

City of Escondido PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

SOUTH ESCONDIDO

**South Escondido
Escondido, CA 92027**

**ASSESSOR'S PARCEL NUMBER(S):
APN: 238-152-06, 07**

ENGINEER OF WORK:



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DATE OF SWQMP:
05/28/2019

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[FOR CITY STAFF ONLY]

APPROVAL DATE:



PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

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PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

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ATTACHMENTS

Attachment 1: Backup for PDP Pollutant Control BMPs

Attachment 1a: Storm Water Pollutant Control Worksheet Calculations (Worksheet B.2-1 DCV, Form I-4)

Attachment 1b: Form I-5, Categorization of Infiltration Feasibility Condition

Attachment 1c: Form I-6, Factor of Safety and Design Infiltration Rate Worksheet

Attachment 1d: Drainage Management Area (DMA) Exhibit

Attachment 1e: Individual Structural BMP DMA Mapbook

Attachment 2: Backup for PDP Hydromodification Control Measures

Attachment 2a: Flow Control Facility Design

Attachment 2b: Hydromodification Management Exhibit

Attachment 2c: Management of Critical Coarse Sediment Yield Areas

Attachment 2d: Geomorphic Assessment of Receiving Channels (optional)

Attachment 2e: Vector Control Plan (if applicable)

Attachment 3: Structural BMP Maintenance Plan

Attachment 3a: Structural BMP Maintenance Thresholds and Actions

Attachment 3b: Draft Maintenance Agreements / Notifications (when applicable)

Attachment 4: City of Escondido PDP Structural BMP Verification

Attachment 5: Copy of Plan Sheets Showing Permanent Storm Water BMPs

ACRONYMS

ACP	Alternative Compliance Project
APN	Assessor's Parcel Number
BMP	Best Management Practice
DMA	Drainage Management Area
EOW	Engineer of Work
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
PDP	Priority Development Project
PE	Professional Engineer
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWDM	Storm Water Design Manual
SWQMP	Storm Water Quality Management Plan
WMAA	Watershed Management Area Analysis
WQIP	Water Quality Improvement Plan

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

PDP SWQMP PREPARER'S CERTIFICATION PAGE

Project Name: Apollo Senior Care

Permit Application Number:

PREPARER'S CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the City of Escondido Storm Water Design Manual, which is a design manual for compliance with the City of Escondido Municipal Code (Chapter 22, Article 2) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100) requirements for storm water management.

I have read and understand that the City of Escondido has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the Storm Water Design Manual. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by City staff is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

RCE # C081699, Exp. 03/31/20

Engineer of Work's Signature, PE Number & Expiration Date

Robert D'Amaro

Print Name

Masson and Associates, Inc

Company

5, 28, 19

Date

Engineer's Seal:



PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

SUBMITTAL RECORD

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In column 4 summarize the changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

Preliminary Design / Planning / CEQA

Submittal Number	Date	Summary of Changes
1	5-28-2019	Initial Submittal
2		
3		
4		

Final Design

Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Plan Changes

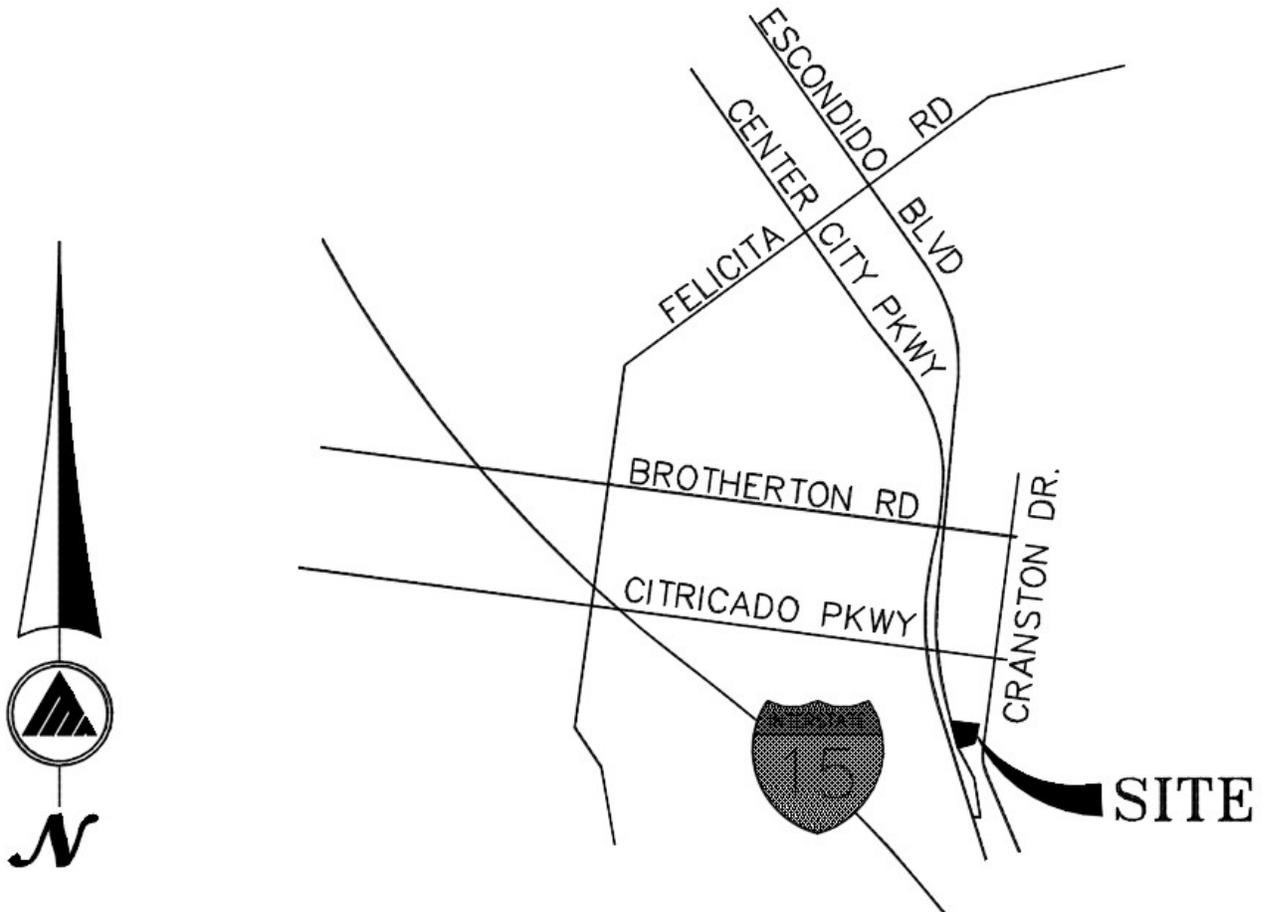
Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

PROJECT VICINITY MAP

Project Name: South Escondido
Record ID: xxxx

CITY OF ESCONDIDO, CALIFORNIA



VICINITY MAP

NTS

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Step 1: Project type determination (Standard or Priority Development Project) (Form I-2a)

Project Summary Information	
Project Name	South Escondido
Project Address	2608 S Escondido Blvd. Escondido, CA 92025
Assessor's Parcel Number(s)	238-152-06, 07
Permit Application Number	XXXX
Project Watershed (Hydrologic Unit)	Select One: Carlsbad 904 <input checked="" type="checkbox"/> San Dieguito 905
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	<u>1.75</u> Acres (<u>76,135</u> Square Feet)
Area to be disturbed by the project (Project Area)	<u>1.75</u> Acres (<u>76,135</u> Square Feet)
Project Proposed Impervious Area (subset of Project Area)	<u>1.55</u> Acres (<u>67,435</u> Square Feet)
Project Proposed Pervious Area (subset of Project Area)	<u>0.2</u> Acres (<u>8,700</u> Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	
Confirmation of Priority Development Project Determination	
The project is (select one): <input type="checkbox"/> New Development <input checked="" type="checkbox"/> Redevelopment ¹	
The total proposed newly created or replaced impervious area is: <u>67,435</u> ft ²	

¹ Redevelopment is defined as: The creation and/or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include routine maintenance activities, such as trenching and resurfacing associated with utility work; pavement grinding; resurfacing existing roadways; new sidewalks construction; pedestrian ramps; or bike lanes on existing roads; and routine replacement of damaged pavement, such as pothole repair.

Solar energy farms that are not also one of the categories listed in Step 2b of Table 1-1. City staff must also determine that appropriate BMPs are provided to mitigate for downstream impacts due to significant changes to the existing hydrology

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Is the project in any of the following categories, (a) through (f)?			
Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	(a)	New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	(c)	<p>New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses:</p> <ul style="list-style-type: none"> (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. <input checked="" type="checkbox"/> (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. <input checked="" type="checkbox"/> (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.
Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	(d)	<p>New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).</p> <p><i>Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.</i></p>
Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	(e)	<p>New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses:</p> <ul style="list-style-type: none"> (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

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Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	(f)	<p>New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. <i>Note: See Storm Water Design Manual Section 1.4.2 for additional guidance.</i></p>
<p>Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above?</p> <p><input type="checkbox"/> No – the project is <u>not</u> a Priority Development Project (Standard Project). <input checked="" type="checkbox"/> Yes – the project is a Priority Development Project (PDP).</p> <p>Further guidance may be found in Chapter 1 and Table 1-2 of the Storm Water Design Manual.</p>			
<p>The following is for redevelopment PDPs only:</p> <p>The area of existing (pre-project) impervious area at the project site is: _____ ft² (A) The total proposed newly created or replaced impervious area is _____ <u>67,435</u> ft² (B) Percent impervious surface created or replaced (B/A)*100: _____ %</p> <p>The percent impervious surface created or replaced is (select one based on the above calculation):</p> <p><input type="checkbox"/> less than or equal to fifty percent (50%) – only newly created or replaced impervious areas are considered a PDP and subject to stormwater requirements</p> <p>OR</p> <p><input type="checkbox"/> greater than fifty percent (50%) – the entire project site is considered a PDP and subject to stormwater requirements</p>			

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Step 1.1: Storm Water Quality Management Plan requirements

Step	Answer	Progression
<p>Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions?</p> <p>To answer this item, complete Step 1 Project Type Determination Checklist on Pages 1 and 2, and see PDP exemption information below. For further guidance, see Section 1.4 of the Storm Water Design Manual <i>in its entirety</i>.</p>	<input type="checkbox"/> Standard Project	<u>Standard Project</u> requirements apply, including <u>Standard Project SWQMP</u> . Complete Form I-1.
	<input checked="" type="checkbox"/> PDP	<u>Standard and PDP</u> requirements apply, including <u>PDP SWQMP</u> . SWQMP Required.
	<input type="checkbox"/> PDP with ACP	If participating in offsite alternative compliance, complete Step 6.3 and an ACP SWQMP.
	<input type="checkbox"/> PDP Exemption	Go to Step 1.2 below.

Step 1.2: Exemption to PDP definitions

<p>Is the project exempt from PDP definitions based on either of the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Projects that are only new or retrofit paved sidewalks, bicycle lanes, or trails that meet the following criteria: <ul style="list-style-type: none"> (i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR (ii) Designed and constructed to be hydraulically disconnected from paved streets or roads [i.e., runoff from the new improvement does not drain directly onto paved streets or roads]; OR (iii) Designed and constructed with permeable pavements or surfaces in accordance with County of San Diego Green Streets Infrastructure; <input type="checkbox"/> Projects that are only retrofitting or redeveloping existing paved alleys, streets or roads that are designed and constructed in accordance with the City of Escondido Guidance on Green Infrastructure. 	<p>If so:</p> <p><u>Standard Project</u> requirements apply, AND <u>any additional requirements specific to the type of project</u>. <u>City concurrence</u> with the exemption is required. <i>Provide discussion and list any additional requirements below in this form.</i></p>
PDP Exempt.	
<p><i>Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:</i></p>	

Step 2: Construction Storm Water BMPs

Construction storm water BMPs shall be shown on the Grading Plan and (if applicable) included in the Storm Water Pollution Prevention Plan (SWPPP).

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Step 3: City of Escondido PDP SWQMP Site Information Checklist (Form I-2a)

Step 3.1: Description of Existing Site Condition

<p>Current Status of the Site (select all that apply):</p> <p><input checked="" type="checkbox"/> Existing development</p> <p><input type="checkbox"/> Previously graded but not built out</p> <p><input type="checkbox"/> Demolition completed without new construction</p> <p><input type="checkbox"/> Agricultural or other non-impervious use</p> <p><input checked="" type="checkbox"/> Vacant, undeveloped/natural</p> <p><i>Description / Additional Information:</i></p>
<p>Existing Land Cover Includes (select all that apply and provide each area on site):</p> <p><input checked="" type="checkbox"/> Vegetative Cover <u>1.18</u> Acres (<u>51,239</u> Square Feet)</p> <p><input type="checkbox"/> Non-Vegetated Pervious Areas _____ Acres (_____ Square Feet)</p> <p><input checked="" type="checkbox"/> Impervious Areas <u>0.57</u> Acres (<u>24,896</u> Square Feet)</p> <p><i>Description / Additional Information:</i></p>
<p>Underlying Soil belongs to Hydrologic Soil Group (select all that apply):</p> <p><input type="checkbox"/> NRCS Type A</p> <p><input type="checkbox"/> NRCS Type B</p> <p><input checked="" type="checkbox"/> NRCS Type C</p> <p><input type="checkbox"/> NRCS Type D</p>
<p>Approximate Depth to Groundwater (GW) (or N/A for no infiltration BMPs):</p> <p><input type="checkbox"/> GW Depth < 5 feet</p> <p><input type="checkbox"/> 5 feet < GW Depth < 10 feet</p> <p><input checked="" type="checkbox"/> 10 feet < GW Depth < 20 feet</p> <p><input type="checkbox"/> GW Depth > 20 feet</p>
<p>Existing Natural Hydrologic Features (select all that apply):</p> <p><input type="checkbox"/> Watercourses</p> <p><input type="checkbox"/> Seeps</p> <p><input type="checkbox"/> Springs</p> <p><input type="checkbox"/> Wetlands</p> <p><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> Other</p> <p><i>Description / Additional Information:</i> there is an existing groundwater table and sanitary leach filed on the site, therefore designing infiltration basin is not feasible on the site.</p>

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Step 3.2: Description of Existing Site Drainage Patterns

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

- (1) Whether existing drainage conveyance is natural or urban;
- (2) Is runoff from offsite conveyed through the site? if yes, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site;
- (3) Provide details regarding existing project site drainage conveyance network, including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and
- (4) Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Describe existing site drainage patterns:

The Project is an existing building with approximately 1.75 acres operated as restaurant located on South Escondido Blvd within the City of Escondido, California. The site slopes gently from northwest to southeasterly direction on an average slope of 2 percent. The site runoff currently drains onto South Escondido via surface flow and an existing ditch located on the south portion of the site from east to west. The existing ditch discharges the runoff onto south Escondido Blvd and then into an existing storm drain system located on South Escondido Blvd and ultimately onto Lake Hodge reservoir.

The project site is located on GC zoning area (General Commercial). There are no offsite onto project site.

According to NRCS Websoil Survey, the project site is situated on soil types C.

Step 3.3: Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:

The Project is an existing building with approximately 1.75 acres operated as restaurant located on South Escondido Blvd within the City of Escondido, California. The proposed development project will consist of 42 3-story Townhomes, driveway, parking lot, treatment basin. The project site is located on GC zoning area (General Commercial). All the proposed runoff will ultimately discharge onto Lake Hodge Reservoir. There are no offsite onto project site.

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List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

The project proposed impervious area will consist of 34 residential houses, sidewalks, driveways and private street.

Buildings:	30,302	sf
Patio, Deck, sidewalk::	18,237	sf
Street :	17,720	sf
Parking lot	<u>1,176</u>	<u>sf</u>
Total:	67,435	sf

List/describe proposed pervious features of the project (e.g., landscape areas):

The proposed pervious area will consist of one treatment basin, landscape and open space areas.

IMP -1:	±4930	sf
Landscaped :	<u>3,770</u>	<u>sf</u>
Total	8,700	sf

Does the project include grading and changes to site topography?

Yes

No

Description / Additional Information:

Considering the site has never been graded before, the site will require considerable re-contouring to make the site developable for the land use plan.

Insert acreage or square feet for the different land cover types in the table below:

Change in Land Cover Type Summary			
Land Cover Type	Existing (ft ²)	Proposed (ft ²)	Percent Change
Vegetation	51,239	8,700	- 83%
Pervious (non-vegetated)	-		
Impervious	24,896	67,435	+271%

Step 3.4: Description of Proposed Site Drainage Patterns

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

Yes

No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre- and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Describe proposed site drainage patterns:

The project will have one onsite drainage basin. The Proposed drainage basin will drain southeasterly via a proposed roof drain, curb gutter into a proposed treatment basin and then discharge into south Escondido Blvd prior to discharging into an existing storm drain system located on South Escondido Blvd downstream of the project site. All the proposed runoff will ultimately discharge onto Lake Hodge Reservoir.

Refer to the drainage study for more detail.

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Step 3.5: Potential Pollutant Source Areas

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply).

- On-site storm drain inlets
- Interior floor drains and elevator shaft sump pumps
- Interior parking garages
- Need for future indoor & structural pest control
- Landscape/Outdoor Pesticide Use
- Pools, spas, ponds, decorative fountains, and other water features
- Food service
- Refuse areas
- Industrial processes
- Outdoor storage of equipment or materials
- Vehicle and Equipment Cleaning
- Vehicle/Equipment Repair and Maintenance
- Fuel Dispensing Areas
- Loading Docks
- Fire Sprinkler Test Water
- Miscellaneous Drain or Wash Water
- Plazas, sidewalks, and parking lots
- Other (provide description)

Description / Additional Information:

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Step 3.6: Identification and Narrative of Receiving Water and Pollutants of Concern

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable):

The storm water from the site drains into the Escondido Creek and ultimately into the San Elijo Lagoon which empties into the Pacific Ocean.

List any 303(d) impaired water bodies² within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
Kit Carson Creek	Pentachlorophenol (PCP), Total dissolved Solids.	Needed
Hodges, Lake	Color, Manganese, Mercury, Nitrogen, Phosphorus, TDS, Turbidity, pH	Needed
San Dieguito River	Enterococcus, Fecal Coliform, Nitrogen, Phosphorus, TDS, Toxicity	Needed
Pacific Ocean	Total Coliform	Needed

Identification of Project Site Pollutants* N/A

*Identification of project site pollutants below is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs. Note the project must also participate in an alternative compliance program (unless prior lawful approval to meet earlier PDP requirements is demonstrated).

Identify pollutants expected from the project site based on all proposed use(s) of the site (see Storm Water Design Manual Appendix B.6):

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment			
Nutrients			
Heavy Metals			
Organic Compounds			
Trash & Debris			
Oxygen Demanding Substances			

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Oil & Grease			
Bacteria & Viruses			
Pesticides			

² The current list of Section 303(d) impaired water bodies can be found at http://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired

N/A, because the site will not participate in an **Alternative Compliance Program**

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Step 3.7: Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the Storm Water Design Manual)?

- Yes, hydromodification management requirements for flow control and preservation of critical coarse sediment yield areas are applicable.
- No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA³ for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

³The Watershed Management Area Analysis (WMAA) is an optional element for inclusion in the Water Quality Improvement Plans (WQIPs) described in the 2013 MS4 Permit [Provision B.3.b.(4)]. It is available online at the Project Clean Water website:

http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=248

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Step 3.7.1: Critical Coarse Sediment Yield Areas* N/A

***This Section only required if hydromodification management requirements apply**

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

Yes

No, no critical coarse sediment yield areas to be protected based on WMAA maps

If yes, have any of the optional analyses presented in Section 6.2 of the manual been performed?

6.2.1 Verification of GLUs (classification that provides an estimate of sediment yield based on geology, hillslope, and land cover) Onsite

6.2.2 Downstream Systems Sensitivity to Coarse Sediment

6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite

No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

No critical coarse sediment yield areas to be protected based on verification of GLUs onsite. Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 8 of the SWQMP.

Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Discussion / Additional Information:

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Flow Control for Post-Project Runoff*

<p>*This Section only required if hydromodification management requirements apply</p> <p><i>List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.</i></p>
<p>Has a geomorphic assessment been performed for the receiving channel(s)?</p> <p><input checked="" type="checkbox"/> No, the low flow threshold is 0.1Q2 (default low flow threshold)</p> <p><input type="checkbox"/> Yes, the result is the low flow threshold is 0.1Q2</p> <p><input type="checkbox"/> Yes, the result is the low flow threshold is 0.3Q2</p> <p><input type="checkbox"/> Yes, the result is the low flow threshold is 0.5Q2</p> <p><i>If a geomorphic assessment has been performed, provide title, date, and preparer:</i></p> <p><i>Discussion / Additional Information: (optional)</i></p>

Step 3.8: Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

Optional Additional Information or Continuation of Previous Sections As Needed
This space provided for additional information or continuation of information from previous sections as needed.

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Step 4: Source Control BMP Checklist (Form I-2b)

Source Control BMPs			
<p>All development projects must implement source control BMPs 4.2.1 through 4.2.6 where applicable and feasible. See Chapter 4.2 and Appendix E of the City Storm Water Design Manual for information to implement source control BMPs shown in this checklist. The following checklists serve as guides only. Mark what elements are included in your project. See Storm Water Design Manual Chapter 4 and Appendix E for more information on determining appropriate BMPs for your project.</p> <p>Answer each category below pursuant to the following:</p> <ul style="list-style-type: none"> • "Yes" means the project will implement the source control BMP as described in Chapter 4.2 and/or Appendix E of the City Storm Water Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification must be provided. 			
Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Direct irrigation water away from impervious surfaces <input type="checkbox"/> Direct vehicle wash water away from impervious surfaces Other: _____			
<i>Discussion / justification if SC-1 not implemented:</i>			
SC-2 Storm Drain Stenciling or Signage	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Stencil or stamp storm drains with anti-dumping message <input checked="" type="checkbox"/> Post signs prohibiting illegal dumping Other			
<i>Discussion / justification if SC-2 not implemented:</i>			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Store materials inside a covered enclosure <input type="checkbox"/> Direct runoff from downspouts and roofs away from storage areas <input type="checkbox"/> Other			
<i>Discussion / justification if SC-3 not implemented:</i>			
There won't be any proposed outdoor Material storage on the site			

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SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Locate work area away from storm drains or catch basins Work over impermeable surfaces where spills and pollutants can be captured and removed <input type="checkbox"/> removed <i>Discussion / justification if SC-4 not implemented:</i> There won't be any proposed outdoor Materials Stored in Outdoor Work Areas on the site			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Locate trash containers in a roofed, walled enclosure <input checked="" type="checkbox"/> Locate trash containers away from storm drains <i>Discussion / justification if SC-5 not implemented:</i>			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below):			
<input checked="" type="checkbox"/> A. On-site storm drain inlets	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> B. Interior floor drains and elevator shaft sump pumps	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
<input checked="" type="checkbox"/> C. Interior parking garages	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> D. Need for future indoor & structural pest control	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> E. Landscape/outdoor pesticide use	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> F. Pools, spas, ponds, fountains, and other water features	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> G. Food service	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
<input checked="" type="checkbox"/> H. Refuse areas	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> I. Industrial processes	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> J. Outdoor storage of equipment or materials	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> K. Vehicle and equipment cleaning	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> L. Vehicle/equipment repair and maintenance	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> M. Fuel dispensing areas	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> N. Loading docks	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> O. Fire sprinkler test water	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> P. Miscellaneous drain or wash water	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Q. Plazas, sidewalks, and parking lots	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<i>Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.</i> The project site is residential development, therefore checked items "No" will not be included on the design.			

Note: Show all source control measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

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Step 5: Site Design BMP Checklist (Form I-2c)

Site Design BMPs			
<p>All development projects must implement site design BMPs SD-A through SD-H where applicable and feasible. See Chapter 4.3 and Appendix E of the City Storm Water Design Manual for information to implement site design BMPs shown in this checklist. The following checklists serve as guides only. Mark what elements are included in your project. See Storm Water Design Manual Chapter 4 and Appendix E for more information on determining appropriate BMPs for your project.</p> <p>Answer each category below pursuant to the following:</p> <ul style="list-style-type: none"> • "Yes" means the project will implement the site design BMP as described in Chapter 4.3 and/or Appendix E of the City Storm Water Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification must be provided. 			
Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Maintain existing drainage patterns <i>Discussion / justification if SD-1 not implemented:</i>			
SD-2 Conserve Natural Areas, Soils, and Vegetation	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
<input type="checkbox"/> Preserve trees (see Zoning Code Art. 55 Grading & Erosion Control; Art. 62 Landscape Regulations) <input type="checkbox"/> Avoid sensitive areas such as wetlands and waterways <i>Discussion / justification if SD-2 not implemented:</i> Considering the development plan, the entire disturbed area will be regraded to accommodate the development plan.			
SD-3 Minimize Impervious Area	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Install parking and driving aisles to minimum width required to meet standards <i>Discussion / justification if SD-3 not implemented:</i>			

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SD-4 Minimize Soil Compaction	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Avoid compaction in planned landscaped spaces <input checked="" type="checkbox"/> Till and amend soil for improved infiltration capacity <i>Discussion / justification if SD-4 not implemented:</i> As the site will be completely regraded, soil compaction of import soils will be required. No native area will remain undisturbed on the development area.			
SD-5 Impervious Area Dispersion	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Drain rooftops, roads or sidewalks into adjacent landscape areas <input type="checkbox"/> Drain impervious surfaces through pervious areas <i>Discussion / justification if SD-5 not implemented:</i> The runoff from project site will convey via proposed curb gutter, roof drain and inlet prior to discharging into the treatment basin. No dispersion prior to discharging into treatment basin.			
SD-6 Runoff Collection	<input type="checkbox"/> Yes		
<i>Discussion / justification if SD-6 not implemented:</i>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
SD-7 Landscaping with Native or Drought Tolerant Species			
<i>Discussion / justification if SD-7 not implemented:</i>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
SD-8 Harvesting and Using Precipitation			
<i>Discussion / justification if SD-8 not implemented:</i>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
See Form I-4 feasibility check list and Attachment A worksheet B.3-1 for BMP feasibility analysis. DCV = 3,113 cf $0.25 * 3,113 = 778 > 353$ (from Worksheet B.3-1) Therefore Harvest and use is considered to be infeasible.			

Note: Show all site design measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

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Step 6: PDP Structural BMPs (Form I-3)

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the Storm Water Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the Storm Water Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 8.2.3.2 of the Storm Water Design Manual). PDP structural BMPs must be maintained into perpetuity, and the City must confirm the maintenance (see Section 7 of the Storm Water Design Manual).

Use this section to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (Step 6.2) for each structural BMP within the project (copy the BMP summary information sheet [Step 6.2] as many times as needed to provide summary information for each individual structural BMP).

Step 6.1: Description of structural BMP strategy

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the Storm Water Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. At the end of this discussion provide a summary of all the structural BMPs within the project including the type and number.

The pollutant control and flow control BMP will be integrated by proposed treatment basin. One biofiltration basin will be constructed on the site to treat onsite storm water runoff and detain the existing storm water runoff. The location of the treatment basins is shown on the BMP exhibits.

The treatment basins have a medium or high rating for removal of all likely pollutants from stormwater.

Step 1. Site design evaluation to minimize proposed impervious areas, implementing landscaping, runoff collections to minimize pollutants created from proposed site design, minimizing soil compaction, keep the onsite de minimis areas to minimum, maximize self-mitigation areas to maximum pervious lands

Step 2. Calculate DCV after identifying location of BMP and DMA delineation

Step 3. Conduct feasibility analysis for Harvest and Use BMP

Step 4. Conduct feasibility analysis for infiltration for the BMP locations selected

Step 5. Evaluate if required BMP footprint BMP will fit considering the site design and constrains

Step 6. Implement flow-thru treatment control BMPs for the remaining DCV (NOT APPLICABLE)

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Step 7. Prepare a SWQMP documenting site planning and opportunity assessment activities, final site layout and storm water management design

Step 8. Identify and document O&M requirement

The pollutant control BMPs will be proposed to treat DMA-1. One bio-filtration basin with underground R-Tank will be constructed on the site to treat onsite storm water runoff (DMA-1) and detain the 100yr existing storm water runoff. The location of the treatment basins are shown on the BMP exhibits.

Basin Number	Treatment Type
DMA-1, IMP-1	Biofiltration Basin

(Continue on following page as necessary.)

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Step 6.2:a Structural BMP Checklist

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. 1	
Construction Plan Sheet No. 5	
Type of structural BMP: <input type="checkbox"/> Retention by harvest and use (HU-1) <input type="checkbox"/> Retention by infiltration basin (INF-1) <input type="checkbox"/> Retention by bioretention (INF-2) <input type="checkbox"/> Retention by permeable pavement (INF-3) <input type="checkbox"/> Partial retention by biofiltration with partial retention (PR-1) <input checked="" type="checkbox"/> Biofiltration (BF-1) <input type="checkbox"/> Biofiltration with Nutrient Sensitive Media Design (BF-2) <input type="checkbox"/> Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F <input type="checkbox"/> Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) <input type="checkbox"/> Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) <input type="checkbox"/> Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) <input type="checkbox"/> Detention pond or vault for hydromodification management <input type="checkbox"/> Other (describe in discussion section below)	
Purpose: <input type="checkbox"/> Pollutant control only <input type="checkbox"/> Hydromodification control only <input checked="" type="checkbox"/> Combined pollutant control and hydromodification control <input type="checkbox"/> Pre-treatment/forebay for another structural BMP <input type="checkbox"/> Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms (See Section 8.2.3.2 of the Storm Water Design Manual)	Robert D'Amaro Engineer of Work
Who will be the final owner of this BMP?	<input checked="" type="checkbox"/> HOA <input type="checkbox"/> Property Owner <input type="checkbox"/> City <input type="checkbox"/> Other (describe)
Who will maintain this BMP into perpetuity?	<input checked="" type="checkbox"/> HOA <input type="checkbox"/> Property Owner <input type="checkbox"/> City <input type="checkbox"/> Other (describe)
<i>Discussion (as needed):</i> <i>(Continue on subsequent pages as necessary)</i>	Private Maintenance

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Step 6.3: Offsite Alternative Compliance Participation Form

THIS FORM IS NOT APPLICABLE AT THIS TIME: An Alternative Compliance Program is under consideration by the City of Escondido. <u>N/A</u>	
PDP INFORMATION	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
What are your PDP Pollutant Control Debits? *See Attachment 1 of the PDP SWQMP	
What are your PDP HMP Debits? (if applicable) *See Attachment 2 of the PDP SWQMP	
ACP Information	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
Project Owner/Address	
What are your ACP Pollutant Control Credits? *See Attachment 1 of the ACP SWQMP	
What are your ACP HMP Debits? (if applicable) *See Attachment 2 of the ACP SWQMP	
Is your ACP in the same watershed as your PDP? <input type="checkbox"/> Yes <input type="checkbox"/> No	Will your ACP project be completed prior to the completion of the PDP? <input type="checkbox"/> Yes <input type="checkbox"/> No
Does your ACP account for all Deficits generated by the PDP? <input type="checkbox"/> Yes <input type="checkbox"/> No (PDP and/or ACP must be redesigned to account for all deficits generated by the PDP.)	What is the difference between your PDP debits and ACP Credits? *(ACP Credits -Total PDP Debits = Total Earned Credits)

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ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 1a	Storm Water Pollutant Control Worksheet Calculations -Worksheet B.2-1 (Required) ✓-Worksheet B.3-1 (Form I-4; Required) -Worksheet B.4-1 (if applicable) ✓-Worksheet B.5-1 (if applicable) -Worksheet B.5-2 (if applicable) -Worksheet B.5-3 (if applicable) ✓-Worksheet B.6-1 (if applicable) -Summary Worksheet (optional)	<input checked="" type="checkbox"/> Included
Attachment 1b	Form I-5, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the Storm Water Design Manual to complete Form I-5.	<input checked="" type="checkbox"/> Included <input type="checkbox"/> Not included because the entire project will use harvest and use BMPs
Attachment 1c	Form I-6, Factor of Safety and Design Infiltration Rate Worksheet (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the Storm Water Design Manual to complete Form I-6.	<input type="checkbox"/> Included <input type="checkbox"/> Not included because the entire project will use harvest and use BMPs N/A The Basin is soil type "C" and will be lined
Attachment 1d	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	<input checked="" type="checkbox"/> Included
Attachment 1e	Individual Structural BMP DMA Mapbook (Required) -Place each map on 8.5"x11" paper. -Show at a minimum the DMA, Structural BMP, and any existing hydrologic features within the DMA.	<input checked="" type="checkbox"/> Included

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Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

- Underlying hydrologic soil group
- Approximate depth to groundwater
- Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- Critical coarse sediment yield areas to be protected
- Existing topography and impervious areas
- Existing and proposed site drainage network and connections to drainage offsite
- Proposed demolition
- Proposed grading
- Proposed impervious features
- Proposed design features and surface treatments used to minimize imperviousness
- Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Step 3.5)
- Structural BMPs (identify location, structural BMP ID#, type of BMP, and size/detail)

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Worksheet B.2-1. DCV

Design Capture Volume		Worksheet B-2.1		
1	85 th percentile 24-hr storm depth from Figure B.1-1	d=	*	inches
2	Area tributary to BMP (s)	A=	*	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	*	unitless
4	Street trees volume reduction	TCV=	*	cubic-feet
5	Rain barrels volume reduction	RCV=	*	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	*	cubic-feet

*For DMA calculations Refer to county’s worksheets: B.1-1, B.3-1, B.5-1

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.3)

Category	#	Description	<i>i</i>	<i>ii</i>
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	DMA-1	
	1	Basin Drains to the Following BMP Type	Biofiltration	
	2	85th Percentile 24-hr Storm Depth	0.61	
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	
	4	Impervious Surfaces <u>Not Directed to Dispersion Area</u> (C=0.90)	67,435	
	5	Semi-Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.30)		
	6	Engineered Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.10)		
	7	Natural Type A Soil <u>Not Serving as Dispersion Area</u> (C=0.10)		
	8	Natural Type B Soil <u>Not Serving as Dispersion Area</u> (C=0.14)		
	9	Natural Type C Soil <u>Not Serving as Dispersion Area</u> (C=0.23)	3,770	
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	
	12	Impervious Surfaces Directed to Dispersion Area per SD-B (Ci=0.90)		
	13	Semi-Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.30)		
	14	Engineered Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.10)		
	15	Natural Type A Soil Serving as Dispersion Area per SD-B (Ci=0.10)		
	16	Natural Type B Soil Serving as Dispersion Area per SD-B (Ci=0.14)		
	17	Natural Type C Soil Serving as Dispersion Area per SD-B (Ci=0.23)		
	18	Natural Type D Soil Serving as Dispersion Area per SD-B (Ci=0.30)		
	19	Number of Tree Wells Proposed per SD-A		
	20	Average Mature Tree Canopy Diameter		
Treatment Train Inputs & Calculations	23	Does BMP Overflow to Stormwater Features in <u>Downstream</u> Drainage?	No	No
	24	Identify Downstream Drainage Basin Providing Treatment in Series		
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas		
	26	Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90)	0	0
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0
Initial Runoff Factor Calculation	28	Total Tributary Area	71,205	0
	29	Initial Runoff Factor for Standard Drainage Areas	0.86	0.00
	30	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00
	31	Initial Weighted Runoff Factor	0.86	0.00
	32	Initial Design Capture Volume	3,113	0
Dispersion Area Adjustments	33	Total Impervious Area Dispersed to Pervious Surface	0	0
	34	Total Pervious Dispersion Area	0	0
	35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a
	36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00
	37	Runoff Factor After Dispersion Techniques	0.86	n/a
	38	Design Capture Volume After Dispersion Techniques	3,113	0
Tree & Barrel Adjustments	39	Total Tree Well Volume Reduction	0	0
	40	Total Rain Barrel Volume Reduction	0	0
Results	41	Final Adjusted Runoff Factor	0.86	0.00
	42	Final Effective Tributary Area	61,236	0
	43	Initial Design Capture Volume Retained by Site Design Elements	0	0
	44	Final Design Capture Volume Tributary to BMP	3,113	0

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Automated Worksheet B.5-1: Sizing Lined or Unlined Biofiltration BMPs (V1.3)					
Category	#	Description	i	ii	Units
BMP Inputs	0	Drainage Basin ID or Name	DMA-1	-	sq-ft
	1	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	-	in/hr
	2	Effective Tributary Area	61,236	-	sq-ft
	3	Minimum Biofiltration Footprint Sizing Factor	0.030	-	ratio
	4	Design Capture Volume Tributary to BMP	3,113	-	cubic-feet
	5	Is Biofiltration Basin Impermeably Lined or Unlined?	Lined		unitless
	6	Provided Biofiltration BMP Surface Area	2,740		sq-ft
	7	Provided Surface Ponding Depth	24		inches
	8	Provided Soil Media Thickness	18		inches
	9	Provided Depth of Gravel Above Underdrain Invert	18 *		inches
	10	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.10*		inches
11	Provided Depth of Gravel Below the Underdrain	3 *		inches	
Retention Calculations	12	Volume Infiltrated Over 6 Hour Storm	0	0	cubic-feet
	13	Soil Media Pore Space Available for Retention	0.05	0.05	unitless
	14	Gravel Pore Space Available for Retention	0.00	0.00	unitless
	15	Effective Retention Depth	0.90	0.00	inches
	16	Calculated Retention Storage Drawdown (Including 6 Hr Storm)	120	0	hours
	17	Volume Retained by BMP	206	0	cubic-feet
	18	Fraction of DCV Retained	0.07	0.00	ratio
	19	Portion of Retention Performance Standard Satisfied	0.08	0.00	ratio
	20	Fraction of DCV Retained (normalized to 36-hr drawdown)	0.04	0.00	ratio
	21	Design Capture Volume Remaining for Biofiltration	2,988	0	cubic-feet
Biofiltration Calculations	22	Max Hydromod Flow Rate through Underdrain	0.0707	n/a	CFS
	23	Max Soil Filtration Rate Allowed by Underdrain Orifice	1.12	n/a	in/hr
	24	Soil Media Filtration Rate per Specifications	5.00	5.00	in/hr
	25	Soil Media Filtration Rate to be used for Sizing	1.12	5.00	in/hr
	26	Depth Biofiltered Over 6 Hour Storm	6.69	30.00	inches
	27	Soil Media Pore Space Available for Biofiltration	0.20	0.20	unitless
	28	Effective Depth of Biofiltration Storage	34.80	0.00	inches
	29	Drawdown Time for Surface Ponding	22	0	hours
	30	Drawdown Time for Effective Biofiltration Depth	31	0	hours
	31	Total Depth Biofiltered	41.49	30.00	inches
	32	Option 1 - Biofilter 1.50 DCV: Target Volume	4,482	0	cubic-feet
	33	Option 1 - Provided Biofiltration Volume	4,482	0	cubic-feet
	34	Option 2 - Store 0.75 DCV: Target Volume	2,241	0	cubic-feet
	35	Option 2 - Provided Storage Volume	2,241	0	cubic-feet
	36	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	ratio
Result	37	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	-	yes/no
	38	Overall Portion of Performance Standard Satisfied	1.00	0.00	ratio
	39	This BMP Overflows to the Following Drainage Basin	-	-	unitless
	40	Deficit of Effectively Treated Stormwater	0	n/a	cubic-feet

* R-Tank is designed to provide underground storage.

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Automated Worksheet B.3-1: Project-Scale BMP Feasibility Analysis (V1.3)

Category	#	Description	Value	Units
Capture & Use Inputs	0	Design Capture Volume for Entire Project Site	3,113	cubic-feet
	1	Proposed Development Type	Residential	unitless
	2	Number of Residents or Employees at Proposed Development	168	#
	3	Total Planted Area within Development	8,700	sq-ft
	4	Water Use Category for Proposed Planted Areas	Moderate	unitless
Infiltration Inputs	5	Is Average Site Design Infiltration Rate ≤ 0.500 Inches per Hour?	Yes	yes/no
	6	Is Average Site Design Infiltration Rate ≤ 0.010 Inches per Hour?	No	yes/no
	7	Is Infiltration of the Full DCV Anticipated to Produce Negative Impacts?	Yes	yes/no
	8	Is Infiltration of Any Volume Anticipated to Produce Negative Impacts?	Yes	yes/no
Calculations	9	36-Hour Toilet Use Per Resident or Employee	1.86	cubic-feet
	10	Subtotal: Anticipated 36 Hour Toilet Use	313	cubic-feet
	11	Anticipated 1 Acre Landscape Use Over 36 Hours	196.52	cubic-feet
	12	Subtotal: Anticipated Landscape Use Over 36 Hours	39	cubic-feet
	13	Total Anticipated Use Over 36 Hours	353	cubic-feet
	14	Total Anticipated Use / Design Capture Volume	0.11	cubic-feet
	15	Are Full Capture and Use Techniques Feasible for this Project?	No	unitless
	16	Is Full Retention Feasible for this Project?	No	yes/no
	17	Is Partial Retention Feasible for this Project?	No	yes/no
Result	18	Feasibility Category	5	1, 2, 3, 4, 5

Worksheet B.3-1 General Notes:

- A. Applicants may use this worksheet to determine the types of structural BMPs that are acceptable for implementation at their project site (as required in Section 5 of the BMPDM). User input should be provided for yellow shaded cells, values for all other cells will be automatically generated. Projects demonstrating feasibility or potential feasibility via this worksheet are encouraged to incorporate capture and use features in their project.
- B. Negative impacts associated with retention may include geotechnical, groundwater, water balance, or other issues identified by a geotechnical engineer and substantiated through completion of Form I-8.
- C. Feasibility Category 1: Applicant must implement capture & use, retention, and/or infiltration elements for the entire DCV.
- D. Feasibility Category 2: Applicant must implement capture & use elements for the entire DCV.
- E. Feasibility Category 3: Applicant must implement retention and/or infiltration elements for all DMAs with Design Infiltration Rates greater than 0.50 in/hr.
- F. Feasibility Category 4: Applicant must implement standard unlined biofiltration BMPs sized at $\geq 3\%$ of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.011 to 0.50 in/hr. Applicants may be permitted to implement lined BMPs, reduced size BMPs, and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.
- G. Feasibility Category 5: Applicant must implement standard lined biofiltration BMPs sized at $\geq 3\%$ of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.010 in/hr or less. Applicants may also be permitted to implement reduced size and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.
- H. PDPs participating in an offsite alternative compliance program are not held to the feasibility categories presented herein.

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Summary of Stormwater Pollutant Control Calculations (V1.3)

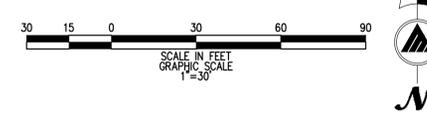
Category	#	Description	<i>i</i>	<i>ii</i>	Units
General Info	0	Drainage Basin ID or Name	DMA-1	-	unitless
	1	85th Percentile Storm Depth	0.61	-	inches
	2	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	-	in/hr
	3	Total Tributary Area	71,205	-	sq-ft
	4	85th Percentile Storm Volume (Rainfall Volume)	3,620	-	cubic-feet
Initial DCV	5	Initial Weighted Runoff Factor	0.86	-	unitless
	6	Initial Design Capture Volume	3,113	-	cubic-feet
Site Design Volume Reductions	7	Dispersion Area Reductions	0	-	cubic-feet
	8	Tree Well and Rain Barrel Reductions	0	-	cubic-feet
BMP Volume Reductions	9	Effective Area Tributary to BMP	61,236	-	square feet
	10	Final Design Capture Volume Tributary to BMP	3,113	-	cubic-feet
	11	Basin Drains to the Following BMP Type	Biofiltration	-	unitless
	12	Volume Retained by BMP (normalized to 36 hour drawdown)	62	-	cubic-feet
Total Volume Reductions	13	Total Fraction of Initial DCV Retained within DMA	0.02	-	fraction
	14	Percent of Average Annual Runoff Retention Provided	3.0%	-	%
	15	Percent of Average Annual Runoff Retention Required	1.5%	-	%
Performance Standard	16	Percent of Pollution Control Standard Satisfied	100.0%	-	%
Treatment Train	17	Discharges to Secondary Treatment in Drainage Basin	-	-	unitless
	18	Impervious Surface Area Still Requiring Treatment	0	-	square feet
	19	Impervious Surfaces Directed to Downstream Dispersion Area	-	-	square feet
	20	Impervious Surfaces Not Directed to Downstream Dispersion Area	-	-	square feet
Result	21	Deficit of Effectively Treated Stormwater	0	-	cubic-feet

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LEGEND

SYMBOL	DESCRIPTION
	BASIN BOUNDARY
	PROPERTY LINE
"C"	SOIL TYPE
	TREATMENT BASIN



Stage	Elevation	Contour Area	Incremental Storage	Total Storage
(ft)	(ft)	(sqft)	(cuft)	(cuft)
0.00	560.60	2,603 95% Void	0.000	0.000
1.00	561.60	2,603 95% Void	2,603	2,603
1.00	561.60	1,096 40% Void	1.85	2,605
3.00	563.60	1,096 40% Void	2,191	4,796
3.00	563.60	2,740 100% Void	1.92	4,798
4.00	564.60	3,360 100% Void	3,047	7,845
5.00	565.60	3,990 100% Void	3,675	11,520
5.33	565.93	4,190 100% Void	1,350	12,869
5.50	566.10	4,930 100% Void	775	13,645

Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.3)

Category	#	Description	DMA-1	#	
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	DMA-1		
	1	Basin Drains to the Following BMP Type	Biofiltration		
	2	85th Percentile 24-hr Storm Depth	0.61		
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000		
	4	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	67,435		
	5	Semi-Permeable Surfaces Not Serving as Dispersion Area (C=0.30)			
	6	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)			
	7	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)			
	8	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)			
	9	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)	3,770		
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)			
	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No		
	12	Impervious Surfaces Directed to Dispersion Area per SD-B (C _i =0.90)			
	13	Semi-Permeable Surfaces Serving as Dispersion Area per SD-B (C _i =0.30)			
	14	Engineered Pervious Surfaces Serving as Dispersion Area per SD-B (C _i =0.10)			
	15	Natural Type A Soil Serving as Dispersion Area per SD-B (C _i =0.14)			
	16	Natural Type B Soil Serving as Dispersion Area per SD-B (C _i =0.14)			
	17	Natural Type C Soil Serving as Dispersion Area per SD-B (C _i =0.23)			
	18	Natural Type D Soil Serving as Dispersion Area per SD-B (C _i =0.30)			
	19	Number of Tree Wells Proposed per SD-A			
Treatment Train Inputs & Calculations	20	Average Mature Tree Canopy Diameter			
	21	Number of Rain Barrels Proposed per SD-E			
	22	Average Rain Barrel Size			
	23	Does BMP Overflow to Stormwater Features in Downstream Drainage?	No	No	
	24	Identify Downstream Drainage Basin Providing Treatment in Series			
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas			
	26	Upstream Impervious Surfaces Directed to Dispersion Area (C _i =0.90)	0	0	
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	
	Initial Runoff Factor Calculation	28	Total Tributary Area	71,205	0
		29	Initial Runoff Factor for Standard Drainage Areas	0.86	0.00
30		Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	
31		Initial Weighted Runoff Factor	0.86	0.00	
32		Initial Design Capture Volume	3,113	0	
Dispersion Area Adjustments		33	Total Impervious Area Dispersed to Pervious Surfaces	0	0
		34	Total Pervious Dispersion Area	0	0
		35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a
		36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00
		37	Runoff Factor After Dispersion Techniques	0.86	n/a
	38	Design Capture Volume After Dispersion Techniques	3,113	0	
	Tree & Barrel Adjustments	39	Total Tree Well Volume Reduction	0	0
		40	Total Rain Barrel Volume Reduction	0	0
		41	Final Adjusted Runoff Factor	0.86	0.00
		42	Final Effective Tributary Area	61,236	0
Results		43	Initial Design Capture Volume Retained by Site Design Elements	0	0
		44	Final Design Capture Volume Tributary to BMP	3,113	0

BIO-FILTRATION CHART

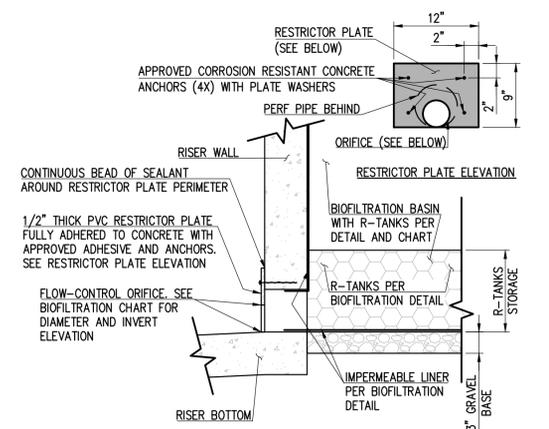
IMP #	ORIFICE DIAMETER (IN)	ORIFICE INVERT ELEVATION (FT)	OVERFLOW PIPE (IN)	# OF RISERS	GRATE SIZE IN FEET (X,Y)	TOTAL BASIN DEPTH (IN)	MULCH DEPTH "A" (IN)	AMENDED SOIL DEPTH "B" (IN)	SAND FILTER DEPTH "C" (IN)*	R-TANK "D" (IN)	BOTTOM BASIN ELEVATION (FT)	DISTANCE FROM BOTTOM OF POND TO TOP OF GRATE	TOP OF GRATE ELEVATION (FT)	SLOPE Z:1	TOP OF BERM ELEVATION (FT)	BASIN VOLUME REQUIRED (CF)	BASIN VOLUME PROVIDED (CF)	PROVIDED FREE BOARD (FT)
1	1.1"	560.6	12"	1	0.8' X 0.8'	30.0"	3"	18"	6"	12"	563.6.00	24"	565.6	2:1	566.1	11,271	11,520	0.5

* PEA GRAVEL

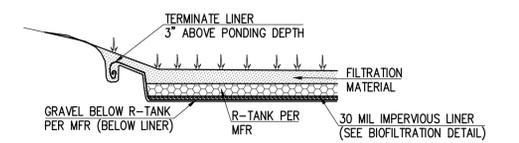
BIORETENTION SOIL MEDIA (BSM)
 SHALL MEET REQUIREMENTS OF THE COUNTY OF SAN DIEGO LOW IMPACT DEVELOPMENT HANDBOOK, APPENDIX G AND ALLOW FOR A LONG TERM, IN-PLACE INFILTRATION RATE OF 5 INCHES PER HOUR. BSM SHALL BE COMPOSED OF THE FOLLOWING:

BSM COMPOSITION	SANDY LOAM			COMPOST
	SAND	SILT	CLAY	
VOLUME	65%	20%	15%	
WEIGHT	75-80%	10% MAX	3% MAX	9% MAX ¹

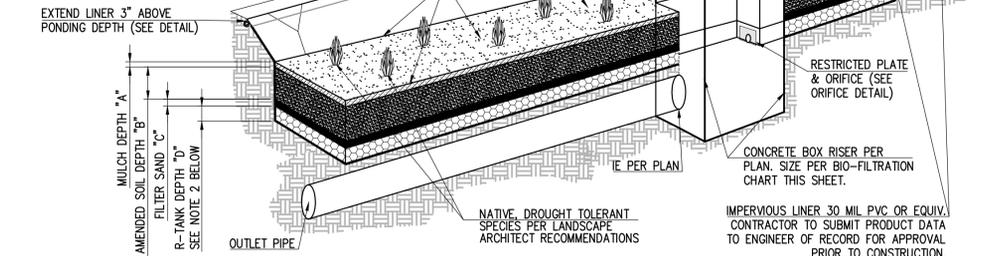
¹ 9% COMPOST BY WEIGHT RESULTS IN APPROXIMATELY 5% ORGANIC MATTER BY WEIGHT.



RESTRICTOR PLATE AND ORIFICE DETAIL
Scale: NTS

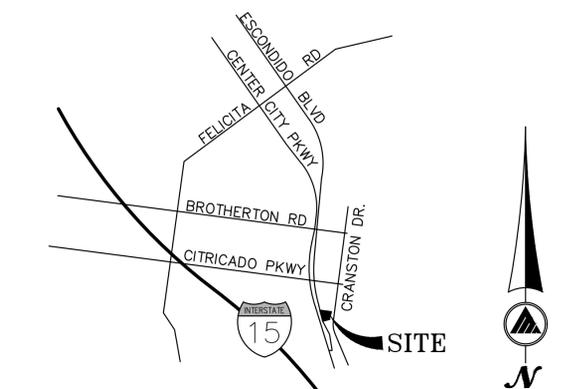


LINER DETAIL
Scale: NTS



- NOTES:**
- PROVIDE WATER TIGHT SEAL FOR LINER TO CONCRETE STRUCTURES 3" ABOVE PONDING DEPTH.
 - PROVIDE FINAL DESIGN OF R-TANKS FROM ACF ENVIRONMENTAL (MANUFACTURED) FOR ENGINEERING REVIEW AND APPROVAL PRIOR TO INSTALL. ONCE APPROVED IN WRITTEN BY THE ENGINEER OF RECORD, INSTALL R-TANKS IN ACCORDANCE WITH ACCEPTED FINAL DESIGN, THESE PLANS AND DETAILS, AND MANUFACTURER'S INSTALLATION REQUIREMENTS.
 - PROVIDE PHOTO DOCUMENTATION OF ALL STAGES OF BIOFILTRATION FACILITY CONSTRUCTION TO ENGINEER OF RECORD FOR FINAL APPROVAL.

CITY OF ESCONDIDO, CALIFORNIA



VICINITY MAP

DMA EXHIBIT STORM WATER QUALITY MANAGEMENT PLAN SOUTH ESCONDIDO CITY OF ESCONDIDO, CA

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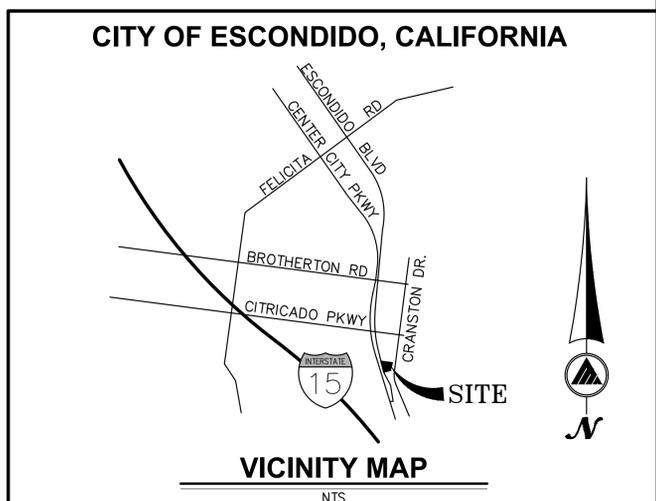
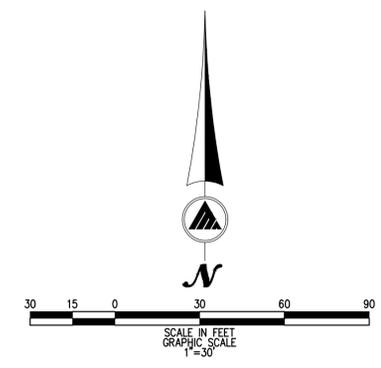
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SOURCE CONTROL BMPs	
A	STENCIL ON-SITE INLETS: "NO DUMPING! FLOWS TO BAY"
D1	INDOOR & STRUCTURAL PEST CONTROL: PROVIDE IMP
D2	LANDSCAPE/OUTDOOR PESTICIDE USE: PROVIDE IMP
E	POOL: FOLLOW OPERATIONAL BMP FACT SHEET SC-27
O	ROOFTOP AND EQUIPMENT: CONNECT CONDENSATE DRAIN TO SANITARY SEWER, PROVIDE ROOFING AND/OR SECONDARY CONTAINMENT TO EQUIPMENT, AVOID USE OF UNPROTECTED METALS
P	PLAZAS, SIDEWALKS, AND PARKING LOTS: SWEEP REGULARY, COLLECT DEBRIS, COLLECT WASHWATER AND DISCHARGE TO SANITARY SEWER

LEGEND

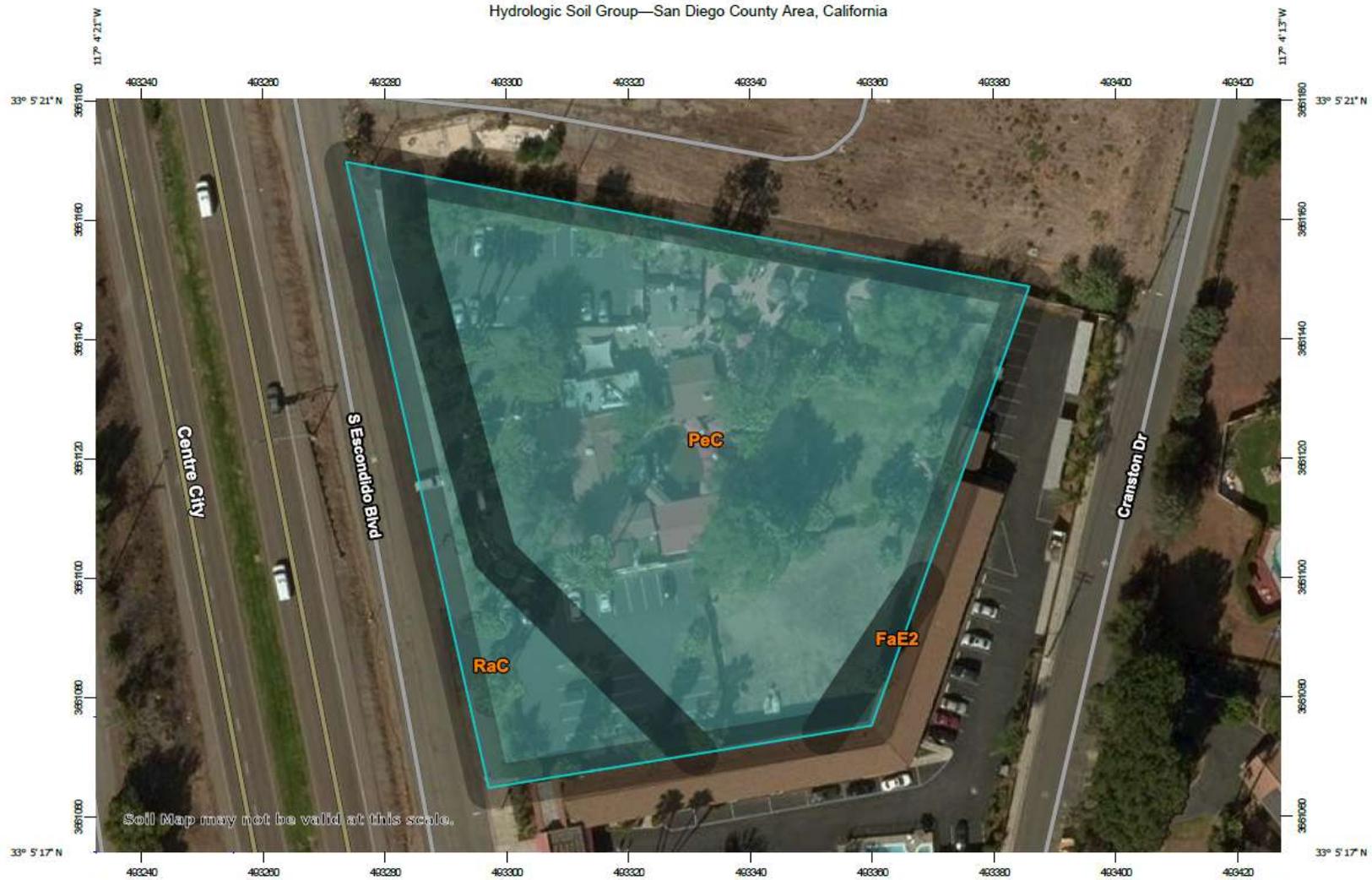
SYMBOL	DESCRIPTION
	BASIN BOUNDARY
	PROPERTY LINE
	TREATMENT BASIN



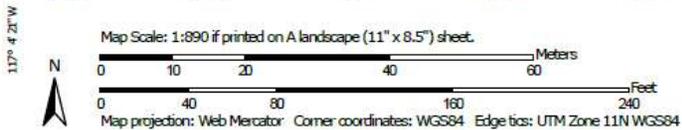
SOURCE CONTROL EXHIBIT FOR SOUTH ESCONDIDO CITY OF ESCONDIDO, CA


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PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP



Soil Map may not be valid at this scale.



PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Hydrologic Soil Group—San Diego County Area, California

MAP LEGEND		MAP INFORMATION	
<p>Area of Interest (AOI)</p> <p> Area of Interest (AOI)</p> <p>Soils</p> <p>Soil Rating Polygons</p> <p> A</p> <p> A/D</p> <p> B</p> <p> B/D</p> <p> C</p> <p> C/D</p> <p> D</p> <p> Not rated or not available</p> <p>Soil Rating Lines</p> <p> A</p> <p> A/D</p> <p> B</p> <p> B/D</p> <p> C</p> <p> C/D</p> <p> D</p> <p> Not rated or not available</p> <p>Soil Rating Points</p> <p> A</p> <p> A/D</p> <p> B</p> <p> B/D</p>		<p> C</p> <p> C/D</p> <p> D</p> <p> Not rated or not available</p> <p>Water Features</p> <p> Streams and Canals</p> <p>Transportation</p> <p> Rails</p> <p> Interstate Highways</p> <p> US Routes</p> <p> Major Roads</p> <p> Local Roads</p> <p>Background</p> <p> Aerial Photography</p>	<p>The soil surveys that comprise your AOI were mapped at 1:24,000.</p> <p>Warning: Soil Map may not be valid at this scale.</p> <p>Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.</p> <p>Please rely on the bar scale on each map sheet for map measurements.</p> <p>Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)</p> <p>Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.</p> <p>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</p> <p>Soil Survey Area: San Diego County Area, California Survey Area Data: Version 12, Sep 13, 2017</p> <p>Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.</p> <p>Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014</p> <p>The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.</p>

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Hydrologic Soil Group—San Diego County Area, California

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

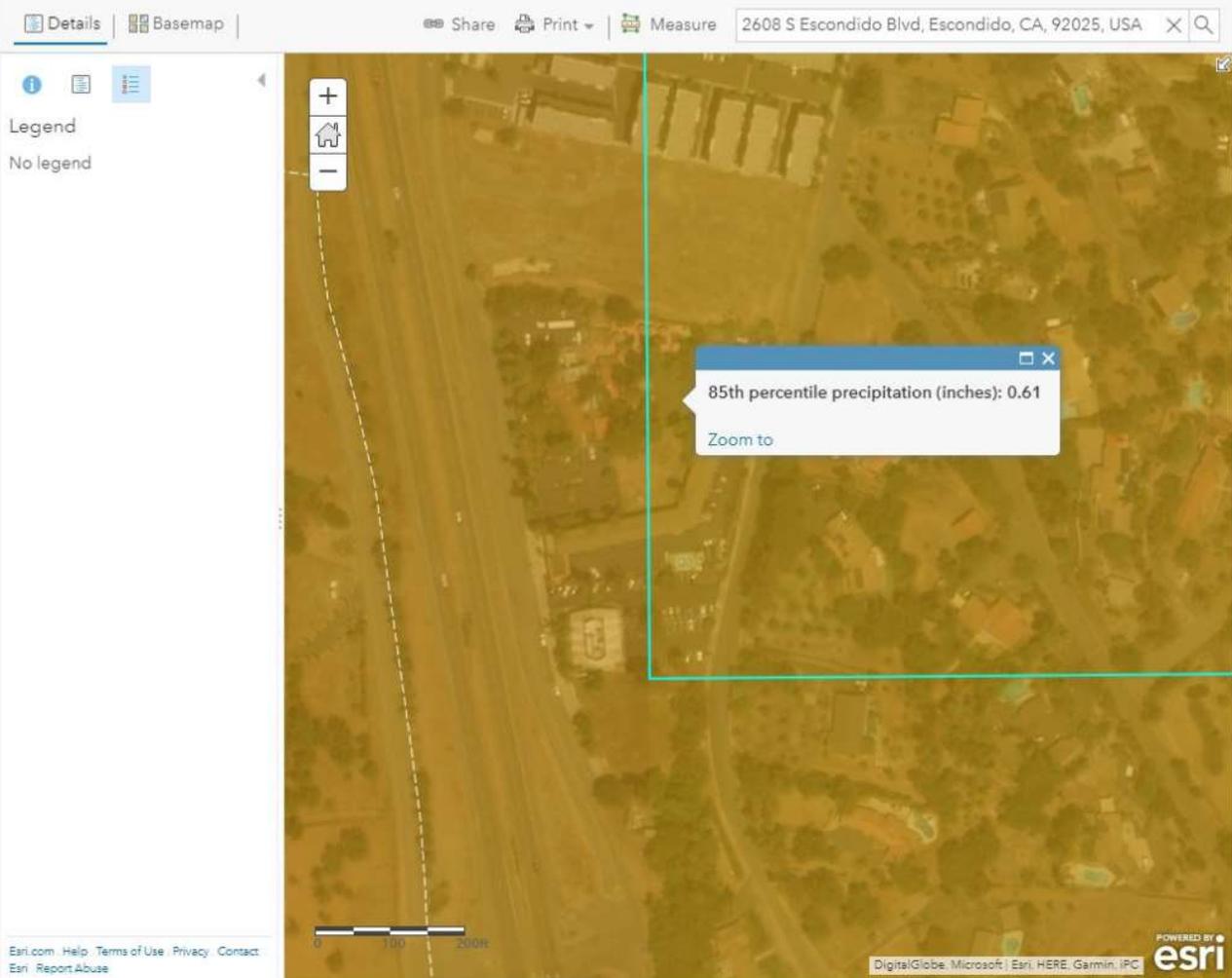
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP



PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Harvest and Use Feasibility Checklist		Form I-4
<p>1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?</p> <p><input type="checkbox"/> Toilet and urinal flushing</p> <p><input type="checkbox"/> Landscape irrigation</p> <p><input type="checkbox"/> Other: _____</p> <p>Demand for toilet and Urinal flushing and Landscape irrigation are very low during wet season for a period of 36 hours</p>		
<p>2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.</p> <p>DCV = 3,113 cf $0.25 * 3,113 = 778 > 353$ (from Worksheet B.3-1)</p>		
<p>3. Calculate the DCV using worksheet B-2.1.</p> <p>DCV = <u>3,885</u> (cubic feet)</p>		
<p>3a. Is the 36 hour demand greater than or equal to the DCV?</p> <p>Yes / <input checked="" type="radio"/> No \Rightarrow</p> <p>\Downarrow</p>	<p>3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?</p> <p>Yes / <input checked="" type="radio"/> No \Rightarrow</p> <p>\Downarrow</p>	<p>3c. Is the 36 hour demand less than 0.25DCV?</p> <p><input checked="" type="radio"/> Yes</p> <p>\Downarrow</p>
<p>Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.</p>	<p>Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.</p>	<p>Harvest and Use is considered to be Infeasible.</p>
<p>Is harvest and use feasible based on further evaluation?</p> <p>Yes, refer to Appendix E to select and size harvest and use BMPs.</p> <p><input checked="" type="checkbox"/> No, select alternate BMPs.</p>		

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Categorization of Infiltration Feasibility Condition		Form I-5	
<p>Part 1 - Full Infiltration Feasibility Screening Criteria</p> <p>Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?</p>			
Criteria	Screening Question	Yes	No
1	<p>Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.</p>		✓
<p>Provide basis:</p> <p>The Site is situated on Soil type "C".</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
2	<p>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.</p>		✓
<p>Provide basis:</p> <p>The Project site is not feasible for infiltration because of soil type "C".</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Form I-5			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria			
Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		✓
<p>Provide basis:</p> <p>Provide basis:</p> <p>Soil type “C”</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		✓
<p>Provide basis:</p> <p>The Project site is not feasible for infiltration because of soil type “C”.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

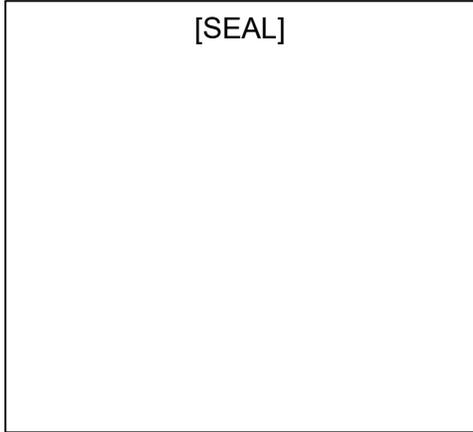
Form I-5 Certification

The Geotechnical Engineer certifies they completed Form I-5 except Criteria 4 & 8 (see Appendix C.4.3).

Professional Geotechnical Engineer's Printed Name:

Professional Geotechnical Engineer's Signed Name:

Date: _____



The Project Design Engineer certifies they completed Criteria 4 & 8 (see Appendix C.4.4).

Professional Project Design Engineer's Printed Name:

Robert D'Amaro, _____

Professional Project Design Engineer's Signed Name:

Date: _____



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PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Factor of Safety and Design Infiltration Rate Worksheet			Form I-6		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25		
		Predominant soil texture	0.25		
		Site soil variability	0.25		
		Depth to groundwater / impervious layer	0.25		
		Suitability Assessment Safety Factor, $S_A = \sum p$			
B	Design	Level of pretreatment/ expected sediment loads	0.5		
		Redundancy/resiliency	0.25		
		Compaction during construction	0.25		
		Design Safety Factor, $S_B = \sum p$			
Combined Safety Factor, $S_{total} = S_A \times S_B$					
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)					
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$					
Supporting Data					
Briefly describe infiltration test and provide reference to test forms: N/A					
The biofiltration basin will be lined.					

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

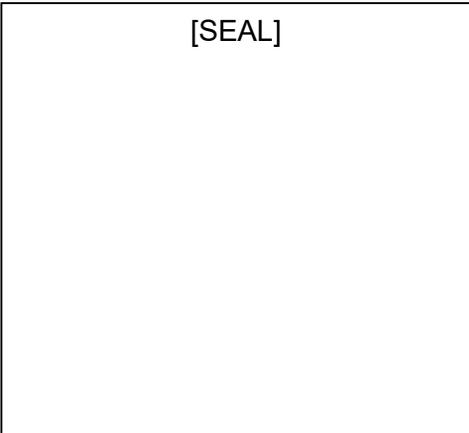
Factor of Safety and Design Infiltration Rate Worksheet	Form I-6 Certification
--	---------------------------

The Geotechnical Engineer certifies they completed Form I-6 (see Appendix C.4.3).

Professional Geotechnical Engineer's Printed Name:

Professional Geotechnical Engineer's Signed Name:

Date: _____



PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

ATTACHMENT 2

BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 2a	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the Storm Water Design Manual	<input checked="" type="checkbox"/> Included <input type="checkbox"/> Submitted as separate stand-alone document
Attachment 2b	Hydromodification Management Exhibit (Required)	<input checked="" type="checkbox"/> Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2c	Management of Critical Coarse Sediment Yield Areas See Section 6.2 and Appendix H of the Storm Water Design Manual.	<input type="checkbox"/> Exhibit depicting onsite and/or upstream sources of critical coarse sediment as mapped in the WMAA AND, <input type="checkbox"/> Demonstration that the project effectively avoids and bypasses sources of mapped critical coarse sediment OR, <input type="checkbox"/> Demonstration that project does not generate a net impact on the receiving water.
Attachment 2d	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the Storm Water Design Manual.	<input checked="" type="checkbox"/> Not performed <input type="checkbox"/> Included <input type="checkbox"/> Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	<input type="checkbox"/> Included <input checked="" type="checkbox"/> Not required because BMPs will drain in less than 96 hours

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BMP Sizing Spreadsheet V3.0

Project Name:	South Escondido
Project Applicant:	South Escondido, LP
Jurisdiction:	City of Escondido
Parcel (APN):	238-152-06, 07
Hydrologic Unit:	San Dieguito
Rain Gauge:	Oceanside
Total Project Area (sf):	76,135
Channel Susceptibility:	High

BMP Sizing Spreadsheet V3.0			
Project Name:	South Escondido	Hydrologic Unit:	San Dieguito
Project Applicant:	South Escondido, LP	Rain Gauge:	Oceanside
Jurisdiction:	City of Escondido	Total Project Area:	76,135
Parcel (APN):	238-152-06, 07	Low Flow Threshold:	0.1Q2
BMP Name:	DMA-1	BMP Type:	Biofiltration
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors	Minimum BMP Size
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1) ¹	Surface Area	Surface Area (SF)
Footprint, DW, St.	67,435	C	Flat	Roofs	1.0	0.075	5058
Landscaping	8,700	C	Flat	Landscape	0.1	0.075	65
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
BMP Tributary Area	76,135					Minimum BMP Size	5123

Proposed BMP Size*		
Surface Ponding Depth	12.00	in
Bioretention Soil Media Depth	18.00	in
Filter Coarse	6.00	in
Gravel Storage Layer Depth	12	in
Underdrain Offset	3.0	in
Required Volume	11,271	CF

* Assumes standard configuration

Notes:
 1. Runoff factors which are used for hydromodification management flow control (Table G.2-1) are different from the runoff factors used for pollutant control BMP sizing (Table B.1-1). Table references are taken from the San Diego Region Model BMP Design Manual

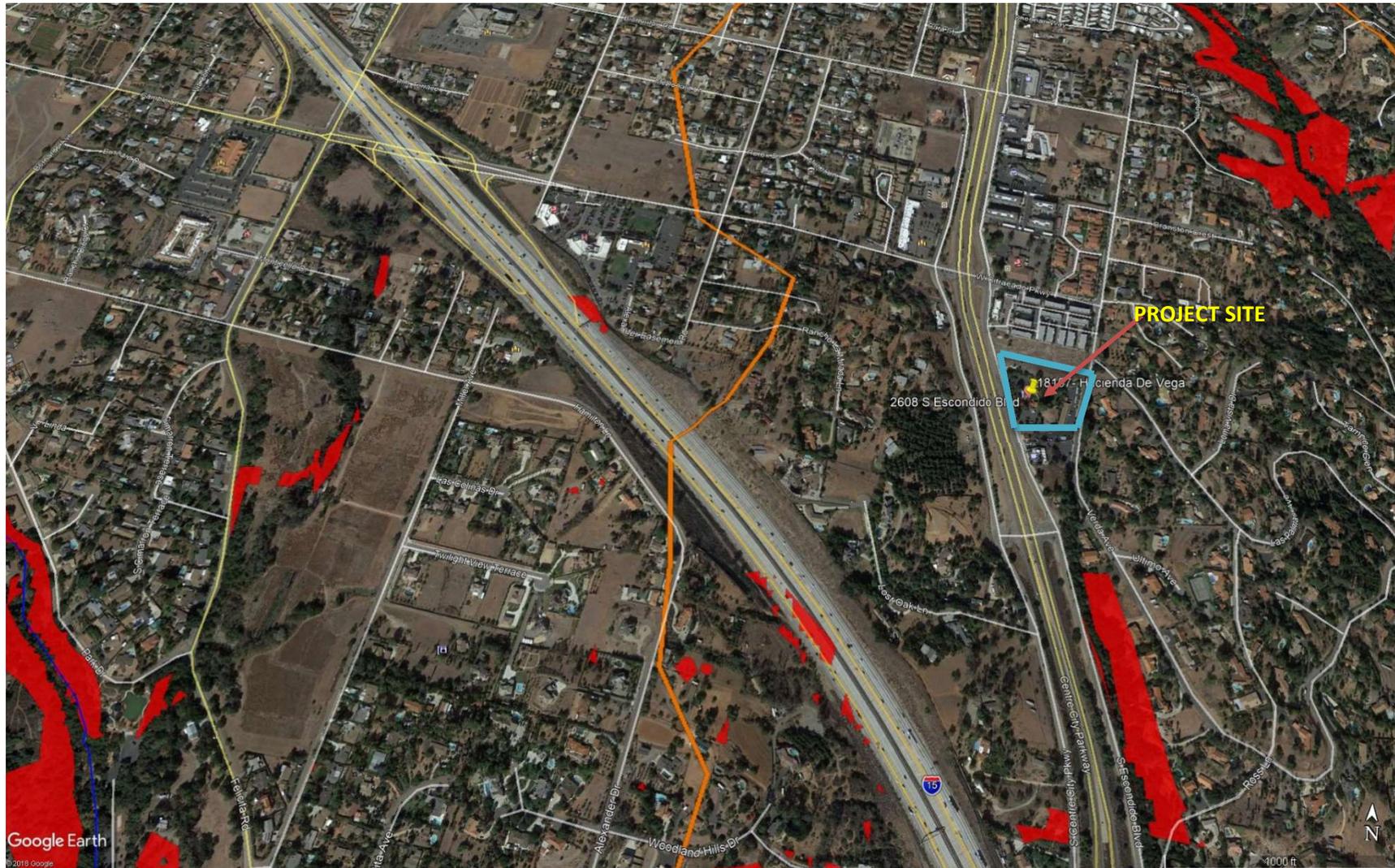
Describe the BMP's in sufficient detail in your PDP SWQMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head. Designated Staff have final review and approval authority over the project design.

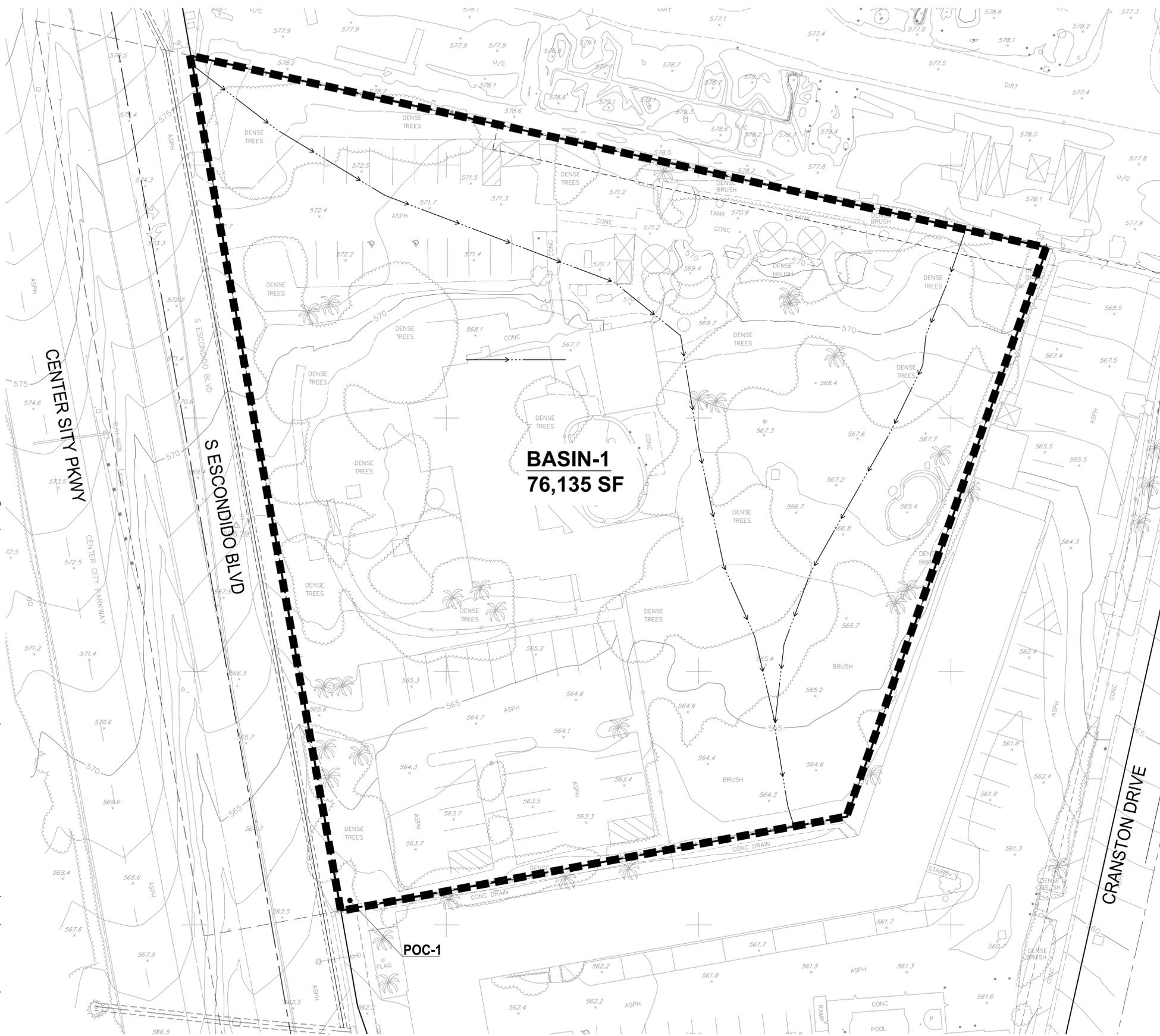
This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, April 2018. For questions or concerns please contact the jurisdiction in which your project is located.

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

CCSYA EXHIBIT



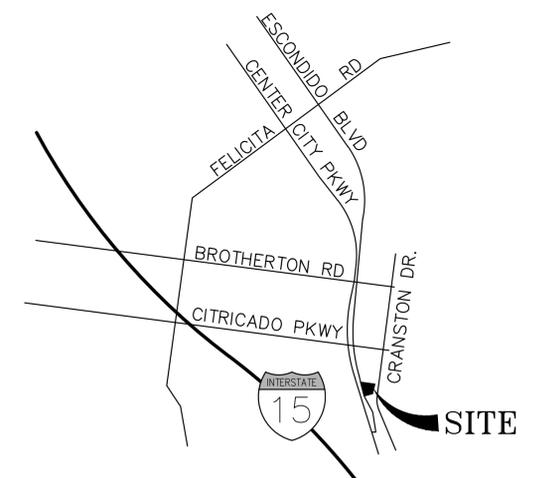
DATE: Sep 17, 2019-2:48pm by: Ljardin FILE: I:\18\18157\PROD\Reports\SWQMP\Exhibits\18157-Pre HMP Map.dwg



LEGEND

SYMBOL	DESCRIPTION
— — — — —	BASIN BOUNDARY
- - - - -	PROPERTY LINE
→ ··· ··· →	FLOW PATH
> 7 FEET	GROUNDWATER DEPTH
"C"	SOIL TYPE

CITY OF ESCONDIDO, CALIFORNIA



VICINITY MAP
NTS



EXHIBIT 'A'
PRE HMP MAP FOR
SOUTH ESCONDIDO
CITY OF ESCONDIDO, CA



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PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

- Underlying hydrologic soil group
- Approximate depth to groundwater
- Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- Critical coarse sediment yield areas to be protected
- Existing topography
- Existing and proposed site drainage network and connections to drainage offsite
- Proposed grading
- Proposed impervious features
- Proposed design features and surface treatments used to minimize imperviousness
- Point(s) of Compliance (POC) for Hydromodification Management
- Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

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ATTACHMENT 3

Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Plan (Required)	<input checked="" type="checkbox"/> Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Storm Water Control Facilities Maintenance Agreement (SWCFMA) (when applicable)	<input checked="" type="checkbox"/> Included <input type="checkbox"/> Not Applicable

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E.12 BF-1 Biofiltration

MS4 Permit Category

Biofiltration

Manual Category

Biofiltration

Applicable Performance Standard

Pollutant Control

Flow Control

Primary Benefits

Treatment

Volume Reduction (Incidental)

Peak Flow Attenuation (Optional)



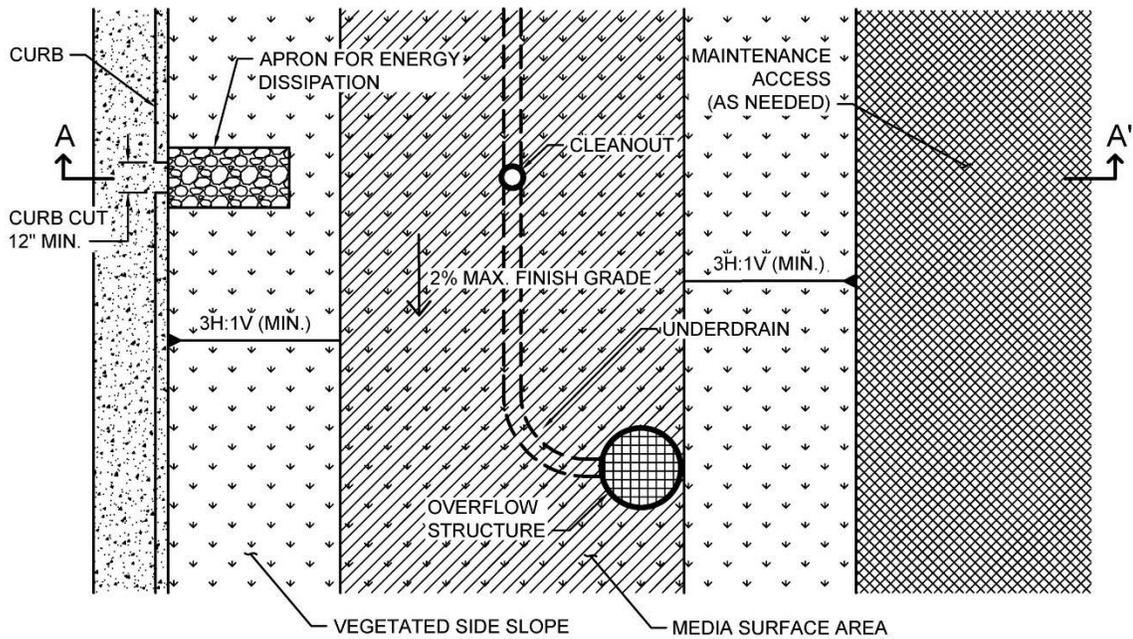
Location: 43rd Street and Logan Avenue, San Diego, California

Description

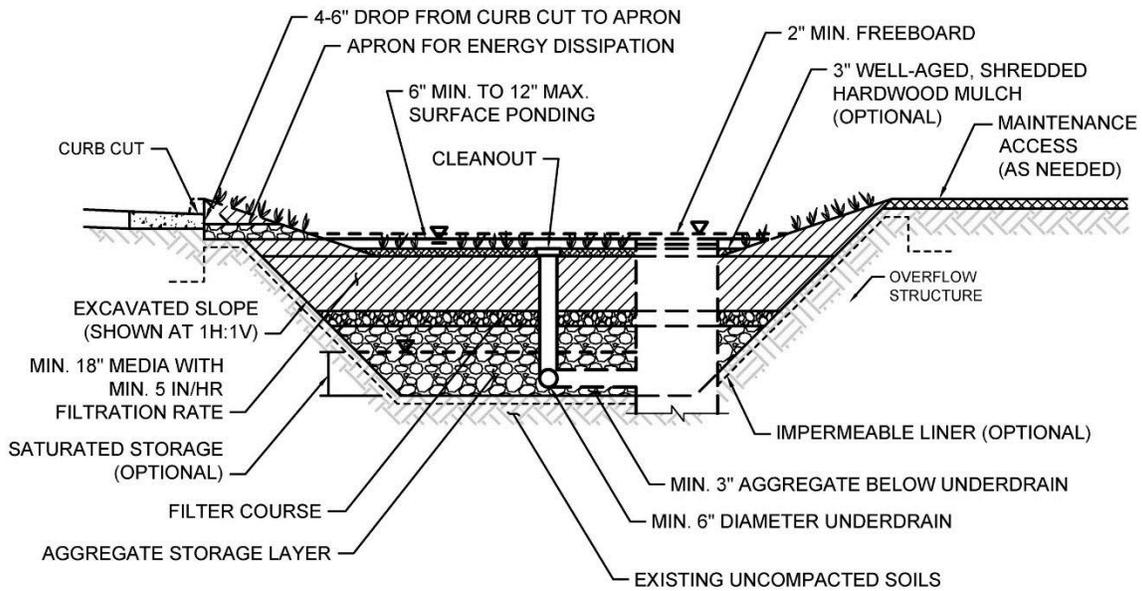
Biofiltration (Bioretention with underdrain) facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to discharge via underdrain or overflow to the downstream conveyance system. Bioretention with underdrain facilities are commonly incorporated into the site within parking lot landscaping, along roadsides, and in open spaces. Because these types of facilities have limited or no infiltration, they are typically designed to provide enough hydraulic head to move flows through the underdrain connection to the storm drain system. Treatment is achieved through filtration, sedimentation, sorption, biochemical processes and plant uptake.

Typical bioretention with underdrain components include:

- Inflow distribution mechanisms (e.g, perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side slope and basin bottom vegetation selected based on expected climate and ponding depth
- Non-floating mulch layer (Optional)
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Impermeable liner or uncompacted native soils at the bottom of the facility
- Overflow structure



PLAN
NOT TO SCALE



SECTION A-A'
NOT TO SCALE

Typical plan and Section view of a Biofiltration BMP

Design Adaptations for Project Goals

Biofiltration Treatment BMP for storm water pollutant control. The system is lined or un-lined to provide incidental infiltration, and an underdrain is provided at the bottom to carry away filtered runoff. This configuration is considered to provide biofiltration treatment via flow through the media layer. Storage provided above the underdrain within surface ponding, media, and aggregate storage is considered included in the biofiltration treatment volume. Saturated storage within the aggregate storage layer can be added to this design by raising the underdrain above the bottom of the aggregate storage layer or via an internal weir structure designed to maintain a specific water level elevation.

Integrated storm water flow control and pollutant control configuration. The system can be designed to provide flow rate and duration control by primarily providing increased surface ponding and/or having a deeper aggregate storage layer above the underdrain. This will allow for significant detention storage, which can be controlled via inclusion of an outlet structure at the downstream end of the underdrain.

Design Criteria and Considerations

Bioretention with underdrain must meet the following design criteria. Deviations from the below criteria may be approved at the discretion of the City Engineer if it is determined to be appropriate:

<i>Siting and Design</i>	<i>Intent/Rationale</i>
<input type="checkbox"/> Placement observes geotechnical recommendations regarding potential hazards (e.g., slope stability, landslides, liquefaction zones) and setbacks (e.g., slopes, foundations, utilities).	Must not negatively impact existing site geotechnical concerns.
<input type="checkbox"/> An impermeable liner or other hydraulic restriction layer is included if site constraints indicate that infiltration or lateral flows should not be allowed.	Lining prevents storm water from impacting groundwater and/or sensitive environmental or geotechnical features. Incidental infiltration, when allowable, can aid in pollutant removal and groundwater recharge.
<input type="checkbox"/> Contributing tributary area shall be ≤ 5 acres (≤ 1 acre preferred).	Bigger BMPs require additional design features for proper performance. Contributing tributary area greater than 5 acres may be allowed at the discretion of the City Engineer if the following conditions are met: 1) incorporate design features (e.g. flow spreaders) to minimizing short circuiting of flows in

<i>Siting and Design</i>	<i>Intent/Rationale</i>
	the BMP and 2) incorporate additional design features requested by the City Engineer for proper performance of the regional BMP.
<input type="checkbox"/> Finish grade of the facility is $\leq 2\%$.	Flatter surfaces reduce erosion and channelization within the facility.
<i>Surface Ponding</i>	
<input type="checkbox"/> Surface ponding is limited to a 24-hour drawdown time.	Surface ponding limited to 24 hour for plant health.
<input type="checkbox"/> Surface ponding depth is ≥ 6 and ≤ 12 inches.	<p>Surface ponding capacity lowers subsurface storage requirements. Deep surface ponding raises safety concerns.</p> <p>Surface ponding depth greater than 12 inches (for additional pollutant control or surface outlet structures or flow-control orifices) may be allowed at the discretion of the [City Engineer] if the following conditions are met: 1) surface ponding depth drawdown time is less than 24 hours; and 2) safety issues and fencing requirements are considered (typically ponding greater than 18" will require a fence and/or flatter side slopes) and 3) potential for elevated clogging risk is considered.</p>
<input type="checkbox"/> A minimum of 2 inches of freeboard is provided.	Freeboard provides room for head over overflow structures and minimizes risk of uncontrolled surface discharge.
<input type="checkbox"/> Side slopes are stabilized with vegetation and are = 3H:1V or shallower.	Gentler side slopes are safer, less prone to erosion, able to establish vegetation more quickly and easier to maintain.
<i>Vegetation</i>	
<input type="checkbox"/> Plantings are suitable for the climate and expected ponding depth. A plant list to aid in selection can be found in Appendix E.20.	Plants suited to the climate and ponding depth are more likely to survive.

<i>Siting and Design</i>	<i>Intent/Rationale</i>
<input type="checkbox"/> An irrigation system with a connection to water supply should be provided as needed.	Seasonal irrigation might be needed to keep plants healthy.
<i>Mulch (Optional)</i>	
<input type="checkbox"/> A minimum of 3 inches of well-aged, shredded hardwood mulch that has been stockpiled or stored for at least 12 months is provided.	Mulch will suppress weeds and maintain moisture for plant growth. Aging mulch kills pathogens and weed seeds and allows the beneficial microbes to multiply.
<i>Media Layer</i>	
<input type="checkbox"/> Media maintains a minimum filtration rate of 5 in/hr over lifetime of facility. An initial filtration rate of 8 to 12 in/hr is recommended to allow for clogging over time; the initial filtration rate should not exceed 12 inches per hour.	A filtration rate of at least 5 inches per hour allows soil to drain between events. The initial rate should be higher than long term target rate to account for clogging over time. However an excessively high initial rate can have a negative impact on treatment performance, therefore an upper limit is needed.
<input type="checkbox"/> Media is a minimum 18 inches deep, meeting either of these two media specifications: City of San Diego Low Impact Development Design Manual (page B-18) (July 2011, unless superseded by more recent edition) or County of San Diego Low Impact Development Handbook: Appendix G -Bioretention Soil Specification (June 2014, unless superseded by more recent edition). Alternatively, for proprietary designs and custom media mixes not meeting the media specifications contained in the City or County LID Manual, the media meets the pollutant treatment performance criteria in Section F.1.	A deep media layer provides additional filtration and supports plants with deeper roots. Standard specifications shall be followed. For non-standard or proprietary designs, compliance with F.1 ensures that adequate treatment performance will be provided.
<input type="checkbox"/> Media surface area is 3% of contributing area times adjusted runoff factor or greater.	Greater surface area to tributary area ratios: a) maximizes volume retention as required by the MS4 Permit and b) decrease loading rates per square foot and therefore increase longevity.

<i>Siting and Design</i>	<i>Intent/Rationale</i>
	<p>Adjusted runoff factor is to account for site design BMPs implemented upstream of the BMP (such as rain barrels, impervious area dispersion, etc.). Refer to Appendix B.2 guidance.</p> <p>Use Worksheet B.5-1 Line 26 to estimate the minimum surface area required per this criteria.</p>
<p><input type="checkbox"/> Where receiving waters are impaired or have a TMDL for nutrients, the system is designed with nutrient sensitive media design (see fact sheet BF-2).</p>	<p>Potential for pollutant export is partly a function of media composition; media design must minimize potential for export of nutrients, particularly where receiving waters are impaired for nutrients.</p>
<i>Filter Course Layer</i>	
<p><input type="checkbox"/> A filter course is used to prevent migration of fines through layers of the facility. Filter fabric is not used.</p>	<p>Migration of media can cause clogging of the aggregate storage layer void spaces or subgrade. Filter fabric is more likely to clog.</p>
<p><input type="checkbox"/> Filter course is washed and free of fines.</p>	<p>Washing aggregate will help eliminate fines that could clog the facility and impede infiltration.</p>
<p><input type="checkbox"/> Filter course calculations assessing suitability for particle migration prevention have been completed.</p>	<p>Gradation relationship between layers can evaluate factors (e.g., bridging, permeability, and uniformity) to determine if particle sizing is appropriate or if an intermediate layer is needed.</p>
<i>Aggregate Storage Layer</i>	
<p><input type="checkbox"/> Class 2 Permeable per Caltrans specification 68-1.025 is recommended for the storage layer. Washed, open-graded crushed rock may be used, however a 4-6 inch washed pea gravel filter course layer at the top of the crushed rock is required.</p>	<p>Washing aggregate will help eliminate fines that could clog the aggregate storage layer void spaces or subgrade.</p>
<p><input type="checkbox"/> The depth of aggregate provided (12-inch typical) and storage layer configuration is</p>	<p>Proper storage layer configuration and underdrain placement will minimize facility drawdown time.</p>

<i>Siting and Design</i>	<i>Intent/Rationale</i>
adequate for providing conveyance for underdrain flows to the outlet structure.	
<i>Inflow, Underdrain, and Outflow Structures</i>	
<input type="checkbox"/> Inflow, underdrains and outflow structures are accessible for inspection and maintenance.	Maintenance will prevent clogging and ensure proper operation of the flow control structures.
<input type="checkbox"/> Inflow velocities are limited to 3 ft/s or less or use energy dissipation methods. (e.g., riprap, level spreader) for concentrated inflows.	High inflow velocities can cause erosion, scour and/or channeling.
<input type="checkbox"/> Curb cut inlets are at least 12 inches wide, have a 4-6 inch reveal (drop) and an apron and energy dissipation as needed.	Inlets must not restrict flow and apron prevents blockage from vegetation as it grows in. Energy dissipation prevents erosion.
<input type="checkbox"/> Underdrain outlet elevation should be a minimum of 3 inches above the bottom elevation of the aggregate storage layer.	A minimal separation from subgrade or the liner lessens the risk of fines entering the underdrain and can improve hydraulic performance by allowing perforations to remain unblocked.
<input type="checkbox"/> Minimum underdrain diameter is 6 inches.	Smaller diameter underdrains are prone to clogging.
<input type="checkbox"/> Underdrains are made of slotted, PVC pipe conforming to ASTM D 3034 or equivalent or corrugated, HDPE pipe conforming to AASHTO 252M or equivalent.	Slotted underdrains provide greater intake capacity, clog resistant drainage, and reduced entrance velocity into the pipe, thereby reducing the chances of solids migration.
<input type="checkbox"/> An underdrain cleanout with a minimum 6-inch diameter and lockable cap is placed every 250 to 300 feet as required based on underdrain length.	Properly spaced cleanouts will facilitate underdrain maintenance.
<input type="checkbox"/> Overflow is safely conveyed to a downstream storm drain system or discharge point Size overflow structure to pass 100-year peak flow for on-line infiltration basins and water quality peak flow for off-line basins.	Planning for overflow lessens the risk of property damage due to flooding.

Conceptual Design and Sizing Approach for Storm Water Pollutant Control Only

To design bioretention with underdrain for storm water pollutant control only (no flow control

required), the following steps should be taken:

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Calculate the DCV per Appendix B based on expected site design runoff for tributary areas.
3. Use the sizing worksheet presented in Appendix B.5 to size biofiltration BMPs.

Conceptual Design and Sizing Approach when Storm Water Flow Control is Applicable

Control of flow rates and/or durations will typically require significant surface ponding and/or aggregate storage volumes, and therefore the following steps should be taken prior to determination of storm water pollutant control design. Pre-development and allowable post-project flow rates and durations should be determined as discussed in Chapter 6 of the manual.

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Iteratively determine the facility footprint area, surface ponding and/or aggregate storage layer depth required to provide detention storage to reduce flow rates and durations to allowable limits. Flow rates and durations can be controlled from detention storage by altering outlet structure orifice size(s) and/or water control levels. Multi-level orifices can be used within an outlet structure to control the full range of flows.
3. If bioretention with underdrain cannot fully provide the flow rate and duration control required by this manual, an upstream or downstream structure with significant storage volume such as an underground vault can be used to provide remaining controls.
4. After bioretention with underdrain has been designed to meet flow control requirements, calculations must be completed to verify if storm water pollutant control requirements to treat the DCV have been met.

BF-1

Biofiltration

BMP MAINTENANCE FACT SHEET FOR STRUCTURAL BMP BF-1 BIOFILTRATION

Biofiltration facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to discharge via underdrain or overflow to the downstream conveyance system. Biofiltration facilities have limited or no infiltration. They are typically designed to provide enough hydraulic head to move flows through the underdrain connection to the storm drain system. Typical biofiltration components include:

- Inflow distribution mechanisms (e.g., perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side slope and basin bottom vegetation selected based on climate and ponding depth
- Non-floating mulch layer
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Impermeable liner or uncompacted native soils at the bottom of the facility
- Overflow structure

Normal Expected Maintenance

Biofiltration requires routine maintenance to: remove accumulated materials such as sediment, trash or debris; maintain vegetation health; maintain infiltration capacity of the media layer; replenish mulch; and maintain integrity of side slopes, inlets, energy dissipators, and outlets. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure

If any of the following scenarios are observed, the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance, increased inspection and maintenance, BMP replacement, or a different BMP type will be required.

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.
- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace such as media, filter course, and aggregate layers.
- Erosion due to concentrated storm water runoff flow that is not readily corrected by adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.

BF-1

Biofiltration

Other Special Considerations

Biofiltration is a vegetated structural BMP. Vegetated structural BMPs that are constructed in the vicinity of, or connected to, an existing jurisdictional water or wetland could inadvertently result in creation of expanded waters or wetlands. As such, vegetated structural BMPs have the potential to come under the jurisdiction of the United States Army Corps of Engineers, SDRWQCB, California Department of Fish and Wildlife, or the United States Fish and Wildlife Service. This could result in the need for specific resource agency permits and costly mitigation to perform maintenance of the structural BMP. Along with proper placement of a structural BMP, **routine maintenance is key to preventing this scenario.**

BF-1 Biofiltration

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR BF-1 BIOFILTRATION

The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district.

Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.

Threshold/Indicator	Maintenance Action	Typical Maintenance Frequency
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer.	<ul style="list-style-type: none"> • Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Obstructed inlet or outlet structure	Clear blockage.	<ul style="list-style-type: none"> • Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable	<ul style="list-style-type: none"> • Inspect annually. • Maintenance when needed.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	<ul style="list-style-type: none"> • Inspect monthly. • Maintenance when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	<ul style="list-style-type: none"> • Inspect monthly. • Maintenance when needed.
Overgrown vegetation	Mow or trim as appropriate.	<ul style="list-style-type: none"> • Inspect monthly. • Maintenance when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	<ul style="list-style-type: none"> • Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.

*"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

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Biofiltration

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR BF-1 BIOFILTRATION (Continued from previous page)		
Threshold/Indicator	Maintenance Action	Typical Maintenance Frequency
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	<ul style="list-style-type: none"> • Inspect monthly. • Maintenance when needed.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.	<ul style="list-style-type: none"> • Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.
<p>Standing water in BMP for longer than 24 hours following a storm event</p> <p>Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health</p>	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils.	<ul style="list-style-type: none"> • Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
<p>Presence of mosquitos/larvae</p> <p>For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology</p>	<p>If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water.</p> <p>If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.</p>	<ul style="list-style-type: none"> • Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Underdrain clogged	Clear blockage.	<ul style="list-style-type: none"> • Inspect if standing water is observed for longer than 24-96 hours following a storm event. • Maintenance when needed.

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Biofiltration

References

American Mosquito Control Association.

<http://www.mosquito.org/>

California Storm Water Quality Association (CASQA). 2003. Municipal BMP Handbook.

<https://www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook>

County of San Diego. 2014. Low Impact Development Handbook.

<http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/susmp/lid.html>

San Diego County Copermittees. 2016. Model BMP Design Manual, Appendix E, Fact Sheet BF-1.

http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

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Biofiltration

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BF-1 Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	
Property / Development Name:		Responsible Party Name and Phone Number:
Property Address of BMP:		Responsible Party Address:

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 1 of 5			
Threshold/Indicator	Maintenance Recommendation	Date	Description of Maintenance Conducted
Accumulation of sediment, litter, or debris Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Remove and properly dispose of accumulated materials, without damage to the vegetation <input type="checkbox"/> If sediment, litter, or debris accumulation exceeds 25% of the surface ponding volume within one month (25% full*), add a forebay or other pre-treatment measures within the tributary area draining to the BMP to intercept the materials. <input type="checkbox"/> Other / Comments:		
Poor vegetation establishment Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Re-seed, re-plant, or re-establish vegetation per original plans <input type="checkbox"/> Other / Comments:		

*"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

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Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 2 of 5			
Threshold/Indicator	Maintenance Recommendation	Date	Description of Maintenance Conducted
Dead or diseased vegetation Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans <input type="checkbox"/> Other / Comments:		
Overgrown vegetation Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Mow or trim as appropriate <input type="checkbox"/> Other / Comments:		
2/3 of mulch has decomposed, or mulch has been removed Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches <input type="checkbox"/> Other / Comments:		

BF-1 Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 3 of 5			
Threshold/Indicator	Maintenance Recommendation	Date	Description of Maintenance Conducted
Erosion due to concentrated irrigation flow Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Repair/re-seed/re-plant eroded areas and adjust the irrigation system <input type="checkbox"/> Other / Comments:		
Erosion due to concentrated storm water runoff flow Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan <input type="checkbox"/> If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction <input type="checkbox"/> Other / Comments:		

BF-1 Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 4 of 5			
Threshold/Indicator	Maintenance Recommendation	Date	Description of Maintenance Conducted
Obstructed inlet or outlet structure Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Clear blockage <input type="checkbox"/> Other / Comments:		
Underdrain clogged (inspect underdrain if standing water is observed for longer than 24-96 hours following a storm event) Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Clear blockage <input type="checkbox"/> Other / Comments:		
Damage to structural components such as weirs, inlet or outlet structures Maintenance Needed? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> Repair or replace as applicable <input type="checkbox"/> Other / Comments:		

BF-1 Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 5 of 5			
Threshold/Indicator	Maintenance Recommendation	Date	Description of Maintenance Conducted
<p>Standing water in BMP for longer than 24-96 hours following a storm event*</p> <p>Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health</p> <p>Maintenance Needed?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A</p>	<p><input type="checkbox"/> Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils</p> <p><input type="checkbox"/> Other / Comments:</p>		
<p>Presence of mosquitos/larvae</p> <p>For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology</p> <p>Maintenance Needed?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A</p>	<p><input type="checkbox"/> Apply corrective measures to remove standing water in BMP when standing water occurs for longer than 24-96 hours following a storm event.**</p> <p><input type="checkbox"/> Other / Comments:</p>		

*Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.

**If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff.

Approach

Pollution Prevention

- Accomplish reduction in the amount of waste generated using the following source controls:
 - Production planning and sequencing
 - Process or equipment modification
 - Raw material substitution or elimination
 - Loss prevention and housekeeping
 - Waste segregation and separation
 - Close loop recycling
- Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- Recycle materials whenever possible.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓



Suggested Protocols***General***

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater run-on and runoff with a berm. The waste containers or piles must be covered except when in use.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- Check storage containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the storage area regularly. If it is paved, do not hose down the area to a storm drain.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain.
- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.

Controlling Litter

- Post “No Littering” signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- Keep waste collection areas clean.
- Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Do not fill waste containers with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/ hazardous waste collection section below).

- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Good Housekeeping

- Use all of the product before disposing of the container.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers and protect them from vandalism.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Stencil or demarcate storm drains on the facility's property with prohibitive message regarding waste disposal.

Run-on/Runoff Prevention

- Prevent stormwater run-on from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent waste materials from directly contacting rain.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

Inspection

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.

- Repair leaking equipment including valves, lines, seals, or pumps promptly.

Training

- Train staff in pollution prevention measures and proper disposal methods.
- Train employees and contractors in proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Have an emergency plan, equipment and trained personnel ready at all times to deal immediately with major spills
- Collect all spilled liquids and properly dispose of them.
- Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.
- Ensure that vehicles transporting waste have spill prevention equipment that can prevent spills during transport. Spill prevention equipment includes:
 - Vehicles equipped with baffles for liquid waste
 - Trucks with sealed gates and spill guards for solid waste

Other Considerations (Limitations and Regulations)

Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.

Requirements***Costs***

Capital and O&M costs for these programs will vary substantially depending on the size of the facility and the types of waste handled. Costs should be low if there is an inventory program in place.

Maintenance

- None except for maintaining equipment for material tracking program.

Supplemental Information***Further Detail of the BMP******Land Treatment System***

Minimize runoff of polluted stormwater from land application by:

- Choosing a site where slopes are under 6%, the soil is permeable, there is a low water table, it is located away from wetlands or marshes, and there is a closed drainage system

- Avoiding application of waste to the site when it is raining or when the ground is saturated with water
- Growing vegetation on land disposal areas to stabilize soils and reduce the volume of surface water runoff from the site
- Maintaining adequate barriers between the land application site and the receiving waters (planted strips are particularly good)
- Using erosion control techniques such as mulching and matting, filter fences, straw bales, diversion terracing, and sediment basins
- Performing routine maintenance to ensure the erosion control or site stabilization measures are working

Examples

The port of Long Beach has a state-of-the-art database for identifying potential pollutant sources, documenting facility management practices, and tracking pollutants.

References and Resources

California's Nonpoint Source Program Plan <http://www.swrcb.ca.gov/nps/index.html>

Clark County Storm Water Pollution Control Manual
<http://www.co.clark.wa.us/pubworks/bmpman.pdf>

Solid Waste Container Best Management Practices – Fact Sheet On-Line Resources – Environmental Health and Safety. Harvard University. 2002.

King County Storm Water Pollution Control Manual <http://dnr.metrokc.gov/wlr/dss/spcm.htm>

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). <http://www.basmaa.org>

Santa Clara Valley Urban Runoff Pollution Prevention Program <http://www.scvurppp.org>

The Storm Water Managers Resource Center <http://www.stormwatercenter.net/>

Building & Grounds Maintenance SC-41



Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	
Organics	



SC-41 Building & Grounds Maintenance

- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.
- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

Building & Grounds Maintenance **SC-41**

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

Fertilizer and Pesticide Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.

SC-41 Building & Grounds Maintenance

- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

Training

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

Other Considerations

Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Cost will vary depending on the type and size of facility.
- Overall costs should be low in comparison to other BMPs.

Maintenance

Sweep paved areas regularly to collect loose particles. Wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, polyphosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan <http://www.swrcb.ca.gov/nps/index.html>

Clark County Storm Water Pollution Control Manual
<http://www.co.clark.wa.us/pubworks/bmpman.pdf>

King County Storm Water Pollution Control Manual <http://dnr.metrokc.gov/wlr/dss/spcm.htm>

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Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). <http://www.basmaa.org/>

Santa Clara Valley Urban Runoff Pollution Prevention Program <http://www.scvurppp.org>

The Storm Water Managers Resource Center <http://www.stormwatercenter.net/>



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
 - Immediate repair of any deterioration threatening structural integrity.
 - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
 - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	



- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Stream or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
 - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
 - Illegal dumping hot spots
 - Types and quantities (in some cases) of wastes
 - Patterns in time of occurrence (time of day/night, month, or year)
 - Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills)
 - Responsible parties
- Post “No Dumping” signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
 - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using “dry” methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements***Costs***

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:
 - Purchase and installation of signs.
 - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.
 - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.
 - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vacuor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents “plug flow” discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

SC-44 Drainage System Maintenance

References and Resources

California's Nonpoint Source Program Plan <http://www.swrcb.ca.gov/nps/index.html>

Clark County Storm Water Pollution Control Manual
<http://www.co.clark.wa.us/pubworks/bmpman.pdf>

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual <http://dnr.metrokc.gov/wlr/dss/spcm.htm>

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program <http://www.scvurppp.org>

The Storm Water Managers Resource Center <http://www.stormwatercenter.net>

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmeps/poll_16.htm



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING



– DRAINS TO OCEAN” and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of “redevelopment”, then the requirements stated under “designing new installations” above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner’s association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.
- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

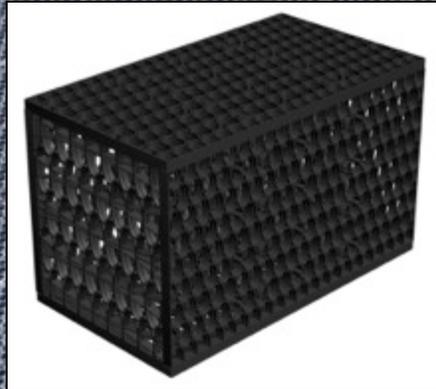
Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.



R-TANK Modular Stormwater Management System

95% Void Space for Storage



Minimum Excavation For Maximum Storage & Footprint Usage



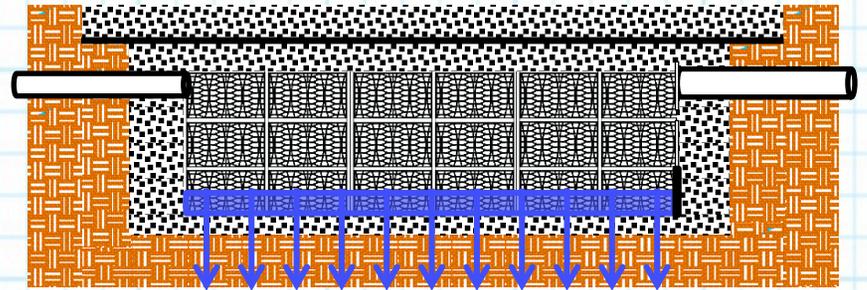
Application Versatility:

#1: Infiltration

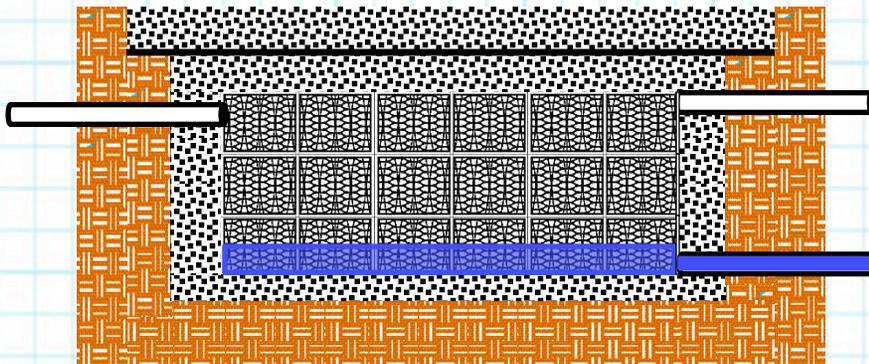
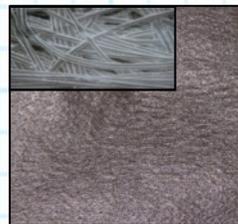
#2: Detention

#3: Harvesting - Retention

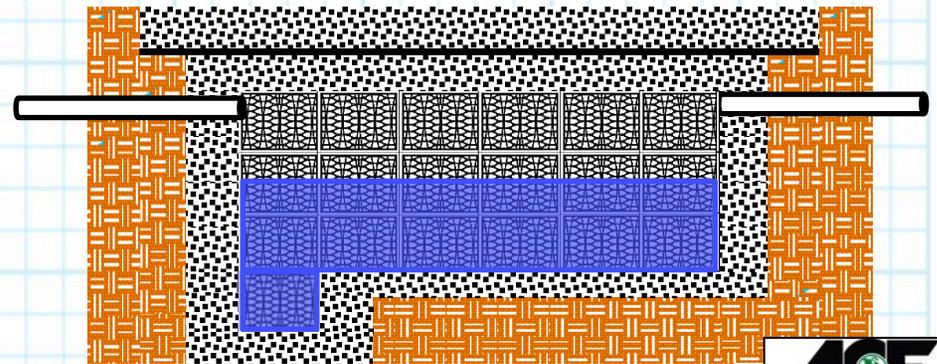
#1: Typical Infiltration Design



#2: Typical Detention Design



#3: Typical Harvest – Retention Design





- **Shipping**
- **Assembly**
- **Placement**

Modules shipped unassembled = significant cost savings!



Assembly at Site. ACF can provide assembly and cost certainty



Hand Placement = Cost Savings!

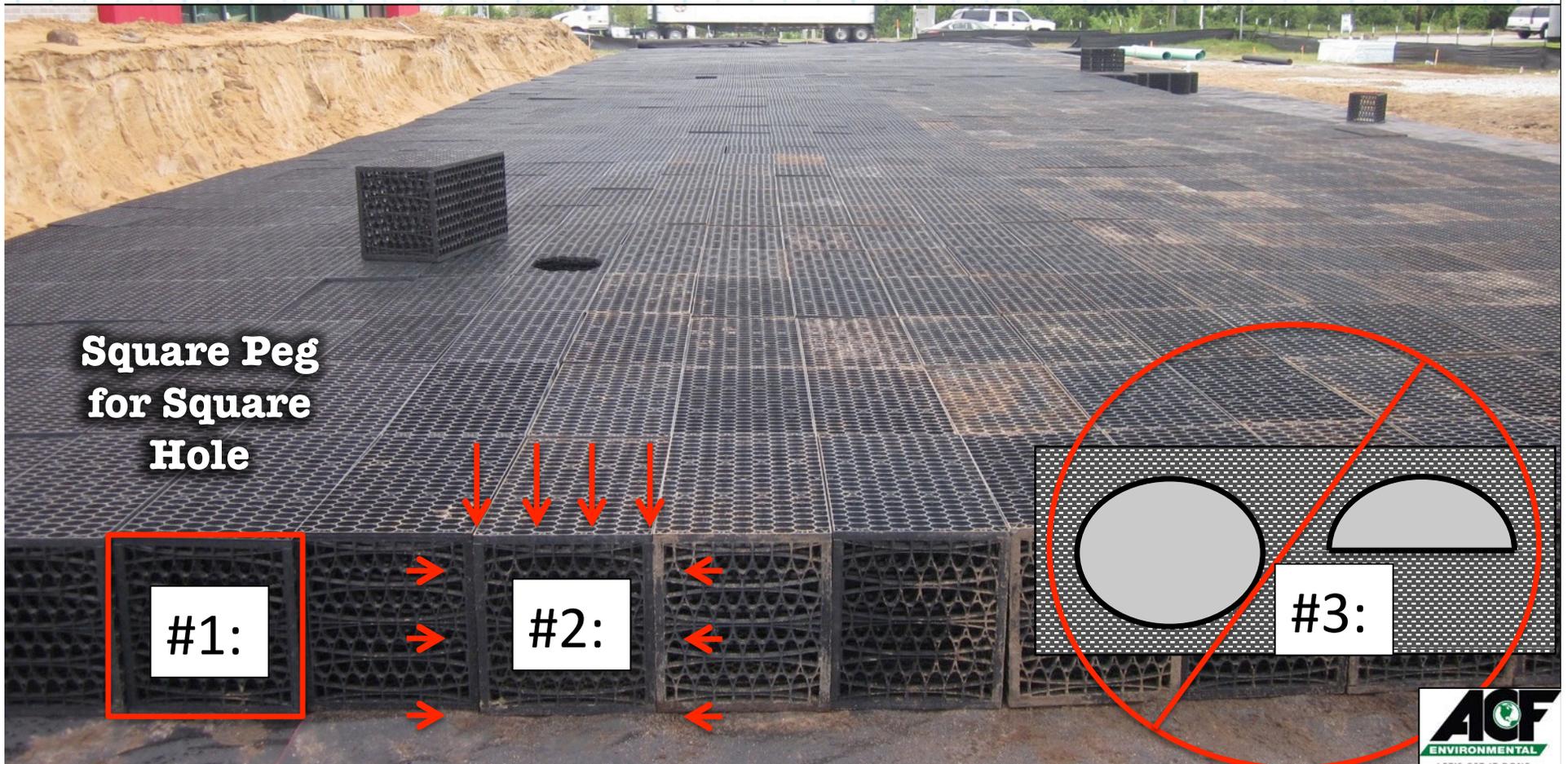


Structural Stability – R-Tank Provides:

#1: Easy To Calculate and Fit in Excavated Area.

#2: Stability for Lateral and Vertical Pressures.

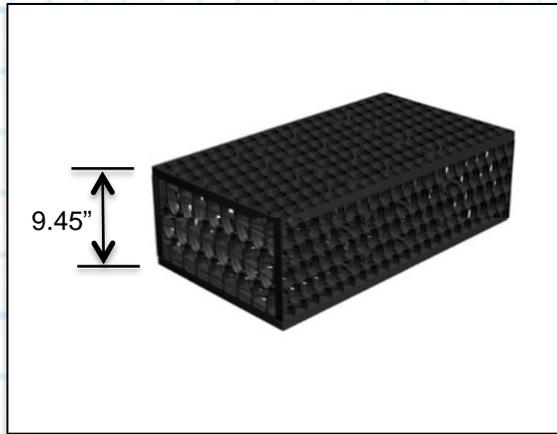
#3: Eliminates Low Void Space and Compaction Issues.



Modular Versatility: Depth & Storage

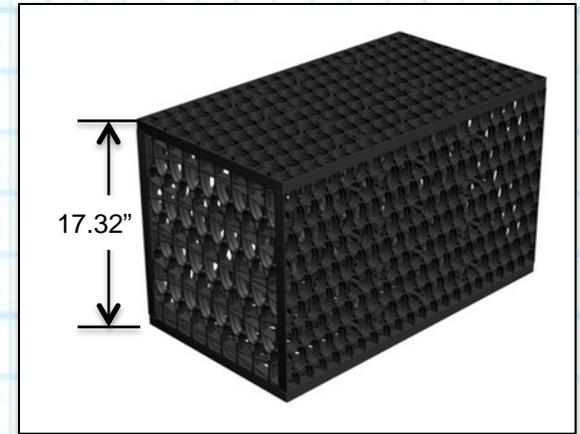
Mini R-Tank Module

Storage
Volume
= 2.30 cf



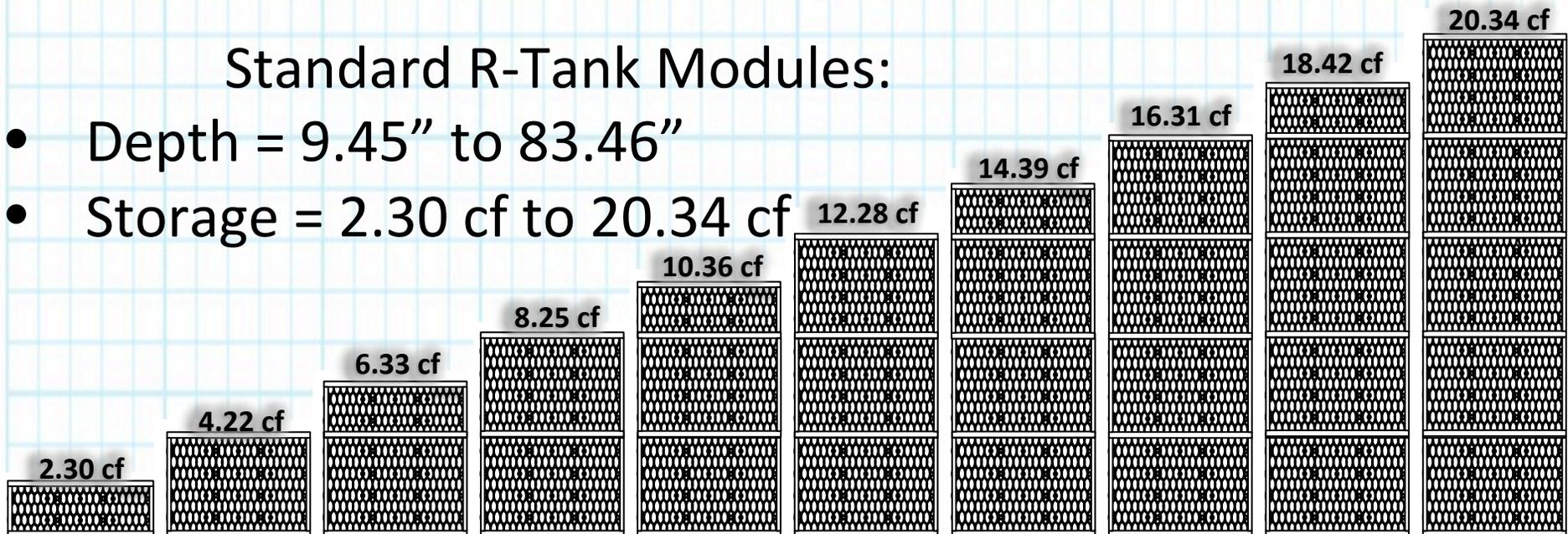
Single R-Tank Module

Storage
Volume
= 4.22 cf



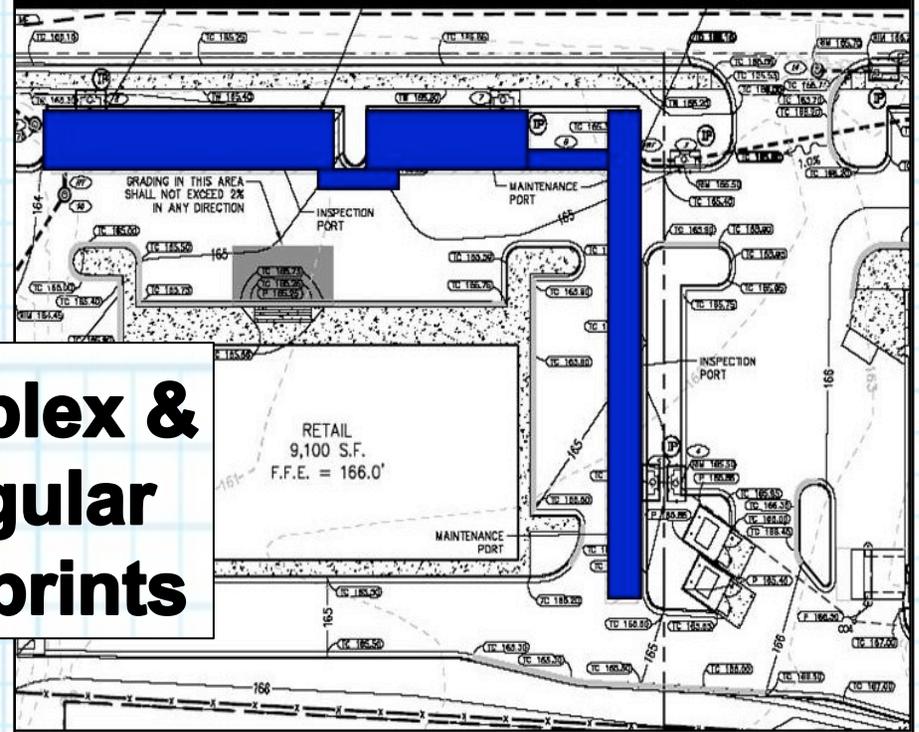
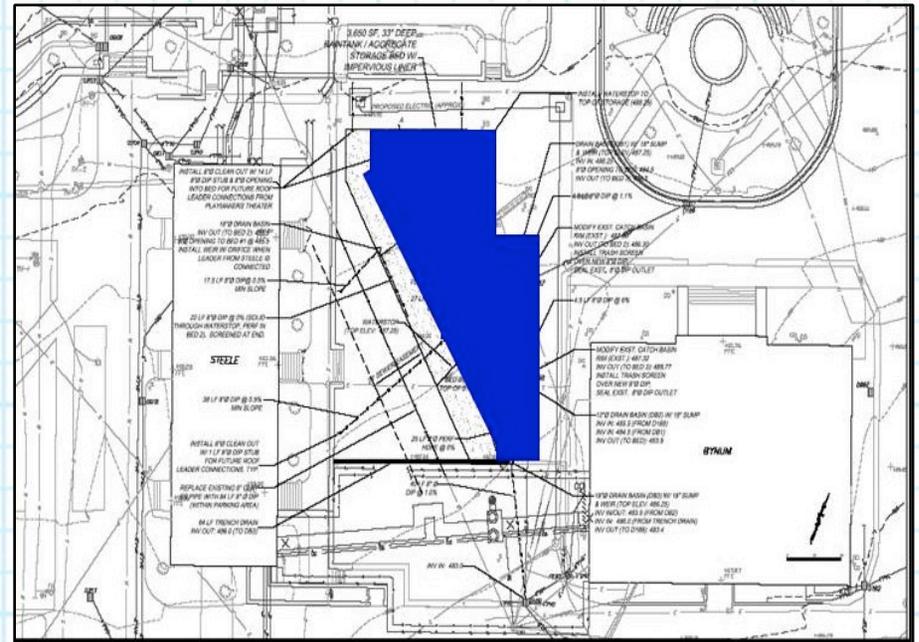
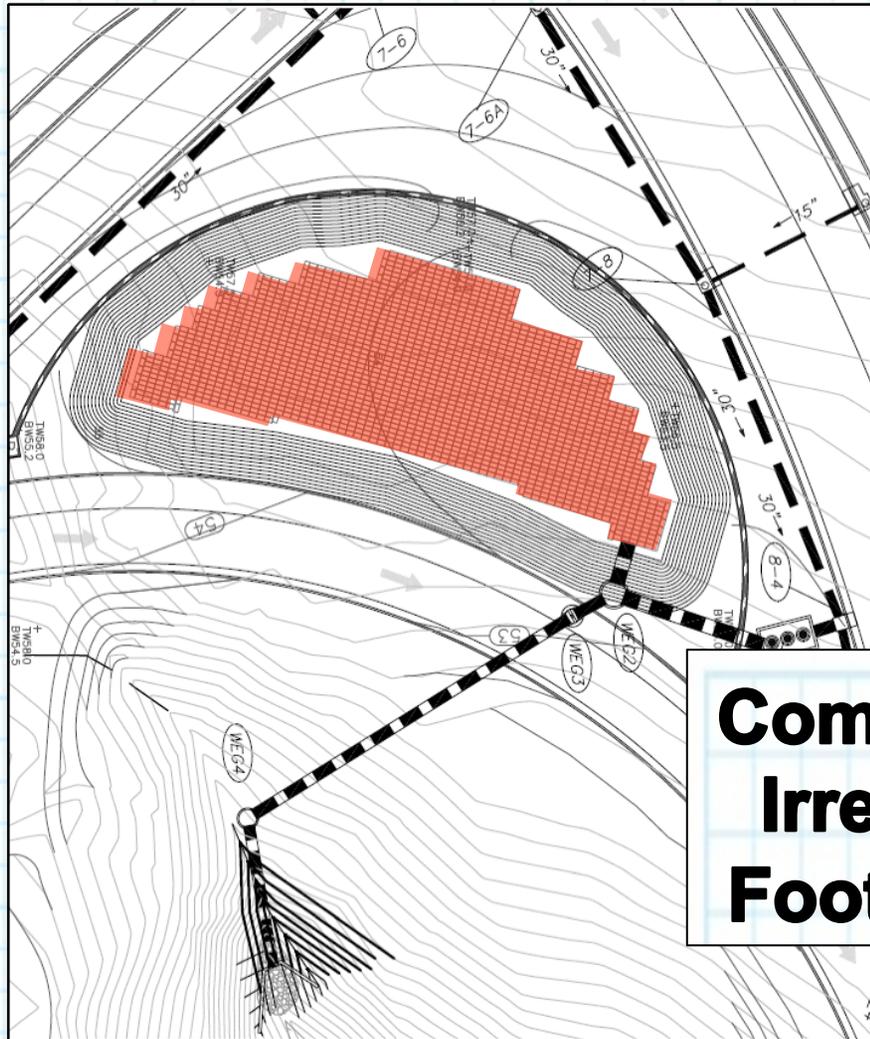
Standard R-Tank Modules:

- Depth = 9.45" to 83.46"
- Storage = 2.30 cf to 20.34 cf





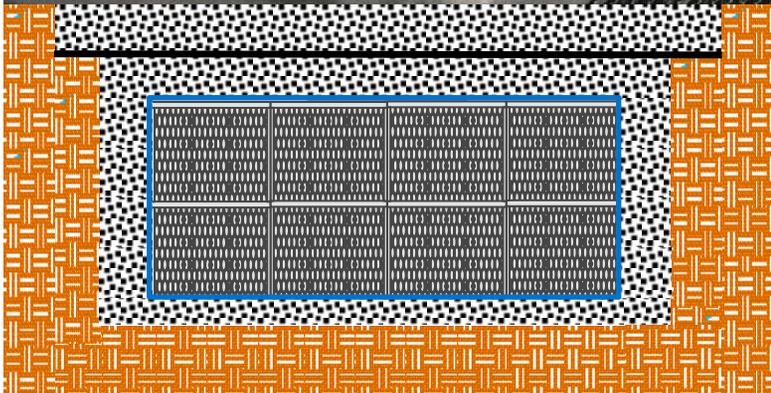
Modular Versatility: Layout Arrangement



**Complex &
Irregular
Footprints**



R-Tank Provides HS-20 & HS-25 Loading With as Little as 20" of Cover



Minimum Fills:

- Min 20" Cover
- 24" Perimeter
- 3" Base



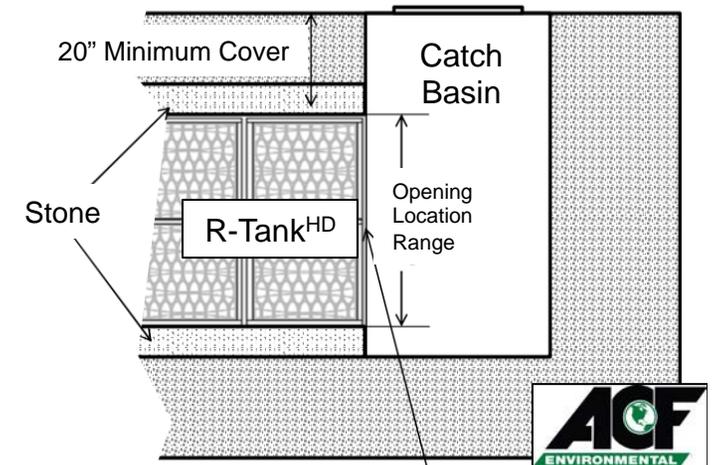
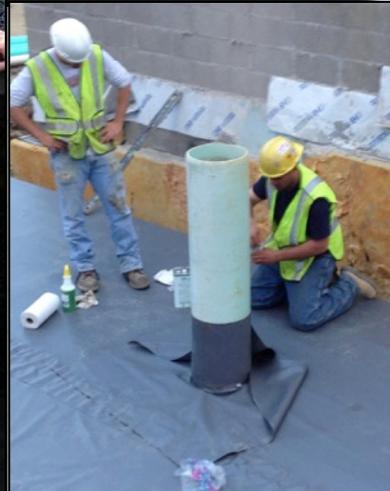
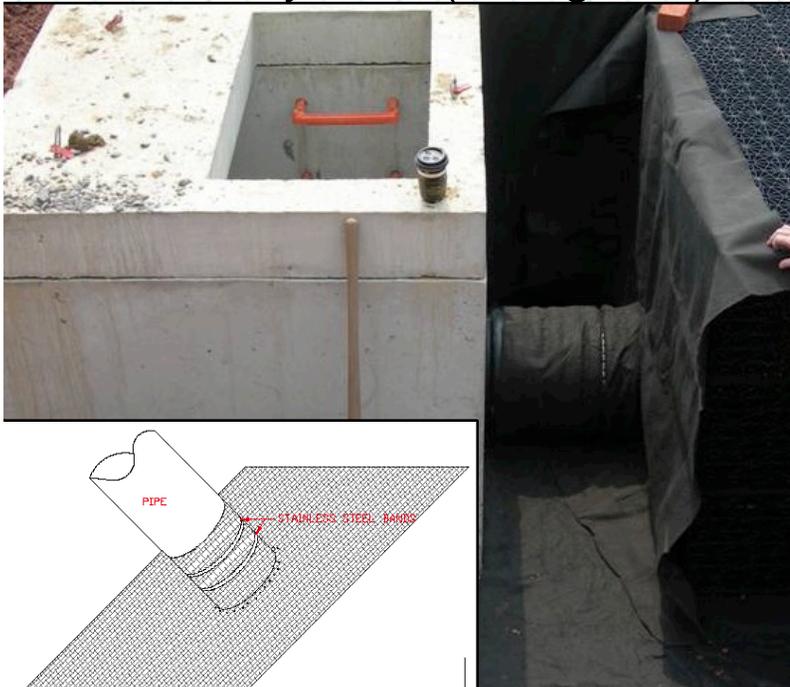
R-Tank^{HD} Eliminates the Need for Header Manifolds: Reduce Cost & Complexity



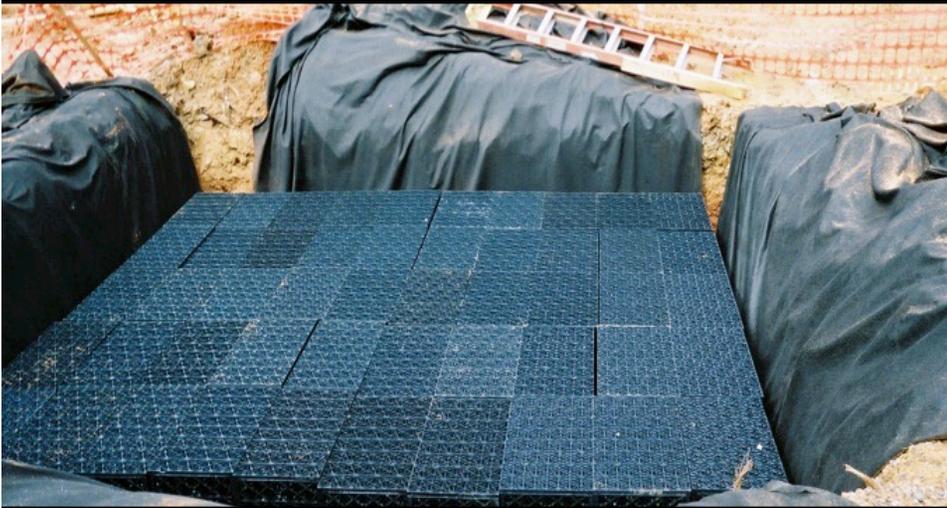
Pipe connections to R-Tank^{HD} are easy, facilitated by using a pipe boot; horizontal, vertical, geotextile or liner. Another option is to connect a catch basin directly to the R-Tank^{HD} system (far right →)



Direct catch basin connection example.



Decentralized Design: Allowed for Two More Houses, Eliminated Basins & HOAs!



Modular Tanks in Place



Fabric & Perimeter Fill



Grid Layer for F.O.S.



Completed On-Lot Storage

Retrofit Design: Converted existing basin to underground for development expansion



Existing Basin



Reworked with Engineered Base



Tank Placement Continues



Enhanced Storage Under Parking

Stormwater Harvest Design: Encapsulated System With Liner to Capture for Reuse



Liner Prior to Modular Tanks



Modular Tank Placement



Backfill Placement



Finished Runoff Harvesting

ACF's Engineering Team can provide project specific support or you can access the tools below:

R-Tank Worksheet

Contact: _____ Project Name: _____

HydroCAD[®]

Underground Stormwater Management System

PART 1 - GENERAL

R-Tank & HS-20 Loads

CAD Details

R-TANK[™] System Plan Review

Project Name: _____ Location: _____

Pre-Treatment: YES No N/A

Technical

R-TANK[™] Infiltration Systems

When R-Tank[™]s are used to infiltrate concentrated runoff, several parts of the installation process require additional strategy and/or modification.

Subgrade
The subgrade of the excavation must be able to support the system base while remaining porous to allow for infiltration. To achieve this, the subgrade should NOT be compacted, but must support a minimum of 2,000 psf. If the bearing capacity of the subgrade is below 2,000 psf, a qualified engineer must be consulted for guidance on bringing the bearing capacity up to minimum requirements while not reducing the infiltration capacity of the soil.

Geotextile
In areas where runoff is exposed to clay soils it is important to change the geotextile used in the system to a woven monofilament (such as Proplex 117[®]) instead of the typical 6 oz/yd nonwoven to prevent clogging of the textile. In addition to wrapping the R-Tank[™]s, an extra layer of Geotextile should be used between the subgrade and the base to prevent contamination of the base by the subgrade.

System Base
R-Tank[™] Systems used for infiltration require a 4" base (instead of the typical 3" base) which acts as a leveling course for the Tanks and a stabilizing layer for the subgrade. The base materials must be porous to encourage infiltration. A clean, coarse sand or a washed angular stone (such as #57 stone) both work well. The base material will generally be placed and rolled but not compacted. Local requirements may provide further guidance on this issue.

Side Backfill
The backfilling procedure for the sides of the R-Tank[™]s should follow the typical installation process. These guidelines require that the material be compacted in 12" lifts with a vibratory compactor. The 12" lift is enough to isolate the porous subgrade from the backfill material, ensuring that porosity of the base is not lost while backfilling the sides of the system.

ACF

- Specifications
- Load Support
- Documentation
- CAD Details
- Pre-treatment
- Options
- Inspection
- Guidelines
- Maintenance
- Support Kit
- Installation & Maintenance Manuals
- Project Pictorials & Case Studies

R-Tank On-Site Inspection Requirements

Residential Dry Wells

Maintenance Port Kit
Now available from ACF

R-TANK[™] Pre-Construction Checklist

Project Name: _____ Reviewer Name: _____

ACF R-Tank[™] Maintenance

With adequate pre-treatment of stormwater before

Installation

ASSEMBLING

INSTALLING

BACKFILLING

ACF ENVIRONMENTAL
LET'S GET IT DONE

FREE RECORDING REQUESTED
PURSUANT TO GOVERNMENT
CODE SECTION 27383
RECORDING REQUESTED BY:

CITY OF ESCONDIDO

WHEN RECORDED MAIL TO:

CITY ENGINEER
CITY OF ESCONDIDO
201 N. BROADWAY
ESCONDIDO, CA 92025

(SPACE ABOVE FOR RECORDER'S USE ONLY)

Documentary Transfer Tax \$ _____
Signature _____

STORM WATER CONTROL FACILITY MAINTENANCE AGREEMENT
APN NO. _____

THIS AGREEMENT for the design, construction, maintenance and repair of the Storm Water Control Facilities (SWCF(s)), installed on the property as identified in the San Diego County Assessor Tax Roll for 20__, as APN No. _____, and commonly known as _____, Escondido, California, ("Property") is entered into between the **CITY OF ESCONDIDO**, a municipal corporation ("CITY") and _____, Developer and/or Property Owner ("LOT OWNER(s)"), and in accordance with the CITY of Escondido Grading Plan No. GP__-____ ("Grading Plan"). ("Agreement")

WHEREAS, installation and maintenance of Storm Water Control Facilities is required pursuant to the Escondido Municipal Code, the California Regional Water Quality Control Board ("RWQCB") and by the CITY as a condition of approval of property development; and

WHEREAS, LOT OWNER(s) is the owner of certain real property being developed that provides benefit to the general public and the CITY and meets the requirements of the California RWQCB Order R9-2013-0001 and National Pollution Discharge Elimination System No. CAS0109266 and subsequent amendments; and

WHEREAS, the current and future subdivision LOT OWNER(s) will use the SWCF(s) as installed per the Grading Plan and the provisions of the Storm Water Quality Management Plan ("Storm Water Plan") prepared by the LOT OWNER(s) and approved by the CITY on _____, 201__; and

WHEREAS, it is the mutual desire of the parties to this Agreement that the SWCF(s) be maintained in a safe and usable condition by the LOT OWNER(s); and

WHEREAS, it is the mutual desire of the parties to this Agreement to establish a method for the maintenance and repair of the SWCF(s); and

WHEREAS, the CITY shall have the right but not the obligation to enforce full compliance with the

STORM WATER CONTROL FACILITY MAINTENANCE AGREEMENT

APN NO. _____

Page 2

terms and conditions of this Agreement; and

WHEREAS, it is the mutual intention of the parties that this Agreement constitute a covenant running with the land, binding upon each successive LOT OWNER of all or any portion of the property.

NOW, THEREFORE, IT IS HEREBY AGREED AS FOLLOWS:

1. The Property is benefited by this Agreement, and present and successive LOT OWNER(s) of all or any portion of the property are expressly bound hereby for the benefit of the land. In the event any of the herein described parcels of land are subdivided further, the LOT OWNER(s), heirs, assigns and successors in interest of each such newly created parcel shall be liable under this Agreement for their then pro rata share of expenses and such pro rata shares of expenses shall be computed to reflect such newly created parcels.

2. The cost and expense of maintaining the SWCF(s) shall be the responsibility of and paid by the LOT OWNER(s) or their heirs, assigns and successors in interest. The SWCF(s) shall be constructed and maintained by the LOT OWNER(s) in accordance with the CITY- approved Grading Plan and Storm Water Plan, on file with the CITY.

3. Repair and maintenance responsibilities for all structural SWCF(s) and required Best Management Practices associated with the project are set forth in the Storm Water Plan. LOT OWNER(s) shall, as changes occur, provide the CITY with the name, title, and phone number the persons or entities responsible for maintenance and reporting activity, the persons or entities responsible for funding, schedules and procedures for inspection and maintenance of the SWCF(s) and implementation of worker training requirements, and any other activities necessary to ensure BMP maintenance. The Storm Water Plan shall provide for the servicing of all SWCF(s) as needed and at least once during August or September of each year, and for the retention of inspection and maintenance records for at least three (3) years. LOT OWNER(s) shall submit annual certification to the CITY's Department of Engineering Services between September 1 and October 1 of each year until the property is redeveloped. The certification shall document all maintenance performed and compliance with applicable permits.

4. CITY shall have the right to inspect the SWCF(s) and records as needed to ensure the SWCF(s) are being properly maintained.

5. Should any LOT OWNER(s) fail to pay their share of costs and expenses as required to use, maintain or repair the SWCF(s) in this Agreement, then the CITY or any other LOT OWNER shall be entitled without further notice to institute legal action for the collection of funds advanced on behalf of the LOT OWNER who did not pay their share of costs and expenses and shall be entitled to recover in such action in addition to the funds advanced, interest thereon at the current prime rate of interest, until paid, all costs and disbursements of such action, including such sum or sums as the court may fix as and for a reasonable attorney's fees.

6. Any liability of the LOT OWNER(s) to any worker employed to make repairs or provide maintenance under this Agreement, or to third persons, as well as any liability of the LOT OWNER(s) for damage to the property of agent, or any such worker, or any third persons, as a result of or arising out of repairs and maintenance under this Agreement, shall be borne, as between the LOT OWNER(s) in the same percentages as they bear the costs and expenses of

STORM WATER CONTROL FACILITY MAINTENANCE AGREEMENT

APN NO. _____

Page 3

such repairs and maintenance. Each LOT OWNER shall be responsible for and maintain his own insurance, if any. By this Agreement, the parties do not intend to provide for the sharing of liability with respect to personal injury or property damage other than that attributable to the repairs and maintenance undertaken under this Agreement. Each of the LOT OWNER(s) agrees to indemnify the others from any and all liability for injury to him or damage to their property when such injury or damage results from, arises out of, or is attributable to any maintenance or repairs undertaken pursuant to this Agreement.

7. CITY Indemnification.

a) To the fullest extent permitted by law, LOT OWNER(s) shall jointly and severally indemnify, defend with legal counsel reasonably satisfactory to the CITY, and hold harmless the CITY and the CITY's officers, directors, employees, and council members (hereinafter referred to as "Indemnitees") from all actions, fines, sanctions, levies, penalties, orders and assessments of any kind harmless against any and all liability, loss, damage, fine, penalty, expense, claim, or cost (including without limitation costs and fees of litigation) of every nature (collectively referred to as "RWQCB Orders") that may arise out of or relate to LOT OWNER(s)'s obligations for implementation of storm water management in accordance with the RWQCB Order R9-2013-0001 and subsequent amendments, including any reasonable attorney's fees, costs and expenses incurred by the Indemnitees in responding to any RWQCB Orders arising out of or relating to implementation of storm water management. LOT OWNER(s) obligations shall include but not be limited to design, construction, maintenance and required documentation of the maintenance activities related to all storm water treatment measures proposed for the project and included in the STORM WATER PLAN, approved _____, arising out of or in connection with this Agreement or its performance (including acts of omission) except for liability caused by the Indemnitees' willful misconduct.

b) LOT OWNER(s) obligation to defend shall apply whether or not Indemnitees were negligent or otherwise at fault and whether or not the RWQCB's Orders have any merit. LOT OWNER(s) obligation to defend shall apply with full force and effect regardless of any concurrent negligence or fault by the Indemnitees, or any of them. However LOT OWNER(s) shall not be obligated under this Agreement to indemnify any Indemnitee after entry of a non-appealable final judgment after trial or award in a judicial proceeding for that portion of the final judgment that arises from the willful misconduct of that Indemnitee.

c) LOT OWNER(s) duty to defend the Indemnitees is separate, independent and free standing from LOT OWNER(s) duty to indemnify and hold harmless the Indemnitees. LOT OWNER(s) defense obligation shall arise immediately upon receipt by CITY or LOT OWNER(s) of any written Notice of Violation or equivalent notice of intent to levy any fines, penalties or sanctions against Indemnitees by the RWQCB or other enforcement agency, and shall continue until the entry of any final and non-appealable RWQCB or other enforcement orders.

d) LOT OWNER(s) obligation to indemnify, defend and hold harmless shall be carried on to future property OWNERS and shall continue until the time that the site is redeveloped.

e) It is expressly understood and agreed that the foregoing provisions will survive termination of this Agreement, unless the property is properly redeveloped.

STORM WATER CONTROL FACILITY MAINTENANCE AGREEMENT

APN NO. _____

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(f) The indemnity protections provided by this Agreement are not intended to exceed the indemnity available under applicable law. If the indemnity protections are found by a court to be unlawful in any way, the protection shall be curtailed or adjusted, but only to the minimum extent required to conform to applicable law.

(g) Nothing in the Agreement, the specifications or other contract documents or CITY approval of the plans and specifications or inspection of the work is intended to include a review, inspection, acknowledgment of any responsibility for any such matter, and CITY, CITY's engineer, and their consultants, and each of their officials, directors, officers, employees and agents, shall have absolutely no responsibility or liability thereof.

8. If, in the CITY's sole judgment said SWCF(s) are not being maintained to standards set forth in paragraph 3 of this Agreement, the CITY may thereupon provide written notice to all LOT OWNER(s) to initiate repairs or construction within ninety (90) days. Upon failure to demonstrate good faith to make repairs or construction within ninety (90), the LOT OWNER(s) agree that the CITY may make all needed repairs to said SWCF(s) and/or construct SWCF(s) to meet the standards set forth in paragraph 3 and to then assess costs to all LOT OWNER(s) equally.

9. If the CITY elects to make necessary maintenance or repairs in accordance with this Agreement, said work shall be without warranty. Said repairs shall be accepted "as is" by the LOT OWNER(s) without any warranty of workmanship and be guaranteed and indemnified by them in accordance this Agreement.

10. The foregoing covenants shall run with the land and shall be deemed to be for the benefit of the land of each of the LOT OWNER(s) and each and every person who shall at any time own all or any portion of the property referred to herein.

11. It is understood and agreed that the covenants herein contained shall be binding on the heirs, executors, administrators, successors, and assigns of each of the LOT OWNER(s).

12. This Agreement shall be recorded and that all obligations created shall constitute a covenant running with the land and any subsequent purchaser of all or any portion thereof, by acceptance of delivery of a deed and/or conveyance regardless of form shall be deemed to have consented to and become bound by this Agreement.

13. The terms of this Agreement may be amended in writing upon majority approval of the LOT OWNER(s) and consent of the CITY.

14. This Agreement shall be governed by the laws of the State of California. In the event that any of the provisions of this Agreement are held to be unenforceable or invalid by any court of competent jurisdiction, the validity, and enforceability of the remaining provisions shall not be affected thereby.

SIGNATURE PAGE FOLLOWS ON PAGE 5:

STORM WATER CONTROL FACILITY MAINTENANCE AGREEMENT

APN NO. _____

Page 5

SIGNATURE PAGE

LOT OWNER(s): _____

PRINT NAME AND TITLE

SIGNATURE

DATE SIGNED

PRINT NAME AND TITLE

SIGNATURE

DATE SIGNED

PRINT NAME AND TITLE

SIGNATURE

DATE SIGNED

ATTACH CALIFORNIA ALL PURPOSE NOTARY ACKNOWLEDGMENT FOR ABOVE SIGNATURES

**CITY OF ESCONDIDO,
a municipal Corporation**

Date Signed: _____

By: _____

Director of Public Works / City Engineer

APPROVED AS TO FORM:
Jeffrey Epp, City Attorney

By: _____

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Attachment 3a must identify:

- Specific maintenance indicators and actions for proposed structural BMP(s). This must be based on Section 7.7 of the Storm Water Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- How to access the structural BMP(s) to inspect and perform maintenance
- Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- Recommended equipment to perform maintenance
- When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For all Structural BMPs, Attachment 3b must include a draft maintenance agreement in the City's standard format (PDP applicant to contact City staff to obtain the current maintenance agreement forms or download from City's website).

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ATTACHMENT 4

City of Escondido PDP Structural BMP Verification for Permitted Land
Development Projects

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PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

City of Escondido Storm Water Structural BMP Verification Form Page 1 of 3	
Project Summary Information	
Project Name	South Escondido
Record ID (e.g., grading/improvement plan number)	xxxx
Project Address	2608 S Escondido Escondido, 92025
Assessor's Parcel Number(s) (APN(s))	238-152-06, 07
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	Kit Carson Creek (905.21) Hodges, Lake (905.21) San Dieguito River (905.11) Pacific Ocean
Maintenance Notification / Agreement No.	
Responsible Party for Construction Phase	
Developer's Name	
Address	South Escondido, LP 1555 Camino Del Mar, Suite 307 Del Mar, CA 92014
Email Address	
Phone Number	Tel:
Engineer of Work	Robert D'Amaro, P.E.
Engineer's Phone Number	760-741-3570 ext. 104
Responsible Party for Ongoing Maintenance	
Owner's Name(s)*	To be provided
Address	
Email Address	
Phone Number	
*Note: If a corporation or LLC, provide information for principal partner or Agent for Service of Process. If an HOA, provide information for the Board or property manager at time of project closeout.	

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

Checklist for Engineer of Work (EOW) to submit to Field Engineering:

- Confirmation that all of the final approved SWQMP, addendum, maintenance agreement and plan have been accepted and are on file with the City.
- Photograph of each Structural BMP.
- Photograph(s) of each Structural BMP during the construction process to illustrate proper construction.

By signing below, I certify that the Structural BMP(s) for this project have been constructed and all BMPs are in substantial conformance with the approved plans and applicable regulations. I understand the City reserves the right to inspect the above BMPs to verify compliance with the approved plans and Storm Water Ordinance. Should it be determined that the BMPs were not constructed to plan or code, corrective actions may be necessary before permits can be closed.

Please sign your name and seal.

Professional Engineer's Printed Name:

Robert D'Amaro

Professional Engineer's Signed Name:

Date: 5-28-2019



ATTACHMENT 5

Copy of Plan Sheets Showing Permanent Storm Water BMPs, Source Control, and Site Design

This is the cover sheet for Attachment 5.

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

- Structural BMP(s) with ID numbers matching Step 6 Summary of PDP Structural BMPs
- The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- Details and specifications for construction of structural BMP(s)
- Signage indicating the location and boundary of structural BMP(s) as required by City staff
- How to access the structural BMP(s) to inspect and perform maintenance
- Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- Recommended equipment to perform maintenance
- When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
- All BMPs must be fully dimensioned on the plans
- When proprietary BMPs are used, site-specific cross section with outflow, inflow, and model number must be provided. Photocopies of general brochures are not acceptable.
- Include all source control and site design measures described in Steps 4 and 5 of the SWQMP. Can be included as a separate exhibit as necessary.

***Note: Plan sheets included in this attachment can be full size or half size.**