sediment) in runoff from the site.

B. No slope erosion.

C. Water velocity moving offsite must not be greater than pre-construction levels.

A site will be considered inactive if construction activities have ceased for a period of 7 or more consecutive calendar days. At any time of year, an inactive site must be fully protected from erosion and discharges of sediment. It is also the owner's/contractor's responsibility at both active and inactive sites to implement a plan to address all potential non-storm water discharges. Regardless of any inspections conducted by the City, property owners or contractors are required to prevent any construction-related materials, wastes, spills or residues from entering a storm water conveyance system and to apply for coverage under the State General Construction Permit as applicable for the site.

3. Seasonal Requirements

A. Dry Season Requirements (May 1 - September 30) include but are not limited to:

A. Perimeter protection BMPs must be installed and maintained to comply with performance standards (above).

B. Sediment control BMPs must be installed and maintained to comply with performance standards (above).

C. BMPs to control sediment tracking must be installed and maintained at entrances/exits to comply with performance standards (above).

D. Material needed to install standby BMPs necessary to completely protect the exposed portions of the site from erosion, and to prevent sediment discharges, must be stored on site. Areas that have already been protected from erosion using physical stabilization or established vegetation stabilization BMPs as described below are not considered to be "exposed" for purposes of this requirement.

E. The owner/contractor must have an approved "weather triggered" action plan and have the ability to deploy standby BMPs as needed to completely protect the exposed portions of the site within 24 hours of prediction of a storm event (a predicted storm event is defined as a forecasted, 40% chance of rain). On request, the owner/contractor must provide proof of this capability that is acceptable to the City of San Diego.

F. Deployment of physical or vegetation erosion control BMP's must commence as soon as grading and/or excavation is completed for any portion of the site. The project proponent may not continue to rely on the ability to deploy standby BMP materials to prevent erosion of graded areas that have been completed.

G. The area that can be cleared or graded and left exposed at one time is limited to the amount of acreage that the owner/contractor can adequately protect

prior to a predicted rainstorm.

H. A washout area shall be designated and maintained for materials such as concrete, stucco, paint, caulking, sealants, drywall plaster, etc.

I. Properly protected, designated storage areas are required for materials and wastes.

J. Remnant trash and debris shall be removed and/or properly stored/disposed of daily.

K. Storage, service, cleaning and maintenance areas for vehicles and equipment shall be identified and protected accordingly.

L. Materials for spill control/containment must be stockpiled onsite.

M. Non-storm water discharges must be eliminated or controlled to the maximum extent practicable. Requirement "G" will require grading to be phased at larger sites. For example, it may be necessary to deploy erosion and sediment control BMPs in areas that are not completed but are not actively being worked before additional grading is done.

B. Rainy Season Requirements (October 1 - April 30) include but are not limited to:

A. Perimeter protection BMPs must be installed and maintained to comply with performance standards (above).

B. Sediment control BMPs must be installed and maintained to comply with performance standards (above).

C. BMPs to control sediment tracking must be installed and maintained at site entrances/exits to comply with performance standards (above).

D. Material needed to install standby BMPs necessary to completely protect the exposed portions of the site from erosion, and to prevent sediment discharges, must be stored on site. Areas that have already been protected from erosion using physical stabilization or established vegetation stabilization BMPs as described below are not considered to be "exposed" for purposes of this requirement.

E. The owner/contractor must have an approved "weather triggered" action plan and have the ability to deploy standby BMPs as needed to completely protect the exposed portions of the site within 24 hours of prediction of a storm event (a predicted storm event is defined as a forecasted, 40% chance of rain). On request, the owner/contractor must provide proof of this capability that is acceptable to the City of San Diego.

F. Deployment of physical or vegetation erosion control BMPs must commence as soon as grading and/or excavation is completed for any portion of the site. The owner/contractor may not continue to rely on the ability to deploy standby BMP materials to prevent erosion of graded areas that have been completed.

G. The area that can be cleared or graded and left exposed at one time is limited to the amount of acreage that the owner/contractor can adequately protect prior to a predicted rainstorm.

H. A washout area shall be designated and maintained for materials such as concrete, stucco, paint, caulking, sealants, drywall plaster, etc.

I. Properly protected, designated storage areas are required for materials and wastes.

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J. Remnant trash and debris shall be removed and/or properly stored/disposed of daily.

K. Storage, service, cleaning and maintenance areas for vehicles and equipment shall be identified and protected accordingly.

L. Materials for spill control/containment must be stockpiled onsite.

M. Non -storm water discharges must be eliminated or controlled to the maximum extent practicable.

N. Erosion control BMPs must be upgraded if necessary to provide sufficient protection for storms likely to occur during the rainy season.

O. Perimeter protection and sediment control BMPs must be upgraded if necessary to provide sufficient protection for storms likely to occur during the rainy season.

P. Adequate physical or vegetation erosion control BMPs must be installed and established for all graded areas prior to the start of the rainy season. These BMPs must be maintained throughout the rainy season. If a selected BMP fails, it must be repaired and improved, or replaced with an acceptable alternate as soon as it is safe to do so. The failure of a BMP shows that the BMP, as installed, was not adequate for the circumstances in which it was used and shall be corrected or modified as necessary. Repairs or replacements must therefore put a more effective BMP in place.

Q. All vegetation erosion control must be established prior to the rainy season to be considered as a BMP.

R. The amount of exposed soil allowed at one time shall not exceed that which can be adequately protected by deploying standby erosion control and sediment control BMPs prior to a predicted rainstorm.

S. A disturbed area that is not completed but that is not being actively graded must be fully protected from erosion if left for 7 or more calendar days. The ability to deploy standby BMP materials is not sufficient for these areas. BMPs must actually be deployed.

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V. IMPLEMENTATION & MAINTENANCE OF REQUIREMENTS

After all project BMPs have been approved by the City Engineer, applicants must ensure implementation and maintenance of the BMPs according to the processes outlined in the applicable sections for projects requesting discretionary actions and/or construction permits. In addition, any project that will require a "General NPDES Permit for Storm Water Discharges Associated with Industrial Activities," shall include the following note on the plans and condition in the permit/approval:

Industrial NPDES Permit Requirement

"The Permittee or designee shall provide evidence of coverage under the General Industrial National Pollutant Discharge Elimination System Permit, in the form of a Notice of Intent (NOI) filed with the State Water Resources Control Board, prior to the issuance of any construction permits."

1. Discretionary Actions

i. Permanent BMP Requirements. Projects that include permanent BMPs shall be conditioned to require the applicant or designee to execute a maintenance agreement for ongoing permanent BMP maintenance in accordance with the program outlined in the "Permanent Storm Water BMP Maintenance Agreement Requirements" below, satisfactory to the City Engineer, prior to the issuance of any construction permits. This requirement shall be noted on the plans for the discretionary action. The permanent BMPs shall be graphically shown on the plans, where possible, and made a condition of the project's permit/approval.

ii. Construction BMP Requirements. Projects seeking discretionary approvals are not required to graphically demonstrate any construction BMP requirements on the project plans. Instead, the discretionary action shall include the following standard condition, which shall also be noted on the plans:

"The Permittee or designee shall incorporate any construction best management practices (BMPs) necessary to comply with Chapter 14, Article 2, Division 1 (Grading Regulations) of the Land Development Code, into the construction plans and/or specifications, satisfactory to the City Engineer, prior to the issuance of any construction permits."

2. Construction Permits

i. Construction Permits for Projects Under 1 Acre. Projects proposing to disturb less than 1 acre during construction shall include construction requirements, where possible, on the plans. Any remaining construction BMPs that cannot be shown graphically on the plans shall be either noted on, or stapled to, the plans (Water Pollution Control Plan). The project's construction priority ranking (see

Appendix A) must also be noted on the construction plans. Applicants proposing projects that include permanent BMPs must prepare (if not already prepared as part of a previous permit or approval), and execute a maintenance agreement, prepared satisfactory to the City, following the program outlined below prior to the issuance of any construction permits. The permanent BMPs shall be graphically shown on the plans, where possible. The permanent BMP's operation and maintenance requirements (O & M plan discussed below) shall also be noted on the plans.

ii. Construction Permits for Projects Over 1 Acre. Projects proposing to disturb more than 1 acre during construction shall include all construction BMPs in a Storm Water Pollution Prevention Plan, prepared in accordance with Appendix E, "Storm Water Pollution Prevention Plan Guidelines." The construction BMPs shall also be shown on the plans, where possible. Any remaining construction BMPs that cannot be shown graphically on the plans shall be either noted or stapled to the plans. The project's construction priority ranking (see Appendix A) must also be noted on the construction plans. Applicants proposing projects that include permanent BMPs must prepare (if not already prepared as part of a previous permit or approval), and execute a maintenance agreement, prepared satisfactory to the City, following the program outlined below prior to the issuance of any construction permits. The permanent BMPs shall be graphically shown on the plans, where possible. The permanent BMP's operation and maintenance requirements (O & M plan discussed below) shall also be noted on the plans.

3. Permanent BMP Maintenance Agreement Requirements

Applicants shall propose a maintenance agreement assuring all permanent BMPs will be maintained throughout the "use" of a project site, satisfactory to the City Engineer see Appendix H for a list of potential mechanisms). For projects with discretionary actions, the project's permit shall be conditioned to require the applicant or designee to execute a maintenance agreement for ongoing permanent BMP maintenance, satisfactory to the City Engineer, prior to the issuance of any construction permits. This requirement shall be noted on the plans for the discretionary action. City-approved method of permanent BMP maintenance shall be incorporated into, and shall be consistent with permits issued by resource agencies, before decision-maker approval of discretionary actions. For projects requiring only construction permits, the City approved method of permanent BMP maintenance (operation and maintenance procedures) shall be executed prior to the issuance of any construction permits. The maintenance procedures shall be noted on the construction plans. In all instances, the applicant shall provide proof of execution of a City-approved method of permanent BMP maintenance repair and replacement before the issuance of construction approvals. For all properties, the verification mechanism will include the applicant's signed statement, as part of the construction permit application, accepting responsibility for all permanent BMP maintenance, repair and replacement.

The maintenance agreement shall include the following:

1. Operation & Maintenance (O&M) Plan: The applicant shall include an Operation & Maintenance (O&M) plan, prepared satisfactory to the City, with the approved maintenance agreement, which describes the designated responsible party to manage the storm water BMP(s), employee's training program and duties, operating schedule, maintenance frequency, routine service schedule, specific maintenance activities (including maintenance of storm water conveyance system stamps), copies of resource agency permits, and any other necessary activities. At a minimum, maintenance agreements shall require the applicant to provide inspection and servicing of all permanent treatment BMPs on an annual basis. The project proponent or City-approved maintenance entity shall complete and maintain O&M forms to document all maintenance requirements. Parties responsible for the O&M plan shall retain records for at least 5 years. These documents shall be made available to the City for inspection upon request at any time.

2. Access Easement/Agreement: Unless the applicant accepts permanent maintenance responsibilities, the applicant shall execute an access easement to the official maintenance entity that shall be binding on the land throughout the life of the project, until such time that the permanent treatment BMP requiring access is no longer required to be in use, satisfactory to the City.

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APPENDICES

APPENDIX A

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APPENDIX B – WATER QUALITY SENSITIVE AREAS WITHIN THE CITY OF SAN DIEGO

Note: This map is printed here for reference only. A more detailed map with parcel lines is available at the SanGIS website at, www.sangis.org, or by contacting SanGIS at 1010 Second Avenue, Suite 130A, San Diego, CA 92101, or by phone at (619) 702-0400. The Water Quality Sensitive Areas map has been produced under the direction of the City of San Diego solely for the purpose of assisting development project applicants in complying with the

City's Storm Water Standards Manual. This map was prepared at a regional scale and may not accurately represent conditions on individual sites.

Applicants may submit a proposal to refine the boundaries of the Water Quality Sensitive Areas with the project.

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APPENDIX C

EXAMPLE PERMANENT STORM WATER BEST MANAGEMENT PRACTICES

The following are a list of BMPs may be used to minimize the introduction of pollutants of concern that may result in significant impacts to receiving waters. Other BMPs approved by the Development Services Department as being equal or more effective in pollutant reduction than comparable BMPs identified below are acceptable. All BMPs must comply with local zoning and building codes and other applicable regulations. Site Design BMPs Minimizing Impervious Areas

- Reduce sidewalk widths

- Incorporate landscaped buffer areas between sidewalks and streets.

- Design residential streets for the minimum required pavement widths

- Minimize the number of residential street cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.

- Use open space development that incorporates smaller lot sizes

- Increase building density while decreasing the building footprint

- Reduce overall lot imperviousness by promoting alternative driveway surfaces and shared driveways that connect two or more homes together

- Reduce overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in spillover parking areas

Increase Rainfall Infiltration

- Use permeable materials for private sidewalks, driveways, parking lots, and interior roadway surfaces (examples: hybrid lots, parking groves, permeable overflow parking, etc.)

- Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas, and avoid routing rooftop runoff to the roadway or the urban runoff conveyance system

Maximize Rainfall Interception

- Maximizing canopy interception and water conservation by preserving existing native trees and shrubs, and planting Additional native or drought tolerant trees and large shrubs.

Minimize Directly Connected Impervious Areas (DCIAs)

- Draining rooftops into adjacent landscaping prior to discharging to the storm water conveyance system

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- Draining parking lots into landscape areas co-designed as biofiltration areas

- Draining roads, sidewalks, and impervious trails into adjacent landscaping

Slope and Channel Protection

Use of natural drainage systems to the maximum extent practicable

- Stabilized permanent channel crossings

- Planting native or drought tolerant vegetation on slopes

- Energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined Channels Maximize Rainfall Interception

- Cisterns

- Foundation planting

Increase Rainfall Infiltration

- Dry wells

Source Control BMPs

- Storm water conveyance system stenciling and signage

- Outdoor material and trash storage area designed to reduce or control rainfall runoff

- Efficient irrigation system

Treatment Control BMPs

Biofilters

- Grass swale

- Grass strip

- Wetland vegetation swale

- Bioretention

Detention Basins

- Extended/dry detention basin with grass lining

- Extended/dry detention basin with impervious lining

Infiltration

- Infiltration basin

- Infiltration trench

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Pervious Paving

- Porous asphalt

- Porous concrete

- Porous modular concrete block

Wet Ponds and Wetlands

- Wet pond (permanent pool)

- Constructed wetland

Drainage Inserts

- Catch basin/storm drain inserts

- Catch basin screens

Filtration Systems

- Media filtration

- Sand filtration

Hydrodynamic Separation Systems

- Swirl concentrator

- Cyclone separator

- Baffle boxes

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APPENDIX D

WATER QUALITY TECHNICAL REPORT GUIDELINES

Purpose

To describe the permanent storm water Best Management Practices (BMPs) that will be incorporated in the project to mitigate the impacts of urban runoff due to the development.

Minimum Requirements

 Prepared by Registered Civil Engineer

Organization & Content

Table of Contents

Vicinity Map

Project Description

 Narrative of project activities

Site Map

 Entire property included on one map (use key map if multi-sheets)

 Drainage areas and direction of flow

 Private storm drain system(s)

 Nearby water bodies and municipal storm drain inlets

 Location of storm water conveyance systems (ditches, inlets, storm drains, etc.)

 Location of existing and proposed storm water controls

 Location of "impervious" areas- paved areas, buildings, covered areas

 Locations where materials would be directly exposed to storm water

 Location of building and activity areas (e.g. fueling islands, garages, waste container area, wash racks, hazardous material storage areas, etc.)

 Areas of potential soil erosion (including areas downstream of project)

Pollutants and Conditions of Concern

 Project located in which Watershed

 Impaired water bodies downstream of the project and impairment

 Impacts to hydrologic regime

 Pollutants based upon land use

Types of BMPs:

Site Design BMPs

 Reduce impervious surfaces

 Conserve natural Areas

 Minimize directly connected areas

 Protect slopes and channels

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Source Control BMPs

 Inlet stenciling and signage

 Materials Storage

 Trash storage

 Efficient irrigation

 Other controls (as applicable)

Structural Treatment BMPs

 Basis for selection (include targeted pollutants, justification, and alternative analysis)

 Design criteria (include calculations)

 Pollutant removal information (other than vendor specifications)

 Literature References

 Maintenance Condition(s)

Drainage Study*

*Note: The drainage study must include analysis of the project's potential conditions of concern, per Section III.1.C of the Storm Water Standards Manual, and must be prepared in accordance with the City's Drainage Design Manual.

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APPENDIX E

STORM WATER POLLUTION PREVENTION PLAN / WATER POLLUTION

CONTROL PLAN GUIDELINES

At a minimum, the Storm Water Pollution Prevention Plan (SWPPP) or Water Pollution

Control Plan (WPCP), whichever is required, must cover the areas listed below.

If a project disturbs 5-acres or more (to be reduced to 1-acre on March 10, 2003), the applicant must provide a Storm Water Pollution Prevention Plan (SWPPP), which identifies all construction BMP requirements required by Section IV, in accordance with Order No. 99-08-DWQ of the State General Permit for Storm Water Discharges Associated with Construction Activity (State General Construction Permit). The SWPPP must be kept on site and made available upon request of a representative of the City of San Diego. Additionally, the State General Construction Permit has a requirement for a sampling and monitoring program to be implemented. Projects that are also required to obtain a general construction National Pollutant Discharge Elimination System (NPDES) Permit are encouraged to visit the State Water Resource Control Board's website for permit application instructions, NOI and NOT forms and guidance in preparing a Storm Water Pollution Prevention Plan (go to: www.swrcb.ca.gov/stormwtr/docs/constpermit).

A checklist to assist with the preparation of a SWPPP is also provided at the following website: www.swrcb.ca.gov/stormwtr/construction.html.

For projects that disturb less than 5-acres (to be reduced to 1-acre on March 10, 2003), and are determined to have a potential to impact water quality during construction, the applicant must provide a Water Pollution Control Plan (WPCP), which identifies all construction BMP requirements required by Section IV, with the project submittal. The WPCP shall depict the BMPs to be implemented during construction to reduce/eliminate discharges of pollutants to the storm drain conveyance system. The WPCP shall include but not be limited to erosion and sediment control BMPs, good housekeeping measures and site and materials management. Planning and Organization

· Identify the pollution prevention team members who will maintain and implement the SWPPP.

· If applicable, incorporate or reference the appropriate elements of other regulatory requirements.

Site Map

Features displayed on the map must include:

· An outline of the entire property

· Drainage areas on the property and direction of flow

· Areas of soil erosion

· Nearby water bodies and municipal storm drain inlets

· Location of storm water conveyance systems (ditches, inlets, storm drains, etc.)

· Location of existing storm water controls (oil/ water separators, sumps, etc.)

· Location of "impervious" areas- paved areas, buildings, covered areas

· Locations where materials are directly exposed to storm water

· Locations where toxic or hazardous materials have spilled in the past

· Location of building and activity areas (e.g. fueling islands, garages, waste container area, wash racks, hazardous material storage areas, etc.)

List of Significant Materials

List materials stored and handled at the site. Include the location and typical quantities.

Description of Potential Pollutant Sources

· Provide a narrative description of the site's activities and list the potential pollutant sources and the potential pollutants that could be discharged in storm water discharges from each activity.

· List non-storm water discharges including the source, quantity, frequency, and characteristics of the discharges and drainage area.

Assessment of Potential Sources

Describe which activities are likely to be sources of pollution in storm water and which pollutants are likely to be present in storm water discharges.

Best Management Practices

Describe the BMPs that will be implemented at the site for each potential pollutant and its source.

APPENDIX F

EXAMPLE CONSTRUCTION BEST MANAGEMENT PRACTICES

A. Erosion Control

Physical stabilization BMPs, vegetation stabilization BMPs, or both, will be required to prevent erosion and sediment runoff from exposed graded areas. BMPs for physical and vegetation stabilization include:

1) Physical Stabilization

a) Geotextiles

b) Mats

c) Fiber blankets

d) Hydraulic mulch, Bonded Fiber Matrix

e) Sprayed on binders

f) Mulch on flat areas

g) Other material approved by the City for use in specific circumstances

If physical stabilization is selected, materials must be appropriate to the circumstances in which they are deployed, and sufficient material must be deployed.

2) Vegetation Stabilization

a) Preservation of existing vegetation

b) Established interim vegetation (via Hydroseed, seeded mats, etc.)

c) Established permanent landscaping

If vegetation stabilization is selected, the stabilizing vegetation must be installed, irrigated and established (uniform vegetative coverage with 70% coverage established) prior to October 1. In the event stabilizing vegetation has not been established by October 1, other forms of physical stabilization must be employed to prevent erosion until the stabilizing vegetation is established.

B. Sediment Control

1) Perimeter protection. Protect the perimeter of the site or exposed area from sediment ingress/discharge in sheet flows using:

a) Silt fencing

b) Gravel bag barriers

c) Fiber rolls

2) Resource protection. Protect water quality sensitive areas, and watercourses from sediment in sheet flows by using:

a) Silt fencing

b) Gravel bag barriers

c) Fiber rolls

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3) Sediment Capture. Capture sediments in channeled storm water by using:

a) Storm-drain inlet protection measures

b) De-silting basins (Designed in accordance with an industry standard such as Caltrans, California Storm water BMP manual etc. If the project is 5 acres or greater the desilting basin(s) must be designed in accordance with the State General Construction Permit, Order DWQ 99-08.)

4) Velocity Reduction. Reduce the velocity of storm water by using:

a) Outlet protection (energy dissipater)

b) Equalization basins

c) Check dams

5) Off-site Sediment Tracking. Prevent sediment from being tracked off-site by using:

a) Stabilized construction entrances/exits

b) Construction road stabilization

c) Tracking control (i.e., corrugated steel panels, wheel washes)

d) Dust control

Materials Management

6) Prevent the contamination of storm water by wastes through proper management of the following types of wastes:

a) Solid

b) Sanitary

c) Concrete

d) Hazardous

e) Equipment – related wastes

f) Stock piles (protection from wind and rain)

7) Prevent the contamination of storm water by construction materials by:

a) Covering and/or providing secondary containment of storage areas

b) Taking adequate precautions when handling materials.

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APPENDIX G

SUGGESTED RESOURCES HOW TO GET A COPY

California Storm Water Best Management

Practices Handbook for New Development and

Redevelopment (2003)

Provides “how to” guidance specifically for

implementation of permanent BMP requirements

typically required across the state, including the

City of San Diego’s Storm Water Standards

Manual.

California Storm Water Quality Association

7000 East Avenue, L-627

Livermore, CA 94550-0234

Phone: (925) 423-6679

Fax: (925) 422-2748

Internet: www.cabmphandbooks.org/

Better Site Design: A Handbook for Changing

Development Rules in Your Community (1998)

Presents guidance for different model development

alternatives.

Center for Watershed Protection

8391 Main Street

Ellicott City, MD 21043

410-461-8323

www.cwp.org

California Urban runoff Best Management

Practices Handbooks (1993) for Construction

Activity, Municipal, and Industrial/Commercial

Presents a description of a large variety of

Structural BMPs, Treatment Control, BMPs and

Source Control BMPs

Los Angeles County Department of Public Works

Cashiers Office

900 S. Fremont Avenue

Alhambra, CA 91803

626-458-6959

Caltrans Urban runoff Quality Handbook: Planning and Design Staff Guide (Best Management Practices Handbooks (1998)

Presents guidance for design of urban runoff BMPs

California Department of Transportation

P.O. Box 942874

Sacramento, CA 94274-0001

916-653-2975

Design Manual for Use of Bioretention in Stormwater Management (1993)

Presents guidance for designing bioretention facilities.

Prince George's County

Watershed Protection Branch

9400 Peppercorn Place, Suite 600

Landover, MD 20785

Design of Stormwater Filtering Systems (1996) by Richard A. Claytor and Thomas R. Schuler

Presents detailed engineering guidance on ten different urban runoff-filtering systems.

Center for Watershed Protection

8391 Main Street

Ellicott City, MD 21043

410-461-8323

Development Planning for Stormwater

Management, A Manual for the Standard Urban

Stormwater Mitigation Plan (SUSMP), (May 2000)

Los Angeles County

Department of Public Works

http://dpw.co.la.ca.us/epd/ or

http://www.888cleanLA.com

Florida Development Manual: A Guide to Sound

Land and Water Management (1988)

Presents detailed guidance for designing BMPs

Florida Department of the Environment 2600

Blairstone Road, Mail Station 3570

Tallahassee, FL 32399

850-921-9472

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SUGGESTED RESOURCES HOW TO GET A COPY

Guidance Specifying Management Measures for

Sources of Nonpoint Pollution in Coastal Waters

(1993) Report No. EPA–840-B-92-002.

Provides an overview of, planning and design considerations, programmatic and regulatory aspects, maintenance considerations, and costs.

National Technical Information Service U.S. Department of Commerce
Springfield, VA 22161
800-553-6847

Guide for BMP Selection in Urban Developed Areas (2001)

ASCE Envir. and Water Res. Inst.
1801 Alexander Bell Dr.
Reston, VA 20191-4400
(800) 548-2723

Low-Impact Development Design Strategies - An Integrated Design Approach (June 1999)

Prince George's County, Maryland
Department of Environmental Resource Programs and Planning Division
9400 Peppercorn Place
Largo, Maryland 20774
http://www.co.pg.md.us/Government/DER/PPD/pgcounty/lidmain.htm

Maryland Stormwater Design Manual (1999)

Presents guidance for designing urban runoff

BMPs

Maryland Department of the Environment

2500 Broening Highway

Baltimore, MD 21224

410-631-3000

National Stormwater Best Management Practices

(BMP) Database, Version 1.0

Provides data on performance and evaluation of

urban runoff BMPs

American Society of Civil Engineers

1801 Alexander Bell Drive

Reston, VA 20191

703-296-6000

National Stormwater Best Management Practices

Database (2001)

Urban Water Resources Research Council of

ASCE

Wright Water Engineers, Inc.

(303) 480-1700

Operation, Maintenance and Management of

Stormwater Management (1997)

Provides a thorough look at storm water practices

including, planning and design considerations, programmatic and regulatory aspects, maintenance considerations, and costs.

Watershed Management Institute, Inc.
410 White Oak Drive
Crawfordville, FL 32327
850-926-5310

Potential Groundwater Contamination from Intentional and Non-Intentional Stormwater Infiltration
Report No. EPA/600/R-94/051, USEPA (1994).

Preliminary Data Summary of Urban runoff Best Management Practices (August 1999)
EPA-821-R-99-012
http://www.epa.gov/ost/stormwater/

Reference Guide for Stormwater Best Management Practices (July 2000)
City of Los Angeles
Urban runoff Management Division
650 South Spring Street, 7th Floor
Los Angeles, California 90014
http://www.lacity.org/san/swmd/

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SUGGESTED RESOURCES HOW TO GET A COPY

Second Nature: Adapting LA's Landscape for
Sustainable Living (1999) by Tree People

Detailed discussion of BMP designs presented to conserve water, improve water quality, and achieve flood protection.

Tree People
12601 Mullholland Drive
Beverly Hills, CA 90210
(818) 623-4848
Fax (818) 753-4625

Start at the Source (1999)

Detailed discussion of permeable pavements and alternative driveway designs presented.

Bay Area Stormwater Management Agencies Association
2101 Webster Street
Suite 500
Oakland, CA
510-286-1255

Stormwater Management in Washington State
(1999) Vols. 1-5

Presents detailed guidance on BMP design for new development and construction.

Department of Printing

State of Washington Department of Ecology

P.O. Box 798

Olympia, WA 98507-0798

360-407-7529

Stormwater, Grading and Drainage Control Code, Seattle Municipal Code Section 22.800-22.808, and Director's Rules, Volumes 1-4. (Ordinance 119965, effective July 5, 2000)

City of Seattle

Department of Design, Construction & Land Use

700 5th Avenue, Suite 1900

Seattle, WA 98104-5070

(206) 684-8880

www.ci.seattle.wa.us/dclu/Codes/sgdccode.htm

Texas Nonpoint Source Book – Online Module (1998)www.txnpsbook.org

Presents BMP design and guidance information on-line

Texas Statewide Urban runoff Quality Task Force

North Central Texas Council of Governments

616 Six Flags Drive

Arlington, TX 76005

817-695-9150

The Practice of Watershed Protection by Thomas

R. Schuler and Heather K. Holland

Center for Watershed Protection

8391 Main Street

Ellicott City, MD 21043

410-461-8323

www.cwp.org

Urban Storm Drainage, Criteria Manual – Volume

3, Best Management Practices (1999)

Presents guidance for designing BMPs

Urban Drainage and Flood Control District

2480 West 26th Avenue, Suite 156-B

Denver, CO 80211

303-455-6277

Urban Runoff Quality Management

WEF Manual of Practice, No. 23

ASCE M&REP No. 87

ISBN 1-57278-039-8

Water Environment Foundation

601 Wythe Street

Alexandria, VA 22314

(703) 684-2400

Evaluation and Management of Highway Runoff

Water Quality

U.S. Department of Transportation

Federal Highway Adminstration

Publication No. FHWA-PD-96-032

Office of Environmental Planning

400 7th Street SW

Washington, D.C. 20590

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APPENDIX H

POTENTIAL PERMANENT TREATMENT BMP MAINTENANCE MECHANISMS

1. Project proponent agreement to maintain storm water BMPs: The City may enter into a contract with the project proponent obliging the project proponent to maintain, repair and replace the storm water BMP as necessary into perpetuity. Security may be required.

2. Assessment districts: The City may approve an Assessment District or other funding mechanism created by the project proponent to provide funds for storm water BMP maintenance, repair and replacement on an ongoing basis. Any agreement with such a District shall be subject to the Public Entity Maintenance Provisions above.

3. Lease provisions: In those cases where the City holds title to the land in question,

and the land is being leased to another party for private or public use, the City may assure storm water BMP maintenance, repair and replacement through conditions in the lease.

4. Public entity maintenance: The City may approve a public or acceptable quasi-public entity (e.g., the County Flood Control District, or annex to an existing assessment district, an existing utility district, a state or federal resource agency, or a conservation conservancy) to assume responsibility for maintenance, repair and replacement of the permanent treatment BMP. Unless acceptable to the City, public entity maintenance agreements shall ensure estimated costs are front-funded or reliably guaranteed, (e.g., through a trust fund, assessment district fees, bond, letter of credit or similar means). In addition, the City may seek protection from liability by appropriate releases and indemnities. The City shall have the authority to approve storm water BMPs proposed for transfer to any other public entity within its jurisdiction before installation. The City shall be involved in the negotiation of maintenance requirements with any other public entities accepting maintenance responsibilities within their respective jurisdictions; and in negotiations with the resource agencies responsible for issuing permits for the construction and/or maintenance of the facilities. The City must be identified as a third party beneficiary empowered to enforce any such maintenance agreement within their respective jurisdictions.

The City may accept alternative maintenance mechanisms if such mechanisms are as protective as those listed above.

APPENDIX I

DEFINITIONS

"Attached Residential Development" means any development that provides 10 or more residential units that share an interior/exterior wall. This category includes, but is not limited to: dormitories, condominiums and apartments.

"Automotive Repair Shop" means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.

"Best Management Practices" see: "storm water best management practices".

"Commercial Development" means any development on private land that is not exclusively heavy industrial or residential uses. The category includes, but is not limited to: mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses, hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities, automotive dealerships, commercial airfields, and other light industrial complexes.

"Commercial Development greater than 100,000 square feet" means any commercial development that with a project footprint of at least 100,000 square feet.

"Construction Permits" means any building, electrical, plumbing/mechanical, demolition/removal, grading, public right-of-way, and sign permits, reviewed in accordance with Process One by the Development Services Department, as described in Chapter 12, Article 9, Divisions 1 through 8 of the Land Development Code.

"Detached Residential Development" means any development that provides 10 or more

freestanding residential units. This category includes, but is not limited to: detached homes, such as single-family homes and detached condominiums.

"Directly Connected Impervious Area (DCIA)" means the area covered by a building, impermeable pavement, and/ or other impervious surfaces, which drains directly into the storm water conveyance system without first flowing across permeable vegetated land area (e.g., lawns).

"Discretionary Actions" means any adoption or amendment of a land use plan, zoning or rezoning action, development agreement, subdivision of land in accordance with the Subdivision Map Act, or development permits reviewed by Development Services staff, as described in Chapter 12, Articles 2 through 6 of the Land Development Code.

"Infiltration" means the downward entry of water into the surface of the soil.

"Maximum Extent Practicable (MEP)" means the technology-based standard

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established by Congress in the Clean Water Act 402(p)(3)(B)(iii) that municipal dischargers of urban runoff must meet. MEP generally emphasizes pollution prevention and source control BMPs primarily (as the first line of defense) in combination with treatment methods serving as a backup (additional lines of defense).

"New Development" means land disturbing activities; structural development, including construction or installation of a building or structure, the creation of impervious surfaces; and land subdivision.

"Parking Lot" means land area or facility for the temporary parking or storage of motor vehicles used personally, or for business or commerce.

"Pollutants of Concern." For the purposes of identifying pollutants of concern and associated storm water BMPs, pollutants are grouped in nine general categories as follows:

General Categories of Water Pollution:

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

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

3. Metals - Metals are raw material components in non-metal products such as fuels, adhesives, paints, and other coatings. Primary source of metal pollution in storm water are typically commercially available metals and metal products. Metals of concern include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors in primer coatings and cooling tower systems. At low concentrations naturally occurring in soil, metals are not

toxic. However, at higher concentrations, certain metals can be toxic to aquatic life. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish. Environmental concerns, regarding the potential for release of metals to the environment, have already led to restricted metal usage in certain applications.

4. Organic Compounds - Organic compounds are carbon-based. Commercially available or naturally occurring organic compounds are found in pesticides, solvents, and hydrocarbons. Organic compounds can, at certain concentrations, indirectly or directly constitute a hazard to life or health. When rinsing off objects,

toxic levels of solvents and cleaning compounds can be discharged to storm drains. Dirt, grease, and grime retained in the cleaning fluid or rinse water may also adsorb levels of organic compounds that are harmful or hazardous to aquatic life.

5. Trash & Debris - Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) are general waste products on the landscape. The presence of trash & debris may have a significant impact on the recreational value of a water body and aquatic habitat. Excess organic matter can create a high biochemical oxygen demand in a stream and thereby lower its water quality. Also, in areas where stagnant water exists, the presence of excess organic matter can promote septic conditions resulting in the growth of undesirable

organisms and the release of odorous and hazardous compounds such as hydrogen sulfide.

6. Oxygen-Demanding Substances - This category includes biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. Proteins, carbohydrates, and fats are examples of biodegradable organic compounds. Compounds such as ammonia and hydrogen sulfide are examples of oxygen-demanding compounds. The oxygen demand of a substance can lead to depletion of dissolved oxygen in a water body and possibly the development of septic conditions.

7. Oil and Grease - Oil and grease are characterized as high-molecular weight organic compounds. Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids. Introduction of these pollutants to the water bodies are very possible due to the wide uses and applications of some of these products in municipal, residential, commercial, industrial, and construction areas. Elevated oil and grease content can decrease the aesthetic value of the water body, as well as the water quality.

8. Bacteria and Viruses - Bacteria and viruses are ubiquitous microorganisms that thrive under certain environmental conditions. Their proliferation is typically caused by the transport of animal or human fecal wastes from the watershed. Water, containing excessive bacteria and viruses can alter the aquatic habitat and create a harmful environment for humans and aquatic life. Also, the decomposition of excess organic waste causes increased growth of undesirable

organisms in the water.

9. Pesticides - Pesticides (including herbicides) are chemical compounds commonly used to control nuisance growth or prevalence of organisms. Excessive application of a pesticide may result in runoff containing toxic levels of its active component.

"Pollution Prevention" means practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control, treatment, or disposal. Pollution prevention is generally the best "first line of defense" and should be used in conjunction with site design, source control and treatment control BMPs.

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"Projects Discharging to Receiving Waters within Water Quality Sensitive Areas" means all development and significant redevelopment that would create 2,500 square feet of impervious surfaces or increase the area of imperviousness of a project site to 10% or more of its naturally occurring condition, and either discharge urban runoff to a receiving water within an water quality sensitive area (where any portion of the project footprint is located within 200 feet of the water quality sensitive area), or discharge to a receiving water within an water quality sensitive area without mixing with flows from adjacent lands (where the project footprint is located more than 200 feet from the water quality sensitive area).

"Project Footprint" means the limits of all grading and ground disturbance, including landscaping, associated with a project.

"Receiving Waters" means surface bodies of water, which directly or indirectly receive

discharges from urban runoff conveyance systems, including naturally occurring wetlands, streams (perennial, intermittent, and ephemeral (exhibiting bed, bank, and ordinary high water mark)), creeks, rivers, reservoirs, lakes, lagoons, estuaries, harbors, bays and the Pacific Ocean. The City shall determine the definition for wetlands and the limits thereof for the purposes of this definition, which shall be as protective as the Federal definition utilized by the United States Army Corps of Engineers and the United States Environmental Protection Agency. Constructed wetlands are not considered wetlands under this definition, unless the wetlands were constructed as mitigation for habitat loss. Other constructed BMPs are not considered receiving waters under this definition, unless the BMP was originally constructed in receiving waters.

"Residential Development" means any development on private land that provides living accommodations for one or more persons. This category includes, but is not limited to: single-family homes, multi-family homes, condominiums, and apartments.

"Restaurant" means a stand-alone facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812).

"Significant Redevelopment" means development that would create, replace or add at least 5,000 square feet of impervious surfaces on an already developed site. Significant redevelopment includes, but is not limited to: the expansion of a building footprint; addition to or replacement of a structure; replacement of an impervious surface that is not part of a routine maintenance activity; and land disturbing activities related with structural or impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s)

are removed, exposing underlying soil during construction. Significant redevelopment does not include trenching and resurfacing associated with utility work; resurfacing and reconfiguring surface parking lots; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and replacement of damaged pavement.

"Site Design BMP" means any project design feature that reduces the creation or severity of potential pollutant sources or reduces the alteration of the project site's

natural flow regime. Redevelopment projects that are undertaken to remove pollutant sources (such as existing surface parking lots and other impervious surfaces) or to reduce the need for new roads and other impervious surfaces (as compared to conventional or low-density new development) by incorporating higher densities and/or mixed land uses into the project design, are also considered site design BMPs.

"Source Control BMP (both structural and non-structural)" means land use or site planning practices, or structures that aim to prevent urban runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff. Examples include roof structures over trash or material storage areas, and berms around fuel dispensing areas.

"Steep hillside" means lands that have a natural gradient of 25 percent (4 feet of horizontal distance for every 1 foot of vertical distance) or greater and a minimum elevation differential of 50 feet, or a natural gradient of 200 percent (1 foot of horizontal distance for every 2 feet of vertical distance) or greater and a minimum elevation

differential of 10 feet.

"Steep hillside development greater than 5,000 square feet" means any development that would create more than 5,000 square feet of impervious surfaces in hillsides with known erosive soil conditions.

"Storm Water Best Management Practice (BMP)" means any schedules of activities, prohibitions of practices, general good house keeping practices, pollution prevention and educational practices, maintenance procedures, structural treatment BMPs, and other management practices to prevent or reduce to the maximum extent practicable the discharge of pollutants directly or indirectly to receiving waters. Storm Water BMPs also include treatment requirements, operating procedures and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. This manual groups development-related storm water BMPs into two categories:

(1) Construction Storm Water BMPs, which are practices, procedures, devices or materials used to prevent the transport and introduction of pollutants both on and from a project site during construction; and

(2) Permanent Storm Water BMPs, which are the site design features, source control features, and treatment control BMPs that become a permanent part of a project's design and remain functioning throughout the "use" phase of a project site. (See the definitions for site design, source control and treatment control BMPs in this appendix).

"Storm Water Conveyance System" means private and public drainage facilities by which storm water may be conveyed to Receiving Waters, such as: natural drainages,

ditches, roads, streets, constructed channels, aqueducts, storm drains, pipes, street gutters, or catch basins.

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"Streets, Roads, Highways, and Freeways" means any project that is not part of a routine maintenance activity, and would create a new paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles and other vehicles. For the purposes of Storm Water Standards Manual requirements, Streets, Roads, Highways and Freeways do not include trenching and resurfacing associated with utility work; applying asphalt overlay to existing pavement; new sidewalk, pedestrian ramps, or bike lane construction on existing roads; and replacement of damaged pavement.

"Treatment Control (Structural) BMP" means any engineered system designed and constructed to remove pollutants from urban runoff. Pollutant removal is achieved by simple gravity settling of particulate pollutants, filtration, biological uptake, media adsorption or any other physical, biological, or chemical process.

"Water Quality Sensitive Areas" means areas that include, but are not limited to, all Clean Water Act 303(d) impaired water bodies ("303[d] water bodies"); areas designated as an "Area of Special Biological Significance" (ASBS) by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); water bodies designated as having a RARE beneficial use by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments), or areas designated as preserves or their equivalent

under the Multiple Species Conservation Program (MSCP) within the Cities and County of San Diego. The limits of Areas of Special Biological Significance are those defined in the Water Quality Control Plan for the San Diego Basin (1994 and amendments).

Water quality sensitive area is defined for the purposes of implementing Storm Water Standards Manual requirements, and does not replace or supplement other environmental resource-based terms, such as "Environmentally Sensitive Lands," employed by the City in their land development review processes. A reference map depicting the Water Quality Sensitive Areas in the City of San Diego is included in Appendix B.

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APPENDIX J

Note: This map is printed here for reference only. A more detailed map with parcel lines is available at the SanGIS website at, www.sangis.org, or by contacting SanGIS at 1010 Second Avenue, Suite 130A, San Diego, CA 92101, or by phone at (619) 702-0400. The 303d water bodies data layer was produced under the direction of the City of San Diego and represents the

City's interpretation of impaired water bodies as described in the 2002 CWA Section 303(d) List

Of Water Quality Limited Segments adopted by the State Water Resources Control Board on February 4, 2003 (more information regarding the 2002 303d list can be found at

www.swrcb.ca.gov/tmdl/docs/2002_cwa_section_303d_list_wqls_020403.pdf). The accuracy of

this data has not been verified. These data layers have been prepared only as a reference tool to assist development project applicants in identifying their project's pollutants of concern

according to the process in the City's Storm Water Standards Manual. Additional information

regarding 303(d) listed water bodies can be found on the State Water Resources Control Board

website at www.swrcb.ca.gov.