County of San Diego
PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

THE AVENTINE AT SWEETWATER SPRINGS
PDS2018-SPA-18-002, TM-5627

SWC OF AUSTIN DRIVE AND SWEETWATER SPRINGS BLVD
SPRING VALLEY, CA 91977

ASSESSOR'S PARCEL NUMBER(S):
APN'S 505-580-07-00, 505-580-08-00, 505-580-09-00, 505-580-10-00

ENGINEER OF WORK:

_____

ALISA S. VIALPANDO, PE# 47945

PREPARED FOR:

LENNAR
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PDP SWQMP PREPARED BY:

HUNSAKER & ASSOCIATES SAN DIEGO, INC.
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(858) 558-4500

DATE OF SWQMP:
December 21, 2018

PLANS PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC.
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(858) 558-45400

SWQMP APPROVED BY:

APPROVAL DATE:

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Table of Contents

Attachments

Acronyms

ACP	Alternative Compliance Project
APN	Assessor's Parcel Number
BMP	Best Management Practice
BMP DM	Best Management Practice Design Manual
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDCI	Private Development Construction Inspection Section
PDP	Priority Development Project
PDS	Planning and Development Services
PE	Professional Engineer
RPO	Resource Protection Ordinance
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan
WMAA	Watershed Management Area Analysis
WPO	Watershed Protection Ordinance
WQIP	Water Quality Improvement Plan

PDP SWQMP Preparer's Certification Page

Project Name: The Aventine at Sweetwater Springs
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 County of San Diego BMP Design Manual, which is a design manual for compliance with local County of San Diego Watershed Protection Ordinance (Sections 67.801 et seq.) 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 County of San Diego has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP 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 County 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.

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

Alisa S. Vialpando
Print Name

Hunsaker & Associates San Diego, Inc.
Company

_____
Date

Engineer's Seal:

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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	April 26, 2018	Initial Submittal
2	July 27, 2018	Address first submittal planchecks.
3	December 21, 2018	Address 2nd Submittal planchecks
4		

Final Design

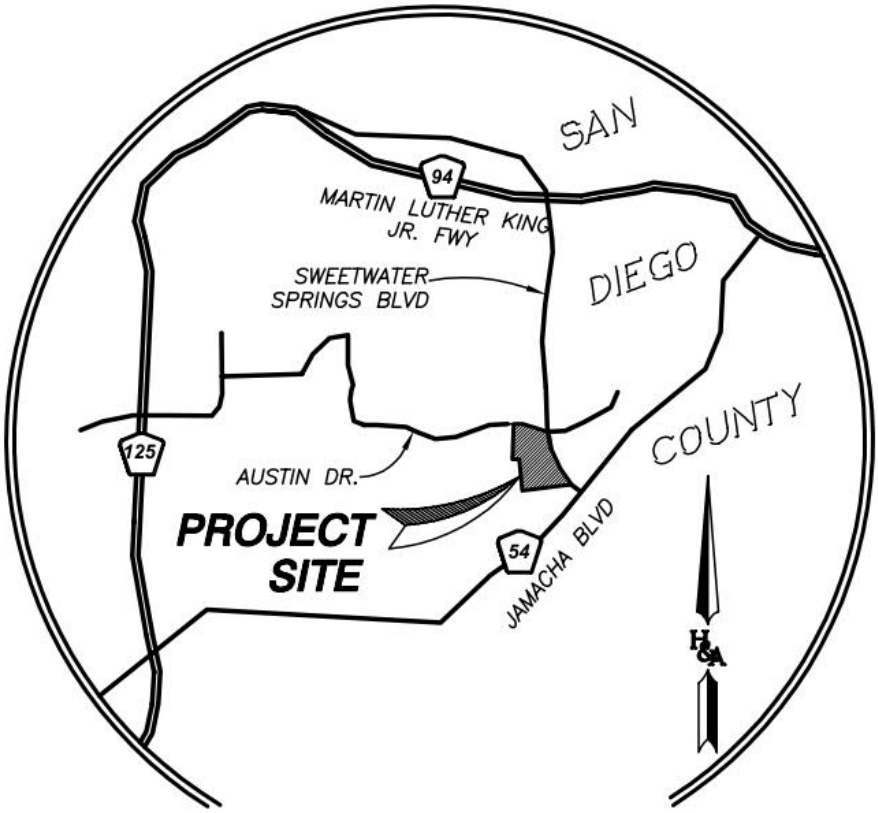
Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Plan Changes

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

Project Vicinity Map

Project Name: The Aventine at Sweetwater Springs
Record ID:



VICINITY MAP
NTS

Step 1: Project type determination (Standard or Priority Development Project)

Is the project part of another Priority Development Project (PDP)? (☐Yes ☒ No If so, a PDP SWQMP is required. Go to Step 2.			
The project is (select one): ☐ New Development ☒ Redevelopment[1]			
The total proposed newly created or replaced impervious area is: 286,189 ft^2			
The total existing (pre-project) impervious area is: 418,596 ft^2			
The total area disturbed by the project is: 460,602 ft^2			
If the total area disturbed by the project is 1 acre (43,560 sq. ft.) or more OR the project is part of a larger common plan of development disturbing 1 acre or more, a Waste Discharger Identification (WDID) number must be obtained from the State Water Resources Control Board. WDID: TBD			
Is the project in any of the following categories, (a) through (f)?[2]			
Yes ☐	No ☒	(a)	New development projects that create 10,000 square feet or more of impervious surfaces [3](collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☒	No ☐	(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 ☒	No ☐	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

[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.

[2] Applicants should note that any development project that will create and/or replace 10,000 square feet or more of impervious surface (collectively over the entire project site) is considered a new development.

[3] For solar energy farm projects, the area of the solar panels does not count toward the total impervious area of the site.

Project type determination (continued)

Yes ☐	No ☒	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). *Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.*
Yes ☐	No ☒	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (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.
Yes ☒	No ☐	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*

Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above?

☐ No – the project is not a Priority Development Project (Standard Project).

☒ Yes – the project is a Priority Development Project (PDP).

Further guidance may be found in Chapter 1 and Table 1-2 of the BMP Design Manual.

The following is for **redevelopment PDPs only**:

The area of existing (pre-project) impervious area at the project site is: (A)	418,596 ft^2
The total proposed newly created or replaced impervious area is	286,189 ft^2 (B)
Percent impervious surface created or replaced (B/A)*100:	68.4 %

The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – **only newly created or replaced impervious areas are considered a PDP and subject to stormwater requirements**

OR

☒ greater than fifty percent (50%) – **the entire project site is considered a PDP and subject to stormwater requirements**

Step 1.1: Storm Water Quality Management Plan requirements

Step	Answer	Progression
Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? 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 BMP Design Manual *in its entirety*.	☐ Standard Project	Standard Project requirements apply, including Standard Project SWQMP. **Complete Standard Project SWQMP.**
	☒ PDP	Standard and PDP requirements apply, including PDP SWQMP. **Complete PDP SWQMP.**
	☐ PDP with ACP	If participating in offsite alternative compliance, **complete Step 6.3 and an ACP SWQMP.**
	☐ PDP Exemption	**Go to Step 1.2 below.**

Step 1.2: Exemption to PDP definitions

Is the project exempt from PDP definitions based on either of the following:	If so:
☐ Projects that are only new or retrofit paved sidewalks, bicycle lanes, or trails that meet the following criteria: (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 Guidance on Green Infrastructure;	Standard Project requirements apply, AND any additional requirements specific to the type of project. County concurrence with the exemption is required. *Provide discussion and list any additional requirements below in this form.* **Complete Standard Project SWQMP**
☐ Projects that are only retrofitting or redeveloping existing paved alleys, streets or roads that are designed and constructed in accordance with the County of San Diego Guidance on Green Infrastructure.	**Complete Green Streets PDP Exempt SWQMP.**
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:	

Step 2: Construction Storm Water BMP Checklist

Minimum Required Standard Construction Storm Water BMPs		
If you answer "Yes" to any of the questions below, your project is subject to Table 1 on the following page (Minimum Required Standard Construction Stormwater BMPs). As noted in Table 1, please select at least the minimum number of required BMPs, or as many as are feasible for your project. If no BMP is selected, an explanation must be given in the box provided. The following questions are intended to aid in determining construction BMP requirements for your project. **Note: All selected BMPs below must be included on the BMP plan incorporated into the construction plan sets.**		
1. Will there be soil disturbing activities that will result in exposed soil areas? (This includes minor grading and trenching.) **Reference Table 1 Items A, B, D, and E** Note: Soil disturbances NOT considered significant include, but are not limited to, change in use, mechanical/electrical/plumbing activities, signs, temporary trailers, interior remodeling, and minor tenant improvement.	☒Yes	☐No
2. Will there be asphalt paving, including patching? **Reference Table 1 Items D and F**	☒Yes	☐No
3. Will there be slurries from mortar mixing, coring, or concrete saw cutting? **Reference Table 1 Items D and F**	☒Yes	☐No
4. Will there be solid wastes from concrete demolition and removal, wall construction, or form work? **Reference Table 1 Items D and F**	☒Yes	☐No
5. Will there be stockpiling (soil, compost, asphalt, concrete, solid waste) for over 24 hours? **Reference Table 1 Items D and F**	☒Yes	☐No
6. Will there be dewatering operations? **Reference Table 1 Items C and D**	☐Yes	☒No
7. Will there be temporary on-site storage of construction materials, including mortar mix, raw landscaping and soil stabilization materials, treated lumber, rebar, and plated metal fencing materials? **Reference Table 1 Items E and F**	☒Yes	☐No
8. Will trash or solid waste product be generated from this project? **Reference Table 1 Item F**	☒Yes	☐No
9. Will construction equipment be stored on site (e.g.: fuels, oils, trucks, etc.?) **Reference Table 1 Item F**	☒Yes	☐No
10. Will Portable Sanitary Services ("Porta-potty") be used on the site? **Reference Table 1 Item F**	☒Yes	☐No

Table 1. Construction Storm Water BMP Checklist

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook[4] Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
A. Select Erosion Control Method for Disturbed Slopes (choose at least one for the appropriate season)			
Vegetation Stabilization Planting[5] (Summer)	SS-2, SS-4	☐	This report is prepared for Preliminary Phase. Therefore, construction design plan sheets have not been produced.
Hydraulic Stabilization Hydroseeding[2] (Summer)	SS-4	☒	
Bonded Fiber Matrix or Stabilized Fiber Matrix[6] (Winter)	SS-3	☐	
Physical Stabilization Erosion Control Blanket[3] (Winter)	SS-7	☐	
B. Select erosion control method for disturbed flat areas (slope < 5%) (choose at least one)			
County Standard Lot Perimeter Protection Detail	PDS 659[7], SC-2	☒	This report is prepared for Preliminary Phase. Therefore, construction design plan sheets have not been produced.
Will use erosion control measures from Item A on flat areas also	SS-3, 4, 7	☐	
County Standard Desilting Basin (must treat all site runoff)	PDS 660[8], SC-2	☒	
Mulch, straw, wood chips, soil application	SS-6, SS-8	☐	

4 State of California Department of Transportation (Caltrans). 2003. Storm Water Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual. March. Available online at: http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm.

5 If Vegetation Stabilization (Planting or Hydroseeding) is proposed for erosion control it may be installed between May 1st and August 15th. Slope irrigation is in place and needs to be operable for slopes >3 feet. Vegetation must be watered and established prior to October 1st. The owner must implement a contingency physical BMP by August 15th if vegetation establishment does not occur by that date. If landscaping is proposed, erosion control measures must also be used while landscaping is being established. Established vegetation must have a subsurface mat of intertwined mature roots with a uniform vegetative coverage of 70 percent of the natural vegetative coverage or more on all disturbed areas.

6 All slopes over three feet must have established vegetative cover prior to final permit approval.

7 County of San Diego, Planning & Development Services. 2012. Standard Lot Perimeter Protection Design System. Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds659.pdf.

8 County of San Diego, Planning & Development Services. 2012. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds660.pdf.

Table 1. Construction Storm Water BMP Checklist (continued)

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
C. If runoff or dewatering operation is concentrated, velocity must be controlled using an energy dissipater			
Energy Dissipater Outlet Protection[9]	SS-10	☒	This report is prepared for Preliminary Phase. Therefore, construction design plan sheets have not been produced.
D. Select sediment control method for all disturbed areas (choose at least one)			
Silt Fence	SC-1	☒	This report is prepared for Preliminary Phase. Therefore, construction design plan sheets have not been produced.
Fiber Rolls (Straw Wattles)	SC-5	☒	
Gravel & Sand Bags	SC-6 & 8	☒	
Dewatering Filtration	NS-2	☐	
Storm Drain Inlet Protection	SC-10	☒	
Engineered Desilting Basin (sized for 10-year flow)	SC-2	☒	
E. Select method for preventing offsite tracking of sediment (choose at least one)			
Stabilized Construction Entrance	TC-1	☒	This report is prepared for Preliminary Phase. Therefore, construction design plan sheets have not been produced.
Construction Road Stabilization	TC-2	☐	
Entrance/Exit Tire Wash	TC-3	☐	
Entrance/Exit Inspection & Cleaning Facility	TC-1	☐	
Street Sweeping and Vacuuming	SC-7	☒	
F. Select the general site management BMPs			
F.1 Materials Management			
Material Delivery & Storage	WM-1	☒	This report is prepared for Preliminary Phase. Therefore, construction design plan sheets have not been produced.
Spill Prevention and Control	WM-4	☒	
F.2 Waste Management[10]			
Waste Management Concrete Waste Management	WM-8	☒	This report is prepared for Preliminary Phase. Therefore, construction design plan sheets have not been produced.
Solid Waste Management	WM-5	☒	
Sanitary Waste Management	WM-9	☒	
Hazardous Waste Management	WM-6	☒	

Note: The Construction General Permit (Order No. 2009-0009-DWQ) also requires all projects not subject to the BMP Design Manual to comply with runoff reduction requirements through the implementation of post-construction BMPs as described in Section XIII of the order.

[9] Regional Standard Drawing D-40 – Rip Rap Energy Dissipater is also acceptable for velocity reduction.

[10] Not all projects will have every waste identified. The applicant is responsible for identifying wastes that will be onsite and applying the appropriate BMP. For example, if concrete will be used, BMP WM-8 must be selected.

Step 3: County of San Diego PDP SWQMP Site Information Checklist

Step 3.1: Description of Existing Site Condition

Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	Sweetwater Hydrologic Unit, Middle Sweetwater HA, Jamacha HSA (909.21)

Current Status of the Site (select all that apply):

☒ Existing development
☐ Previously graded but not built out
☐ Demolition completed without new construction
☐ Agricultural or other non-impervious use
☐ Vacant, undeveloped/natural

Description / Additional Information:
The site is currently a vacant shopping mall complete with empty buildings and parking areas.

Existing Land Cover Includes (select all that apply and provide each area on site):

☒ Vegetative Cover 0.96 Acres (42,006 Square Feet)
☐ Non-Vegetated Pervious Areas _____ Acres (_____ Square Feet)
☒ Impervious Areas 9.61 Acres (418,596 Square Feet)

Description / Additional Information:

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

☐ NRCS Type A
☐ NRCS Type B
☐ NRCS Type C
☒ NRCS Type D

Approximate Depth to Groundwater (GW) (or N/A if no infiltration is used):

☐ GW Depth < 5 feet
☐ 5 feet < GW Depth < 10 feet
☒ 10 feet < GW Depth < 20 feet
☐ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):

☐ Watercourses
☐ Seeps
☐ Springs
☐ Wetlands
☒ None
☐ Other

Description / Additional Information:
The site is currently developed with a vacant shopping mall with associated buildings, parking lot, sidewalk, and small pervious areas.

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 current site is a vacant shopping mall with buildings, parking lot, sidewalk, and small pervious areas. Grates throughout the site collect onsite stormwater and convey it to the existing storm drain along Austin Drive and Sweetwater Springs Blvd.
A small vegetated slope along the exterior of the western property boundary drains towards the site. This area is less than 0.5 acres and its flow is collected onsite in an existing brow ditch which flows south then east along the southern boundary until it exits the site at Sweetwater Springs Blvd.
The site does not currently have any evident detention or stormwater treatment facilities. All onsite runoff is either collected with the onsite storm drain system consisting of pipe, grates, and cleanouts or sheet flows towards the northern or eastern streets (Austin Drive and Sweetwater Springs Blvd) where it is collected by a curb inlet. The existing peak runoff from the 11.1-acre drainage area is 56.17 cfs as determined by the Preliminary Drainage Study for the Aventine at Sweetwater Springs prepared by Hunsaker & Associates San Diego, Inc. (December 2018).

Step 3.3: Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:
The proposed redevelopment of the site will replace the land use from Commercial to multi-family residential and will consist of dwelling units, a tot lot, an active rec area, roads, driveways, sidewalks, open spaces, and an area for a basin to treat onsite runoff and address flow control hydromodification.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):
The site will include impervious surfaces including roofs, sidewalks, and roads/ driveways.

List/describe proposed pervious features of the project (e.g., landscape areas):
Pervious surfaces for the site will include the landscaped open space areas and the proposed water quality basin.

Does the project include grading and changes to site topography?
☒Yes
☐No

Description / Additional Information:
There will be minor changes to the topography. However, the general drainage pattern relative to the existing condition will be maintained. Drainage areas will not be diverted and onsite flows collected and discharged into the existing storm drain along Sweetwater Springs Road.

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 (acres or ft^2)	Proposed (acres or ft^2)	Percent Change
Vegetation	42,006 sf	172,677 sf	+411%
Pervious (non-vegetated)			
Impervious	418,596 sf	287,925 sf	-68.8

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 site currently consists of a vacant shopping mall with buildings, parking areas, and small areas of landscaping. The proposed development will demolish the existing structures and replace it with multi-family residential homes, including associated roads and driveways, sidewalks, a tot lot, an active rec area, open spaces, and water quality treatment basin. The proposed development will require re-grading of the site. Inlets place throughout the site will be sized to collect peak flow runoff which will then be conveyed towards the aforementioned basin. Runoff from an offsite slope at the southwest corner of the site will be collected by a proposed brow ditch and directed to the site's discharge point at the southeast project boundary corner. Refer to the Preliminary Drainage Study for the Aventine at Sweetwater Springs (December 2018) prepared by Hunsaker & Associates San Diego, Inc. for a detailed discussion and calculations for the proposed condition runoff associated with the development.

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). Select "Other" if the project is a phased development and provide a description:

- ☒ 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:

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): Runoff exits the site and is conveyed in storm drain south along Sweetwater Springs Blvd. it discharges into a natural drainage channel about 0.25 miles south of project location. This channel confluences with the Sweetwater River which empties into the Sweetwater Reservoir. Downstream of the reservoir, the Sweetwater River continues west an empties into San Diego Bay then into the Pacific Ocean.

List any 303(d) impaired water bodies[11] 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
Paradise Creek	*Selenium*	*Riparian Area Quality*
San Diego Bay	*PCBs*	*Riparian Area Quality*
San Diego Bay shoreline	*Enterococcus, Fecal Coliform, Total Coliform, Copper, Benthic Community Effects, Sediment Toxicity, Toxicity, Chlordane, PAHs (Polycrylic Aromatic Hydrocarbons*	*Water Quality*

Identification of Project Site Pollutants*

*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 BMP 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	☐	☐	☐

[11] 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

Oxygen Demanding Substances	☐	☐	☐
Oil & Grease	☐	☐	☐
Bacteria & Viruses	☐	☐	☐
Pesticides	☐	☐	☐

Step 3.7: Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the BMP 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 WMAA[12] for the watershed in which the project resides.

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

[12] The 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

Step 3.7.1: Critical Coarse Sediment Yield Areas*

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

Projects must satisfy critical coarse sediment yield area (CCSYA) requirements by characterizing the project as one of the scenario-types presented below and satisfying associated criteria. Projects must appropriately satisfy all requirements for identification, avoidance, and bypass, OR may alternatively elect to demonstrate no net impact.

☒ **Scenario 1**: Project is subject to and in compliance with RPO requirements *(without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3) that result in impacts to more than 15% of the project-scale CCSYAs)*.

- ☐ Identify: Project has identified both onsite and upstream CCSYAs as areas that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☐ Avoid: Project has avoided onsite CCSYAs per existing RPO steep slope encroachment criteria. AND,
- ☒ Bypass: Project has demonstrated that both onsite and upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☐ No Net Impact: Project does not satisfy all Scenario 1 criteria above and must alternatively demonstrate no net impact to the receiving water.

☐ **Scenario 2**: Project is entirely exempt/not subject to RPO requirements without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3).

- ☐ Identify: Project has identified upstream CCSYAs that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☐ Avoid: Project is not required to avoid onsite CCSYAs as none were identified in the previous step. AND,
- ☐ Bypass: Project has demonstrated that upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☐ No Net Impact: Project does not satisfy all Scenario 2 criteria above and must alternatively demonstrate no net impact to the receiving water. *(Skip to next row).*

☐ **Scenario 3**: Project utilizes exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3) and impacts more than 15% of the project-scale CCSYAs.

- ☐ No Net Impact: Project is not eligible for traditional methods of identification, avoidance, and bypass. Project must demonstrate no net impact to the receiving water.

Critical Coarse Sediment Yield Areas Continued
Demonstrate No Net Impact
If the project elects to satisfy CCSYA criteria through demonstration of no net impact to the receiving water. Applicants must identify the methods utilized from the list below and provide supporting documentation in Attachment 2c of the SWQMP. Check all that are applicable. ☒ N/A, the project appropriately identifies, avoids, and bypasses CCSYAs. ☐ Project has performed additional analysis to demonstrate that impacts to CCSYAs satisfy the no net impact standard of Ep/Sp≤1.1. ☐ Project has provided alternate mapping of CCSYAs. ☐ Project has implemented additional onsite hydromodification flow control measures. ☐ Project has implemented an offsite stream rehabilitation project to offset impacts. ☐ Project has implemented other applicant-proposed mitigation measures.

Step 3.7.2: Flow Control for Post-Project Runoff*

*This Section only required if hydromodification management requirements apply
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. This project will redevelop an existing vacant shopping center which currently drains towards the southeast corner of the site. The POC for this site has been set at this southeast corner and labeled POC1 on the hydromodification exhibits for both existing and proposed conditions. The proposed condition flow control analysis was performed using the SWMM software and includes three subareas; onsite developed areas, basin area, and offsite areas bypassing the basin but tributary to POC1.
Has a geomorphic assessment been performed for the receiving channel(s)? ☒ No, the low flow threshold is 0.1Q2 (default low flow threshold) ☐ Yes, the result is the low flow threshold is 0.1Q2 ☐ Yes, the result is the low flow threshold is 0.3Q2 ☐ Yes, the result is the low flow threshold is 0.5Q2 *If a geomorphic assessment has been performed, provide title, date, and preparer:* *Discussion / Additional Information: (optional)*

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.

Development of the site will require that the proposed stormwater facilities tie in to the existing downstream infrastructure. The sizing will need to be accommodated both onsite (basin) and offsite (storm drain drain) both vertically and horizontally.

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.

Step 4: Source Control BMP Checklist

Source Control BMPs			
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 County BMP Design Manual for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the source control BMP as described in Chapter 4.2 and/or Appendix E of the County BMP 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?**		
4.2.1 Prevention of Illicit Discharges into the MS4	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.1 not implemented:			
4.2.2 Storm Drain Stenciling or Signage	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.2 not implemented:			
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☐No	☒N/A
Discussion / justification if 4.2.3 not implemented:			
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☐No	☒N/A
Discussion / justification if 4.2.4 not implemented:			

Source Control Requirement	Applied?		
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☐No	☒N/A
Discussion / justification if 4.2.5 not implemented:			
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below):			
☒ A. On-site storm drain inlets	☒Yes	☐No	☐N/A
☐ B. Interior floor drains and elevator shaft sump pumps	☐Yes	☐No	☒N/A
☐ C. Interior parking garages	☐Yes	☐No	☒N/A
☒ D. Need for future indoor & structural pest control	☒Yes	☐No	☐N/A
☒ E. Landscape/outdoor pesticide use	☒Yes	☐No	☐N/A
☐ F. Pools, spas, ponds, fountains, and other water features	☐Yes	☐No	☒N/A
☐ G. Food service	☐Yes	☐No	☒N/A
☐ H. Refuse areas	☐Yes	☐No	☒N/A
☐ I. Industrial processes	☐Yes	☐No	☒N/A
☐ J. Outdoor storage of equipment or materials	☐Yes	☐No	☒N/A
☐ K. Vehicle and equipment cleaning	☐Yes	☐No	☒N/A
☐ L. Vehicle/equipment repair and maintenance	☐Yes	☐No	☒N/A
☐ M. Fuel dispensing areas	☐Yes	☐No	☒N/A
☐ N. Loading docks	☐Yes	☐No	☒N/A
☐ O. Fire sprinkler test water	☐Yes	☐No	☒N/A
☐ P. Miscellaneous drain or wash water	☐Yes	☐No	☒N/A
☒ Q. Plazas, sidewalks, and parking lots	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.			

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

Step 5: Site Design BMP Checklist

Site Design BMPs
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 County BMP Design Manual for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the site design BMP as described in Chapter 4.3 and/or Appendix E of the County BMP 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?		
4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.1 not implemented:			
4.3.2 Conserve Natural Areas, Soils, and Vegetation	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.2 not implemented: Slopes along the projects west side will be conserved as much as possible.			
4.3.3 Minimize Impervious Area	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.3 not implemented: Streets and sidewalks will be constructed to minimum widths necessary as required by the County.			
4.3.4 Minimize Soil Compaction	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.4 not implemented:			
4.3.5 Impervious Area Dispersion	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.5 not implemented: Roof downspouts will be disconnected and be allowed to disperse into the adjacent landscaping.			

Site Design Requirement	Applied?		
4.3.6 Runoff Collection	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.6 not implemented:			
4.3.7 Landscaping with Native or Drought Tolerant Species	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.7 not implemented:			
4.3.8 Harvesting and Using Precipitation	☐Yes	☐No	☒N/A
Discussion / justification if 4.3.8 not implemented:			

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

Step 6: PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP 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 BMP 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 County 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 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the County must confirm the maintenance (see Section 7 of the BMP 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 BMP 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.

This site will include one water quality basin to address pollution control and flow control hydromodification. This BMP was selected based on its effectiveness for pollutant removal and ability to also be used for flow control. In selection of the biofiltration BMP, the following steps were taken as presented in Section 5.1 of the BMP Design Manual.

1. Identified DMAs which were not self-retaining, self-mitigating, or De Minimis.
2. Estimated DCV.
3. Determined that Harvest is not used or is infeasible.
4. Infiltration is partially feasible per geotechnical study. However, at this project phase, no infiltration rates have been determined. Therefore, basin has been conservatively sized to assume no infiltration and is based on a 3% sizing factor.
5. Computed sizing requirements.
6. Design BMPs for DCV per design criteria and considerations listed in the fact sheets.

This project will address storm water pollutant control and hydromodification flow control within a single biofiltration basin facility. The site design of the project is such that all impervious area drainage is collected by inlets and routed to the proposed biofiltration basin. The basin will include engineered soil to aid in the removal of pollutants generated from the developed site. The DCV associated with the site will filter through proposed engineered fill layer. Discharge will be routed through the basin via it's riser which will be sized to allow peak flows through and include orifices along its height to moderate low-flow discharges which aid in flow control hydromodification. Stage discharge of the runoff from the basin's outlet structure will be designed to meet flow-control HMP requirements with thresholds between 0.1Q2–Q10. Small graded slopes along the exterior of the site are considered self-mitigating per Section 5.2.1 of the County of San Diego BMP Design Manual.

(Continue on following page as necessary.)

Description of structural BMP strategy continued **(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)**
(Continued from previous page)

Step 6.2: Structural BMP Checklist

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. BF-1-1	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☒ Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ 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) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☒ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ 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 1.12 of the BMP Design Manual)	Lennar 16465 Via Esprillo, Suite 150 San Diego, CA 92127 (858) 618-4910
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	Category 2
Discussion (as needed): *(Continue on subsequent pages as necessary)*	

Step 6.3: Offsite Alternative Compliance Participation Form

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? ☐ Yes ☐ No	Will your ACP project be completed prior to the completion of the PDP? ☐ Yes ☐ No
Does your ACP account for all Deficits generated by the PDP? ☐ Yes ☐ 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)

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.3-1 (Required) -Worksheet B.1-1 (Required) -Worksheet B.4-1 (if applicable) -Worksheet B.4-2 (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)	☒ Included
Attachment 1b	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	☒ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1c	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☒ Included
Attachment 1d	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.	☒ Included

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)

ATTACHMENT 1a
STORM WATER POLLUTANT CONTROL
WORKSHEETS CALCULATIONS

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	11,832	cubic-feet
	1	Proposed Development Type	Residential	unitless
	2	Number of Residents or Employees at Proposed Development	184	#
	3	Total Planted Area within Development	154,202	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?	Yes	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	343	cubic-feet
	11	Anticipated 1 Acre Landscape Use Over 36 Hours	196.52	cubic-feet
	12	Subtotal: Anticipated Landscape Use Over 36 Hours	696	cubic-feet
	13	Total Anticipated Use Over 36 Hours	1,039	cubic-feet
	14	Total Anticipated Use / Design Capture Volume	0.09	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 ≥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 ≥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.

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	BF-1-1										unitless
	1	Basin Drains to the Following BMP Type	Biofiltration										unitless
	2	85th Percentile 24-hr Storm Depth	0.52										inches
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000										in/hr
	4	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	286,189										sq-ft
	5	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	6	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	154,202										sq-ft
	7	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	8	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	9	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	10	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	12	Impervious Surfaces Directed to Dispersion Area per SD-B (Ci=0.90)											sq-ft
	13	Semi-Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft
	14	Engineered Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.10)											sq-ft
	15	Natural Type A Soil Serving as Dispersion Area per SD-B (Ci=0.10)											sq-ft
	16	Natural Type B Soil Serving as Dispersion Area per SD-B (Ci=0.14)											sq-ft
	17	Natural Type C Soil Serving as Dispersion Area per SD-B (Ci=0.23)											sq-ft
	18	Natural Type D Soil Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft
	19	Number of Tree Wells Proposed per SD-A											#
	20	Average Mature Tree Canopy Diameter											ft
	21	Number of Rain Barrels Proposed per SD-E											#
	22	Average Rain Barrel Size											gal
Treatment Train Inputs & Calculations	23	Does BMP Overflow to Stormwater Features in Downstream Drainage?	No	No	No	No	No	No	No	No	No	No	unitless
	24	Identify Downstream Drainage Basin Providing Treatment in Series											unitless
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas											percent
	26	Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
Initial Runoff Factor Calculation	28	Total Tributary Area	440,391	0	0	0	0	0	0	0	0	0	sq-ft
	29	Initial Runoff Factor for Standard Drainage Areas	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	30	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	31	Initial Weighted Runoff Factor	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	32	Initial Design Capture Volume	11,832	0	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	33	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	34	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	37	Runoff Factor After Dispersion Techniques	0.62	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	38	Design Capture Volume After Dispersion Techniques	11,832	0	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	39	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	40	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	41	Final Adjusted Runoff Factor	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	42	Final Effective Tributary Area	273,042	0	0	0	0	0	0	0	0	0	sq-ft
	43	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Final Design Capture Volume Tributary to BMP	11,832	0	0	0	0	0	0	0	0	0	cubic-feet

Worksheet B.1-1 General Notes:

A. Applicants may use this worksheet to calculate design capture volumes for up to 10 drainage areas User input must be provided for yellow shaded cells, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Upon completion of this worksheet, proceed to the appropriate BMP Sizing worksheet(s).

Automated Worksheet B.5-1: Sizing Lined or Unlined Biofiltration BMPs (V1.3)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	0	Drainage Basin ID or Name	BF-1-1	-	-	-	-	-	-	-	-	-	sq-ft
	1	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	-	-	-	-	-	-	-	-	-	in/hr
	2	Effective Tributary Area	273,042	-	-	-	-	-	-	-	-	-	sq-ft
	3	Minimum Biofiltration Footprint Sizing Factor	0.030	-	-	-	-	-	-	-	-	-	ratio
	4	Design Capture Volume Tributary to BMP	11,832	-	-	-	-	-	-	-	-	-	cubic-feet
	5	Is Biofiltration Basin Impermeably Lined or Unlined?	Lined										unitless
	6	Provided Biofiltration BMP Surface Area	11,162										sq-ft
	7	Provided Surface Ponding Depth	6										inches
	8	Provided Soil Media Thickness	18										inches
	9	Provided Depth of Gravel Above Underdrain Invert	12										inches
	10	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.20										inches
	11	Provided Depth of Gravel Below the Underdrain	3										inches
Retention Calculations	12	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	13	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	14	Gravel Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	15	Effective Retention Depth	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	16	Calculated Retention Storage Drawdown (Including 6 Hr Storm)	120	0	0	0	0	0	0	0	0	0	hours
	17	Volume Retained by BMP	837	0	0	0	0	0	0	0	0	0	cubic-feet
	18	Fraction of DCV Retained	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	19	Portion of Retention Performance Standard Satisfied	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	20	Fraction of DCV Retained (normalized to 36-hr drawdown)	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	21	Design Capture Volume Remaining for Biofiltration	11,359	0	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	22	Max Hydromod Flow Rate through Underdrain	0.0650	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	CFS
	23	Max Soil Filtration Rate Allowed by Underdrain Orifice	0.25	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	in/hr
	24	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	25	Soil Media Filtration Rate to be used for Sizing	0.25	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	26	Depth Biofiltered Over 6 Hour Storm	1.51	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	27	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	28	Effective Depth of Biofiltration Storage	14.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	29	Drawdown Time for Surface Ponding	24	0	0	0	0	0	0	0	0	0	hours
	30	Drawdown Time for Effective Biofiltration Depth	57	0	0	0	0	0	0	0	0	0	hours
	31	Total Depth Biofiltered	15.91	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	32	Option 1 - Biofilter 1.50 DCV: Target Volume	17,039	0	0	0	0	0	0	0	0	0	cubic-feet
	33	Option 1 - Provided Biofiltration Volume	14,797	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Option 2 - Store 0.75 DCV: Target Volume	8,519	0	0	0	0	0	0	0	0	0	cubic-feet
	35	Option 2 - Provided Storage Volume	8,519	0	0	0	0	0	0	0	0	0	cubic-feet
	36	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	39	This BMP Overflows to the Following Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	40	Deficit of Effectively Treated Stormwater	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	cubic-feet

Worksheet B.5-1 General Notes:

A. Applicants may use this worksheet to size Lined or Unlined Biofiltration BMPs (BF-1, PR-1) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red/orange and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

Summary of Stormwater Pollutant Control Calculations (V1.3)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
General Info	0	Drainage Basin ID or Name	BF-1-1	-	-	-	-	-	-	-	-	-	unitless
	1	85th Percentile Storm Depth	0.52	-	-	-	-	-	-	-	-	-	inches
	2	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	-	-	-	-	-	-	-	-	-	in/hr
	3	Total Tributary Area	440,391	-	-	-	-	-	-	-	-	-	sq-ft
	4	85th Percentile Storm Volume (Rainfall Volume)	19,084	-	-	-	-	-	-	-	-	-	cubic-feet
Initial DCV	5	Initial Weighted Runoff Factor	0.62	-	-	-	-	-	-	-	-	-	unitless
	6	Initial Design Capture Volume	11,832	-	-	-	-	-	-	-	-	-	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	273,042	-	-	-	-	-	-	-	-	-	square feet
	10	Final Design Capture Volume Tributary to BMP	11,832	-	-	-	-	-	-	-	-	-	cubic-feet
	11	Basin Drains to the Following BMP Type	Biofiltration	-	-	-	-	-	-	-	-	-	unitless
	12	Volume Retained by BMP (normalized to 36 hour drawdown)	473	-	-	-	-	-	-	-	-	-	cubic-feet
Total Volume Reductions	13	Total Fraction of Initial DCV Retained within DMA	0.04	-	-	-	-	-	-	-	-	-	fraction
	14	Percent of Average Annual Runoff Retention Provided	6.1%	-	-	-	-	-	-	-	-	-	%
	15	Percent of Average Annual Runoff Retention Required	4.5%	-	-	-	-	-	-	-	-	-	%
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

Summary Notes:

All fields in this summary worksheet are populated based on previous user inputs. If applicable, drainage basin elements that require revisions and/or supplemental information outside the scope of these worksheets are highlighted in orange and summairzed in the red text below. If all drainage basins achieve full compliance without a need for supplemental information, a green message will appear below.

-Congratulations, all specified drainage basins and BMPs are in compliance with stormwater pollutant control requirements. Include 11x17 color prints of this summary sheet and supporting worksheet calculations as part of the SWQMP submittal package.

False

ATTACHMENT 1b
FORM I-8, CATEGORIZATION OF
INFILTRATION FEASIBILITY CONDITION

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
1	**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.		X

Provide basis: Based on results of permeability testing in two locations within the proposed basin footprint, the unfactored infiltration rate was measured to be approximately 0.073 and 0.088 inches/hour using a constant head borehole permeameter. If applying a feasibility factor of safety of 2.0, the infiltration rates would be 0.0365 iph and 0.044 iph, which are less than the required threshold value of 0.5 iph. The USDA web soil survey website indicates the underlying soils belong to Diablo Clay. Diablo clay is identified as Hydrologic Soil Group D. Information collected from the USDA website is attached. The Aardvark Permeameter test results are attached. In accordance with the Riverside County storm water procedures, which reference the United States Bureau of Reclamation Well Permeameter Method (USBR 7300), the saturated hydraulic conductivity is equal to the unfactored infiltration rate.

.

2	**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.		X

Provide basis: A liquefaction potential is very low to negligible, and the landslide potential is very low to negligible. Existing utilities are present along the perimeter public roadways within the right of ways. The proposed basin is situated adjacent to an existing 2:1 fill slope. Infiltration of storm water may result in slope instability and daylight water seepage. Mitigation measures would be required to limit the adverse impacts of water infiltration, such as slope instability, daylight water seepage, and lateral water migration that may adversely impact on-site and adjacent foundations, roadways, and public and private improvements.

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants 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.3.	X	
Provide basis: Based on the USGS website, groundwater is expected to be encountered greater than 300 feet below the ground surface. Groundwater is not located within 10 feet from any proposed infiltration BMP, therefore the risk of storm water infiltration BMP's adversely impacting groundwater is considered negligible.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: It is our opinion there are no adverse impacts to groundwater, water balance impacts to stream flow, or impacts on any downstream water rights. It should be noted that researching downstream water rights or evaluating water balance issues to stream flows is beyond the scope of the geotechnical consultant.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		No Full Infiltration

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Form I-8 Page 3 of 4

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.		X

Provide basis: The proposed basin will be founded on approximately 16 feet of compacted fill over granitic rock. The test results indicate poor infiltration rates. Saturating compacted fill should be avoided (see discussion in Appendix C). The adverse impacts of storm water infiltration could be reasonably mitigated to acceptable levels using side liners and subdrains, however it is considered infeasible in this case due to the depth to encounter a suitable infiltration surface (i.e. 16 feet below bottom of proposed basin). Saturation of the compacted fill should be avoided to prevent slope instability, daylight water seepage, settlement, and distress to adjacent structures and improvements.

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.		X

Provide basis: The proposed basin is situated adjacent to an existing 2:1 fill slope. Infiltration of storm water may result in slope instability and daylight water seepage. Ground water mounding is not expected, no landslides are in the vicinity, and utility impacts could be reasonably mitigated using side liners to prevent lateral water migration. We do not recommend saturating the compacted fill. Any partial infiltration BMP should be extended below the compacted fill and into the underlying formational materials. However, partial infiltration is considered infeasible in this case due to the depth to encounter a suitable infiltration surface (i.e. 16 feet below the bottom of the proposed basin).

Form I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Groundwater is not located within 10 feet from any proposed infiltration BMP, therefore the risk of storm water infiltration BMP's adversely impacting groundwater or contributing to the flow of contaminated surface waters into the groundwater table is considered negligible.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Geocon is not aware of any downstream water rights that would be affected by incidental infiltration of storm water. Researching downstream water rights is beyond the scope of the geotechnical consultant.			
Part 2 Result*	If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**		No Infiltration

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

ATTACHMENT 1c
DMA EXHIBIT

SOURCE CONTROL BMPS:

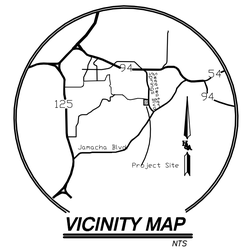
- SC-1 PREVENTION OF ILLICIT DISCHARGES INTO THE MS4
  - -Smart Irrigation Systems
- SC-2 / SC-6a STORM DRAIN STENCILING OR SIGNAGE
- SC-5 PROTECT TRASH STORAGE AREAS FROM RAINFALL
  - -Trash Storage Containers Will Be Required to Have Lids
- SC-6 ON-SITE STORM DRAIN INLETS
  - -Maintain Inlets
- SC-6d NEED FOR FUTURE INDOOR & STRUCTURAL PEST CONTROL
  - -Provide Integrated Pest Management Information to Owners
- SC-6e LANDSCAPE/OUTDOOR PESTICIDE USE
  - -Maintain Landscaping Using Minimum or No Pesticides
- SC-6q PLAZAS, SIDEWALKS AND PARKING LOTS
  - -Sweep Streets Regularly

SITE DESIGN / LID BMPS:

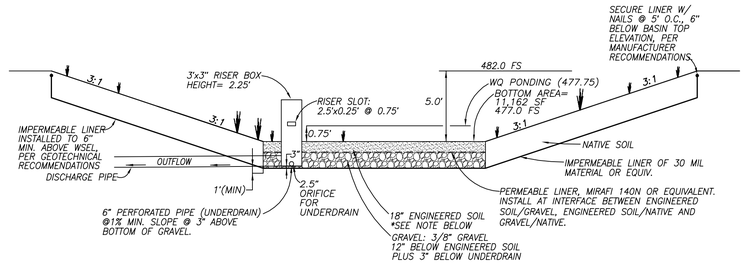
- SD-1 MAINTAIN NATURAL DRAINAGE PATHWAYS & HYDROLOGIC
  - -Conserve Natural Areas Along Site's Exterior Where Possible
- SD-2 CONSERVE NATURAL AREAS, SOILS, AND VEGETATION
  - -Conserve Natural Areas Along Site's Exterior Where Possible
- SD-3 MINIMIZE IMPERVIOUS AREA
  - -Maximize the Amount of Open Space and Landscaping
- SD-4 MINIMIZE SOIL COMPACTION
  - -Where Feasible, Use Minimum Compaction
- SD-5 IMPERVIOUS AREA DISPERSION — TBD
  - -Use Splash Pads At Downspout Discharge Points
- SD-6 RUNOFF COLLECTION
  - -Where Possible, Direct Downspout Discharge to Biofiltration Areas
- SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES

LEGEND

- PROJECT BOUNDARY
- DMA BOUNDARY
- FLOW DIRECTION
- SUBAREA ACREAGE — X ACRES
- DMA ID# — #
- STRUCTURAL BMP ID # — XX-#
- LANDSCAPE-OFFSITE (PERVIOUS, SELF-MITIGATING)
- LANDSCAPE-ONSITE (PERVIOUS)
- ROOFS (IMPERVIOUS)
- STREETS/DRIVEWAYS (IMPERVIOUS)
- SIDEWALKS (IMPERVIOUS)
- BIOFILTRATION AREA (PERVIOUS)
- REC-AREA (SEMI IMPERVIOUS)
- PAVER SECTIONS (PERVIOUS, SELF-MITIGATING)
- PERVIOUS, SELF-MITIGATING



VICINITY MAP
NTS



*"ENGINEERED SOIL" LAYER SHALL BE MINIMUM 18" DEEP "SANDY LOAM" SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50-60% SAND, 20-30% COMPOST, AND 20-30% TOPSOIL.

BASIN #1 (BF-1-1)
NOT TO SCALE

SCALE 1"=50'

SWEETWATER SPRINGS

DMA ID	DMA Surface Type (roof, street, etc.)	DMA Area	DMA Type[1]	Structural BMP ID	Proposed Structural BMP Type[2]	Structural BMP Size[3]
1	Street, roof, sdwk, landscaping	10.11 ac	Drains to BMP	BF-1-1	Biofiltration	Bottom Area= 11,162 sf
2	Landscaping	1.0 ac	Self-mitigating	SM-1	Self-mitigating	1.0 ac

[1] DMA Type can only be: 1) Drains to BMP, 2) Self-mitigating, 3) De Minimis, or 4) Self-retaining
[2] BMP Type must be consistent with terminology in the BMP Design Manual and/or CASQA Fact Sheets
[3] Structural BMP Size is typically presented as an area (sq. ft.) or size (e.g., proprietary devices)
[4] The Biofiltration BMPs are supplemental facilities acting as Treatment Train with Proprietary Flow-Through TCBMPs.

UNDERLYING SOIL GROUP PER NRCS WEBSITE: D
APPROXIMATE DEPTH TO GROUNDWATER > 11.5'
PRESERVATION OF CRITICAL COARSE SEDIMENT NOT REQUIRED

DMA 1	Area (ac.)
Aroof w/ patio	3.41
Street	1.58
Sidewalk	0.34
Driveway	0.77
Active Rec	0.20
Landscape	3.81
A total	10.11

PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
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DMA EXHIBIT FOR:

THE AVENTINE @ Sweetwater Springs

COUNTY OF SAN DIEGO, CALIFORNIA

SHEET 1 OF 1

W.O.# 3321-0024

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ATTACHMENT 1d
INDIVIDUAL STRUCTURAL BMP DMA MAPBOOK

MAPBOOKS WILL BE PRODUCED AT FINAL ENGINEERING PHASE. BMP SUMMARY TABLE AND TYPICAL BASIN DETAIL HAS BEEN INCLUDED AS PLACEHOLDER FOR THIS PRELIMINARY-PHASE 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 BMP Design Manual	☒ Included ☐ Submitted as separate stand-alone document
Attachment 2b	Hydromodification Management Exhibit (Required)	☒ 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 BMP Design Manual.	☒ Exhibit depicting onsite and/or upstream sources of critical coarse sediment as mapped by Regional or Jurisdictional approaches outlined in Appendix H.1 AND, ☒ Demonstration that the project effectively avoids and bypasses sources of mapped critical coarse sediment per approaches outlined in Appendix H.2 and H.3. OR, ☐ Demonstration that project does not generate a net impact on the receiving water per approaches outlined in Appendix H.4.
Attachment 2d	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☒ Not performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☒ Not required because BMPs will drain in less than 96 hours

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)

ATTACHMENT 2a
FLOW CONTROL FACILITY DESIGN

Attachment 2d
Flow Control Facility Design

INTRODUCTION

This HMP analysis for flow control summarizes the approach used to model the proposed Aventine at Sweetwater Springs project site in Spring Valley, CA using the Environmental Protection Agency (EPA) Storm Water Management Model 5.0 (SWMM). SWMM models were prepared for the pre and post developed conditions at the site in order to determine if the proposed biofiltration/detention basin facility has sufficient footprint and volume potential to meet the current Hydromodification Management Plan (HMP) requirements from the Regional Water Quality Control Board (RWQCB).

This HMP analysis addresses areas shown on the Existing and Proposed Condition exhibits located in Attachment 2a.

POC1 is located at the southeast corner discharge location of the site along Sweetwater Springs Blvd. This discharge location is not exempt from flow-control hydromodification since the development will increase the amount of impervious area and unmitigated peak flow. The flow-control analysis for POC1 is discussed in the following sections of this Attachment.

SWMM MODEL DEVELOPMENT

Two (2) SWMM models were prepared for this study for POC1, one for existing conditions and the second for the proposed condition. SWMM was used since it has been found to be more comparable to San Diego area watersheds than the more widely used San Diego Hydrology Model (SDHM). For both SWMM models, flow duration curves were prepared to determine if the proposed hydromodification vault was sufficient to meet the current HMP requirements.

The inputs required to develop SWMM models include rainfall, watershed characteristics, and BMP configurations. The Lower Otay rain gauge station from the Project Clean Water website was selected for this specific site. First, it is closer to the project site when compared to the Kearny Mesa rain gauge station. Additionally, the project site is at an elevation of about +/- 485 feet while the Lower Otay station is at an elevation of 491 feet, which is very close to the site. On the other hand the Kearny Mesa station is at an elevation of 420 feet, so is not only further from the site when compared to the Lower Otay station but it is also 60 plus feet different in elevation. In regards to the Bonita rain gauge station, which is the closest to the site, is at an elevation of 120 feet which is much lower than the elevation of the project site by almost 400 feet in elevation. Therefore the most appropriate rain gauge is the Lower Otay rain gauge.

Evaporation for the site was modeled using average monthly values from the county hourly dataset. The site was modeled with hydrologic soil group D soils as determined from USGS Survey web-based Soil Survey Map. Other SWMM inputs for the subareas are discussed in the Sections to this document where the selection of the parameters is explained in detail.

BASIN MODELING

Developed storm water runoff is routed through the proposed basin located along the southeastern corner of the project site. Flows from the proposed project are collected via inlets and catch basins and conveyed to the biofiltration/hydromodification basin. The basin will consist of engineered soil, gravel, and a riser outlet structure. The treated stormwater discharge from the basin will then confluence with offsite runoff from the brow ditch which is located along the southern boundary and then connected to the existing storm drain along Sweetwater Springs Blvd. The basin is not necessary for peak flow attenuation since the proposed developed flows will be reduced at the POC as determined by the drainage study. This reduction is attributed to the site's current imperviousness being reduced due to the existing site's land use as a shopping mall compared to the proposed multi-family land use. Please refer to the *Drainage Study for the Aventine at Sweetwater Springs* prepared by Hunsaker & Associates San Diego, Inc. for additional hydrologic discussion and calculations.

Basin Discussion:

The proposed basin has been sized to mitigate runoff flows in the range of 10%Q2- Q10. The basin will have a bottom surface area of 11,162 square feet and an effective height of 5.0'. Flow will exit the basin via one (1) 36" storm drain via riser with orifices placed along its height as detailed in the table below.

Basins Table

	Basin BF-1-1
Basin Height (ft)*	5.0
Riser Height (ft)*	2.25
Riser Dimension (ft)	3 x 3
Bottom Effective Surface Area (sf)	11,162
Engineered Fill Thickness (in)	18
Gravel Thickness (in)	15
Lower Slot	
No. of Slot	1
Base x Height (ft)	2.50 x 0.25
Invert Height (ft)*	0.75
Underdrain Orifice	
No. of Orifices	1
Diameter (in)	2.5
Depth below basin bottom (ft)	2.5

*- heights are measured from bottom of mulch.

Once flows have been routed through the respective basin outlet structure, flows are conveyed via a storm drain pipe and exit the site then tie into the existing 54" storm drain along Sweetwater Springs Blvd.

FLOW DURATION CURVE COMPARISON

The Flow Duration Curve (FDC) for the site was compared at the Point of Compliance (POC1) by exporting the hourly runoff time series results from SWMM to a spreadsheet. FDC was compared between 10% of the existing condition Q_2 up to the existing condition Q_{10}. The Q_2 and Q_{10} were determined using a partial duration statistical analysis of the runoff time series in an Excel spreadsheet using the Cunnane plotting position method (which is the preferred plotting methodology in the HMP Permit). As the SWMM Model is a statistical analysis based on the Weibull Plotting Position Method, the Weibull Method was also used within the spreadsheet to ensure that the results were similar to those obtained by the SWMM Model.

The range between 10% of Q_2 and Q_{10} was divided into 100 equal time intervals; the number of hours that each flow rate was exceeded was counted from the hourly series. Additionally, the intermediate peaks with a return period "i" were obtained (Q_i with i=3 to 9). For the purpose of the plot, the values were presented as percentage of time exceeded for each flow rate.

FDC comparison at POC1 is illustrated in Figure 1. POC1 corresponds with the point located downstream of the discharge of the vault. Attachment 2a provides detailed drainage exhibit for the post-developed condition.

As can be seen in Figure 1, the FDC for the proposed condition is within 110% of the curve for the existing condition. The additional runoff volume generated from developing the site will be released to the downstream storm drain at a flow rate below the 10% Q_2 lower threshold. Additionally, the project will also not increase peak flow rates between the Q_2 and the Q_{10}, as shown in the graphic and also in the attached table.

SUMMARY

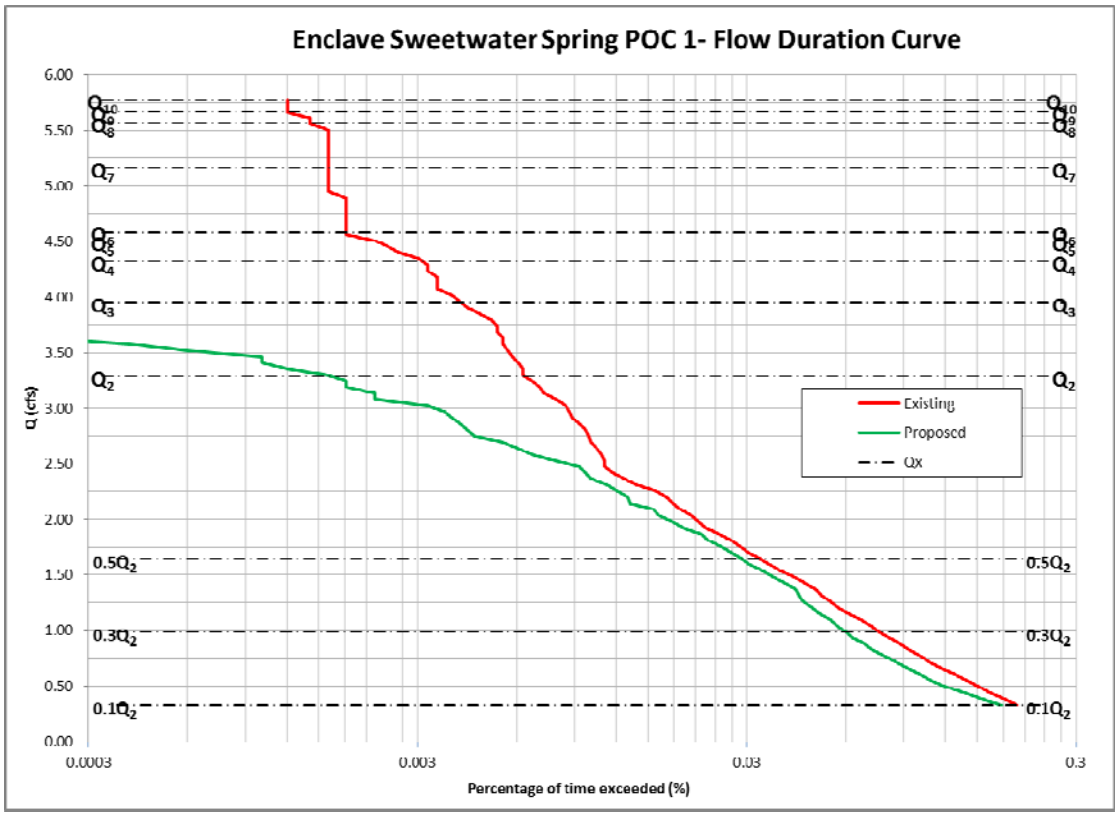
This study has demonstrated that the proposed basin footprint at the Aventine at Sweetwater Springs site is sufficient to meet the current HMP criteria if the basin areas and volumes recommended within this technical memorandum are incorporated within the proposed project site.

KEY ASSUMPTIONS

1. D Soils are representative of the existing condition site.

ATTACHMENTS

1. Q_2 to Q_{10} Comparison Tables
2. FDC Plots (log and natural “x” scale) and Flow Duration Table.
3. List of the “n” largest Peaks: Pre-Development and Post-Development Conditions
4. Elevations vs. Discharge Curves to be used in SWMM & Drawdown Calculations
5. Section sketches
6. SWMM Input Data in Input Format (Existing and Proposed Models)
7. SWMM Screens and Explanation of Significant Variables
8. Geotechnical Documentation
9. Summary files from the SWMM Model



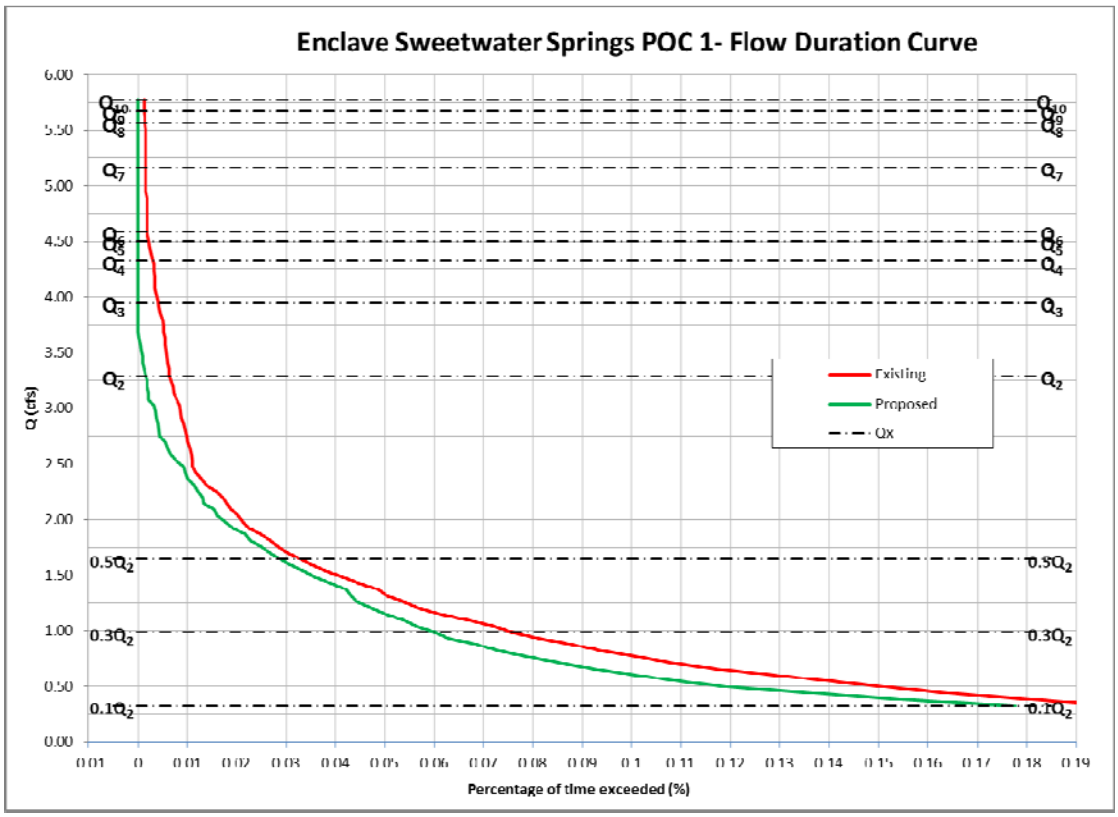


Figure 1a and 1b. Flow Duration Curve Comparison (logarithmic and normal "x" scale)

ATTACHMENT 1

Peak Flow Frequency Comparison Table

ATTACHMENT 1.

Q_2 to Q_{10} Comparison Table – POC 1

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
2-year	3.289	2.217	1.072
3-year	3.949	2.582	1.367
4-year	4.323	2.727	1.596
5-year	4.501	2.997	1.503
6-year	4.587	3.040	1.547
7-year	5.165	3.055	2.110
8-year	5.568	3.114	2.453
9-year	5.670	3.200	2.470
10-year	5.776	3.248	2.529

ATTACHMENT 2

Flow Duration Curve Analysis

ATTACHMENT 2

FLOW DURATION CURVE ANALYSIS

1) Flow duration curve shall not exceed the existing conditions by more than 10%, neither in peak flow nor duration.

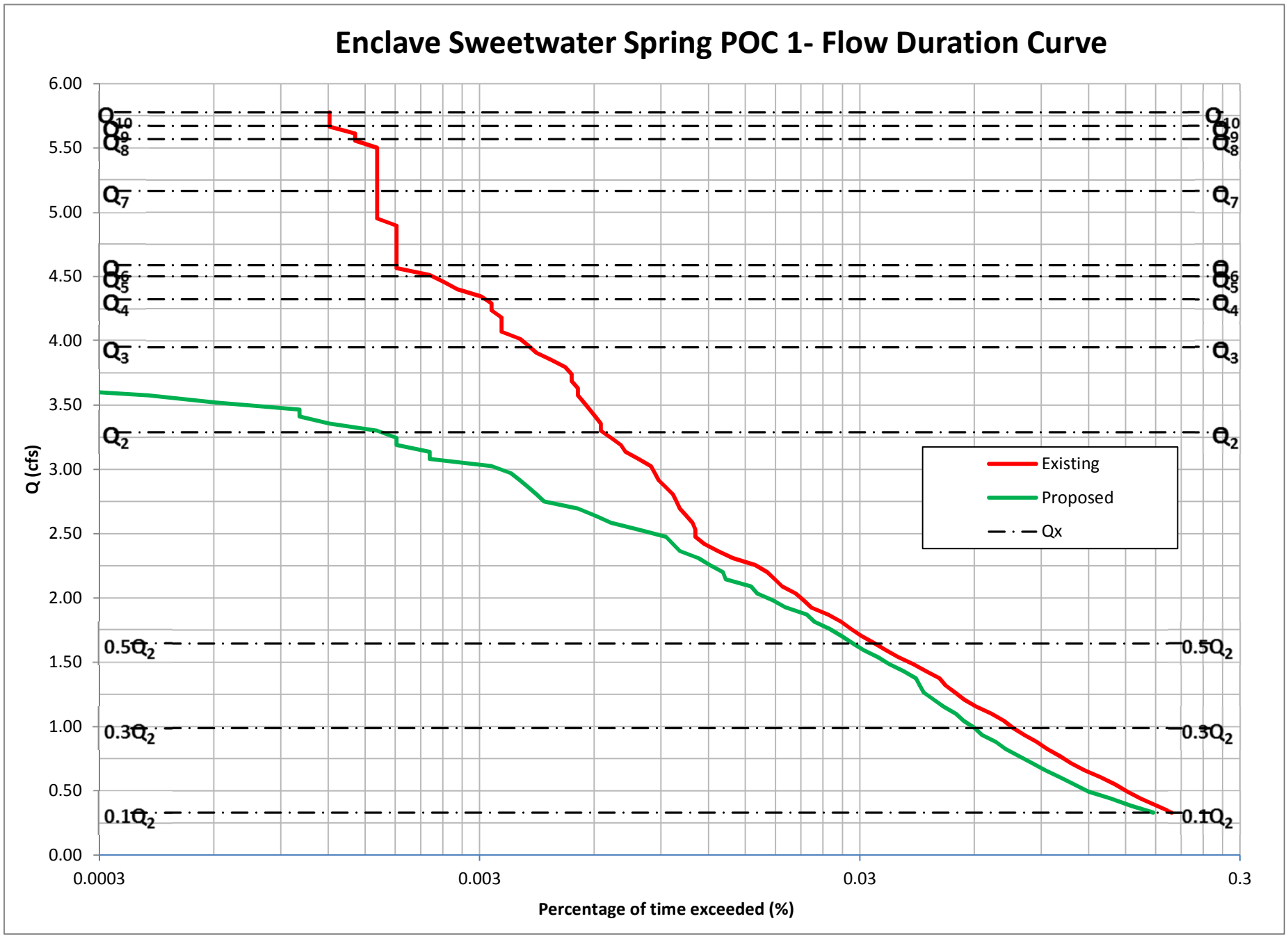
The figures on the following pages illustrate that the flow duration curve in post-development conditions after the proposed BMP is below the existing flow duration curve. The flow duration curve table following the curve shows that if the interval $0.10Q_2 - Q_{10}$ is divided in 100 sub-intervals, then a) the post development divided by pre-development durations are never larger than 110% (the permit allows up to 110%); and b) there are no more than 10 intervals in the range 101%-110% which would imply an excess over 10% of the length of the curve (the permit allows less than 10% of excesses measured as 101-110%).

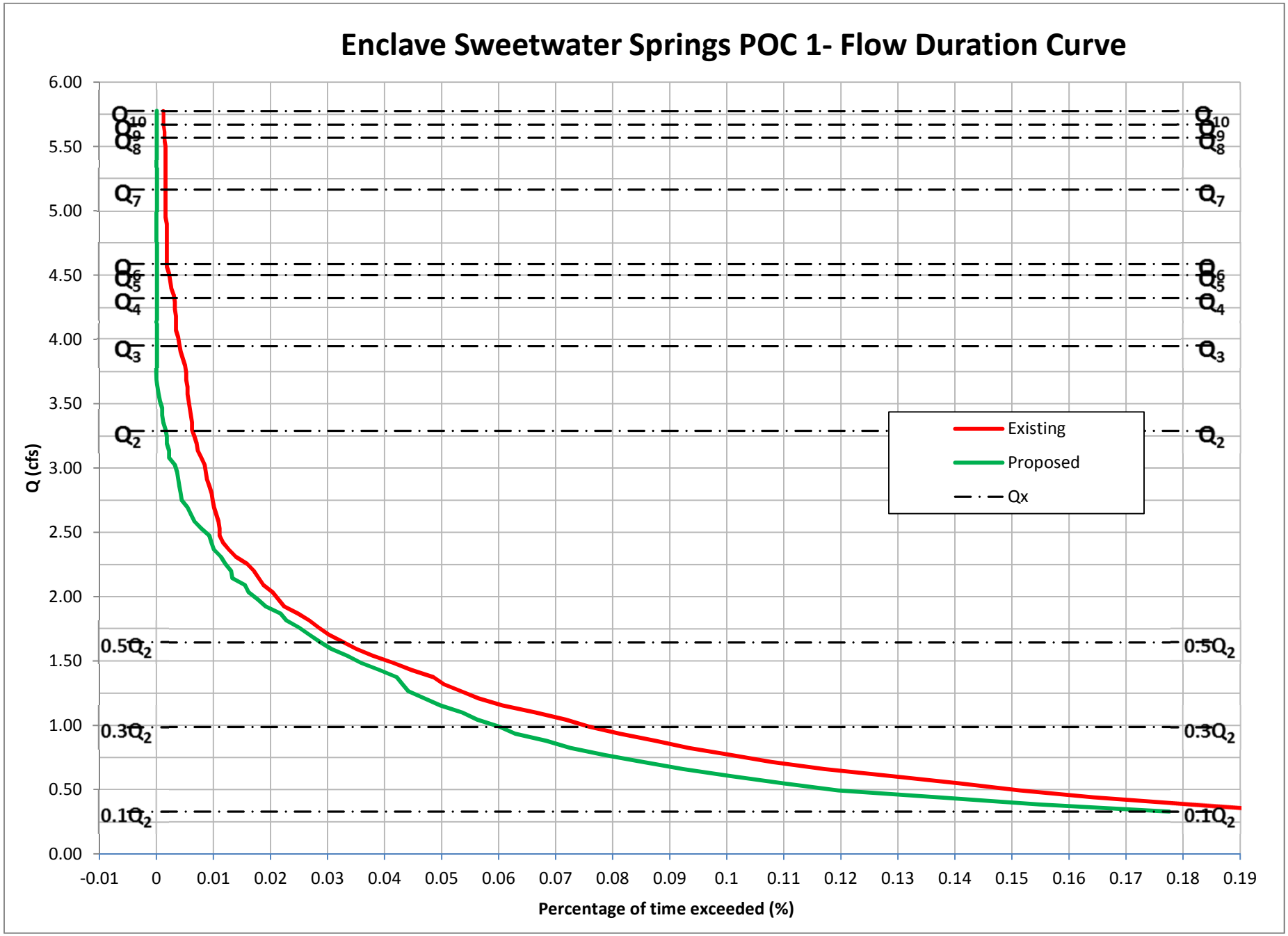
Consequently, the design passes the hydromodification test.

It is important to note that the flow duration curve can be expressed in the "x" axis as percentage of time, hours per year, total number of hours, or any other similar time variable. As those variables only differ by a multiplying constant, their plot in logarithmic scale is going to look exactly the same, and compliance can be observed regardless of the variable selected. However, in order to satisfy the City of Spring Valley HMP example, % of time exceeded is the variable of choice in the flow duration curve. The selection of a logarithmic scale in lieu of the normal scale is preferred, as differences between the pre-development and post-development curves can be seen more clearly in the entire range of analysis. Both graphics are presented just to prove the difference.

In terms of the "y" axis, the peak flow value is the variable of choice. As an additional analysis performed by REC, not only the range of analysis is clearly depicted (10% of Q_2 to Q_{10}) but also all intermediate flows are shown (Q_2, Q_3, Q_4, Q_5, Q_6, Q_7, Q_8 and Q_9) in order to demonstrate compliance at any range $Q_x - Q_{x+1}$. It must be pointed out that one of the limitations of both the SWMM and SDHM models is that the intermediate analysis is not performed (to obtain Q_i from i = 2 to 10). REC performed the analysis using the Cunnane Plotting position Method (the preferred method in the HMP permit) from the "n" largest independent peak flows obtained from the continuous time series.

The largest "n" peak flows are attached in this appendix, as well as the values of Q_i with a return period "i", from i=2 to 10. The Q_i values are also added into the flow-duration plot.


Enclave Sweetwater Spring POC 1- Flow Duration Curve
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Q (cfs)
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx
0.0003
0.003
0.03
0.3
Percentage of time exceeded (%)


Enclave Sweetwater Springs POC 1- Flow Duration Curve
Q (cfs)
Percentage of time exceeded (%)
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
-0.01
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
0.11
0.12
0.13
0.14
0.15
0.16
0.17
0.18
0.19
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx

Flow Duration Curve Data for Enclave Sweetwater Springs, City of Spring Valley CA

Q2 =	3.29	cfs	Fraction	10 %
Q10 =	5.78	cfs		
Step =	0.0550	cfs		
Count =	496008	hours		
	56.58	years		

	Existing Condition			Detention Optimized			Pass or
Interval	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	Fail?
1	0.329	987	1.99E-01	881	1.78E-01	89%	Pass
2	0.384	899	1.81E-01	768	1.55E-01	85%	Pass
3	0.439	815	1.64E-01	680	1.37E-01	83%	Pass
4	0.494	751	1.51E-01	593	1.20E-01	79%	Pass
5	0.549	698	1.41E-01	545	1.10E-01	78%	Pass
6	0.604	640	1.29E-01	500	1.01E-01	78%	Pass
7	0.659	581	1.17E-01	458	9.23E-02	79%	Pass
8	0.714	535	1.08E-01	423	8.53E-02	79%	Pass
9	0.769	500	1.01E-01	390	7.86E-02	78%	Pass
10	0.824	463	9.33E-02	360	7.26E-02	78%	Pass
11	0.879	434	8.75E-02	339	6.83E-02	78%	Pass
12	0.934	403	8.12E-02	312	6.29E-02	77%	Pass
13	0.989	376	7.58E-02	298	6.01E-02	79%	Pass
14	1.044	356	7.18E-02	279	5.62E-02	78%	Pass
15	1.099	330	6.65E-02	266	5.36E-02	81%	Pass
16	1.154	301	6.07E-02	247	4.98E-02	82%	Pass
17	1.209	280	5.65E-02	233	4.70E-02	83%	Pass
18	1.264	265	5.34E-02	219	4.42E-02	83%	Pass
19	1.319	250	5.04E-02	214	4.31E-02	86%	Pass
20	1.374	241	4.86E-02	209	4.21E-02	87%	Pass
21	1.429	222	4.48E-02	194	3.91E-02	87%	Pass
22	1.484	206	4.15E-02	178	3.59E-02	86%	Pass
23	1.539	188	3.79E-02	166	3.35E-02	88%	Pass
24	1.594	174	3.51E-02	152	3.06E-02	87%	Pass
25	1.649	162	3.27E-02	142	2.86E-02	88%	Pass
26	1.705	150	3.02E-02	133	2.68E-02	89%	Pass
27	1.760	141	2.84E-02	124	2.50E-02	88%	Pass
28	1.815	133	2.68E-02	113	2.28E-02	85%	Pass
29	1.870	123	2.48E-02	108	2.18E-02	88%	Pass
30	1.925	111	2.24E-02	95	1.92E-02	86%	Pass
31	1.980	106	2.14E-02	88	1.77E-02	83%	Pass
32	2.035	101	2.04E-02	80	1.61E-02	79%	Pass
33	2.090	93	1.87E-02	77	1.55E-02	83%	Pass
34	2.145	89	1.79E-02	66	1.33E-02	74%	Pass
35	2.200	85	1.71E-02	65	1.31E-02	76%	Pass
36	2.255	79	1.59E-02	60	1.21E-02	76%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
37	2.310	69	1.39E-02	56	1.13E-02	81%	Pass
38	2.365	63	1.27E-02	50	1.01E-02	79%	Pass
39	2.420	58	1.17E-02	48	9.68E-03	83%	Pass
40	2.475	55	1.11E-02	46	9.27E-03	84%	Pass
41	2.530	55	1.11E-02	39	7.86E-03	71%	Pass
42	2.585	54	1.09E-02	33	6.65E-03	61%	Pass
43	2.640	52	1.05E-02	30	6.05E-03	58%	Pass
44	2.695	50	1.01E-02	27	5.44E-03	54%	Pass
45	2.750	49	9.88E-03	22	4.44E-03	45%	Pass
46	2.805	48	9.68E-03	21	4.23E-03	44%	Pass
47	2.860	46	9.27E-03	20	4.03E-03	43%	Pass
48	2.915	44	8.87E-03	19	3.83E-03	43%	Pass
49	2.970	43	8.67E-03	18	3.63E-03	42%	Pass
50	3.025	42	8.47E-03	16	3.23E-03	38%	Pass
51	3.080	39	7.86E-03	11	2.22E-03	28%	Pass
52	3.135	36	7.26E-03	11	2.22E-03	31%	Pass
53	3.190	35	7.06E-03	9	1.81E-03	26%	Pass
54	3.245	33	6.65E-03	9	1.81E-03	27%	Pass
55	3.300	31	6.25E-03	8	1.61E-03	26%	Pass
56	3.355	31	6.25E-03	6	1.21E-03	19%	Pass
57	3.410	30	6.05E-03	5	1.01E-03	17%	Pass
58	3.465	29	5.85E-03	5	1.01E-03	17%	Pass
59	3.520	28	5.65E-03	3	6.05E-04	11%	Pass
60	3.575	27	5.44E-03	2	4.03E-04	7%	Pass
61	3.630	27	5.44E-03	1	2.02E-04	4%	Pass
62	3.685	26	5.24E-03	0	0.00E+00	0%	Pass
63	3.740	26	5.24E-03	0	0.00E+00	0%	Pass
64	3.795	25	5.04E-03	0	0.00E+00	0%	Pass
65	3.850	23	4.64E-03	0	0.00E+00	0%	Pass
66	3.905	21	4.23E-03	0	0.00E+00	0%	Pass
67	3.960	20	4.03E-03	0	0.00E+00	0%	Pass
68	4.016	19	3.83E-03	0	0.00E+00	0%	Pass
69	4.071	17	3.43E-03	0	0.00E+00	0%	Pass
70	4.126	17	3.43E-03	0	0.00E+00	0%	Pass
71	4.181	17	3.43E-03	0	0.00E+00	0%	Pass
72	4.236	16	3.23E-03	0	0.00E+00	0%	Pass
73	4.291	16	3.23E-03	0	0.00E+00	0%	Pass
74	4.346	15	3.02E-03	0	0.00E+00	0%	Pass
75	4.401	13	2.62E-03	0	0.00E+00	0%	Pass
76	4.456	12	2.42E-03	0	0.00E+00	0%	Pass
77	4.511	11	2.22E-03	0	0.00E+00	0%	Pass
78	4.566	9	1.81E-03	0	0.00E+00	0%	Pass
79	4.621	9	1.81E-03	0	0.00E+00	0%	Pass
80	4.676	9	1.81E-03	0	0.00E+00	0%	Pass
81	4.731	9	1.81E-03	0	0.00E+00	0%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
82	4.786	9	1.81E-03	0	0.00E+00	0%	Pass
83	4.841	9	1.81E-03	0	0.00E+00	0%	Pass
84	4.896	9	1.81E-03	0	0.00E+00	0%	Pass
85	4.951	8	1.61E-03	0	0.00E+00	0%	Pass
86	5.006	8	1.61E-03	0	0.00E+00	0%	Pass
87	5.061	8	1.61E-03	0	0.00E+00	0%	Pass
88	5.116	8	1.61E-03	0	0.00E+00	0%	Pass
89	5.171	8	1.61E-03	0	0.00E+00	0%	Pass
90	5.226	8	1.61E-03	0	0.00E+00	0%	Pass
91	5.281	8	1.61E-03	0	0.00E+00	0%	Pass
92	5.336	8	1.61E-03	0	0.00E+00	0%	Pass
93	5.391	8	1.61E-03	0	0.00E+00	0%	Pass
94	5.446	8	1.61E-03	0	0.00E+00	0%	Pass
95	5.501	8	1.61E-03	0	0.00E+00	0%	Pass
96	5.556	7	1.41E-03	0	0.00E+00	0%	Pass
97	5.611	7	1.41E-03	0	0.00E+00	0%	Pass
98	5.666	6	1.21E-03	0	0.00E+00	0%	Pass
99	5.721	6	1.21E-03	0	0.00E+00	0%	Pass
100	5.776	6	1.21E-03	0	0.00E+00	0%	Pass

Peak Flows calculated with Cunnane Plotting Position

Return Period (years)	Pre-dev. Q (cfs)	Post-Dev. Q (cfs)	Reduction (cfs)
10	5.776	3.248	2.529
9	5.670	3.200	2.470
8	5.568	3.114	2.453
7	5.165	3.055	2.110
6	4.587	3.040	1.547
5	4.501	2.997	1.503
4	4.323	2.727	1.596
3	3.949	2.582	1.367
2	3.289	2.217	1.072

ATTACHMENT 3

List of the "n" Largest Peaks: Pre & Post-Developed Conditions

ATTACHMENT 3

List of the "n" Largest Peaks: Pre & Post-Developed Conditions

Basic Probabilistic Equation:

R = 1/P R: Return period (years).

P: Probability of a flow to be equaled or exceeded any given year (dimensionless).

Cunnane Equation:

$$P = \frac{i-0.4}{n+0.2}$$

Weibull Equation:

$$P = \frac{i}{n+1}$$

i: Position of the peak whose probability is desired (sorted from large to small)

n: number of years analyzed.

Explanation of Variables for the Tables in this Attachment

Peak: Refers to the peak flow at the date given, taken from the continuous simulation hourly results of the n year analyzed.

Posit: If all peaks are sorted from large to small, the position of the peak in a sorting analysis is included under the variable Posit.

Date: Date of the occurrence of the peak at the outlet from the continuous simulation

Note: all peaks are not annual maxima; instead they are defined as event maxima, with a threshold to separate peaks of at least 12 hours. In other words, any peak P in a time series is defined as a value where dP/dt = 0, and the peak is the largest value in 25 hours (12 hours before, the hour of occurrence and 12 hours after the occurrence, so it is in essence a daily peak).

List of Peak events and Determination of Q2 and Q10 (Pre-Development)
Enclave Sweetwater Springs - POC 1

T (Year)	Cunnane (cfs)	Weibull (cfs)
10	**5.78**	**5.83**
9	**5.67**	**5.72**
8	**5.57**	**5.60**
7	**5.17**	**5.34**
6	**4.59**	**4.68**
5	**4.50**	**4.52**
4	**4.32**	**4.34**
3	**3.95**	**3.96**
2	**3.29**	**3.29**

Note:
Cunnane is the preferred method by the HMP permit.

Peaks (cfs)	Date	Posit	Period of Return (Years) Weibull	Cunnane
2.271	1/4/2005	57	1.02	1.01
2.286	1/11/2001	56	1.04	1.03
2.322	11/28/1970	55	1.05	1.05
2.334	3/8/1968	54	1.07	1.07
2.339	1/3/1977	53	1.09	1.09
2.378	12/28/1977	52	1.12	1.11
2.397	1/31/1979	51	1.14	1.13
2.407	1/13/1997	50	1.16	1.15
2.434	11/15/1965	49	1.18	1.18
2.458	11/23/1965	48	1.21	1.20
2.542	12/28/1984	47	1.23	1.23
2.586	12/20/1997	46	1.26	1.25
2.637	3/5/1970	45	1.29	1.28
2.689	1/29/1980	44	1.32	1.31
2.7	10/20/2004	43	1.35	1.34
2.779	1/17/1978	42	1.38	1.38
2.852	3/1/1991	41	1.41	1.41
2.883	11/21/1967	40	1.45	1.44
2.913	2/8/1976	39	1.49	1.48
2.945	10/27/2004	38	1.53	1.52
2.974	12/7/1992	37	1.57	1.56
3.072	1/18/1952	36	1.61	1.61
3.087	3/22/1954	35	1.66	1.65
3.093	2/6/1976	34	1.71	1.70
3.133	1/14/1969	33	1.76	1.75
3.198	1/18/1955	32	1.81	1.81
3.199	3/1/1970	31	1.87	1.87
3.279	3/24/1983	30	1.93	1.93
3.289	1/7/1993	29	2.00	2.00
3.463	3/1/1983	28	2.07	2.07
3.503	2/16/1959	27	2.15	2.15
3.538	2/16/1998	26	2.23	2.23
3.795	3/27/1971	25	2.32	2.33
3.804	12/30/1951	24	2.42	2.42
3.81	1/4/1995	23	2.52	2.53
3.865	3/2/1983	22	2.64	2.65
3.865	3/2/1983	21	2.76	2.78
3.918	2/15/1986	20	2.90	2.92
3.977	2/23/2005	19	3.05	3.08
4.029	11/25/1985	18	3.22	3.25
4.048	2/6/1992	17	3.41	3.45
4.23	3/4/1978	16	3.63	3.67
4.305	2/23/1998	15	3.87	3.92
4.368	11/22/1996	14	4.14	4.21
4.381	1/29/1983	13	4.46	4.54
4.491	11/12/1976	12	4.83	4.93
4.556	12/21/1970	11	5.27	5.40
4.565	3/1/1978	10	5.80	5.96
4.93	1/3/2005	9	6.44	6.65
5.52	2/22/2004	8	7.25	7.53
5.635	10/19/1972	7	8.29	8.67
5.799	2/2/1988	6	9.67	10.21
5.997	10/14/2006	5	11.60	12.43
6.357	10/30/1998	4	14.50	15.89
6.624	2/2/1998	3	19.33	22.00
7.008	2/7/1998	2	29.00	35.75
7.414	2/13/1998	1	58.00	95.33

List of Peak events and Determination of Q2 and Q10 (Post-Development)
Enclave Sweetwater Springs - POC 1

T (Year)	Cunnane (cfs)	Weibull (cfs)
10	**3.25**	**3.27**
9	**3.20**	**3.22**
8	**3.11**	**3.15**
7	**3.05**	**3.06**
6	**3.04**	**3.04**
5	**3.00**	**3.01**
4	**2.73**	**2.73**
3	**2.58**	**2.58**
2	**2.22**	**2.22**

Note:
Cunnane is the preferred method by the HMP permit.

Peaks (cfs)	Date	Posit	Period of Return (Years) Weibull	Cunnane
1.57	1/8/1993	57	1.02	1.01
1.584	10/19/1972	56	1.04	1.03
1.589	2/19/2007	55	1.05	1.05
1.607	3/17/1982	54	1.07	1.07
1.642	3/4/1983	53	1.09	1.09
1.662	12/6/1966	52	1.12	1.11
1.704	3/5/1995	51	1.14	1.13
1.727	3/4/1978	50	1.16	1.15
1.742	3/24/1964	49	1.18	1.18
1.742	11/28/1970	48	1.21	1.20
1.748	3/8/1968	47	1.23	1.23
1.776	2/16/1998	46	1.26	1.25
1.816	1/29/1983	45	1.29	1.28
1.856	1/15/1978	44	1.32	1.31
1.89	1/18/1955	43	1.35	1.34
1.906	1/23/1967	42	1.38	1.38
1.917	2/8/1976	41	1.41	1.41
1.925	1/7/1957	40	1.45	1.44
1.928	10/19/2004	39	1.49	1.48
1.948	10/20/2004	38	1.53	1.52
1.977	12/7/1992	37	1.57	1.56
1.984	2/6/1976	36	1.61	1.61
2.011	12/21/1970	35	1.66	1.65
2.029	1/18/1952	34	1.71	1.70
2.084	3/1/1983	33	1.76	1.75
2.107	2/16/1959	32	1.81	1.81
2.114	2/14/1995	31	1.87	1.87
2.139	1/13/1997	30	1.93	1.93
2.217	12/28/1984	29	2.00	2.00
2.221	3/1/1970	28	2.07	2.07
2.245	1/3/2005	27	2.15	2.15
2.268	1/29/1980	26	2.23	2.23
2.31	11/23/1965	25	2.32	2.33
2.344	1/7/1993	24	2.42	2.42
2.35	10/27/2004	23	2.52	2.53
2.479	11/15/1965	22	2.64	2.65
2.511	2/23/1998	21	2.76	2.78
2.58	10/30/1998	20	2.90	2.92
2.584	3/1/1991	19	3.05	3.08
2.599	1/14/1969	18	3.22	3.25
2.645	2/15/1986	17	3.41	3.45
2.669	2/23/2005	16	3.63	3.67
2.724	3/1/1978	15	3.87	3.92
2.735	3/22/1954	14	4.14	4.21
2.847	11/25/1985	13	4.46	4.54
2.992	2/6/1992	12	4.83	4.93
3.027	11/22/1996	11	5.27	5.40
3.039	3/2/1983	10	5.80	5.96
3.048	2/22/2004	9	6.44	6.65
3.065	1/4/1995	8	7.25	7.53
3.184	12/30/1951	7	8.29	8.67
3.258	2/2/1988	6	9.67	10.21
3.355	2/2/1998	5	11.60	12.43
3.393	11/12/1976	4	14.50	15.89
3.5	2/7/1998	3	19.33	22.00
3.555	10/14/2006	2	29.00	35.75
3.634	2/13/1998	1	58.00	95.33

ATTACHMENT 4

Area Vs Elevation & Discharge Vs Elevation

ATTACHMENT 4

AREA VS ELEVATION

The storage provided by the LID BMP is entered into the LID Module within SWMM – please refer to Attachment 7 for further information. For verification, a stage storage relationship for the facilities is provided on the following pages.

DISCHARGE VS ELEVATION

The orifices have been selected to maximize their size while still restricting flows to conform with the required 10% of the Q2 event flow as mandated in the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. While REC acknowledges that these orifices are small, to increase the size of these outlets would impact the basin's ability to restrict flows beneath the HMP thresholds, thus preventing the BMP from conformance with HMP requirements.

In order to further reduce the risk of blockage of the orifices, regular maintenance of the riser and orifices must be performed to ensure potential blockages are minimized. A detail of the orifice and riser structure is provided in Attachment 5 of this memorandum.

The LID low flow orifice discharge relationship is addressed within the LID Module within SWMM – please refer to Attachment 7 for further information.

DRAWDOWN CALCULATIONS

Surface drawdown calculations are provided on the following pages for reference and proof of draining within 24 hours. It is assumed the basin is full to the crest and discharges occur thru all available outlets as well as by infiltration.

DISCHARGE EQUATIONS

1) Weir:

$$Q_W = C_W \cdot L \cdot H^{3/2} \quad (1)$$

2) Slot:

As an orifice: $$Q_s = B_s \cdot h_s \cdot c_g \cdot \sqrt{2g\left(H - \frac{h_s}{2}\right)} \quad (2.a)$$

As a weir: $$Q_s = C_W \cdot B_s \cdot H^{3/2} \quad (2.b)$$

For H > h_s slot works as weir until orifice equation provides a smaller discharge. The elevation such that equation (2.a) = equation (2.b) is the elevation at which the behavior changes from weir to orifice.

3) Vertical Orifices

As an orifice: $$Q_o = 0.25 \cdot \pi D^2 \cdot c_g \cdot \sqrt{2g\left(H - \frac{D}{2}\right)} \quad (3.a)$$

As a weir: Critical depth and geometric family of circular sector must be solved to determined Q as a function of H:

$$\frac{Q_O^2}{g} = \frac{A_{cr}^3}{T_{cr}}; \quad H = y_{cr} + \frac{A_{cr}}{2 \cdot T_{cr}}; \; T_{cr} = 2\sqrt{y_{cr}(D - y_{cr})}\,; \quad A_{cr} = \frac{D^2}{8}[\alpha_{cr} - sin(\alpha_{cr})]\,;$$

$$y_{cr} = \frac{D}{2}[1 - sin(0.5 \cdot \alpha_{cr})] \quad \text{(3.b.1, 3.b.2, 3.b.3, 3.b.4 and 3.b.5)}$$

There is a value of H (approximately H = 110% D) from which orifices no longer work as weirs as critical depth is not possible at the entrance of the orifice. This value of H is obtained equaling the discharge using critical equations and equations (3.b).

A mathematical model is prepared with the previous equations depending on the type o discharge.

The following are the variables used above:

Q_W, Q_s, Q_O = Discharge of weir, slot or orifice (cfs)

C_W, c_g : Coefficients of discharge of weir (typically 3.1) and orifice (0.61 to 0.62)

L, B_s, D, h_s : Length of weir, width of slot, diameter of orifice and height of slot, respectively; (ft)

H: Level of water in the pond over the invert of slot, weir or orifice (ft)

A_{cr}, T_{cr}, y_{cr}, α_{cr}: Critical variables for circular sector: area (sq-ft), top width (ft), critical depth (ft), and angle to the center, respectively.

Basin #1 Stage Storage

depth	area (sq-ft)	area (ac)	elevation	volume (cu-ft)	volume (ac-ft)
0.00	11162	0.26	477.0	0	0.00
0.10	11289	0.26	477.1	449	0.01
0.20	11417	0.26	477.2	903	0.02
0.25	11481	0.26	477.25	1132	0.03
0.30	11546	0.27	477.3	1708	0.04
0.40	11675	0.27	477.4	2869	0.07
0.50	11805	0.27	477.5	4043	0.09
0.60	11936	0.27	477.6	5230	0.12
0.70	12067	0.28	477.7	6430	0.15
0.75	12133	0.28	477.8	7035	0.16
0.80	12199	0.28	477.8	7643	0.18
0.90	12332	0.28	477.9	8870	0.20
1.00	12466	0.29	478.0	10110	0.23
1.10	12600	0.29	478.1	11363	0.26
1.20	12735	0.29	478.2	12630	0.29
1.30	12871	0.30	478.3	13910	0.32
1.40	13007	0.30	478.4	15204	0.35
1.50	13145	0.30	478.5	16512	0.38
1.60	13283	0.30	478.6	17833	0.41
1.70	13421	0.31	478.7	19168	0.44
1.80	13561	0.31	478.8	20517	0.47
1.90	13701	0.31	478.9	21880	0.50
2.00	13842	0.32	479.0	23258	0.53
2.10	13983	0.32	479.1	24649	0.57
2.20	14125	0.32	479.2	26054	0.60
2.30	14268	0.33	479.3	27474	0.63
2.40	14412	0.33	479.4	28908	0.66
2.50	14557	0.33	479.5	30356	0.70
2.60	14702	0.34	479.6	31819	0.73
2.70	14848	0.34	479.7	33297	0.76
2.80	14994	0.34	479.8	34789	0.80
2.90	15141	0.35	479.9	36296	0.83
3.00	15289	0.35	480.0	37817	0.87
3.10	15438	0.35	480.1	39353	0.90
3.20	15588	0.36	480.2	40905	0.94
3.30	15738	0.36	480.3	42471	0.98
3.40	15889	0.36	480.4	44052	1.01
3.50	16040	0.37	480.5	45649	1.05
3.60	16193	0.37	480.6	47260	1.08
3.70	16346	0.38	480.7	48887	1.12
3.80	16499	0.38	480.8	50530	1.16
3.90	16654	0.38	480.9	52187	1.20
4.00	16809	0.39	481.0	53860	1.24
4.10	16965	0.39	481.1	55549	1.28
4.20	17122	0.39	481.2	57254	1.31
4.30	17279	0.40	481.3	58974	1.35
4.40	17437	0.40	481.4	60709	1.39
4.50	17596	0.40	481.5	62461	1.43
4.60	17756	0.41	481.6	64229	1.47
4.70	17916	0.41	481.7	66012	1.52
4.80	18077	0.41	481.8	67812	1.56
4.90	18239	0.42	481.9	69628	1.60
5.00	18401	0.42	482.0	71460	1.64

Outlet structure for Discharge of Basin 1

Discharge vs Elevation Table

Low orifice	1.000 "	Lower slot		Lower Weir		*Note: h = head above the invert of the lowest surface discharge opening. In this case h = 0 ft refers to 0.5' from the top of the mulch layer.
Number of orif:	0	Number of slots:	1	Number of weirs:	0	
Cg-low:	0.62	Invert:	0.00 ft	Invert:	0.00	
		B	2.500 ft	B:	0.00	
Middle orifice	1 "	h_{slot}	0.250 ft			
Number of orif:	0					
Cg-middle:	0.62	Upper slot		Emergency weir		
invert elev:	1.750 ft	Number of slots:	0	Invert:	1.500 ft	
		Invert:	0.00 ft	W:	12.00 ft	
		B:	0.00 ft			
		h_{slot}	0.000 ft			

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.042	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.066	0.000	0.000	0.000	0.066
0.083	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.186	0.000	0.000	0.000	0.186
0.125	1.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.000	0.000	0.000	0.343
0.167	2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.527	0.000	0.000	0.000	0.527
0.208	2.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.737	0.000	0.000	0.000	0.737
0.250	3.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.969	0.000	0.000	0.000	0.969
0.292	3.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.221	0.000	0.000	0.000	1.221
0.333	4.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.396	0.000	0.000	0.000	1.396
0.375	4.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.530	0.000	0.000	0.000	1.530
0.417	5.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.652	0.000	0.000	0.000	1.652
0.458	5.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.766	0.000	0.000	0.000	1.766
0.500	6.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.874	0.000	0.000	0.000	1.874
0.542	6.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.975	0.000	0.000	0.000	1.975
0.583	7.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.071	0.000	0.000	0.000	2.071
0.625	7.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.163	0.000	0.000	0.000	2.163
0.667	8.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.252	0.000	0.000	0.000	2.252
0.708	8.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.337	0.000	0.000	0.000	2.337
0.750	9.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.419	0.000	0.000	0.000	2.419
0.792	9.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.498	0.000	0.000	0.000	2.498
0.833	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.575	0.000	0.000	0.000	2.575
0.875	10.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.650	0.000	0.000	0.000	2.650
0.917	11.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.722	0.000	0.000	0.000	2.722

0.958	11.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.793	0.000	0.000	0.000	2.793
1.000	12.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.862	0.000	0.000	0.000	2.862
1.042	12.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.929	0.000	0.000	0.000	2.929
1.083	13.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.995	0.000	0.000	0.000	2.995
1.125	13.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.060	0.000	0.000	0.000	3.060
1.167	14.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.123	0.000	0.000	0.000	3.123
1.208	14.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.184	0.000	0.000	0.000	3.184
1.250	15.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.245	0.000	0.000	0.000	3.245
1.292	15.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.305	0.000	0.000	0.000	3.305
1.333	16.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.363	0.000	0.000	0.000	3.363
1.375	16.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.421	0.000	0.000	0.000	3.421
1.417	17.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.477	0.000	0.000	0.000	3.477
1.458	17.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.533	0.000	0.000	0.000	3.533
1.500	18.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.588	0.000	0.000	0.000	3.588
1.542	18.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.642	0.000	0.000	0.316	3.958
1.583	19.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.695	0.000	0.000	0.895	4.590
1.625	19.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.747	0.000	0.000	1.644	5.391
1.667	20.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.799	0.000	0.000	2.531	6.330
1.708	20.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.850	0.000	0.000	3.537	7.387
1.750	21.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.900	0.000	0.000	4.650	8.550
1.792	21.500	0.500	0.000	0.000	0.000	0.000	0.000	0.000	3.950	0.000	0.000	5.860	9.809
1.833	22.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	3.999	0.000	0.000	7.159	11.158
1.875	22.500	1.500	0.000	0.000	0.000	0.000	0.000	0.000	4.047	0.000	0.000	8.543	12.590
1.917	23.000	2.000	0.000	0.000	0.000	0.000	0.000	0.000	4.095	0.000	0.000	10.005	14.100
1.958	23.500	2.500	0.000	0.000	0.000	0.000	0.000	0.000	4.143	0.000	0.000	11.543	15.686
2.000	24.000	3.000	0.000	0.000	0.000	0.000	0.000	0.000	4.189	0.000	0.000	13.152	17.342
2.042	24.500	3.500	0.000	0.000	0.000	0.000	0.000	0.000	4.236	0.000	0.000	14.830	19.066
2.083	25.000	4.000	0.000	0.000	0.000	0.000	0.000	0.000	4.282	0.000	0.000	16.574	20.855
2.125	25.500	4.500	0.000	0.000	0.000	0.000	0.000	0.000	4.327	0.000	0.000	18.381	22.708
2.167	26.000	5.000	0.000	0.000	0.000	0.000	0.000	0.000	4.372	0.000	0.000	20.249	24.621
2.208	26.500	5.500	0.000	0.000	0.000	0.000	0.000	0.000	4.416	0.000	0.000	22.177	26.593
2.250	27.000	6.000	0.000	0.000	0.000	0.000	0.000	0.000	4.460	0.000	0.000	24.162	28.622
2.292	27.500	6.500	0.000	0.000	0.000	0.000	0.000	0.000	4.503	0.000	0.000	26.203	30.707
2.333	28.000	7.000	0.000	0.000	0.000	0.000	0.000	0.000	4.547	0.000	0.000	28.299	32.846
2.375	28.500	7.500	0.000	0.000	0.000	0.000	0.000	0.000	4.589	0.000	0.000	30.448	35.037
2.417	29.000	8.000	0.000	0.000	0.000	0.000	0.000	0.000	4.632	0.000	0.000	32.648	37.280
2.458	29.500	8.500	0.000	0.000	0.000	0.000	0.000	0.000	4.673	0.000	0.000	34.899	39.573
2.500	30.000	9.000	0.000	0.000	0.000	0.000	0.000	0.000	4.715	0.000	0.000	37.200	41.915
2.542	30.500	9.500	0.000	0.000	0.000	0.000	0.000	0.000	4.756	0.000	0.000	39.549	44.305
2.583	31.000	10.000	0.000	0.000	0.000	0.000	0.000	0.000	4.797	0.000	0.000	41.946	46.743
2.625	31.500	10.500	0.000	0.000	0.000	0.000	0.000	0.000	4.838	0.000	0.000	44.389	49.226

2.667	32.000	11.000	0.000	0.000	0.000	0.000	0.000	0.000	4.878	0.000	0.000	46.877	51.755
2.708	32.500	11.500	0.000	0.000	0.000	0.000	0.000	0.000	4.917	0.000	0.000	48.429	53.347
2.750	33.000	12.000	0.000	0.000	0.000	0.000	0.000	0.000	4.957	0.000	0.000	49.257	54.214
2.792	33.500	12.500	0.000	0.000	0.000	0.000	0.000	0.000	4.996	0.000	0.000	50.071	55.068
2.833	34.000	13.000	0.000	0.000	0.000	0.000	0.000	0.000	5.035	0.000	0.000	50.873	55.908
2.875	34.500	13.500	0.000	0.000	0.000	0.000	0.000	0.000	5.074	0.000	0.000	51.661	56.735
2.917	35.000	14.000	0.000	0.000	0.000	0.000	0.000	0.000	5.112	0.000	0.000	52.438	57.550
2.958	35.500	14.500	0.000	0.000	0.000	0.000	0.000	0.000	5.150	0.000	0.000	53.204	58.354
3.000	36.000	15.000	0.000	0.000	0.000	0.000	0.000	0.000	5.188	0.000	0.000	53.959	59.146
3.042	36.500	15.500	0.000	0.000	0.000	0.000	0.000	0.000	5.225	0.000	0.000	54.703	59.928
3.083	37.000	16.000	0.000	0.000	0.000	0.000	0.000	0.000	5.262	0.000	0.000	55.437	60.700
3.125	37.500	16.500	0.000	0.000	0.000	0.000	0.000	0.000	5.299	0.000	0.000	56.162	61.461
3.167	38.000	17.000	0.000	0.000	0.000	0.000	0.000	0.000	5.336	0.000	0.000	56.877	62.213
3.208	38.500	17.500	0.000	0.000	0.000	0.000	0.000	0.000	5.372	0.000	0.000	57.584	62.956
3.250	39.000	18.000	0.000	0.000	0.000	0.000	0.000	0.000	5.409	0.000	0.000	58.282	63.690
3.292	39.500	18.500	0.000	0.000	0.000	0.000	0.000	0.000	5.444	0.000	0.000	58.972	64.416
3.333	40.000	19.000	0.000	0.000	0.000	0.000	0.000	0.000	5.480	0.000	0.000	59.654	65.134
3.375	40.500	19.500	0.000	0.000	0.000	0.000	0.000	0.000	5.516	0.000	0.000	60.328	65.843
3.417	41.000	20.000	0.000	0.000	0.000	0.000	0.000	0.000	5.551	0.000	0.000	60.994	66.545
3.458	41.500	20.500	0.000	0.000	0.000	0.000	0.000	0.000	5.586	0.000	0.000	61.654	67.240
3.500	42.000	21.000	0.000	0.000	0.000	0.000	0.000	0.000	5.621	0.000	0.000	62.306	67.927
3.542	42.500	21.500	0.000	0.000	0.000	0.000	0.000	0.000	5.655	0.000	0.000	62.952	68.607
3.583	43.000	22.000	0.000	0.000	0.000	0.000	0.000	0.000	5.690	0.000	0.000	63.591	69.281
3.625	43.500	22.500	0.000	0.000	0.000	0.000	0.000	0.000	5.724	0.000	0.000	64.224	69.947
3.667	44.000	23.000	0.000	0.000	0.000	0.000	0.000	0.000	5.758	0.000	0.000	64.850	70.608
3.708	44.500	23.500	0.000	0.000	0.000	0.000	0.000	0.000	5.792	0.000	0.000	65.471	71.262
3.750	45.000	24.000	0.000	0.000	0.000	0.000	0.000	0.000	5.825	0.000	0.000	66.086	71.911
3.792	45.500	24.500	0.000	0.000	0.000	0.000	0.000	0.000	5.859	0.000	0.000	66.695	72.553
3.833	46.000	25.000	0.000	0.000	0.000	0.000	0.000	0.000	5.892	0.000	0.000	67.298	73.190
3.875	46.500	25.500	0.000	0.000	0.000	0.000	0.000	0.000	5.925	0.000	0.000	67.896	73.821
3.917	47.000	26.000	0.000	0.000	0.000	0.000	0.000	0.000	5.958	0.000	0.000	68.489	74.447
3.958	47.500	26.500	0.000	0.000	0.000	0.000	0.000	0.000	5.990	0.000	0.000	69.077	75.068
4.000	48.000	27.000	0.000	0.000	0.000	0.000	0.000	0.000	6.023	0.000	0.000	69.660	75.683
4.042	48.500	27.500	0.000	0.000	0.000	0.000	0.000	0.000	6.055	0.000	0.000	70.238	76.293
4.083	49.000	28.000	0.000	0.000	0.000	0.000	0.000	0.000	6.087	0.000	0.000	70.812	76.899
4.125	49.500	28.500	0.000	0.000	0.000	0.000	0.000	0.000	6.119	0.000	0.000	71.381	77.500
4.167	50.000	29.000	0.000	0.000	0.000	0.000	0.000	0.000	6.151	0.000	0.000	71.945	78.096
4.208	50.500	29.500	0.000	0.000	0.000	0.000	0.000	0.000	6.182	0.000	0.000	72.505	78.687
4.250	51.000	30.000	0.000	0.000	0.000	0.000	0.000	0.000	6.214	0.000	0.000	73.060	79.274

Drawdown of Basin 1 Surface Volume

Elevation (ft)	Area (sq-ft)	Volume (cu-ft)	Volume (ac-ft)	Q (cfs)	Δ Time (hr)	Cumm. (hr)
5.00	18401	71459	1.640	79.4338	0.00	0.00
4.96	18333	70694	1.623	78.8467	0.00	0.00
4.92	18266	69932	1.605	78.2552	0.00	0.01
4.88	18198	69172	1.588	77.6591	0.00	0.01
4.83	18131	68415	1.571	77.0584	0.00	0.01
4.79	18063	67661	1.553	76.4529	0.00	0.01
4.75	17996	66910	1.536	75.8425	0.00	0.02
4.71	17929	66161	1.519	75.2271	0.00	0.02
4.67	17862	65416	1.502	74.6065	0.00	0.02
4.63	17796	64673	1.485	73.9807	0.00	0.02
4.58	17729	63933	1.468	73.3495	0.00	0.03
4.54	17662	63195	1.451	72.7127	0.00	0.03
4.50	17596	62461	1.434	72.0702	0.00	0.03
4.46	17530	61729	1.417	71.4219	0.00	0.04
4.42	17464	61000	1.400	70.7675	0.00	0.04
4.38	17398	60274	1.384	70.1070	0.00	0.04
4.33	17332	59550	1.367	69.4400	0.00	0.04
4.29	17266	58829	1.351	68.7665	0.00	0.05
4.25	17200	58111	1.334	68.0863	0.00	0.05
4.21	17135	57396	1.318	67.3990	0.00	0.05
4.17	17070	56683	1.301	66.7046	0.00	0.06
4.12	17004	55974	1.285	66.0027	0.00	0.06
4.08	16939	55266	1.269	65.2932	0.00	0.06
4.04	16874	54562	1.253	64.5757	0.00	0.07
4.00	16809	53860	1.236	63.8500	0.00	0.07
3.96	16744	53161	1.220	63.1158	0.00	0.07
3.92	16680	52465	1.204	62.3728	0.00	0.07
3.87	16615	51771	1.189	61.6207	0.00	0.08
3.83	16551	51080	1.173	60.8591	0.00	0.08
3.79	16487	50392	1.157	60.0876	0.00	0.08
3.75	16423	49706	1.141	59.3058	0.00	0.09
3.71	16358	49023	1.125	58.5134	0.00	0.09
3.67	16295	48343	1.110	57.7098	0.00	0.09
3.63	16231	47666	1.094	56.8946	0.00	0.10
3.58	16167	46991	1.079	56.0673	0.00	0.10
3.54	16104	46318	1.063	55.2272	0.00	0.10
3.50	16040	45649	1.048	54.3738	0.00	0.11
3.46	15977	44982	1.033	53.5064	0.00	0.11
3.42	15914	44317	1.017	51.9145	0.00	0.11
3.38	15851	43655	1.002	49.3857	0.00	0.12
3.33	15788	42996	0.987	46.9021	0.00	0.12
3.29	15725	42340	0.972	44.4648	0.00	0.13

3.25	15663	41686	0.957	42.0746	0.00	0.13
3.21	15600	41035	0.942	39.7324	0.00	0.13
3.17	15538	40386	0.927	37.4394	0.00	0.14
3.13	15475	39740	0.912	35.1965	0.00	0.14
3.08	15413	39096	0.898	33.0051	0.01	0.15
3.04	15351	38455	0.883	30.8663	0.01	0.15
3.00	15289	37817	0.868	28.7816	0.01	0.16
2.96	15228	37181	0.854	26.7524	0.01	0.17
2.92	15166	36548	0.839	24.7803	0.01	0.17
2.88	15104	35917	0.825	22.8671	0.01	0.18
2.83	15043	35289	0.810	21.0147	0.01	0.19
2.79	14982	34664	0.796	19.2252	0.01	0.20
2.75	14921	34041	0.781	17.5011	0.01	0.21
2.71	14860	33420	0.767	15.8450	0.01	0.22
2.67	14799	32802	0.753	14.2600	0.01	0.23
2.63	14738	32187	0.739	12.7495	0.01	0.24
2.58	14677	31574	0.725	11.3175	0.01	0.26
2.54	14617	30964	0.711	9.9690	0.02	0.27
2.50	14557	30356	0.697	8.7097	0.02	0.29
2.46	14496	29751	0.683	7.5467	0.02	0.31
2.42	14436	29148	0.669	6.4895	0.02	0.33
2.38	14376	28548	0.655	5.5507	0.03	0.36
2.33	14316	27950	0.642	4.7491	0.03	0.39
2.29	14256	27355	0.628	4.1175	0.04	0.43
2.25	14197	26762	0.614	3.7471	0.04	0.47
2.21	14137	26172	0.601	3.6923	0.04	0.52
2.17	14078	25584	0.587	3.6367	0.04	0.56
2.13	14019	24999	0.574	3.5802	0.05	0.61
2.08	13960	24416	0.561	3.5227	0.05	0.65
2.04	13900	23835	0.547	3.4642	0.05	0.70
2.00	13842	23257	0.534	3.4046	0.05	0.74
1.96	13783	22682	0.521	3.3440	0.05	0.79
1.92	13724	22109	0.508	3.2821	0.05	0.84
1.88	13666	21538	0.494	3.2190	0.05	0.89
1.83	13607	20970	0.481	3.1546	0.05	0.94
1.79	13549	20404	0.468	3.0888	0.05	0.99
1.75	13491	19841	0.455	3.0214	0.05	1.04
1.71	13433	19280	0.443	2.9525	0.05	1.09
1.67	13375	18722	0.430	2.8817	0.05	1.15
1.63	13317	18165	0.417	2.809	0.05	1.20
1.58	13260	17612	0.404	2.734	0.06	1.26
1.54	13202	17060	0.392	2.658	0.06	1.31
1.50	13145	16512	0.379	2.578	0.06	1.37
1.46	13087	15965	0.367	2.496	0.06	1.43
1.42	13030	15421	0.354	2.411	0.06	1.49
1.38	12973	14879	0.342	2.323	0.06	1.56

1.33	12916	14340	0.329	2.231	0.07	1.62
1.29	12860	13803	0.317	2.134	0.07	1.69
1.25	12803	13268	0.305	2.033	0.07	1.76
1.21	12746	12736	0.292	1.926	0.07	1.84
1.17	12690	12206	0.280	1.812	0.08	1.91
1.13	12634	11678	0.268	1.689	0.08	2.00
1.08	12578	11153	0.256	1.556	0.09	2.09
1.04	12522	10630	0.244	1.380	0.10	2.19
1.00	12466	10110	0.232	1.128	0.12	2.30
0.96	12410	9591	0.220	0.896	0.14	2.44
0.92	12354	9076	0.208	0.687	0.18	2.63
0.88	12299	8562	0.197	0.502	0.24	2.87
0.83	12244	8051	0.185	0.346	0.33	3.20
0.79	12188	7542	0.173	0.225	0.49	3.70
0.75	12133	7035	0.162	0.160	0.73	4.43
0.71	12078	6531	0.150	0.160	0.88	5.30
0.67	12023	6028	0.138	0.160	0.87	6.18
0.63	11968	5529	0.127	0.160	0.87	7.05
0.58	11914	5031	0.115	0.160	0.87	7.92
0.54	11859	4536	0.104	0.160	0.86	8.78
0.50	11805	4043	0.093	0.160	0.86	9.64
0.46	11751	3552	0.082	0.160	0.85	10.49
0.42	11697	3064	0.070	0.160	0.85	11.34
0.38	11642	2577	0.059	0.160	0.85	12.19
0.33	11589	2093	0.048	0.160	0.84	13.03
0.29	11535	1612	0.037	0.160	0.84	13.87
0.25	11481	1132	0.026	0.160	0.83	14.71
0.21	11428	941	0.022	0.160	0.33	15.04
0.17	11374	751	0.017	0.160	0.33	15.37
0.13	11321	562	0.013	0.160	0.33	15.70
0.08	11268	374	0.009	0.160	0.33	16.03
0.04	11215	186	0.000	0.160	0.33	16.35
0.00	11162	0	0.000	0.160	0.00	16.35

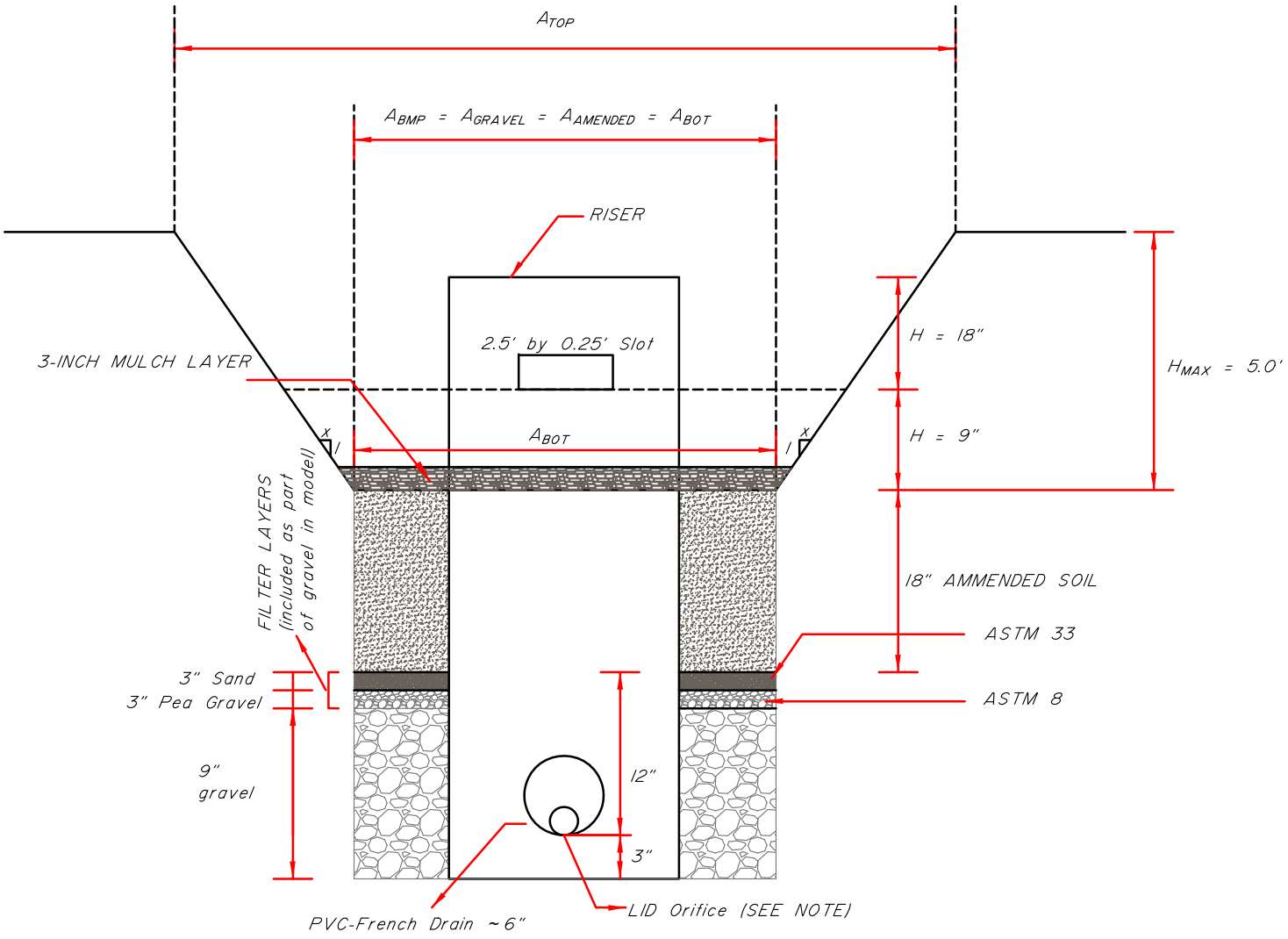
Drawdown Time:	16.35 hrs

ATTACHMENT 5

Section Sketches

BASIN 1 DETAIL

(NOT TO SCALE)



Note: A_{BOT} = 11,162 ft^2
A_{TOP} = 18,401 ft^2
LID Diameter: 1-2.5 inch orifice to be used.
Square Riser: 3' by 3' internal perimeter.

ATTACHMENT 6

SWMM Input Data in Input Format (Existing & Proposed Models)

PRE_DEV

```
[TITLE]

[OPTIONS]
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           08/29/1951
START_TIME           00:00:00
REPORT_START_DATE    08/29/1951
REPORT_START_TIME    00:00:00
END_DATE             03/29/2008
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type       Parameters
;;---------- ----------
MONTHLY      0.07   0.10   0.13   0.17   0.19   0.22   0.24   0.22   0.19   0.13   0.09   0.06
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Lower-Otay       INTENSITY 1:00   1.0    TIMESERIES Lindberg

[SUBCATCHMENTS]
;;                                                 Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
;Existing Area
POC1EXArea       Lower-Otay       POC1Ex           11.11    0        406      2.68     0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
POC1EXArea       0.012      0.05       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
POC1EXArea       9          0.01875    0.33

[OUTFALLS]
;;               Invert     Outfall    Stage/Table      Tide
;;Name           Elev.      Type       Time Series      Gate
;;-------------- ---------- ---------- ---------------- ----
POC1Ex           0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Lindberg Rain Gauge
Lindberg         FILE "Lower Otay.txt"
```

```
[REPORT]
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 816.269 3892.971 2458.654 5750.430
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC1Ex           1740.113           3977.401

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC1EXArea       890.923            5558.444

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Lower-Otay       2384.000           5666.000
```

POST_DEV

```
[TITLE]

[OPTIONS]
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           08/29/1951
START_TIME           00:00:00
REPORT_START_DATE    08/29/1951
REPORT_START_TIME    00:00:00
END_DATE             03/29/2008
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type       Parameters
;;---------- ----------
MONTHLY      0.07   0.10   0.13   0.17   0.19   0.22   0.24   0.22   0.19   0.13   0.09   0.06
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Lower-Otay       INTENSITY 1:00   1.0    TIMESERIES Lindberg

[SUBCATCHMENTS]
;;                                                 Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
;Area Tributary to Basin #4
POC1PRDevArea    Lower-Otay       POC1PRBasin      9.854    66.72    410      1.35     0
;Additional area not tributary to basin
POC1PrBypass     Lower-Otay       POC-1            1.0      0        44       5.33     0
POC1PRBasin      Lower-Otay       Div-1            0.256244 0        10       0.1      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
POC1PRDevArea    0.012      0.05       0.05       0.10       25         OUTLET
POC1PrBypass     0.012      0.05       0.05       0.10       25         OUTLET
POC1PRBasin      0.012      0.05       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
POC1PRDevArea    9          0.01875    0.33
POC1PrBypass     9          0.01875    0.33
POC1PRBasin      9          0.01875    0.33

[LID_CONTROLS]
;;               Type/Layer Parameters
;;-------------- ---------- ----------
BR-1             BC
BR-1             SURFACE    7.56       0.05       0          0          5
```

```
BR-1            SOIL       18         0.4        0.2        0.1        5          5          1.5
BR-1            STORAGE    15         0.67       0          0
BR-1            DRAIN      0.1864     0.5        3          6

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSatur  FromImprv  ToPerv     Report File
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- -----------
POC1PRBasin      BR-1             1       11162      0          0          100        0

[OUTFALLS]
;;               Invert     Outfall    Stage/Table      Tide
;;Name           Elev.      Type       Time Series      Gate
;;-------------- ---------- ---------- ---------------- ----
POC-1            0          FREE                        NO

[DIVIDERS]
;;               Invert     Diverted         Divider
;;Name           Elev.      Link             Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
Div-1            0          Bypass-1         CUTOFF     0.15952    0          0          0          0

[STORAGE]
;;               Invert   Max.     Init.    Storage    Curve                    Ponded   Evap.
;;Name           Elev.    Depth    Depth    Curve      Params                   Area     Frac.    Infiltration
Parameters
;;-------------- -------- -------- -------- ---------- -------- -------- -------- -------- -------- ----------
------
;Basin #4
POC1PRStorage    0        4.25     0        TABULAR    BMP                      18401    1

[CONDUITS]
;;               Inlet            Outlet                        Manning    Inlet      Outlet     Init.      Max.
;;Name           Node             Node             Length       N          Offset     Offset     Flow       Flow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
Bypass-1         Div-1            POC1PRStorage    1          0.01       0          0          0          0
2                Div-1            POC-1            1          0.01       0          0          0          0

[OUTLETS]
;;               Inlet            Outlet           Outflow    Outlet          Qcoeff/                    Flap
;;Name           Node             Node             Height     Type            QTable           Qexpon    Gate
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- ----
OUT              POC1PRStorage    POC-1            0          TABULAR/DEPTH   BMP-OUT                    NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels
;;-------------- ------------ ---------------- ---------- ---------- ---------- ----------
Bypass-1         DUMMY        0                0          0          0          1
2                DUMMY        0                0          0          0          1

[LOSSES]
;;Link           Inlet      Outlet     Average    Flap Gate
;;-------------- ---------- ---------- ---------- ----------

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
BMP-OUT          Rating     0.000      0.000
BMP-OUT                     0.042      0.066
BMP-OUT                     0.083      0.186
BMP-OUT                     0.125      0.343
BMP-OUT                     0.167      0.527
BMP-OUT                     0.208      0.737
BMP-OUT                     0.250      0.969
BMP-OUT                     0.292      1.221
BMP-OUT                     0.333      1.396
BMP-OUT                     0.375      1.530
BMP-OUT                     0.417      1.652
BMP-OUT                     0.458      1.766
BMP-OUT                     0.500      1.874
BMP-OUT                     0.542      1.975
BMP-OUT                     0.583      2.071
```

POST_DEV

BMP-OUT	0.625	2.163
BMP-OUT	0.667	2.252
BMP-OUT	0.708	2.337
BMP-OUT	0.750	2.419
BMP-OUT	0.792	2.498
BMP-OUT	0.833	2.575
BMP-OUT	0.875	2.650
BMP-OUT	0.917	2.722
BMP-OUT	0.958	2.793
BMP-OUT	1.000	2.862
BMP-OUT	1.042	2.929
BMP-OUT	1.083	2.995
BMP-OUT	1.125	3.060
BMP-OUT	1.167	3.123
BMP-OUT	1.208	3.184
BMP-OUT	1.250	3.245
BMP-OUT	1.292	3.305
BMP-OUT	1.333	3.363
BMP-OUT	1.375	3.421
BMP-OUT	1.417	3.477
BMP-OUT	1.458	3.533
BMP-OUT	1.500	3.588
BMP-OUT	1.542	3.958
BMP-OUT	1.583	4.590
BMP-OUT	1.625	5.391
BMP-OUT	1.667	6.330
BMP-OUT	1.708	7.387
BMP-OUT	1.750	8.550
BMP-OUT	1.792	9.809
BMP-OUT	1.833	11.158
BMP-OUT	1.875	12.590
BMP-OUT	1.917	14.100
BMP-OUT	1.958	15.686
BMP-OUT	2.000	17.342
BMP-OUT	2.042	19.066
BMP-OUT	2.083	20.855
BMP-OUT	2.125	22.708
BMP-OUT	2.167	24.621
BMP-OUT	2.208	26.593
BMP-OUT	2.250	28.622
BMP-OUT	2.292	30.707
BMP-OUT	2.333	32.846
BMP-OUT	2.375	35.037
BMP-OUT	2.417	37.280
BMP-OUT	2.458	39.573
BMP-OUT	2.500	41.915
BMP-OUT	2.542	44.305
BMP-OUT	2.583	46.743
BMP-OUT	2.625	49.226
BMP-OUT	2.667	51.755
BMP-OUT	2.708	53.347
BMP-OUT	2.750	54.214
BMP-OUT	2.792	55.068
BMP-OUT	2.833	55.908
BMP-OUT	2.875	56.735
BMP-OUT	2.917	57.550
BMP-OUT	2.958	58.354
BMP-OUT	3.000	59.146
BMP-OUT	3.042	59.928
BMP-OUT	3.083	60.700
BMP-OUT	3.125	61.461
BMP-OUT	3.167	62.213
BMP-OUT	3.208	62.956
BMP-OUT	3.250	63.690
BMP-OUT	3.292	64.416
BMP-OUT	3.333	65.134
BMP-OUT	3.375	65.843
BMP-OUT	3.417	66.545
BMP-OUT	3.458	67.240
BMP-OUT	3.500	67.927
BMP-OUT	3.542	68.607

```
BMP-OUT                     3.583      69.281
BMP-OUT                     3.625      69.947
BMP-OUT                     3.667      70.608
BMP-OUT                     3.708      71.262
BMP-OUT                     3.750      71.911
BMP-OUT                     3.792      72.553
BMP-OUT                     3.833      73.190
BMP-OUT                     3.875      73.821
BMP-OUT                     3.917      74.447
BMP-OUT                     3.958      75.068
BMP-OUT                     4.000      75.683
BMP-OUT                     4.042      76.293
BMP-OUT                     4.083      76.899
BMP-OUT                     4.125      77.500
BMP-OUT                     4.167      78.096
BMP-OUT                     4.208      78.687
BMP-OUT                     4.250      79.274

BMP              Storage    0.00       12133
BMP                         0.05       12199
BMP                         0.15       12332
BMP                         0.25       12466
BMP                         0.35       12600
BMP                         0.45       12735
BMP                         0.55       12871
BMP                         0.65       13007
BMP                         0.75       13145
BMP                         0.85       13283
BMP                         0.95       13421
BMP                         1.05       13561
BMP                         1.15       13701
BMP                         1.25       13842
BMP                         1.35       13983
BMP                         1.45       14125
BMP                         1.55       14268
BMP                         1.65       14412
BMP                         1.75       14557
BMP                         1.85       14702
BMP                         1.95       14848
BMP                         2.05       14994
BMP                         2.15       15141
BMP                         2.25       15289
BMP                         2.35       15438
BMP                         2.45       15588
BMP                         2.55       15738
BMP                         2.65       15889
BMP                         2.75       16040
BMP                         2.85       16193
BMP                         2.95       16346
BMP                         3.05       16499
BMP                         3.15       16654
BMP                         3.25       16809
BMP                         3.35       16965
BMP                         3.45       17122
BMP                         3.55       17279
BMP                         3.65       17437
BMP                         3.75       17596
BMP                         3.85       17756
BMP                         3.95       17916
BMP                         4.05       18077
BMP                         4.15       18239
BMP                         4.25       18401

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Lindberg Rain Gage
Lindberg         FILE "Lower Otay.txt"

[REPORT]
INPUT      NO
```

POST_DEV

```
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 416.952 3594.022 1534.539 5651.988
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            900.000            3687.566
Div-1            900.000            4500.000
POC1PRStorage    0.000              4500.000

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC1PRDevArea    900.000            5558.444
POC1PrBypass     1300.000           4500.000
POC1PRBasin      900.000            4959.350

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Lower-Otay       1483.740           5365.854
```

ATTACHMENT 7

EPA SWMM Figures and Explanations

ATTACHMENT 7

EPA SWMM FIGURES AND EXPLANATIONS

Per the attached, the reader can see the screens associated with the EPA-SWMM Model in both pre-development and post-development conditions. Each portion, i.e., sub-catchments, outfalls, storage units, weir as a discharge, and outfalls (point of compliance), are also shown.

Variables for modeling are associated with typical recommended values by the EPA-SWMM model, typical values found in technical literature (such as Maidment's Handbook of Hydrology). Recommended values for the SWMM model have been attained from the interim Orange County criteria established for their SWMM calibration. Currently, no recommended values have been established by the San Diego County HMP Permit for the SWMM Model.

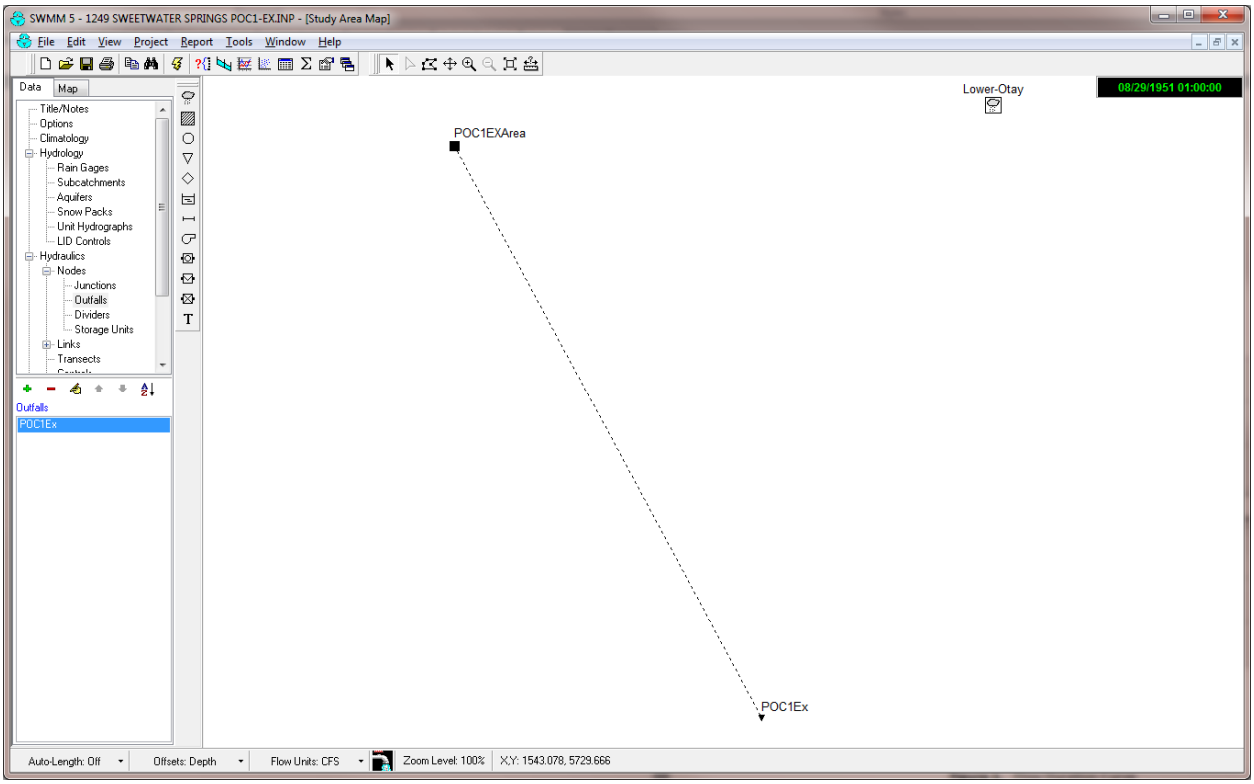
Soil characteristics of the existing soils were determined from the NRCS Web Soil Survey (located in Attachment 8 of this report).

Some values incorporated within the SWMM model have been determined from the professional experience of REC using conservative assumptions that have a tendency to increase the size of the needed BMP and also generate a long-term runoff as a percentage of rainfall similar to those measured in gage stations in Southern California by the USGS.

A Technical document prepared by Tory R Walker Engineering for the Cities of San Marcos, Oceanside and Vista (Reference [1]) can also be consulted for additional information regarding typical values for SWMM parameters.

Manning's roughness coefficients have been based upon the findings of the "*Improving Accuracy in Continuous Hydrologic Modeling: Guidance for Selecting Pervious Overland Flow Manning's n Values in the San Diego Region*" date 2016 by TRW Engineering (Reference [6]).

PRE-DEVELOPED CONDITIONS



Outfall POC1Ex

Property	Value
Name	POC1Ex
X-Coordinate	1740.113
Y-Coordinate	3977.401
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

User-assigned name of outfall

Rain Gage Lower-Otay

Property	Value
Name	Lower-Otay
X-Coordinate	2384.000
Y-Coordinate	5666.000
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	TIMESERIES
TIME SERIES:	
- Series Name	Lindberg
DATA FILE:	
- File Name	*
- Station ID	*
- Rain Units	IN

User-assigned name of rain gage

Subcatchment POC1EXArea

Property	Value
Name	POC1EXArea
X-Coordinate	890.923
Y-Coordinate	5558.444
Description	Existing Area
Tag	
Rain Gage	Lower-Otay
Outlet	POC1Ex
Area	11.11
Width	406
% Slope	2.68
% Imperv	0
N-Imperv	0.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

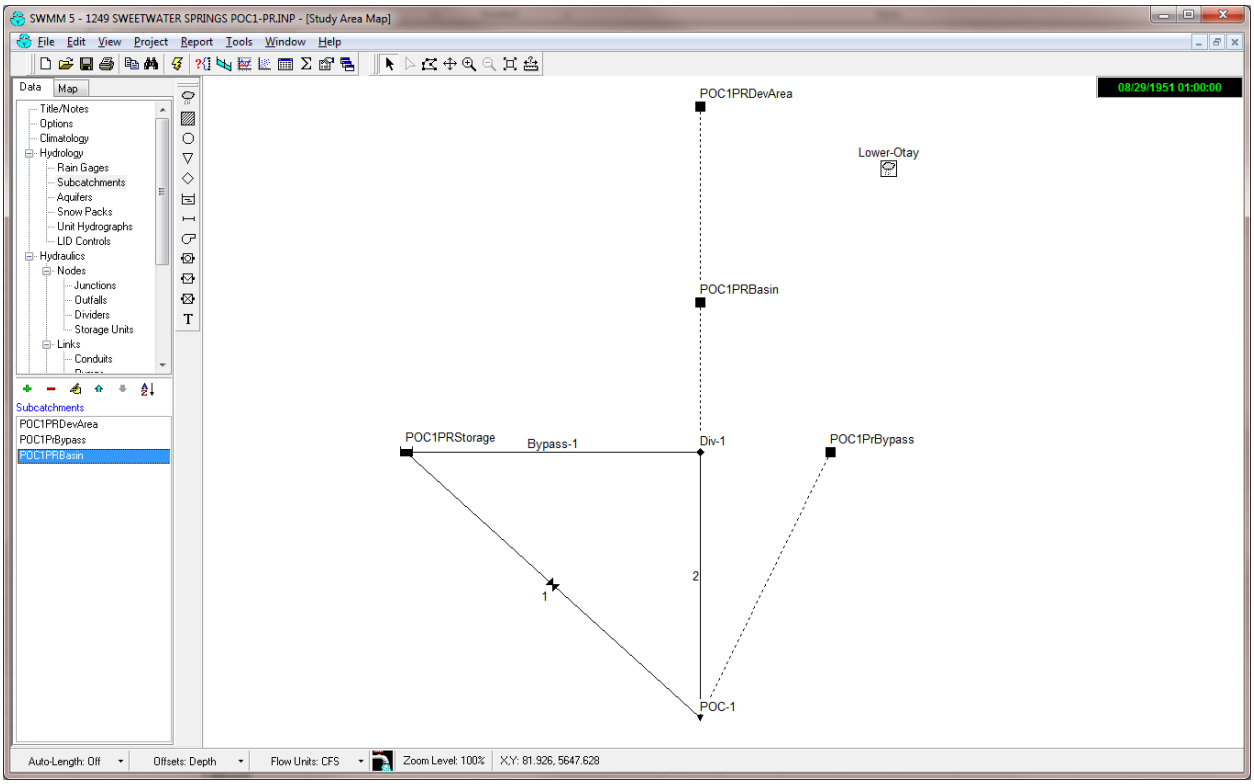
Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.01875
Initial Deficit	0.33

POST-DEVELOPED CONDITIONS



Outfall POC-1

Property	Value
Name	POC-1
X-Coordinate	900.000
Y-Coordinate	3687.566
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

User-assigned name of outfall

Rain Gage Lower-Otay

Property	Value
Name	Lower-Otay
X-Coordinate	1483.740
Y-Coordinate	5365.854
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	TIMESERIES
TIME SERIES:	
- Series Name	Lindberg
DATA FILE:	
- File Name	*
- Station ID	*
- Rain Units	IN

User-assigned name of rain gage

Subcatchment POC1PRDevArea

Property	Value
Name	POC1PRDevArea
X-Coordinate	900.000
Y-Coordinate	5558.444
Description	Area Tributary to Basir
Tag	
Rain Gage	Lower-Otay
Outlet	POC1PRBasin
Area	9.854
Width	410
% Slope	1.35
% Imperv	66.72
N-Imperv	0.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

User-assigned name of subcatchment

Subcatchment POC1PRBasin

Property	Value
Name	POC1PRBasin
X-Coordinate	900.000
Y-Coordinate	4959.350
Description	
Tag	
Rain Gage	Lower-Otay
Outlet	Div-1
Area	0.256244
Width	10
% Slope	0.1
% Imperv	0
N-Imperv	0.012
N-Perv	0.05
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Infiltration Editor

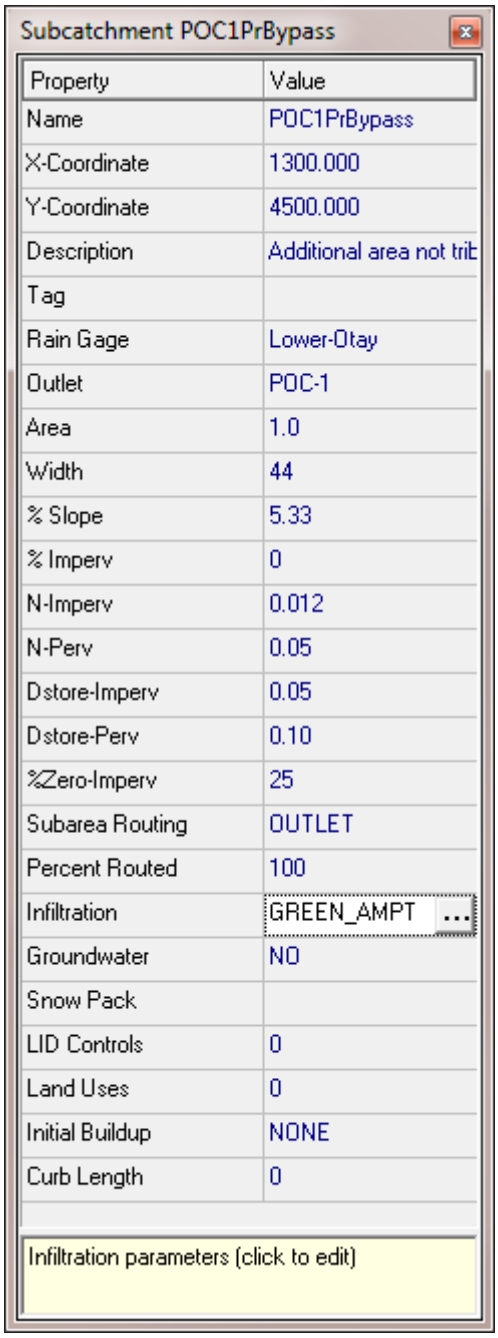
Infiltration Method: GREEN_AMPT

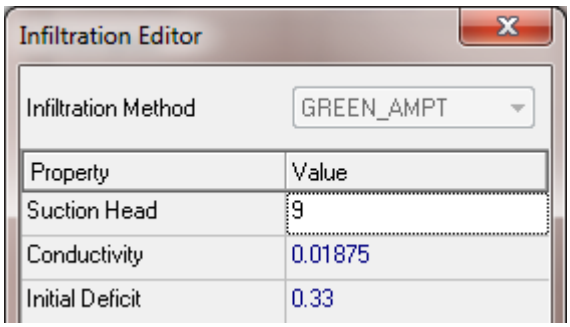
Property	Value
Suction Head	9
Conductivity	0.01875
Initial Deficit	0.33

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.01875
Initial Deficit	0.33


Subcatchment POC1PrBypass
Property
Value
Name
POC1PrBypass
X-Coordinate
1300.000
Y-Coordinate
4500.000
Description
Additional area not trib
Tag
Rain Gage
Lower-Otay
Outlet
POC-1
Area
1.0
Width
44
% Slope
5.33
% Imperv
0
N-Imperv
0.012
N-Perv
0.05
Dstore-Imperv
0.05
Dstore-Perv
0.10
%Zero-Imperv
25
Subarea Routing
OUTLET
Percent Routed
100
Infiltration
GREEN_AMPT
...
Groundwater
NO
Snow Pack
LID Controls
0
Land Uses
0
Initial Buildup
NONE
Curb Length
0
Infiltration parameters (click to edit)


Infiltration Editor
Infiltration Method
GREEN_AMPT
Property
Value
Suction Head
9
Conductivity
0.01875
Initial Deficit
0.33

Detention Basin

Storage Unit POC1PRStorage

Property	Value
Name	POC1PRStorage
X-Coordinate	0.000
Y-Coordinate	4500.000
Description	Basin #4
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Max. Depth	4.25
Initial Depth	0
Ponded Area	18401
Evap. Factor	1
Infiltration	NO ...
Storage Curve	TABULAR
Functional Curve	
Coefficient	1000
Exponent	0
Constant	0
Tabular Curve	
Curve Name	BMP

Click to specify infiltration through the bottom of the storage unit

Outlet OUT

Property	Value
Name	OUT
Inlet Node	POC1PRStorage
Outlet Node	POC-1
Description	
Tag	
Inlet Offset	0
Flap Gate	NO
Rating Curve	TABULAR/DEPTH
Functional Curve	
Coefficient	10.0
Exponent	0.5
Tabular Curve	
Curve Name	BMP-OUT

User-assigned name of outlet

Storage Curve Editor

Curve Name: BMP

Description:

	Depth (ft)	Area (ft2)
1	0.00	12133
2	0.05	12199
3	0.15	12332
4	0.25	12466
5	0.35	12600
6	0.45	12735
7	0.55	12871
8	0.65	13007
9	0.75	13145

Rating Curve Editor

Curve Name: BMP-OUT

Description:

View...

	Head (ft)	Outflow (CFS)
1	0.000	0.000
2	0.042	0.066
3	0.083	0.186
4	0.125	0.343
5	0.167	0.527
6	0.208	0.737
7	0.250	0.969
8	0.292	1.221
9	0.333	1.396

EXPLANATION OF SELECTED VARIABLES

Sub Catchment Areas:

Please refer to the attached diagrams that indicate the DMA and detention BMPs (BMP) sub areas modeled within the project site at both the pre and post developed conditions draining to the POC.

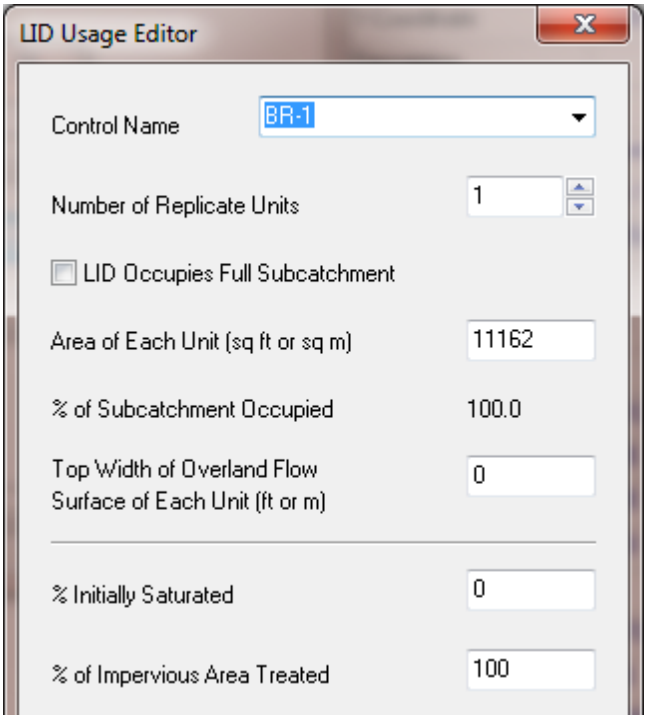
Parameters for the pre- and post-developed models include soil type D as determined from the NRCS websoil survey review (attached at the end of this appendix). Suction head, conductivity and initial deficit corresponds to average values expected for these soils types, according to sources consulted, professional experience, and approximate values obtained by the interim Orange County modeling approach.

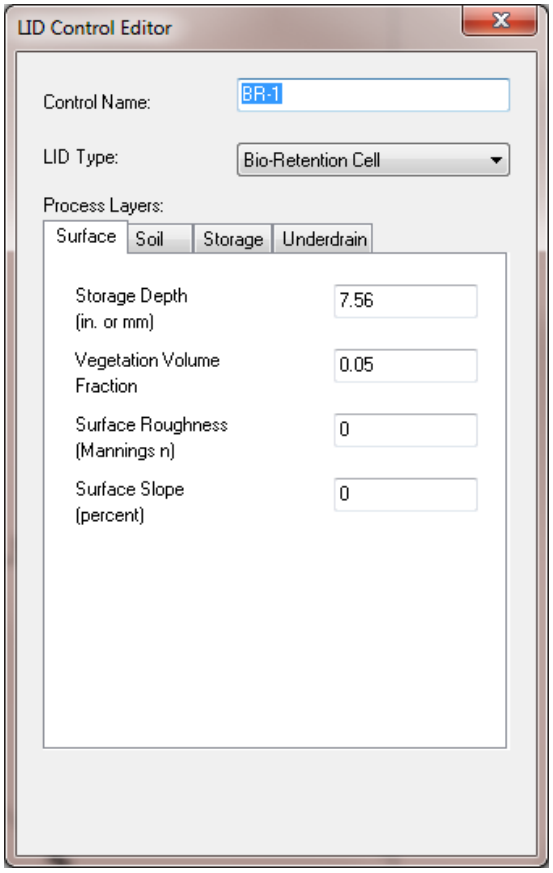
REC selected infiltration values, such that the percentage of total precipitation that becomes runoff, is realistic for the soil types and slightly smaller than measured values for Southern California watersheds.

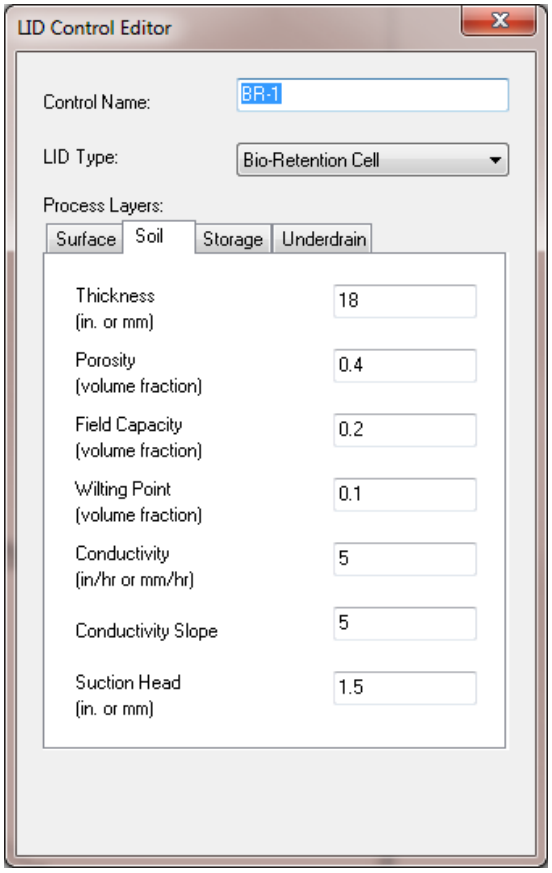
Selection of a Kinematic Approach: As the continuous model is based on hourly rainfall, and the time of concentration for the pre-development and post-development conditions is significantly smaller than 60 minutes, precise routing of the flows through the impervious surfaces, the underdrain pipe system, and the discharge pipe was considered unnecessary. The truncation error of the precipitation into hourly steps is much more significant than the precise routing in a system where the time of concentration is much smaller than 1 hour.

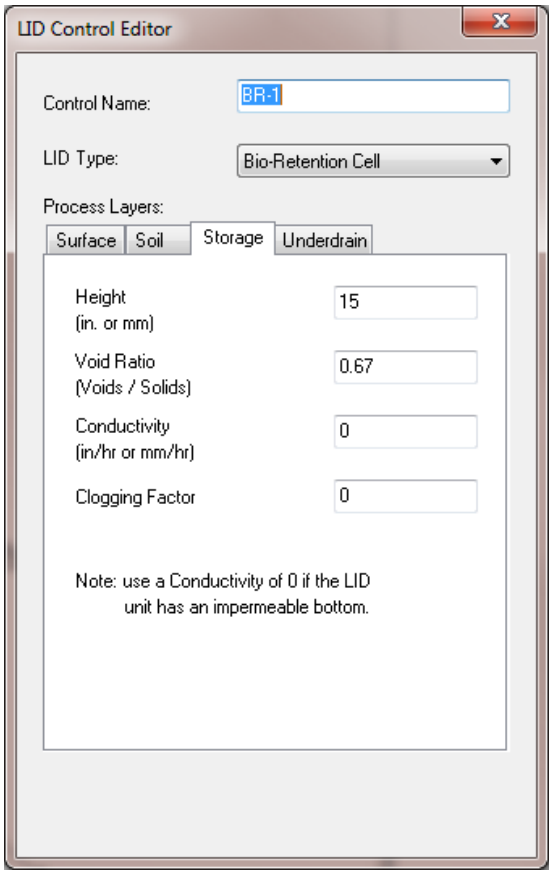
Sub-catchment BMP:

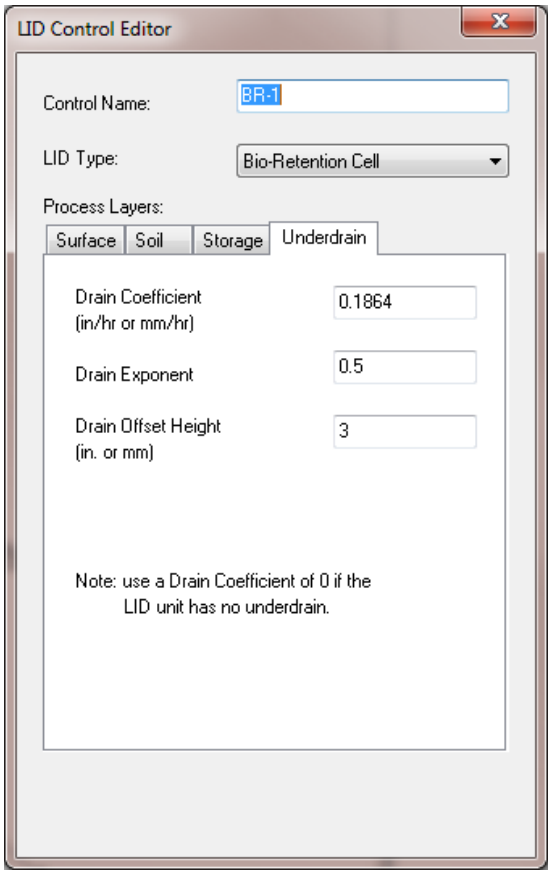
The area of biofiltration must be equal to the area of the development tributary to the biofiltration facility (area that drains into the biofiltration, equal external area plus bio-retention itself). Five (5) decimal places were given regarding the areas of the biofiltration to insure that the area used by the program for the LID subroutine corresponds exactly with this tributary.




LID Control Editor
Control Name:
BR-1
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Storage Depth
(in. or mm)
7.56
Vegetation Volume
Fraction
0.05
Surface Roughness
(Mannings n)
0
Surface Slope
(percent)
0


LID Control Editor
Control Name:
BR-1
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Thickness
(in. or mm)
18
Porosity
(volume fraction)
0.4
Field Capacity
(volume fraction)
0.2
Wilting Point
(volume fraction)
0.1
Conductivity
(in/hr or mm/hr)
5
Conductivity Slope
5
Suction Head
(in. or mm)
1.5


LID Control Editor
Control Name:
BR-1
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Height
(in. or mm)
15
Void Ratio
(Voids / Solids)
0.67
Conductivity
(in/hr or mm/hr)
0
Clogging Factor
0
Note: use a Conductivity of 0 if the LID
unit has an impermeable bottom.


LID Control Editor
Control Name:
BR-1
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Drain Coefficient
(in/hr or mm/hr)
0.1864
Drain Exponent
0.5
Drain Offset Height
(in. or mm)
3
Note: use a Drain Coefficient of 0 if the
LID unit has no underdrain.

LID Control Editor: Explanation of Significant Variables

Storage Depth:

The storage depth variable within the SWMM model is representative of the storage volume provided beneath the surface riser outlet and the surface of the bio filtration facility.

In those cases where the surface storage has a variable area that is also different to the area of the gravel and amended soil, the SWMM model needs to be calibrated as the LID module will use the storage depth multiplied by the BMP area as the amount of volume stored at the surface.

Let A_{BMP} be the area of the BMP (area of amended soil and area of gravel). The proper value of the storage depth S_D to be included in the LID module can be calculated by using geometric properties of the surface volume. Let A_0 be the surface area at the bottom of the surface pond, and let A_i be the surface area at the elevation of the invert of the first row of orifices (or at the invert of the riser if not surface orifices are included). Finally, let h_i be the difference in elevation between A_0 and A_i. By volumetric definition:

$$A_{BMP} \cdot S_D = \frac{(A_0 + A_i)}{2} h_i \qquad (1)$$

Equation (1) allows the determination of S_D to be included as Storage Depth in the LID module. The 3-inches of gravel volume (3-inches x volume of voids (0.4) = 1.2-inches) is then subtracted to this volume.

Porosity: A porosity value of 0.4 has been selected for the model. The amended soil is to be highly sandy in content in order to have a saturated hydraulic conductivity of approximately 5 in/hr.

REC considers such a value to be slightly high; however, in order to comply with the HMP Permit, the value recommended by the Copermittees for the porosity of amended soil is 0.4, per Appendix A of the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. Such porosity is equal to the porosity of the gravel per the same document.

Void Ratio: The ratio of the void volume divided by the soil volume is directly related to porosity as n/(1-n). As the underdrain layer is composed of gravel, a porosity value of 0.4 has been selected (also per Appendix A of the Final HMP document), which results in a void ratio of 0.4/(1-0.4) = 0.67 for the gravel detention layer.

Conductivity: Per the site specific geotechnical investigation for the project site, the design infiltration rate determined by SWQMP Form D-5.1 is 0.110 in/hr.

Clogging factor: A clogging factor was not used (0 indicates that there is no clogging assumed within the model). The reason for this is related to the fairness of a comparison with the SDHM model and the HMP sizing tables: a clogging factor was not considered, and instead, a conservative value of infiltration was recommended.

Drain (Flow) coefficient: The flow coefficient C in the SWMM Model is the coefficient needed to transform the orifice equation into a general power law equation of the form:

$$q = C(H - H_D)^n \quad (2)$$

where q is the peak flow in in/hr, n is the exponent (typically 0.5 for orifice equation), H_D is the elevation of the centroid of the orifice in inches (assumed equal to the invert of the orifice for small orifices and in our design equal to 0) and H is the depth of the water in inches.

The general orifice equation can be expressed as:

$$Q = \frac{\pi}{4} c_g \frac{D^2}{144} \sqrt{2g \frac{(H - H_D)}{12}} \quad (3)$$

where Q is the peak flow in cfs, D is the diameter in inches, c_g is the typical discharge coefficient for orifices (0.61-0.63 for thin walls and around 0.75-0.8 for thick walls), g is the acceleration of gravity in ft/s^2, and H and H_D are defined above and are also used in inches in Equation (3).

It is clear that:

$$q \left(\frac{in}{hr}\right) X \frac{A_{BMP}}{12 \, X \, 3600} = Q \, (cfs) \quad (4)$$

Cut-Off Flow: Q (cfs) and q (in/hr) are also the cutoff flow. For numerical reasons to insure the LID is full, the model uses cut-off = 1.01 Q.

Overland Flow Manning's Coefficient per TRWE (Reference [6])

appeal of a de facto value, we anticipate that jurisdictions will not be inclined to approve land surfaces other than short prairie grass. Therefore, in order to provide SWMM users with a wider range of land surfaces suitable for local application and to provide Copermittees with confidence in the design parameters, we recommend using the values published by Yen and Chow in Table 3-5 of the EPA SWMM Reference Manual Volume I – Hydrology.

SWMM-Endorsed Values Will Improve Model Quality

In January 2016, the EPA released the SWMM Reference Manual Volume I – Hydrology (SWMM Hydrology Reference Manual). The SWMM Hydrology Reference Manual complements the SWMM 5 User's Manual and SWMM 5 Applications Manual by providing an in-depth description of the program's hydrologic components (EPA 2016). Table 3-5 of the SWMM Hydrology Reference Manual expounds upon SWMM 5 User's Manual Table A.6 by providing Manning's *n* values for additional overland flow surfaces[3]. The values are provided in Table 1:

Table 1: Manning's *n* Values for Overland Flow (EPA, 2016; Yen 2001; Yen and Chow, 1983).

Overland Surface	Light Rain (< 0.8 in/hr)	Moderate Rain (0.8-1.2 in/hr)	Heavy Rain (> 1.2 in/hr)
Smooth asphalt pavement	0.010	0.012	0.015
Smooth impervious surface	0.011	0.013	0.015
Tar and sand pavement	0.012	0.014	0.016
Concrete pavement	0.014	0.017	0.020
Rough impervious surface	0.015	0.019	0.023
Smooth bare packed soil	0.017	0.021	0.025
Moderate bare packed soil	0.025	0.030	0.035
Rough bare packed soil	0.032	0.038	0.045
Gravel soil	0.025	0.032	0.045
Mowed poor grass	0.030	0.038	0.045
Average grass, closely clipped sod	0.040	0.050	0.060
Pasture	0.040	0.055	0.070
Timberland	0.060	0.090	0.120
Dense grass	0.060	0.090	0.120
Shrubs and bushes	0.080	0.120	0.180
Land Use			
Business	0.014	0.022	0.035
Semibusiness	0.022	0.035	0.050
Industrial	0.020	0.035	0.050
Dense residential	0.025	0.040	0.060
Suburban residential	0.030	0.055	0.080
Parks and lawns	0.040	0.075	0.120

For purposes of local hydromodification management BMP design, these Manning's *n* values are an improvement upon the values presented by Engman (1986) in SWMM 5 User's Manual Table A.6. Values from SWMM 5 User's Manual Table A.6, while completely suitable for the intended application to certain agricultural land covers, comes with the disclaimer that the provided Manning's *n* values are valid for shallow-depth overland flow that match the conditions in the experimental plots (Engman,

[3] Further discussion is provided on page 6 under "Discussion of Differences Between Manning's *n* Values"

ATTACHMENT 8

Soils Maps

Hydrologic Soil Group—San Diego County Area, California
(The Aventine at Sweetwater Springs)

Map Scale: 1:1,630 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

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.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 12, Sep 13, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaC	Diablo clay, 2 to 9 percent slopes	D	5.8	55.4%
DaE	Diablo clay, 15 to 30 percent slopes	D	0.9	8.5%
DcF	Diablo-Urban land complex, 15 to 50 percent slopes	D	3.8	36.1%
Totals for Area of Interest			**10.5**	**100.0%**

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

ATTACHMENT 9

Summary Files from the SWMM Model

PRE_DEV

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------

***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

***************
Analysis Options
***************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Starting Date ............ AUG-29-1951 00:00:00
Ending Date .............. MAR-29-2008 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Total Precipitation ......       547.769       591.650
Evaporation Loss .........        31.552        34.079
Infiltration Loss ........       440.826       476.140
Surface Runoff ...........        89.591        96.768
Final Surface Storage ....         0.000         0.000
Continuity Error (%) .....        -2.592


*************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        89.591        29.194
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        89.591        29.194
Internal Outflow .........         0.000         0.000
Storage Losses ...........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


**************************
Subcatchment Runoff Summary
**************************

-----------------------------------------------------------------------------------------------------------
                         Total      Total      Total      Total      Total       Total     Peak  Runoff
                        Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff   Coeff
Subcatchment                in         in         in         in         in    10^6 gal      CFS
-----------------------------------------------------------------------------------------------------------
POC1EXArea              591.65       0.00      34.08     476.14      96.77       29.19     7.41   0.164


Analysis begun on:  Wed Dec 12 11:10:58 2018
Analysis ended on:  Wed Dec 12 11:11:13 2018
Total elapsed time: 00:00:15
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------


***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

***************
Analysis Options
***************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ AUG-29-1951 00:00:00
Ending Date .............. MAR-29-2008 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


WARNING 04: minimum elevation drop used for Conduit Bypass-1

WARNING 04: minimum elevation drop used for Conduit 2

*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Total Precipitation ......       547.781       591.650
Evaporation Loss .........       101.775       109.926
Infiltration Loss ........       165.869       179.152
Surface Runoff ...........       284.356       307.128
Final Surface Storage ....         0.000         0.000
Continuity Error (%) .....        -0.770


*************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......       284.355        92.661
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........       283.360        92.337
Internal Outflow .........         0.000         0.000
Storage Losses ...........         0.959         0.313
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.012


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    60.00 sec
Average Time Step           :    60.00 sec
Maximum Time Step           :    60.00 sec
Percent in Steady State     :     0.00
```

Average Iterations per Step : 1.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
POC1PRDevArea	591.65	0.00	90.10	154.59	350.80	93.86	7.74	0.593
POC1PrBypass	591.65	0.00	25.20	467.06	101.70	2.76	0.71	0.172
POC1PRBasin	591.65	13490.26	1203.07	0.00	12919.59	89.89	7.44	0.917

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in	Drain Outflow in	Init. Storage in	Final Storage in	Pcnt. Error
POC1PRBasin	BR-1	14081.91	1203.11	0.00	2707.88	10212.18	0.00	0.00	-0.29

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
POC-1	OUTFALL	0.00	0.00	0.00	0 00:00
Div-1	DIVIDER	0.00	0.00	0.00	0 00:00
POC1PRStorage	STORAGE	0.00	1.43	1.43	16970 17:39

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal
POC-1	OUTFALL	0.71	3.85	16970 17:35	2.761	92.330
Div-1	DIVIDER	7.44	7.44	16970 17:15	89.893	89.893
POC1PRStorage	STORAGE	0.00	7.28	16970 17:15	0.000	19.868

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
Div-1	DIVIDER	496008.02	0.000	0.000
POC1PRStorage	STORAGE	496008.02	1.428	2.822

****

Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
POC1PRStorage	0.007	0	2	18.722	29	16970 17:38	3.49

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal
POC-1	5.05	0.14	3.85	92.330
System	5.05	0.14	3.85	92.330

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
Bypass-1	DUMMY	7.28	16970 17:15			
2	DUMMY	0.16	123 09:19			
OUT	DUMMY	3.49	16970 17:39			

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
Bypass-1	0.01	0.01	0.01	496008.02	0.01
2	0.01	0.01	0.01	496008.02	0.01

Analysis begun on: Wed Dec 19 08:56:07 2018
Analysis ended on: Wed Dec 19 08:56:34 2018
Total elapsed time: 00:00:27

SECTION 9

USGS Soil Map of Project Site

Hydrologic Soil Group—San Diego County Area, California
(The Aventine at Sweetwater Springs)

Map Scale: 1:1,630 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

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.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 12, Sep 13, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
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DaE	Diablo clay, 15 to 30 percent slopes	D	0.9	8.5%
DcF	Diablo-Urban land complex, 15 to 50 percent slopes	D	3.8	36.1%
Totals for Area of Interest			**10.5**	**100.0%**

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.

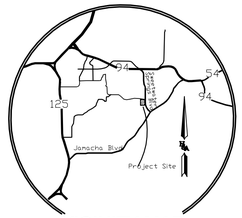
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ATTACHMENT 2b
HYDROMODIFICATION MANAGEMENT
EXHIBIT



VICINITY MAP
NTS

LEGEND

PROJECT BOUNDARY
DMA BOUNDARY
FLOW DIRECTION
SUBAREA ACREAGE — X ACRES
POINT OF COMPLIANCE ID# — #

Sweetwater Springs POC 1 DMA Calculations

Pre-Developed Condition

POC	Neighborhood	% Imperviousness	Total Area	Pervious Area	Impervious Area
1	Natural	0%	11.11	11.11	0.00
1	Residential	40%	0.00	0.00	0.00
1	Roadway/road slope	100%	0.00	0.00	0.00
1	Total	0%	11.11	11.11	0.00

UNDERLYING SOIL GROUP PER NRCS WEBSITE: D
APPROXIMATE DEPTH TO GROUNDWATER > 11.5'
PRESERVATION OF CRITICAL COARSE SEDIMENT NOT REQUIRED

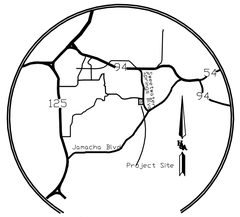
PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 · FX(858)558-1414

EXISTING CONDITION HMOD MAP FOR
THE AVENTINE @ Sweetwater Springs
COUNTY OF SAN DIEGO, CALIFORNIA

SHEET 1 OF 2

W.O.# 5321-0024

R:\1249\Hyd\ACAD\TM\SWQMP\1249- ENCLAVE SWEETWATER- HMOD- EX.dwg[Apr-14-2018 10:31



VICINITY MAP
NTS

LEGEND

- PROJECT BOUNDARY
- DMA BOUNDARY
- FLOW DIRECTION
- SUBAREA ACREAGE — X ACRES
- POINT OF COMPLIANCE ID# — #
- STRUCTURAL BMP ID # — XX-#

Sweetwater Springs POC 1 DMA Calculations					
Post-Developed Condition					
POC	Neighborhood	% Imperviousness	Total Area	Pervious Area	Impervious Area
1-Direct	Natural/ Landscape	0%	1.00	1.00	0.00
1-Direct	Residential-Roadway	40.0%	0.00	0.00	0.00
1-Direct	Direct-Total	0%	1.00	1.00	0.00
1-Basin	Active rec	100%	0.20	0.00	0.20
1-Basin	Basin	0%	0.54	0.54	0.00
1-Basin	Roof/ Street/Sdwk/landscape	68%	9.37	3.00	6.37
1-Basin	Basin-Total	65%	10.11	3.54	6.57
1-Total	Total-Total	59.2%	11.11	4.54	6.57

UNDERLYING SOIL GROUP PER NRCS WEBSITE: D
APPROXIMATE DEPTH TO GROUNDWATER > 11.5'
PRESERVATION OF CRITICAL COARSE SEDIMENT NOT REQUIRED

PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 · FX(858)558-1414

PROPOSED CONDITION HMOD MAP FOR
THE AVENTINE @ Sweetwater Springs
COUNTY OF SAN DIEGO, CALIFORNIA

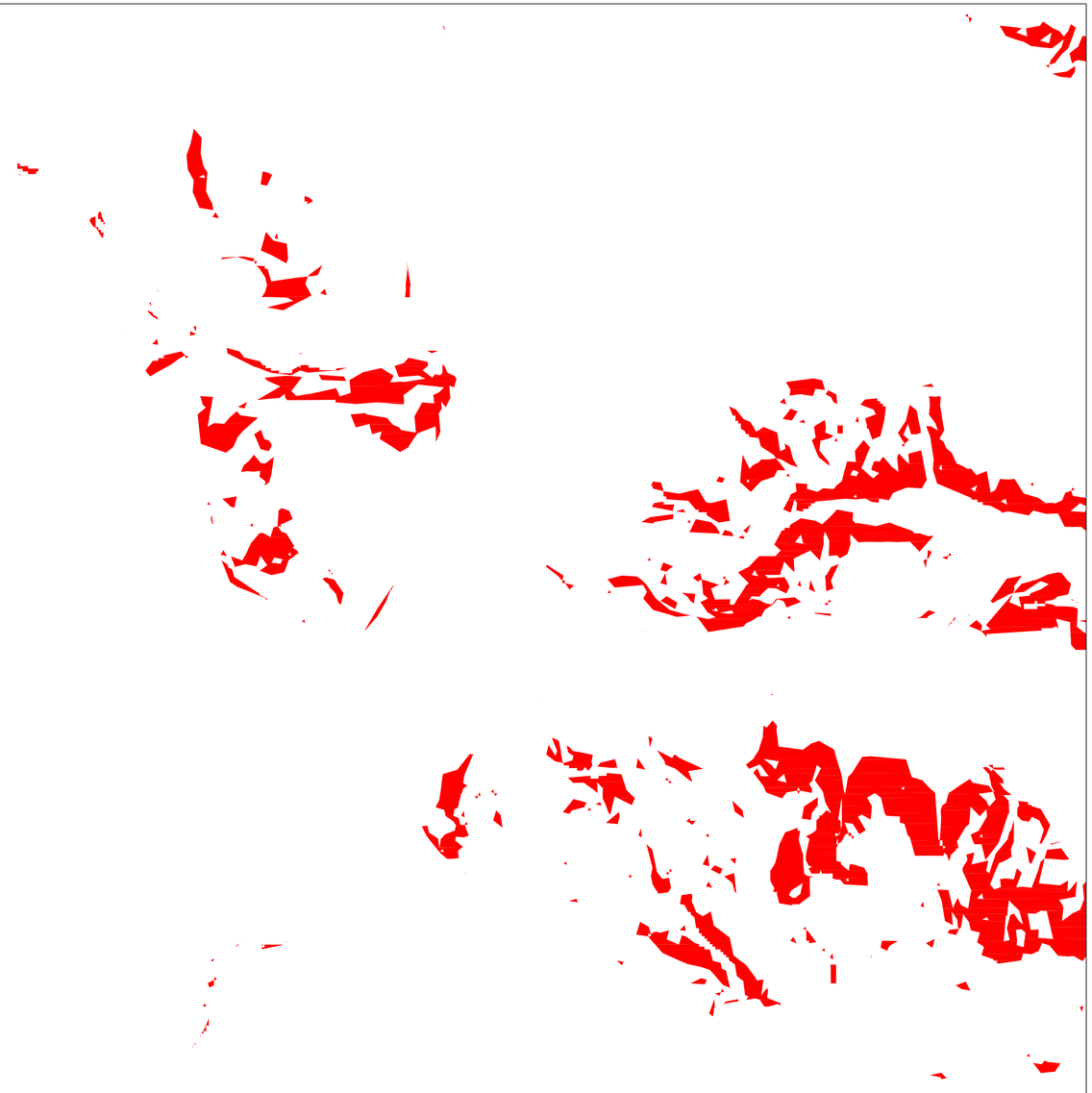
SHEET 2 OF 2

W.O.# 3321-0024

ATTACHMENT 2c
MANAGEMENT OF CRITICAL COARSE SEDIMENT YIELD AREAS

The following exhibit shows the San Diego County WMAA Map over-laid on the project site. Potential Critical Coarse areas are shown to drain through or by pass the site at the northern portion of the site.

PROJECT LOCATION



800 0 800 1,600 2,400

SCALE 1"=800'

LEGEND

CRITICAL COARSE SEDIMENT PER WMAA MAP

UNDERLYING SOIL GROUP PER NRCS WEBSITE: D
APPROXIMATE DEPTH TO GROUNDWATER > 11.5'
PRESERVATION OF CRITICAL COARSE SEDIMENT NOT REQUIRED

PREPARED BY:

HUNSAKER & ASSOCIATES
SAN DIEGO, INC

PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500· FX(858)558-1414

CCYSA EXHIBIT FOR:

THE AVENTINE @ Sweetwater Springs

COUNTY OF SAN DIEGO, CALIFORNIA

SHEET 1 OF 1

W.O.# 5351-0024

R:\1249\Hyd\ACAD\TM\SWGMP\1249- ENCLAVE SWEETWATER- CCSYA.dwg[]Dec-07-2017(10:20

ATTACHMENT 2d
GEOMORPHIC ASSESSMENT OF
RECEIVING CHANNELS

THIS ASSESSMENT WAS NOT PERFORMED FOR THIS PROJECT

ATTACHMENT 2e
VECTOR CONTROL PLAN

VECTOR CONTROL PLAN IS NOT NECESSARY AS BMP DEWATERS WITHIN 96 HRS.

See Section 8 of HMP Flow Control Design for HEC-HMS drawdown calculations

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)	☒ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Stormwater Maintenance Notification / Agreement (when applicable)	☐ Included ☒ Not Applicable

This report is prepared for Tentative Map phase therefore not applicable at this time.

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 BMP 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 County's standard format depending on the Category (PDP applicant to contact County staff to obtain the current maintenance agreement forms). Refer to Section 7.3 in the BMP Design Manual for a description of the different categories.

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

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
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 County must be contacted prior to any additional repairs or reconstruction.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, County staff in the Watershed Protection Program must be contacted prior to any additional repairs or reconstruction.
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm event*	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains (where applicable), or repairing/replacing clogged or compacted soils.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

BMP Maintenance Program

The following inspection and maintenance activities shall be performed and completed as indicated. Question should be directed to the San Diego County Department of Public Works at (858) 694-3810.

Maintenance Program for Inlet Stenciling

Inspection Frequency/Indications:	Regular Maintenance Inspections q Before wet season begins (September); q After wet season (April).
Maintenance Indications	**Maintenance Activities**
q Inlet stenciling/signage begins to weather or fade	q Re-stamp signage
q Broken or damaged structure	q Repair or replace signage structure

Maintenance Program for Riprap Energy Dissipaters

Inspection Frequency/Indications:	Regular Inspection - First Year q Before wet season begins (September); q After wet season (April). Regular Inspection - Subsequent Years q After wet season begins (April). Performance Inspection q After rainfall events greater than 0.5 inches.
Maintenance Indications	**Maintenance Activities**
q Damage to sill, headwall, or other structures	q Repair sill, headwall, or other structures
q Riprap displaced or washed away	q Replace riprap
q Erosion (ruts, rills, or gullies) found downstream of dissipater structure (riprap apron).	q Extend riprap apron, reposition, increase riprap coverage to fully cover eroded area.
q Over-grown vegetation, emergent woody vegetation and/or weeds	q Trim vegetation to 6 inches, remove emergent woody vegetation and weeds
q Sediment accumulation over 3 inches	q Remove sediment accumulation
q Trash and litter present in riprap	q Remove trash and debris
Waste Disposal	Sediment, other pollutants, and all other waste shall be properly disposed of in a licensed landfill or by another appropriate disposal method in accordance with local, state, and federal regulations.

ATTACHMENT 4

County of San Diego PDP Structural BMP Verification for Permitted Land Development Projects

This form must be accepted by the County prior to the release of construction permits or granting of occupancy for applicable portions of a Priority Development Project (PDP). Applicants are responsible for providing all requested information. Do not leave any fields blank; indicate N/A for any requested item that is not applicable.

PART 1 General Project and Applicant Information

Table 1: Project and Applicant Information

A. Project Summary Information	**ID No. IVF-20__-____ To be assigned by DPW-WPP**
Project Name	Click here to enter text.
Record ID (e.g., grading/improvement plan number, building permit)	Click here to enter text.
Project Address	Click here to enter text.
Assessor's Parcel Number(s) APN(s))	Click here to enter text.
Project Watershed (complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	Click here to enter text.
B. Owner Information	
Name	Click here to enter text.
Address	Click here to enter text.
Email Address	Click here to enter text.
Phone Number	Click here to enter text.

Document previously verified BMPs for the PDP in Table 2. Include the Verification Form ID No. from Page 1 if one was issued.

**** DO NOT INCLUDE THIS PAGE UNLESS THIS IS A PARTIAL RECORD PLAN VERIFICATION ****

Table 2: Information on Verifications for Partial Record Plans Only

A: Previous Submittals

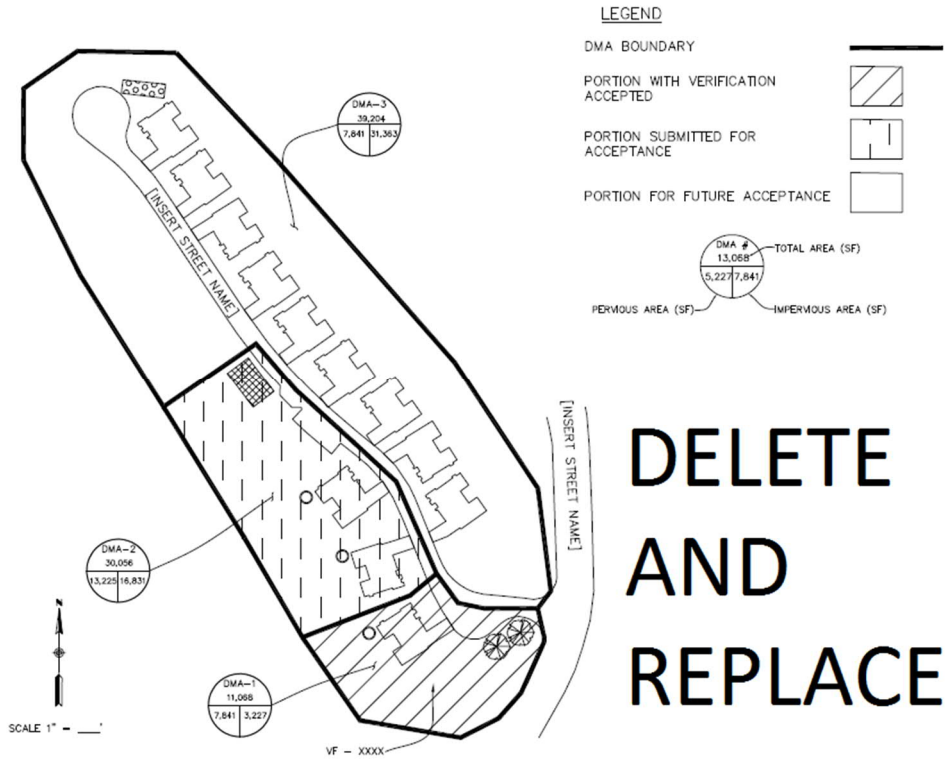
Previous Submittals	Submittal Date	Installation Verification Form ID No. if applicable (e.g., 2016-001)
1	Enter date.	Click here to enter text.
2	Enter date.	Click here to enter text.
3	Enter date.	Click here to enter text.
4	Enter date.	Click here to enter text.
5	Enter date.	Click here to enter text.

Add rows as needed

B: DMA and BMP Map

Please attach a map showing (1) all DMAs for the project site, (2) the DMAs and/or lots accepted under previous Verification Forms, and (3) the locations of Structural BMPs and Significant Site Design BMPs previously accepted OR listed in Table 3 of this Verification Form.

SAMPLE DMA MAP



PART 2 DMA and BMP Inventory Information

Use this table to document Structural BMPs (S-BMPs) and Significant Site Design BMPs (SSD-BMPs) for the PDP. All DMAs are required to have at least one Structural BMP or Significant Site Design BMP.

- In Part A, list all Structural BMPs (including both Pollutant Control and/or Hydromodification as applicable) by DMA.
- Complete Part B for all DMAs that contain only Significant Site Design BMPs. SSD-BMPs are Site Design BMPs credited in Worksheet B-1.1 of the BMP Design Manual for Design Capture Volume (DCV) reductions. Only Tree Wells and Dispersion Areas should be included in this inventory.
- For any DMA that contains both S-BMPs and SD-BMPs, document only the S-BMPs; you do not need to include the SD-BMPs.
- The information provided for each BMP in the table must match that provided in the Stormwater Quality Management Plan (SWQMP), construction plans, maintenance agreements, and other relevant project documentation.

Table 3: Required Information for Structural BMPs and Significant Site Design BMPs

DMA #	BMP Information			Maintenance Category	Maintenance Agreement or Maintenance Notification Recorded Doc. #	Construction Plan Sheet #	Landscape Plan # & Sheet # (For Vegetated BMPs Only)	FOR DPW-WPP USE ONLY Reviewer concurs that the BMP(s) may be accepted into inventory (date and initial)
	Quantity	Description/Type of Structural BMP	BMP ID #(s)					
Part A Structural BMPs								
Add rows as needed								
Part B Significant Site Design BMPs								
		Choose an item.						
		Choose an item.						
		Choose an item.						
Add rows as needed								

PART 3 Required Attachments for All BMPs Listed in Table 3

For ALL projects, submit the following to the County inspector (check all that are attached):

- ☐ Photographs: A photograph of each fully constructed S-BMP or SSD-BMP (or group of BMPs).
- ☐ Maintenance Agreements: Copies of all approved and recorded Storm Water Maintenance Agreements (SWMAs) or Maintenance Notifications (MNs) for all S-BMPs.

Note: All BMPs proposed for County ownership will remain the responsibility of the owner listed on Page 1 until a signed Letter of Acceptance of Completion is received by the DPW Watershed Protection Program.

For Grading and Improvement projects only, ALSO submit:

- ☐ Landscape Plans: An 11" X 17" copy of the most current applicable Landscape Plan sheets where the BMPs are required to be vegetated, including:
  - ☐ The Certification of Completion (Form 407), AND
  - ☐ The Certificate of Approval from PDS Landscape Architect

  Note: For each Landscape Plan, the sheets submitted must show the location of each verified as-built BMP.

- ☐ Construction Plans: An 11" X 17" copy of the most current applicable approved Construction Plan sheets:
  - ☐ Grading Plans, AND/OR
  - ☐ Improvement Plans, AND/OR
  - ☐ Precise Grading Plan(s) (only for residential subdivisions with tract homes), AND/OR
  - ☐ Other (Please specify) Click here to enter text.

  Note: For each Construction Plan, the sheets submitted must incorporate all of the following:
  - ☐ A BMP Table, AND
  - ☐ A plan/cross-section of each verified as-built BMP, AND
  - ☐ The location of each verified as-built BMP

Required only for Verifications for Partial Record Plans

- ☐ If this is a partial record plan verification, please include the following:
  - ☐ A list of previously submitted Verification Forms (Table 2, part A)
  - ☐ A map of DMAs and BMPs (Table 2, part B)

PART 4 Engineer of Work Certification

By signing below, I certify that the BMP(s) listed in Table 3 of this Verification Form have been constructed and all are in substantial conformance with the approved plans and applicable regulations. I understand the County reserves the right to inspect the above BMPs to verify compliance with the approved plans and Watershed Protection Ordinance (WPO). 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 and provide your seal below.

[SEAL]

Professional Engineer's Printed Name:

____Click here to enter text._____

Email: _Click here to enter text._____

Phone Number: _Click here to enter text._____

Professional Engineer's Signed Name:

_____

Date: _Click here to enter text._____

COUNTY - OFFICIAL USE ONLY:

For County Inspectors

County Department: _____

Date verification received from EOW: _____

By signing below, County Inspector concurs that every noted BMP has been installed per plan.

Inspector Name: _____

Inspector's Signature: _____ Date: _____

For Building Division Only

Inspection Supervisor Name: _____

Inspector Supervisor's Signature: _____ Date: _____

PDCI & Building, along with the rest of this package, please provide to DPW WPP:

☐ A copy of the final accepted SWQMP and any accepted addendum

For Watershed Protection Program Only

Date Received: _____

WPP Submittal Reviewer: _____

WPP Reviewer concurs that the BMPs accepted in Part 2 above may be entered into inventory.

WPP Reviewer's Signature: _____ Date: _____

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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 County 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.

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ATTACHMENT 6

Copy of Project's Drainage Report

This is the cover sheet for Attachment 6.

If hardcopy or CD is not attached, the following information should be provided:

Title: Preliminary Drainage Study for the Aventine at Sweetwater Springs
Prepared By: Hunsaker & Associates
Date: December 2018

CD WITH TM PLANS ARE INCLUDED AT END OF ATTACHMENT 7

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ATTACHMENT 7

Copy of Project's Geotechnical and Groundwater Investigation Report

This is the cover sheet for Attachment 7.

If hardcopy or CD is not attached, the following information should be provided:

Title: Update Geotechnical Investigation, The Aventine at Sweetwater Springs
Prepared By: Geocon Incorporated
Date: December 22, 2017

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