Major Stormwater Management Plan and Hydromodification Study (Major SWMP) For Sweetwater Place

PDS2014-TM-5588 RPL-1; STP-14-015 RPL-1;
GPA-14-003; REZ-14-003; ER-14-19-005

Preparation/Revision Date:

June 2014
January 2015
March 2015
July 2015

Prepared for:

SAM Sweetwater, LLC
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The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan have been prepared under the direction of the following Registered Civil Engineer and meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

Jay Sullivan, RCE #77445

3-19-15
Date

The Major Stormwater Management Plan (Major SWMP) must be completed in its entirety and accompany applications to the County for a permit or approval associated with certain types of development projects. To determine whether your project is required to submit a Major or Minor SWMP, please reference the County's Stormwater Intake Form for Development Projects.

Project Name:	Sweetwater Place
Project Location/Address:	Northeast of the intersection of Jamacha Blvd. &
Permit Number (Land Development Projects):	
Work Authorization Number (**CIP only**):	
Applicant:	SAM Sweetwater, LLC
Applicant's Address:	20201 SW Birch Street, STE 100
Plan Prepared By (*Leave blank if same as applicant*):	Jay Sullivan, R.C.E. 77445 RBF Consulting
Preparer's Address:	9755 Clairemont Mesa Blvd, Suite 100
Date:	May 30th 2014

The County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (WPO) (Ordinance No. 9926) requires all applications for a permit or approval associated with a Land Disturbance Activity to be accompanied by a Storm Water Management Plan (SWMP) (section 67.806.b). The purpose of the SWMP is to describe how the project will minimize the short and long-term impacts on receiving water quality. Projects that meet the criteria for a priority development project are required to prepare a Major SWMP.

Since the SWMP is a living document, revisions may be necessary during various stages of approval by the County. Please provide the approval information requested below.

Project Stages	Does the SWMP need revisions?		If YES, Provide Revision Date	County Reviewer
	YES	NO		
1st submittal	x		January 2015	
2nd submittal	x		March 2015	

Instructions for a Major SWMP can be downloaded at
http://www.sdcounty.ca.gov/dpw/watersheds/susmp/susmp.html

Completion of the following checklists and attachments will fulfill the requirements of a Major SWMP for the project listed above.

STEP 1

PRIORITY DEVELOPMENT PROJECT DETERMINATION

TABLE 1: IS THE PROJECT IN ANY OF THESE CATEGORIES?

Yes ✓	No ❑	A	Housing subdivisions of 10 or more dwelling units. Examples: single-family homes, multi-family homes, condominiums, and apartments.
Yes ❑	No ✓	B	Commercial—greater than one acre (total disturbed area). Any development other than heavy industry or residential. Examples: hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; airfields; and other light industrial facilities.
Yes ❑	No ✓	C	Heavy industry—greater than one acre (total disturbed area). Examples: manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas (bus, truck, etc.).
Yes ❑	No ✓	D	Automotive repair shops. A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.
Yes ❑	No ✓	E	Restaurants. Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except for structural treatment BMP and numeric sizing criteria requirements and hydromodification requirements.
Yes ❑	No ✓	F	Hillside development greater than 5,000 square feet. Any development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.
Yes ✓	No ❑	G	Environmentally Sensitive Areas (ESAs). All development located within or directly adjacent to or discharging directly to an ESA (where discharges from the development or redevelopment will enter receiving waters within the ESA), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.
Yes ❑	No ✓	H	Parking lots 5,000 square feet or more or with 15 or more (paved) parking spaces and potentially exposed to urban runoff.
Yes ✓	No ❑	I	Street, roads, highways, and freeways. Any paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles, and other vehicles.
Yes ❑	No ✓	J	Retail Gasoline Outlets (RGOs) that are: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

To use the table, review each definition A through K. If any of the definitions match, the project is a Priority Development Project. Note some thresholds are defined by square footage of impervious area created; others by the total area of the development. Please see special requirements for previously developed sites and project exemptions on page 6 of the County SUSMP.

STEP 2

PROJECT STORMWATER QUALITY DETERMINATION

Total Project Site Area 17.9 (Acres or ft^2)

Estimated amount of disturbed area: 17.7 (Acres or ft^2)
(If >1 acre, you must also provide a WDID number from the SWRCB) WDID: TBD

Complete A through C and the calculations below to determine the amount of impervious surface on your project before and after construction.

A. Total size of project site: 17.9 (Acres or ft^2)

B. Total impervious area (including roof tops) before construction 4.5 (Acres or ft^2)

C. Total impervious area (including roof tops) after construction 8.1 (Acres or ft^2)

Calculate percent impervious before construction: B/A = 25 %
Calculate percent impervious after construction: C/A = 45 %

Please provide detailed descriptions regarding the following questions:

TABLE 2: PROJECT SPECIFIC STORMWATER ANALYSIS

1.	Please provide a brief description of the project.

The Project site is located in the community of Spring Valley within the unincorporated area of southwestern San Diego County. The approximately 20-acre (gross)/17.1-acre (net) Project site is located at the northwestern corner of Sweetwater Springs Boulevard and Jamacha Boulevard. The site address is 2657 Sweetwater Springs Boulevard; the County Assessor Parcel Number (APN) is 505-231-36.

The site was originally designated as future right-of-way (ROW) for extension of State Highway 54 (SR 54). The California Department of Transportation (Caltrans) has since abandoned the SR 54 extension and sold the property at auction as excess right-of-way. The new (current) owner of the Project site is SAM Sweetwater, LLC. The Project site was previously utilized as a retail nursery (Evergreen Nursery), which has since ceased operation and vacated the site. The site is currently 100% disturbed due to the previous use.

Existing land uses in the Project area include undeveloped land to the west/southwest across Sweetwater Springs Boulevard, which is planned for a residential development known as "The Pointe;" however, a number of homes associated with this development have already been constructed. Other uses include a commercial strip mall and gas station to the southeast; a vegetated County detention basin further to the southeast; a self-storage facility, Mardi Gras Café and Market building, and Sweetwater Lodge mobile-home park to the south across Jamacha Boulevard; a vacant lot adjacent to northwest; and, a business park adjacent to the north. Single-family residential uses also exist further to the north and northeast/east.

The Project proposes a 122-unit residential condominium development with exclusive backyards, attached two-car garages, 2.08-acre public community park, private and group useable open space, a riding and hiking trail, pedestrian pathways, and a series of greenbelt open areas. The units will be accessed by a series of 24-foot wide access drives within the interior of the property. Conceptual architectural design for the Project has been prepared, offering various housing styles and sizes. Additionally, ornamental landscaping will be provided within the onsite common areas, along Project roadways, and at the Project entryways to visually enhance the proposed development and blend the site into the existing surrounding setting. A Tentative Map/Condominium, Site Plan, and Grading Plan will be required to implement the proposed development.

Open Space: Integrated into the development will be private useable open space areas [minimum 350 square feet (s.f.) per unit] adjoining each unit, along with group useable open space areas located within the public park (minimum of 150 s.f. per unit). Each unit will have a fenced exclusive use backyard area.

Internal Drives: Private internal drives will be improved to 24 feet in width to enable circulation and fire protection service. The maximum length of the dead-end drives will be 150 feet; no cul-de-sacs are proposed at these locations. A five-foot wide sidewalk is proposed along one side of the main interior roadway, ultimately providing a pedestrian link between Jamacha and Sweetwater Springs Boulevards.

1.	Please provide a brief description of the project.

Parks and Trails: The Project proposes to dedicate, improve, and maintain a 2.08-acre public community park for use by both Sweetwater Place residents and the general public. The public park will be a major focal area for Community gathering. Access to the Public Park and 29-parking spaces is provided via a proposed public road extending easterly from Sweetwater Springs Boulevard. The public park will satisfy County Park Land Dedication Ordinance (PLDO) requirements of the project, plus the group useable open space acreage requirement per the site's zoning regulations. Private useable open space will also be provided within the exclusive back yard areas of the residents.

The Project proposes an 8-foot wide public riding and hiking trail (within a 12-foot wide graded easement) along the northern side of Jamacha Boulevard to enhance the existing public pedestrian network. A series of pedestrian pathways connect and circulate throughout the project site and Public Park. Access from the Jamacha Road public trail to the residential portion of the project and Public Park has been provided. A 10-foot wide existing (cleared) trail easement is also proposed along the eastern Project boundary for future construction of a public trail by others; no physical trail improvements are proposed with the Project along this easement.

Public Street Improvements: Main access will occur from Jamacha Boulevard at the intersection of Folex Way. The intersection will be signalized, and a project entrance will be constructed to extend into the site from the intersection with Jamacha Boulevard that will terminate in a cul-de-sac. An exclusive eastbound left-turn lane is proposed on Jamacha Boulevard, and the existing exclusive northbound left-turn lane will be restriped to a shared thru/left-turn lane.

Secondary access is proposed off of Sweetwater Springs Boulevard via extension of an onsite public roadway terminating in a cul-de-sac. This road will provide access to the proposed public park and associated parking area (29 spaces total). Improvements to Sweetwater Springs Boulevard will include construction of a southbound left-turn pocket, median, and installation of stop signs at the intersection to facilitate ingress to and egress from the site. Additionally, the Project proposes to improve Jamacha Boulevard and Sweetwater Springs Boulevard to a 55-foot half-width with curb, gutter, and sidewalks, and a bike lane.

Fire, Water, Sewer, Storm Drain: The site will be served by the San Miguel Fire Protection District for fire service. The site will be served by the Otay Water District for public water service and the San Diego County (Spring Valley) Sanitation District will provide public sewer service. The Project proposes improvements to capture storm water flows from offsite properties that currently flow aboveground across the site within a proposed underground 54-inch pipe for outflow to an existing storm drain at the southwest corner of the site near Jamacha Boulevard. Onsite stormwater flows will discharge from the Project site in two locations. The majority of the site will discharge to the existing storm drain system within Jamacha Boulevard, consistent with pre-development conditions. The westerly portion of the site will discharge to Sweetwater Springs Boulevard, and flows will continue southwesterly via curb and gutter, consistent with pre-development conditions.

2.	Describe the current and proposed zoning and land use designation.

The Project site is identified in the Spring Valley Community Plan as a "Special Study Area (SSA) – Sweetwater Springs Boulevard and Jamacha Boulevard." The SSA totals approximately 34 acres, extending northward of the Project site across Calavo Drive (two non-contiguous sites); however, the proposed Project site represents approximately 20.35 acres of the overall SSA. The remaining land within the SSA is not part of the proposed Project. The SSA designation requires that additional analysis be prepared to determine an appropriate land use. Additionally, the County provides specific goals and policies intended to guide future development of properties designated as SSA.

The existing County of San Diego General Plan land use designation is Public/Semi-Public with an underlying land use designation of RL-80 (Rural Lands). A General Plan Amendment is required to change the current General Plan designator from RL-80 to a Village Residential (VR-7.3) designator. The Regional Category of Village applies to the property; no change to the Regional Category is proposed with the Project. The Project site is currently zoned as S-90 (Holding Zone). A Rezone is requested to change the zone from S-90 to a RV-Variable Family Use Regulation to allow for the proposed condominium units.

3.	Describe the pre-project and post-project topography of the project. (Show on Plan)

Elevations on site range from approximately 492 feet above mean sea level (MSL) near the northeast property corner to 441 feet above MSL near the southwest property corner. Runoff drains overland southwesterly at an approximate slope of four percent (S=0.04 ft/ft). The project site receives run-on along the entire northerly boundary. Towards the westerly edge, off-site slopes are on the order of 50 percent (S=0.5 ft/ft) and 20 feet high; along the easterly edge, off-site slopes are closer to 20 percent (S=0.2 ft/ft) and five feet high.

The proposed site topography will continue to direct flows southwesterly. The site will be flattened, as compared to existing conditions, in order to facilitate construction of residential pads and drive aisles. The northerly portion of the site will be lowered while the southerly portion will be raised, as compared to existing conditions.

A retaining wall on the order of five feet high will be installed along the northerly boundary. Concrete brow ditches will direct off-site slope run-on westerly, as opposed to cascading over the proposed retaining wall.

4.	Describe the soil classification, permeability, erodibility, and depth to groundwater for LID and Treatment BMP consideration. (Show on Plan) If infiltration BMPs are proposed, a Geotechnical Engineer must certify infiltration BMPs in Attachment E.

Based on the Natural Resources Conservation Service's (NRCS) Websoil Survey, the project site is comprised of approximately 90-percent Diablo clay (DaE), with slopes ranging from 15 to 30 percent (hydrologic soil type D); and approximately 10-percent Huerhuero loam (HrD2), with slopes ranging from nine to 15 percent (hydrologic soil type D). Overall, the soils on the site are classified as hydrologic soil type D, which is less permeable than other hydrologic soil types.

The Revised Feasibility/Due-Diligence Geotechnical Investigation, Proposed Residential Development, Sweetwater Place Project, APM 760-128-54-00, 2657 Sweetwater Springs Boulevard, Spring Valley, San Diego County, California, dated September 18, 2013, states, "Based on our review, adverse effects on the proposed development due to shallow regional groundwater conditions are currently not anticipated. However, seepage and perched groundwater conditions may occur onsite due to excess irrigation, migration from adjacent springs and/or drainage areas and developments during and/or after periods of above normal or heavy precipitation. Thus, seepage and perched water conditions may occur in the future, and should be anticipated." Groundwater was not encountered for all the seven borings taken from depths of 6.5 feet to 19.5 feet.

The Natural Resources Conservation Service (NRCS) lists the erosion factor K indicating the susceptibility of a soil to sheet and rill erosion by water. The values of K range from 0.2-0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water. NRCS identifies the project site K factor, whole soil below:

K Factor, Whole Soil— Summary by Map Unit — San Diego County Area, California (CA638)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaE	Diablo clay, 15 to 30 percent slopes	.15	15.5	87.3%
HrD2	Huerhuero loam, 9 to 15 percent slopes, eroded	.43	2.3	12.7%
Totals for Area of Interest			**17.8**	**100.0%**

5.	Describe if contaminated or hazardous soils are within the project area. (Show on Plan)

The *Revised Feasibility/Due-Diligence Geotechnical Investigation, Proposed Residential Development, Sweetwater Place Project, APM 760-128-54-00, 2657 Sweetwater Springs Boulevard, Spring Valley, San Diego County, California*, dated September 18, 2013, did not indicate that there are any known contaminated soils on the project site.

6.	Describe the existing site drainage and natural hydrologic features. (Show on Plan).

The 17.9-acre project site contains approximately 4.5 acres of impervious cover under existing conditions. This existing impervious area consists of several concrete pads and drive aisles. The site was previously used as a landscape and gardening nursery. No buildings or other vertical construction currently remains. Runoff drains southwesterly via a combination of sheet flow and open channel flow (rock-lined flood control channel).

An existing commercial development is located immediately north of the project site (atop the slope mentioned in Item #3 above). A 54-inch RCP storm drain discharges runoff from this commercial development onto the project site approximately midway along the northerly project boundary. Project site run-on from the 54-inch RCP is conveyed southwesterly across the project site via open channel flow (rock-lined flood control channel).

An existing 60-inch RCP with headwall is located in the southwesterly corner of the site. This pipe and headwall represent the primary project outfall location under pre and post development conditions. This 60-inch pipe transitions to dual 36-inch RCPs at the road right-of-way and conveys runoff southerly beneath Jamacha Boulevard, discharging to a regional detention facility located south of the Jamacha Boulevard. A small portion of the site drains to Sweetwater Springs Boulevard (westerly project boundary) as sheet flow.

An existing concrete lined channel is located on-site, along the easterly project boundary. This concrete channel conveys off-site runoff southerly to an existing F-Type inlet, which discharges runoff to Jamacha Boulevard via a curb outlet. Alterations to this existing concrete channel or its tributary drainage area (northerly storage facility) are not proposed.

A regional detention facility is located immediately adjacent to the southeast corner of the Jamacha Boulevard, Sweetwater Springs Boulevard intersection. Storm water runoff from the project site drains to this detention facility via existing storm drain pipes beneath Jamacha Boulevard (dual 36-inch RCP) and via overland flow under pre and post development conditions. This regional detention facility receives runoff from approximately 590 acres, of which the 17.9-acre project site represents 3-percent.

7.	Describe site features and conditions that constrain, or provide opportunities for stormwater control, such as LID features.

The Sweetwater Place project will include bioretention along the westerly and southerly boundaries. Permeable pavement is proposed along the north-south drive aisles located in the northwesterly portion of the site. Heavy construction equipment should avoid excessive use within the bioretention, permeable paver and park areas to avoid over compaction. Soils within the identified areas may need to be re-tilled from construction vehicles/equipment compaction.

On-site storm drain pipes and inlets will be included to direct on-site runoff to the proposed bioretention areas.
Retaining walls to the north will reduce slope length and steepness of slopes. Run-off from the northern boundary (vegetated slopes) will be collected in a stabilized concrete ditch behind the retaining wall to avoid comingling. The off-site 54-inch RCP will be extended through the project site as bypass flow. Project site runoff will comingle with runoff within this 54-inch RCP downstream of the project site.

8.	Is this project within the environmentally sensitive areas as defined on the maps in Appendix A of the *County of San Diego Standard Urban Storm Water Mitigation Plan for Land Development and Public Improvement Projects?*

Yes	No
✓	

9.	Is this an emergency project? If yes, please provide a description below.

Yes	No
	✓

CHANNELS & DRAINAGES

Complete the following checklist to determine if the project includes work in channels.

TABLE 3: CHANNEL& DRAINAGE ANALYSIS

No.	CRITERIA	YES	NO	N/A	COMMENTS
1.	Will the project include work in channels?		✓		If YES go to 2 If NO go to 13.
2.	Will the project increase velocity or volume of downstream flow?				If YES go to 6.
3.	Will the project discharge to unlined channels?				If YES go to. 6.
4.	Will the project increase potential sediment load of downstream flow?				If YES go to 6.
5.	Will the project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?				If YES go to 8.
6.	Review channel lining materials and design for stream bank erosion.				Continue to 7.
7.	Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity.				Continue to 8.
8.	Include, where appropriate, energy dissipation devices at culverts.				Continue to 9.
9.	Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.				Continue to 10.
10.	Include, if appropriate, detention facilities to reduce peak discharges.				Continue to 11.
11.	"Hardening" natural downstream areas to prevent erosion is not an acceptable technique for protecting channel slopes, unless pre-development conditions are determined to be so erosive that hardening would be required even in the absence of the proposed development.				Continue to 12.
12.	Provide other design principles that are comparable and equally effective.	✓			Continue to 13.
13.	End				

TEMPORARY CONSTRUCTION BMPS

Please check the construction BMPs that may be implemented during construction of the project. The applicant will be responsible for the placement and maintenance of the BMPs incorporated into the final project design.

- ☒ Silt Fence
- ☒ Fiber Rolls
- ☒ Street Sweeping and Vacuuming
- ☒ Storm Drain Inlet Protection
- ☒ Stockpile Management
- ☒ Solid Waste Management
- ☒ Stabilized Construction Entrance/Exit
- ☐ Dewatering Operations
- ☒ Vehicle and Equipment Maintenance
- ☒ Desilting Basin
- ☒ Gravel Bag Berm
- ☒ Sandbag Barrier
- ☒ Material Delivery and Storage
- ☒ Spill Prevention and Control
- ☒ Concrete Waste Management
- ☒ Water Conservation Practices
- ☒ Paving and Grinding Operations

☒ Any minor slopes created incidental to construction and not subject to a major or minor grading permit shall be protected by covering with plastic or tarp prior to a rain event, and shall have vegetative cover reestablished within 180 days of completion of the slope and prior to final building approval.

EXCEPTIONAL THREAT TO WATER QUALITY DETERMINATION

Complete the checklist below to determine if a proposed project will pose an "exceptional threat to water quality," and therefore require Advanced Treatment Best Management Practices during the construction phase.

TABLE 4: EXCEPTIONAL THREAT TO WATER QUALITY DETERMINATION

No.	CRITERIA	YES	NO	INFORMATION
1.	Is all or part of the proposed project site within 200 feet of waters named on the Clean Water Act (CWA) Section 303(d) list of Water Quality Limited Segments as impaired for sedimentation and/or turbidity? Current 303d list may be obtained from the following site: http://www.waterboards.ca.gov/water_issues/programs/tmdl/2010state_ir_reports/category5_report.shtml		✓	If YES, continue to 2. If NO, go to 5.
2.	Will the project disturb more than 5 acres, including all phases of the development?			If YES, continue to 3. If NO, go to 5.
3.	Will the project disturb slopes that are steeper than 4:1 (horizontal: vertical) with at least 10 feet of relief, and that drain toward the 303(d) listed receiving water for sedimentation and/or turbidity?			If YES, continue to 4. If NO, go to 5.
4.	Will the project disturb soils with a predominance of USDA-NRCS Erosion factors k_f greater than or equal to 0.4? http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm			If YES, continue to 6. If NO, go to 5.
5.	Project is not required to use Advanced Treatment BMPs.	✓		Document for Project Files by referencing this checklist.
6.	Project poses an "exceptional threat to water quality" and is required to use Advanced Treatment BMPs.			Advanced Treatment BMPs must be consistent with WPO section 67.811(b)(20)(D) performance criteria

Exemption potentially available for projects that require advanced treatment: Project proponent may perform a Revised Universal Soil Loss Equation, Version 2 (RUSLE 2), Modified Universal Soil Loss Equation (MUSLE), or similar analysis that demonstrates (to the County official's satisfaction) that advanced treatment is not required.

STEP 3

HYDROMODIFICATION DETERMINATION

The following questions provide a guide to collecting information relevant to hydromodification management plan (HMP) issues. If the project is exempt from the HMP criteria, please provide the supporting documentation in Attachment H. Please reference the full descriptions of the HMP exemptions located in Figure 1-1 of the County SUSMP.

TABLE 5: HYDROMODIFICATION DETERMINATION

	QUESTIONS	YES	NO	Information
1.	Will the project reduce the pre-project impervious area and are the unmitigated post-project outflows (outflows without detention routing) to each outlet location less as compared to the pre-project condition?		✓	If NO, continue to 2. If YES, go to 7.
2.	Would the project site discharge runoff directly to an exempt receiving water, such as the Pacific Ocean, San Diego Bay, an exempt reservoir, or a tidally-influenced area?		✓	If NO, continue to 3. If YES, go to 7.
3.	Would the project site discharge to a stabilized conveyance system, which has the capacity for the ultimate $Q_{10,}$ and extends to the Pacific Ocean, San Diego Bay, a tidally-influenced area, an exempt river reach or reservoir?		✓	If NO, continue to 4. If YES, go to 7.
4.	Does the contributing watershed area to which the project discharges have an impervious area percentage greater than 70 percent?		✓	If NO, continue to 5. If YES, go to 7.
5.	Is this an urban infill project which discharges to an existing hardened or rehabilitated conveyance system that extends beyond the "domain of analysis," where the potential for cumulative impacts in the watershed are low, and the ultimate receiving channel has a "Low" susceptibility to erosion as defined in the SCCWRP channel assessment tool?		✓	If NO, continue to 6. If YES, go to 7.
6.	Project is required to manage hydromodification impacts.	✓		Reference Appendix G "Hydromodification Management Plan" of the County SUSMP.
7.	Project is not required to manage hydromodification impacts.			Hydromodification Exempt. Keep on file.

STEP 4

POLLUTANTS OF CONCERN DETERMINATION

WATERSHED

Please check the watershed(s) for the project.

☐ San Juan 901	☐ Santa Margarita 902	☐ San Luis Rey 903	☐ Carlsbad 904
☐ San Dieguito 905	☐ Penasquitos 906	☐ San Diego 907	☒ Sweetwater 909
☐ Otay 910	☐ Tijuana 911	☐ Whitewater 719	☐ Clark 720
☐ West Salton 721	☐ Anza Borrego 722	☐ Imperial 723	

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

*Projects located fully within these watersheds require only a Minor SWMP.

HYDROLOGIC SUB-AREA NAME AND BASIN NUMBER(S)

Basin Number	Sub-Area Name
909.21	Jamacha HSA

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

RECEIVING WATERS that each project discharge point proposes to discharge to.

RECEIVING WATERS (river, lake, reservoir, etc.)	Hydrologic Unit Basin Number	Impairment(s) listed [303(d) listed waters or waters with established TMDLs]. List the impairments identified in **Table 7**.	Distance to Project
Unnamed Tributary to Sweetwater Reservoir	909.20	None	300 feet
Sweetwater Reservoir	909.21	Dissolved Oxygen	0.9 miles
Sweetwater River, Lower (below Sweetwater Reservoir)	909.12	Enterococcus, Fecal Coliform, Phosphorus, Selenium, Total Dissolved Solids, Total Nitrogen as N, Toxicity	3.4 miles
San Diego Bay		Polychlorinated Biphenyls (PCBs)	10 miles

http://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/epa/r9_06_303d_reqtmdls.pdf

GROUND WATERS

Ground Waters	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR	FRESH
Middle Sweetwater	909.20	●	●	●			

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

+ Excepted from Municipal ● Existing Beneficial Use ○ Potential Beneficial Use

PROJECT ANTICIPATED AND POTENTIAL POLLUTANTS

Using Table 6, identify pollutants that are anticipated to be generated from the proposed priority project categories. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern.

TABLE 6: ANTICIPATED AND POTENTIAL POLLUTANTS GENERATED BY LAND USE TYPE

	General Pollutant Categories								
PDP Categories	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development 1 acre or greater	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Heavy industry /industrial development	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	
Hillside Development >5,000 ft²	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X		

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

PROJECT POLLUTANTS OF CONCERN SUMMARY TABLE

Please summarize the identified project pollutants-of-concern by checking the appropriate boxes in the table below and list any surface water impairments identified. Pollutants anticipated to be generated by the project, which are also causing impairment of receiving waters, shall be considered the primary pollutants of concern. For projects where no primary pollutants of concern exist, those pollutants identified as anticipated shall be considered secondary pollutants of concern.

TABLE 7: PROJECT POLLUTANTS OF CONCERN

Pollutant Category	**Anticipated (X)**	**Potential (P)**	**Surface Water Impairments (determined by your receiving waters impairments on page 10)**
Sediments	X		N/A
Nutrients	X		Phosphorus, Total Nitrogen as N,
Heavy Metals	X		Selenium
Organic Compounds	X		N/A
Trash & Debris	X		N/A
Oxygen Demanding Substances		P	Dissolved Oxygen
Oil & Grease	X		N/A
Bacteria & Viruses		P	Enterococcus, Fecal Coliform
Pesticides	X		TDS, Polychlorinated Biphenyls (PCBs)

STEP 5

LID AND SITE DESIGN STRATEGIES

Each numbered item below is a Low Impact Development (LID) requirement of the WPO. Please check the box(s) under each number that best describes the LID BMP(s) and Site Design Strategies selected for this project. LID BMPs selected on this table will be typically represented as a self-retaining area, self-treating area, pervious pavement and greenroof, which, should be delineated in the Drainage Management Area map in Attachment C.

TABLE 8: LID AND SITE DESIGN

1. Conserve natural Areas, Soils, and Vegetation
☐ Preserve well draining soils (Type A or B)
☐ Preserve Significant Trees
☐ Preserve critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions
☒ Other. Description: There are no well-draining soils or significant trees to conserve. The site is not subject to floodplain inundation, steep slopes, wetlands, or erosive conditions.
2. Minimize Disturbance to Natural Drainages
☒ Set-back development envelope from drainages
☐ Restrict heavy construction equipment access to planned green/open space areas
☒ Other. Description: The drainage channel to the eastern boundary will protect in place.
3. Minimize and Disconnect Impervious Surfaces (see 5)
☐ Clustered Lot Design
☒ Items checked in 5
☒ Other. Description: On-site impervious area will be disconnected prior to discharging from the site
4. Minimize Soil Compaction
☒ Restrict heavy construction equipment access to planned green/open space areas
☒ Re-till soils compacted by construction vehicles/equipment
☐ Collect & re-use upper soil layers of development site containing organic Materials
☐ Other. Description:
5. Drain Runoff from Impervious Surfaces to Pervious Areas
<u>LID Street & Road Design</u>
☒ Curb-cuts to landscaping
☐ Rural Swales
☐ Concave Median
☐ Cul-de-sac Landscaping Design
☒ Other. Description: Curb-cuts to bioretention areas.

LID Parking Lot Design
☐ Permeable Pavements
☒ Curb-cuts to landscaping
☒ Other. Description: Curb-cuts to bioretention areas.
LID Driveway, Sidewalk, Bike-path Design
☒ Permeable Pavements
☒ Pitch pavements toward landscaping
☐ Other. Description:
LID Building Design
☐ Cisterns & Rain Barrels
☐ Downspout to swale or landscaping
☐ Vegetated Roofs
☒ Other. Description: Downspout to permeable pavement and/or bioretention areas
LID Landscaping Design
☒ Soil Amendments
☐ Reuse of Native Soils
☒ Smart Irrigation Systems
☐ Street Trees
☐ Other. Description:
6. Minimize erosion from slopes
☒ Disturb existing slopes only when necessary
☒ Minimize cut and fill areas to reduce slope lengths
☒ Incorporate retaining walls to reduce steepness of slopes or to shorten slopes
☐ Provide benches or terraces on high cut and fill slopes to reduce concentration of flows
☒ Rounding and shaping slopes to reduce concentrated flow
☒ Collect concentrated flows in stabilized drains and channels
☐ Other. Description:

STEP 6

SOURCE CONTROL

Please complete the checklist on the following pages to determine Source Control BMPs. Below is instruction on how to use the checklist. (Also see instructions on page 60 of the *SUSMP)*

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies and list in Table 9.

2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your Source Control Exhibit in Attachment B.

3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs into Table 9.

4. Use the format in Table 9 below to summarize the project Source Control BMPs. Incorporate all identified Source Control BMPs in your Source Control Exhibit in Attachment B.

TABLE 9: PROJECT SOURCE CONTROL BMPS

Potential source of runoff pollutants	*Permanent source control BMPs*	*Operational source control BMPs*
A. On-site storm drain inlets	Provide inlet markers indicating that no dumping is allowed.	Maintain inlet markers as necessary. Provide stormwater pollution prevention information to future owners, operators, or tenants.
D1. Need for future indoor & structural pest control	Select building design features that discourage entry to pests.	Provide integrated Pest Management information to future owners, operators, or tenants.
D2. Landscape / Outdoor Pesticide Use	Select drought tolerant plants that will also survive saturated soils when located in bioretention areas.	Minimize use of pesticides and fertilizers for maintaining the landscaping.
O. Miscellaneous Drain or Wash Water – Roofing, gutters, and trim	Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	N/A

Describe your specific Source Control BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting Source Control BMPs or substituting alternatives.

The proposed project is an attached residential condominium development with internal streets, alleys, and a park site. Standard curb and/or grate inlets are not proposed. As such, runoff will drain overland to permeable pavement and bioretention areas. Storm drain signage will be utilized at the off-site F-Type inlet (midway along the northerly boundary) and at the proposed headwall in the southwest corner of the site.

Information handouts to new owners will include Integrated Pest Management information describing building features that discourage entry to pests.

Landscaping shall be designed to minimize irrigation runoff. For successful plant establishment, selection of plants shall be appropriate for the site soils, slopes climate, sun, wind and rain. Plants within bioretention areas should account for plants that are tolerant of saturated soil conditions. Landscaping maintenance practices should minimize the application of pesticides or fertilizers.

Outdoor construction material should avoid unprotected metals that may leach into runoff. Unprotected construction metals may include roofing, gutters, and trim.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in Table 9 and Narrative**	**4** **Operational BMPs—Include in Table 9 and Narrative**
✓ **A.** On-site storm drain inlets	✓ Locations of inlets.	✓ Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	✓ Maintain and periodically repaint or replace inlet markings. ✓ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ❑ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ❑ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
❑ **B.** Interior floor drains and elevator shaft sump pumps		❑ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	❑ Inspect and maintain drains to prevent blockages and overflow.
❑ **C.** Interior parking garages		❑ State that parking garage floor drains will be plumbed to the sanitary sewer.	❑ Inspect and maintain drains to prevent blockages and overflow.
✓ **D1.** Need for future indoor & structural pest control		✓ Note building design features that discourage entry of pests.	✓ Provide Integrated Pest Management information to owners, lessees, and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in Table 9 and Narrative**	**4** **Operational BMPs—Include in Table 9 and Narrative**
✓ **D2.** Landscape/ Outdoor Pesticide Use Note: Should be consistent with project landscape plan (if applicable).	❑ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ✓ Show self-retaining landscape areas, if any. ✓ Show stormwater treatment facilities.	State that final landscape plans will accomplish all of the following: ❑ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ✓ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ✓ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ❑ Consider using pest-resistant plants, especially adjacent to hardscape. ✓ To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	✓ Maintain landscaping using minimum or no pesticides. ❑ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ❑ Provide IPM information to new owners, lessees and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in Table 9 and Narrative**	**4** **Operational BMPs—Include in Table 9 and Narrative**
❑ **E.** Pools, spas, ponds, decorative fountains, and other water features.	❑ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	❑ If the local municipality requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	❑ See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
❑ **F.** Food service	❑ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ❑ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	❑ Describe the location and features of the designated cleaning area. ❑ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	❑

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	2 **Permanent Controls—Show on Source Control Exhibit, Attachment B**	3 **Permanent Controls—List in Table 9 and Narrative**	4 **Operational BMPs—Include in Table 9 and Narrative**
❑ **G.** Refuse areas	❑ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ❑ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ❑ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	❑ State how site refuse will be handled and provide supporting detail to what is shown on plans. ❑ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	❑ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
❑ **H.** Industrial processes.	❑ Show process area.	❑ If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in Table 9 and Narrative**	**4** **Operational BMPs—Include in Table 9 and Narrative**
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	2 **Permanent Controls—Show on Source Control Exhibit, Attachment B**	3 **Permanent Controls—List in Table 9 and Narrative**	4 **Operational BMPs—Include in Table 9 and Narrative**
❑ **D1.** Need for future indoor & structural pest control		❑ Note building design features that discourage entry of pests.	❑ Provide Integrated Pest Management information to owners, lessees, and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in Table 9 and Narrative**	**4** **Operational BMPs—Include in Table 9 and Narrative**
❑ **D2.** Landscape/ Outdoor Pesticide Use Note: Should be consistent with project landscape plan (if applicable).	❑ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ❑ Show self-retaining landscape areas, if any. ❑ Show stormwater treatment facilities.	State that final landscape plans will accomplish all of the following: ❑ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ❑ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ❑ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ❑ Consider using pest-resistant plants, especially adjacent to hardscape. ❑ To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	❑ Maintain landscaping using minimum or no pesticides. ❑ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ❑ Provide IPM information to new owners, lessees and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in Table 9 and Narrative**	**4** **Operational BMPs—Include in Table 9 and Narrative**
❑ **E.** Pools, spas, ponds, decorative fountains, and other water features.	❑ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	❑ If the local municipality requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	❑ See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
❑ **F.** Food service	❑ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ❑ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	❑ Describe the location and features of the designated cleaning area. ❑ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	❑

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in Table 9 and Narrative**	**4** **Operational BMPs—Include in Table 9 and Narrative**
❑ **G.** Refuse areas	❑ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ❑ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ❑ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	❑ State how site refuse will be handled and provide supporting detail to what is shown on plans. ❑ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	❑ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
❑ **H.** Industrial processes.	❑ Show process area.	❑ If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants – List in Table 9**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in Table 9 and Narrative**	**4** **Operational BMPs—Include in Table 9 and Narrative**
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: ' Hazardous Waste Generation ' Hazardous Materials Release Response and Inventory ' California Accidental Release (CalARP) ' Aboveground Storage Tank ' Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ' Underground Storage Tank	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

❑ **J.** Vehicle and Equipment Cleaning	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle /equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. ❑ Car dealerships and similar may rinse cars with water only. ❑ See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

❑	**K. Vehicle/Equipment Repair and Maintenance**	❑	**Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑	**State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**		**In the SUSMP report, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.**

❑ **L. Fuel Dispensing Areas**	❑ **Fueling areas[1] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[1] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

❑ **M.** Loading Docks	❑ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited. ❑ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ❑ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		❑ Move loaded and unloaded items indoors as soon as possible. ❑ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
❑ **N.** Fire Sprinkler Test Water		❑ Provide a means to drain fire sprinkler test water to the sanitary sewer.	❑ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

O. Miscellaneous Drain or Wash Water ❑ Boiler drain lines ❑ Condensate drain lines ❑ Rooftop equipment ❑ Drainage sumps ❑ Roofing, gutters, and trim.		❑ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ❑ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ❑ Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ❑ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ❑ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
❑ **P.** Plazas, sidewalks, and parking lots.			❑ Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

STEP 7

LID AND TREATMENT CONTROL SELECTION

A treatment control BMP and/or LID IMP must be selected to treat the project pollutants of concern identified in Table 7 "Project Pollutants of Concern". A treatment control facility with a high or medium pollutant removal efficiency for the project's most significant pollutant of concern shall be selected. It is recommended to use the design procedure in Chapter 4 of the SUSMP to meet NPDES permit LID requirements, treatment requirements, and flow control requirements. If your project does not utilize this approach, the project will need to demonstrate compliance with LID, treatment and hydromodification flow control requirements. Review Chapter 2 "Selection of Stormwater Treatment Facilities" in the SUSMP to assist in determining the appropriate treatment facility for your project.

Will this project be utilizing the unified LID design procedure as described in Chapter 4 of the Local SUSMP? *(If yes, please document in Attachment D following the steps in Chapter 4 of the County SUSMP)*	
Yes	No
✓	
If this project is not utilizing the unified LID design procedure, please describe how the alternative treatment facilities will comply with applicable LID criteria, stormwater treatment criteria, and hydromodification management criteria.	

- Indicate the project pollutants of concern (POCs) from Table 7 in Column 2 below.

TABLE 10: GROUPING OF POTENTIAL POLLUTANTS of Concern (POCs) by fate during stormwater treatment

Pollutant	Check Project Specific POCs	Coarse Sediment and Trash	Pollutants that tend to associate with fine particles during treatment	Pollutants that tend to be dissolved following treatment
Sediment	X	X	X	
Nutrients	X		X	X
Heavy Metals	X		X	
Organic Compounds	X		X	
Trash & Debris	X	X		
Oxygen Demanding	X		X	
Bacteria	X		X	
Oil & Grease	X		X	
Pesticides	X		X	

- Indicate the treatment facility(s) chosen for this project in the following table.

TABLE 11: GROUPS OF POLLUTANTS and relative effectiveness of treatment facilities

Pollutants of Concern	Bioretention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	Infiltration Devices (LID)	Media Filters	Higher-rate biofilters	Higher-rate media filters	Trash Racks & Hydro-dynamic Devices	Vegetated Swales
Coarse Sediment and Trash	High	High	High	High	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	Medium	Low	Medium
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	Low	Low	Low

- Please check the box(s) that best describes the Treatment Control BMP(s) and/or LID IMP selected for this project. Please check if the treatment facility is designed for water quality or hydromodification flow control. Check both boxes if the facility is designed for both water quality and hydromodification flow control.

TABLE 12: PROJECT TCBMPS - BMPs designed to treat stormwater (e.g., LID and hydromod) shall be considered TCBMPs.

TCBMP Type	Water Quality Treatment	Hydromodification Flow Control
Bioretention Facilites (LID)		
☒ Bioretention area	X	X
☐ Flow-through Planter		
☐ Cistern with Bioretention		
Basins		
☐ Extended/dry detention basin with grass/vegetated lining		
☐ Extended/dry detention basin with impervious lining		
☐ Underground vault		
☐ Cistern		
Infiltration Devices (LID)		

☐ Infiltration basin		
☐ Infiltration trench		
Other_____		
Wet Ponds and Constructed Wetlands		
☐ Wet pond/basin (permanent pool)		
☐ Constructed wetland		
Vegetated Swales (LID[1])		
☐ Vegetated Swale		
Media Filters		
☐ Austin Sand Filter		
☐ Delaware Sand Filter		
☐ Multi-Chambered Treatment Train (MCTT)		
Higher-rate Biofilters		
☐ Tree-pit-style unit		
Other_____		
Higher-rate Media Filters		
☐ Vault-based filtration unit with replaceable cartridges		
Other_____		
Hydrodynamic Separator Systems		
☐ Swirl Concentrator		
Other_____		
Trash Racks		
☐ Catch Basin Insert		
☐ Catch Basin Insert w/ Hydrocarbon boom		
Other_____		
Self-Retaining Areas (LID)		
☒ Permeable Pavements	X	X
☐ Self-Retaining		
☐ Vegetated Roof		

[1] Must be designed per SUSMP "Vegetated Swales" design criteria for water quality treatment credit (p. 102-103).

For design guidelines and calculations refer to Chapter 4 "Low Impact Development Design Guide" in the SUSMP. Please show all calculations and design sheets for all treatment control BMPs proposed in Attachment D.

- Create a Construction Plan SWMP Checklist for your project.

Instructions on how to fill out table

1. Number and list each measure or BMP you have specified in your SWMP in Columns 1 and Maintenance Category in Column 3 of the table. Leave Column 2 blank.

2. When you submit construction plans, duplicate the table (by photocopy or electronically). Now fill in Column 2, identifying the plan sheets where the BMPs are shown. List all plan sheets on which the BMP appears. **This table must be shown on the front sheet of the grading and improvement plans.**

Treatment Control BMPs[1]			
Description / Type	Sheet	Maintenance Category	Revisions
Bioretention Areas (Along Sweetwater Springs Blvd. & Jamacha Blvd.)		2	
Permeable Pavement (Internal alleys along the northeasterly boundary)		2	
[1] BMPs designed to treat stormwater (e.g., LID and hydromod) shall be considered TCBMPs.			

*BMP's approved as part of Stormwater Management Plan (SWMP) dated xx/xx/xx on file with DPW. Any changes to the above BMP's will require SWMP revision and Plan Change approvals.

Per Chapter 5 of the County SUSMP (dated August 2012), project site BMPs are best described as Maintenance Category 2. The HOA will be responsible for BMP maintenance.

- Please describe why the chosen treatment control BMP(s) was selected for this project. For projects utilizing a low performing BMP, please provide a **feasibility analysis** that demonstrates utilization of a treatment control BMP with a high or medium removal efficiency ranking is infeasible.

The Sweetwater Village development is a residential condominium development. The development will include a Home Owners Association (HOA), which will maintain the proposed Treatment BMPs.

Permeable Pavement

Permeable pavement is proposed along the drive aisles near the northwesterly boundary within low-traffic areas, flat slopes, and minimal erodible areas draining onto pavement. Because of the type D soils, permeable pavement areas are expected to include a sub-grade side wall impermeable liner to prevent lateral migration of runoff, a 6-inch sand layer for water quality benefits, and perforated sub-drains, which will be constructed per the geotechnical recommendations.

Bioretention Areas

The project proposes bioretention which will benefit both hydromodification mitigation and water quality. Because of the type D soils, bioretention areas are expected to include a sub-grade side wall impermeable liner to prevent lateral migration of runoff, subgrade section of 12 inches of gravel, 18-inches of engineering media, 1-foot of 100% voids (ponding area), and perforated sub-drains, which will be constructed per the geotechnical recommendations.

The proposed on-site bioretention areas have been oversized to account for additional impervious area equivalent with off-site improvements to Jamacha Boulevard and Sweetwater Springs Boulevard. The proposed on-site treatment and peak flow attenuation will over mitigate such that runoff from the minor roadway improvements is accounted for.

Please provide the sizing design calculations for each Drainage Management Area in Attachment D. Guidelines for design calculations are located in Chapter 4 of the County SUSMP. To assist in these calculations a BMP sizing calculator is available for use at the following location: http://www.projectcleanwater.org/html/wg_susmp.html

STEP 8

OPERATION AND MAINTENANCE

- Please check the box that best describes the maintenance mechanism(s) for this project. The recorded maintenance agreement shall be included in the Maintenance Plan for this project (Attachment F).

TABLE 13: PROJECT BMP CATEGORY

CATEGORY	SELECTED		BMP Description
	YES	NO	
First[1]		X	Maintenance for the Permeable pavement (category 2) and the bioretention areas (category 2) will be the responsibility of the developer until the HOA is established and operations and maintenance responsibilities are transferred (to the HOA). An easement covering the bioretention areas will be granted to the County of San Diego.
Second[2]	X		
Third[3]		X	
Fourth[4]		X	

Note:

1. A maintenance notification will be required.
2. A recorded maintenance agreement and access easement will be required.
3. The project will be required to establish or be included in a watershed specific Community Facility District (CFD) for long-term maintenance.
4. The developer would be required to dedicate the BMP (and the property on which it is located and any necessary access) to the County.

Per Chapter 5 of the County SUSMP (dated August 2012), the project site bioretention areas and permeable pavement areas are best described as Maintenance Category 2. The HOA will be responsible for BMP maintenance; however, an easement covering the bioretention areas will be granted to the County of San Diego.

- Please list all individual Treatment Control BMPs (TCBMPs) incorporated into the project. Please attach the record plan sheets upon completion of project and amend the Major SWMP where appropriate. For each type of TCBMP provide an inspection sheet in Attachment F "Maintenance Plan". Replicate Table 14 in Attachment G once the TCBMP has been constructed.

TABLE 14: PROJECT SPECIFIC LID AND TCBMPS

Treatment Control BMPs (TCBMPs)[1,2] (List all from SWMP)		
Lot Number Or Location	**Description/Type**	**Sheet**
	Permeable Pavement (with 6-inch sand layer)	
	Bioretention Area	

[1] All Priority Development Projects (PDPs) require a TCBMP.
[2] BMPs designed to treat stormwater (e.g. LID and hydromod) shall be considered TCBMPs.

* For location of BMP's, see approved Record Plan dated XX/XX/XX , plan TBD sheet TBD

- Responsible Party for the Construction Phase:

Identify the parties responsible for maintenance during the construction phase of the BMPs identified above and Source Controls specified in Attachment B.

Developer's Name: SAM – Sweetwater LLC

Address: 20201 W Birch Street, Suite 100

City Newport Beach State CA Zip 92660

Email Address: dthompson@mastercrafthomesllc.com

Phone Number: 949-252-1122

Engineer of Work: Michael Baker Corp.

Engineer's Phone Number: 858.614.5000

- Responsible Party for Ongoing Maintenance:

Identify the parties responsible for long-term maintenance of the BMPs identified above and Source Controls specified in Attachment B. Include the appropriate written agreement with the entities responsible for O&M in Attachment F. Please see Chapter 5 "Stormwater Facility Maintenance" of the County SUSMP for appropriate maintenance mechanisms.

Owner's Name: SAM – Sweetwater LLC

Address: 20201 W Birch Street, Suite 100

City Newport Beach State CA Zip 92660

Email Address: dthompson@mastercrafthomesllc.com

Phone Number: 949-252-1122

* Note: If a corporation or LLC, provide information for principal partner or Agent for Service of Process. If an HOA, provide information for the Board or property manager at time of project closeout.

- Funding Source:

Provide the funding source or sources for long-term operation and maintenance of each BMP identified above. Please see Chapter 5 "Stormwater Facility Maintenance" of the County SUSMP for the appropriate funding source options. By certifying the Major SWMP the applicant is certifying that the funding responsibilities have been addressed and will be transferred to future owners.

Sam Sweetwater, LLC will provide funding to install the Treatment BMPs. Once the HOA is established the Treatment BMPs funding of long-term operation and maintenance will be transferred to the HOA.

ATTACHMENTS

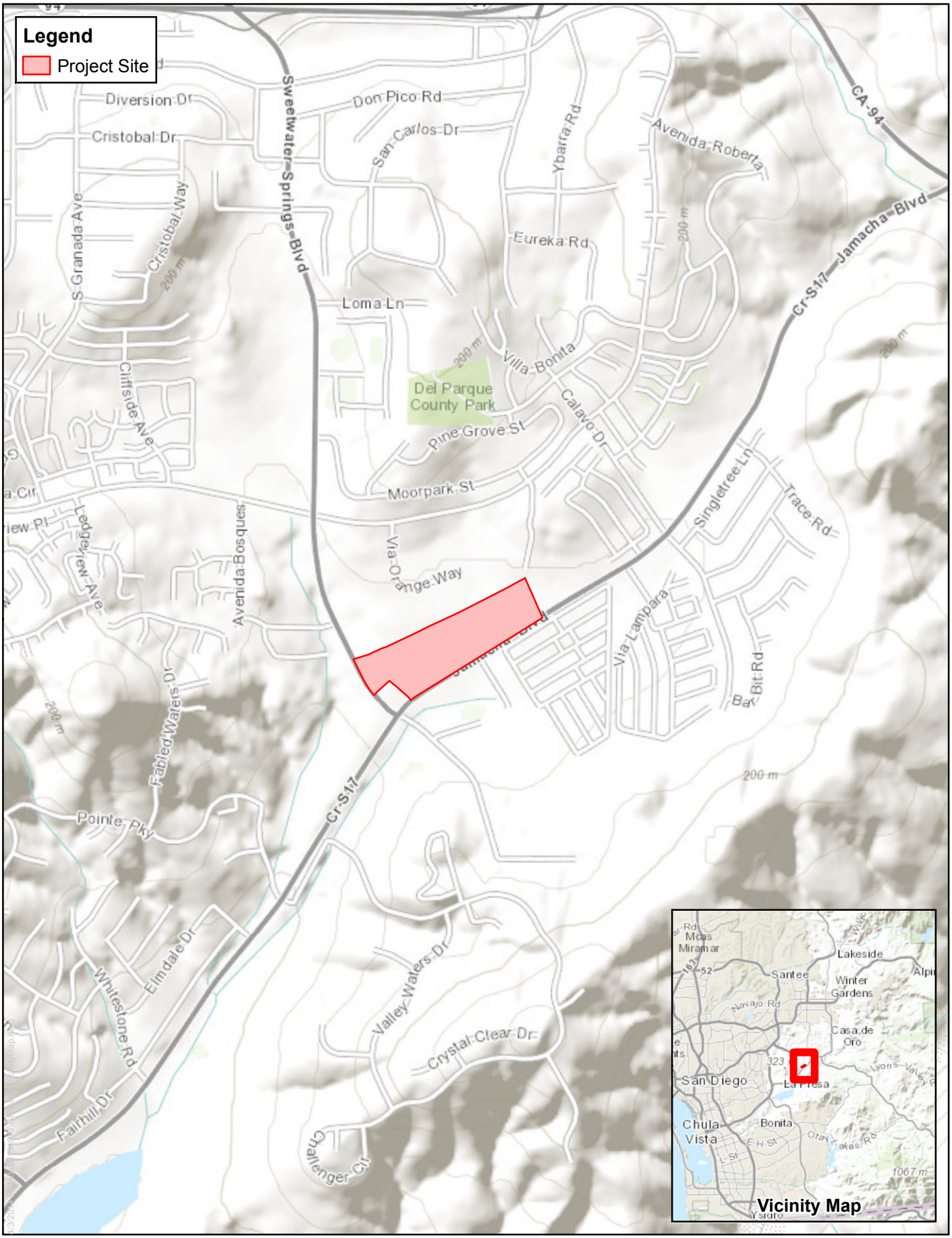
Please include the following attachments.

ATTACHMENT		COMPLETED	N/A
A	Project Location Map	✓	
B	Source Control Exhibit	✓	
C	Drainage Management Area (DMA)Exhibit	✓	
D	BMP Sizing Design Calculations (Water Quality and Hydromodification) and TCBMP/IMP Design Details	✓	
E	Geotechnical Certification Sheet		✓
F	Maintenance Plan	✓	
G	Treatment Control BMP Certification (due at project completion)	✓	
H	HMP Study	✓	
I	Geomorphic Assessment		✓
J	HMP Exemption Documentation		✓
K	Addendum		✓

Note: Attachments B and C may be combined.

ATTACHMENT A

Project Location Map



Spring Valley, California

Sweetwater Village

ATTACHMENT B

Source Control Exhibit

SWEETWATER PLACE
POST DEVELOPMENT
LID / TC-BMP Exhibit

LEGEND:

- PERVIOUS PAVEMENT
- BIORETENTION
- PUBLIC PARK
- EX. CONCRETE CHANNEL
- STORM DRAIN SIGNAGE
- DRAINAGE DIVIDE
- PUBLIC IMPROVEMENT PAVEMENT
- PUBLIC IMPROVEMENT SIDEWALK
- FLOW PATH
- RIPRAP

LID AND SITE DESIGN STRATEGIES:

1. THERE ARE NO WELL DRAINING SOILS OR SIGNIFICANT TREES TO CONSERVE. THE SITE IS NOT SUBJECT TO FLOODPLAIN INUNDATION, STEEP SLOPES, WETLANDS, OR EROSIVE CONDITIONS.
2. SET-BACK DEVELOPMENT ENVELOPE FROM DRAINAGES.
3. THE DRAINAGE CHANNEL TO THE EASTERN BOUNDARY WILL PROTECT IN PLACE.
4. RESTRICT HEAVY CONSTRUCTION EQUIPMENT ACCESS TO PLANNED GREEN/OPEN SPACE AREAS.
5. RE-TILL SOILS COMPACTED BY CONSTRUCTION VEHICLES/EQUIPMENT.
6. CURB-CUTS TO LANDSCAPING AND BIORETENTION AREAS.
7. PITCH PAVEMENTS TOWARD LANDSCAPING.
8. DOWNSPOUT TO PERMEABLE PAVEMENT AND/OR BIORETENTION.
9. LANDSCAPING DESIGN INCLUDES SOIL AMENDMENTS AND SMART IRRIGATION SYSTEMS.
10. DISTURB EXISTING SLOPES ONLY WHEN NECESSARY.
11. MINIMIZE CUT AND FILL AREAS TO REDUCE SLOPE LENGTHS.
12. INCORPORATE RETAINING WALLS TO REDUCE STEEPNESS OF SLOPES OR TO SHORTEN SLOPES.
13. ROUNDING AND SHAPING SLOPES TO REDUCE CONCENTRATED FLOW.
14. COLLECT CONCENTRATED FLOWS IN STABILIZED DRAINS AND CHANNELS.

SOURCE CONTROL BMPS:

1. SELECT BUILDING DESIGN FEATURES THAT DISCOURAGE ENTRY TO PESTS.
2. SELECT DROUGHT TOLERANT PLANTS THAT WILL ALSO SURVIVE SATURATED SOILS WHEN LOCATED IN BIORETENTION AREAS.
3. AVOID ROOFING, GUTTERS, AND TRIM MADE OF COPPER OR OTHER UNPROTECTED METALS THAT MAY LEACH INTO RUNOFF.

TREATMENT CONTROL BMPS:

1. BIORETENTION WITH UNDER DRAINS.
2. PERMEABLE PAVEMENT WITH 6-INCH SAND LAYER AND UNDER DRAINS.

PUBLIC IMPROVEMENTS:

	SWEETWATER SPRINGS BLVD	JAMACHA BLVD.	TOTAL
NEW PAVEMENT	0.06 AC	0.33 AC	0.39 AC
NEW SIDEWALK	0.04 AC	0.19 AC	0.23 AC
	0.10 AC	0.52 AC	0.62 AC

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ATTACHMENT C

Drainage Management Area (DMA) Exhibit

PUBLIC IMPROVEMENTS:	SWEETWATER SPRINGS BLVD	JAMACHA BLVD.	TOTAL
NEW PAVEMENT	0.06 AC	0.33 AC	0.39 AC
NEW SIDEWALK	0.04 AC	0.19 AC	0.23 AC
	0.10 AC	0.52 AC	0.62 AC

DRAINAGE MANAGEMENT AREA

				WQ. VOLUME FT³		WQ. SURFACE AREA FT²	
DMA	AREA AC	IMP (AC)	PER (AC)	REQUIRED	PROVIDED	REQUIRED	PROVIDED
DMA-1	2.10	1.76	0.34	2,744	4,910	3,188	14,880
DMA-2*	2.61	0.90*	1.71	3,068	4,176	1,924	2,962
DMA-3*	6.78	6.08*	0.70	8,860	18,661	10,717	11,848
DMA-4	7.03	6.59	0.44	9,187	30,119	11,559	19,123
TOTAL	18.52*	14.75	3.15	23,859	57,377	26,308	48,813

*ON-SITE BIORETENTION HAS BEEN SIZED TO TREAT AND ATTENUATION AN ADDITIONAL AREA EQUIVALENT TO THE MINOR OFF-SITE IMPROVEMENTS ASSOCIATED WITH JAMACHA BLVD. AND SWEETWATER SPRINGS BLVD.

BMP DETAILS

DMA	DMA 1		DMA 2		DMA 3		DMA 4	
BMP TYPE	POROUS PAVEMENT		BIORETENTION		BIORETENTION		BIORETENTION	
AREA	14,880 FT²		2,962 FT²		11,848 FT²		19,123 FT²	
VOLUME	4,910 FT³		4,176 FT³		18,661 FT³		30,119 FT³	
DETAILS	DEPTH	VOID	DEPTH	VOID	DEPTH	VOID	DEPTH	VOID
PLANTS/ TREES	–	–	0.75	100%	0.75	100%	0.75	100%
SOIL	–	–	1.5	33%	1.5	33%	1.5	33%
ROCK	1.0	33%	0.5	33%	1.0	33%	1.0	33%
NOTES	IMPERVIOUS LINER ALONG SIDES		IMPERVIOUS LINER ALONG SIDES		IMPERVIOUS LINER ALONG SIDES		IMPERVIOUS LINER ALONG SIDES	
	PERFORATED SUB-DRAIN		PERFORATED SUB-DRAIN		PERFORATED SUB-DRAIN		PERFORATED SUB-DRAIN	

LEGEND:

- PERVIOUS PAVEMENT
- BIORETENTION
- PUBLIC PARK
- EX. CONCRETE CHANNEL
- DRAINAGE MANAGEMENT AREA (DMA1)
- PUBLIC IMPROVEMENT PAVEMENT
- PUBLIC IMPROVEMENT SIDEWALK
- FLOW PATH

SWEETWATER PLACE POST DEVELOPMENT DMA LOCATION MAP

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ATTACHMENT D

Sizing Design Calculations and TCBMP/LID Design Details

(Provide BMP Sizing Calculator results and/or continuous simulation modeling results, if applicable)

Volume Based BMP:

$$VOL_{WQ} = C * P_{WQ} * A$$

Where:

VOL_{WQ} = Water Quality Volume Requirement (ac*in)

C = Node Runoff Coefficient

P_{WQ} = 0.6 inches

A = Node Area (ac)

Note: Project includes 122 dwelling units (DU) on 15.39 acres of dwelling area, which results in 7.9 DU/AC. Table: 3-1 of the San Diego County Manual (June 2003) does not include a specific 7.9 DU/AC element, therefore 10.9 DU/AC was used (conservative).

DMA-1	C =	0.60	Per Table: 3-1, San Diego County Hydrology Manual, June 2003 (10.9 DU/AC, 'D' Soil)
Permeable Pavement	P_{WQ} =	0.6	(in)
	A =	2.10	(ac)
	VOL_{WQ} =	0.76	ac-in
	VOL_{WQ} =	0.06	ac-ft
	VOL_{WQ} =	2,744	ft^3

DMA-2	C =	0.90	**Public Road Portion**
Bioretention Areas	P_{WQ} =	0.6	(in)
	A =	0.90	(ac) *(includes equivalent area associated with off-site roadway improvements - 0.1 ac)*
	VOL_{WQ} =	0.49	ac-in
	VOL_{WQ} =	0.04	ac-ft
	VOL_{WQ} =	1,764	ft^3
	C =	0.35	**Public Park Portion**
	P_{WQ} =	0.6	(in)
	A =	1.71	(ac)
	VOL_{WQ} =	0.36	ac-in
	VOL_{WQ} =	0.03	ac-ft
	VOL_{WQ} =	1,304	ft^3
	VOL_{WQ} =	3,068	ft^3

DMA-3	C =	0.60	Per Table: 3-1, San Diego County Hydrology Manual, June 2003 (10.9 DU/AC, 'D' Soil)
Bioretention Areas	P_{WQ} =	0.6	(in)
	A =	6.78	(ac) *(includes equivalent area associated with off-site roadway improvements - 0.52 ac*
	VOL_{WQ} =	2.44	ac-in
	VOL_{WQ} =	0.20	ac-ft
	VOL_{WQ} =	8,860	ft^3

DMA-4	C =	0.60	Per Table: 3-1, San Diego County Hydrology Manual, June 2003 (10.9 DU/AC, 'D' Soil)
Bioretention Areas	P_{WQ} =	0.6	(in)
	A =	7.03	(ac)
	VOL_{WQ} =	2.53	ac-in
	VOL_{WQ} =	0.21	ac-ft
	VOL_{WQ} =	9,187	ft^3

Sweetwater Place
Water Quality Surface Area Requirement
January 2015

I. Self-treating areas:

DMA Name	Area (square feet)
N/A	

II. Self-retaining areas:

DMA Name	Area (square feet)
N/A	

III. Areas draining to self-retaining areas:

DMA Name	Post-Project Surface Type	Runoff Factor	Area (square feet)	Receiving Self-Retaining DMA	Receiving Self-Retaining DMA Area (square feet)
N/A					

IV. Areas draining to IMPs (repeat for each IMP):

DMA-1: Permeable Pavement

DMA Name	DMA Area (square feet)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
10.1	14,880	Permeable Pavement	0.2	2,976
10.2	76,727	Impervious	1.0	76,727
10.3	0	Pervious	0.1	0
			Total	79,703

Soil Type:	IMP Name
D	Permeable Pavement

IMP Sizing Factor (WQ Only)	IMP Name	Minimum Area	Proposed Area
0.04	Permeable Pavement	3,188	14,880

In DMA-1, the provided permeable pavement area is greater than the minimum area required.

Provided Volume: Permeable Pavement

	Area (ft^2)	Depth (ft)	Percent Void	Volume (ft^3)
Surface (bottom area)	14,880	0	100%	0
Sub-Surface Soil	14,880	0	33%	0
Sub-Surface Gravel	14,880	1	33%	4,910
			Total	4,910

	Surface Area REQ. ft^2	**Surface Area Provided ft^2**	**Volume REQ. ft^3**	**Volume Provided ft^3**
Permeable Pavement (w/6" sand layer):	3,188	14,880	2,744	4,910

IV. Areas draining to IMPs (repeat for each IMP):

DMA-2: Bioretention Areas

Made up of DM2a and DMA2b. Public road and lot in DMA2a drain to inlets which drain to bioretention. Public park in DMA2b overland flows to bioretention.

Soil Type:	IMP Name
D	Bioretention

DMA Name	DMA Area (square feet)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor				
20.1	2,962	Bioretention	0.1	296				
20.2	4,356	Off-Site Roadway*	1.0	4,356				
20.3	36,460	Impervious	1.0	36,460				
20.4	69,870	Pervious	0.1	6,987	IMP Sizing Factor (WQ Only)	Bioretention	Minimum Area	Proposed Area (bottom area)
			Total	48,099	0.04		1,924	2,962

*additional area equivalent to off-site improvements associated with Sweetwater Springs Blvd.

In DMA-2, the provided bioretention area is greater than the minimum area required.

Provided Volume: Bioretention

	Area (ft^2)	Depth (ft)	Percent Void	Volume (ft^3)
Surface (bottom area)*	2,962	0.75	100%	2,222
Sub-Surface Soil	2,962	1.5	33%	1,466
Sub-Surface Gravel	2,962	0.5	33%	489
			Total	4,176

*Surface depth is 1' with riser set 0.75' above bottom

	Surface Area REQ. ft^2	**Surface Area Provided ft^2**	**Volume REQ. ft^3**	**Volume Provided ft^3**
DMA-2 Bioretention:	1,924	2,962	3,068	4,176

IV. Areas draining to IMPs (repeat for each IMP):

DMA-3: Bioretention Areas

Made up of DM3a and DMA3b.

Soil Type:	IMP Name
D	Bioretention

DMA Name	DMA Area (square feet)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor				
30.1	11,848	Bioretention	0.1	1,185				
30.2	22,651	Off-Site Roadway*	1.0	22,651				
30.3	242,194	Impervious	1.0	242,194				
30.4	18,857	Pervious	0.1	1,886	IMP Sizing Factor (WQ Only)	Bioretention	Minimum Area	Proposed Area (bottom area)
*additional area equivalent to off-site improvements associated with Jamacha Blvd.			Total	267,916	0.04		10,717	11,848

In DMA-3, the provided bioretention area is greater than the minimum area required.

Provided Volume: Bioretention

	Area (ft^2)	Depth (ft)	Percent Void	Volume (ft^3)
Surface (bottom area)*	11,848	0.75	100%	8,886
Sub-Surface Soil	11,848	1.5	33%	5,865
Sub-Surface Gravel	11,848	1	33%	3,910
			Total	18,661

*Surface depth is 1' with riser set 0.75' above bottom

	Surface Area REQ. ft^2	**Surface Area Provided ft^2**	**Volume REQ. ft^3**	**Volume Provided ft^3**
DMA-3 Bioretention:	10,717	11,848	8,860	18,661

IV. Areas draining to IMPs (repeat for each IMP):

DMA-4: Bioretention Areas

Made up of DM4a and DMA4b.

Soil Type:	IMP Name
D	Bioretention

DMA Name	DMA Area (square feet)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor				
40.1	19,123	Bioretention	0.1	1,912				
40.2	287,060	Impervious	1.0	287,060				
40.3	0	Pervious	0.1	0	IMP Sizing Factor (WQ Only)	Bioretention	Minimum Area	Proposed Area (bottom area)
			Total	288,972	0.04		11,559	19,123

In DMA-4, the provided bioretention area is greater than the minimum area required.

Provided Volume: Bioretention

	Area (ft^2)	Depth (ft)	Percent Void	Volume (ft^3)
Surface (bottom area)*	19,123	0.75	100%	14,342
Sub-Surface Soil	19,123	1.5	33%	9,466
Sub-Surface Gravel	19,123	1	33%	6,311
			Total	30,119

*Surface depth is 1' with riser set 0.75' above bottom

	Surface Area REQ. ft^2	**Surface Area Provided ft^2**	**Volume REQ. ft^3**	**Volume Provided ft^3**
DMA-4 Bioretention:	11,559	19,123	9,187	30,119

ATTACHMENT E

Geotechnical Certification Sheet

(if applicable)

The design of stormwater treatment and other control measures proposed in this plan requiring specific soil infiltration characteristics and/or geological conditions has been reviewed and approved by a registered Civil Engineer, Geotechnical Engineer, or Geologist in the State of California.

_____ _____

Name and registration # Date

ATTACHMENT F

Maintenance Plan

(Use Chapter 5 of the SUSMP as guidance in developing your Maintenance Plan)

The following is a general outline to create your project specific Maintenance Plan. A Maintenance Plan is a living document and field conditions may require modifications to the Maintenance Plan.

I. Inspection, Maintenance Log and Self-Verification Forms (Examples are provided in Appendix F of the San Diego County SUSMP)

II. Updates, Revisions and Errata

III. Introduction

A. Narrative overview describing the site; drainage areas, routing, and discharge points; and treatment facilities.

IV. Responsibility for Maintenance

A. General

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

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

(3) Insert a copy of the recorded maintenance agreement.

(4) Maintenance Funding

(1) Sources of funds for maintenance

(2) Budget category or line item

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

B. Staff Training Program

C. Records

D. Safety

V. Summary of Drainage Areas and Stormwater Facilities

A. Drainage Areas

(1) Drawings showing pervious and impervious areas (copied or adapted from initial SWMP).

(2) Designation and description of each drainage area and how flow is routed to the corresponding facility.

B. Treatment and Flow-Control Facilities

(1) Drawings showing location and type of each facility

(2) General description of each facility (Consider a table if more than two facilities)

(1) Area drained and routing of discharge.

(2) Facility type and size

VI. Facility Documentation

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

B. Manufacturer's data, manuals, and maintenance requirements for pumps, mechanical or electrical equipment, and proprietary facilities (include a "placeholder" in the draft plan for information not yet available).

C. Specific operation and maintenance concerns and troubleshooting

VII. Maintenance Schedule or Matrix

A. Maintenance Schedule for each facility with specific requirements for:

(1) Routine inspection and maintenance

(2) Annual inspection and maintenance

(3) Inspection and maintenance after major storms

B. Service Agreement Information

Assemble and make copies of your maintenance plan. One copy must be submitted to the County, and at least one copy kept on-site. Here are some suggestions for formatting the maintenance plan:

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

ATTACHMENT G

Treatment Control BMP Certification for DPW Permitted Land Development Projects

After TCBMP construction, complete a TCBMP Certification form to verify with County staff that all constructed TCBMPs on the record plans match the approved TCBMPs in the most current SWMP. TCBMP Certification must be completed and verified for permit closure.

County of San Diego

DEPARTMENT OF PUBLIC WORKS

Treatment Control BMP Certification for DPW Permitted Land Development Projects

Permit Number (e.g. L-grading)_____ HSU Watershed_____

Project Name_____

Location / Address _____

Maintenance Notification/Agreement No.: _____

Responsible Party for Construction Phase

Developer's Name: _____

Address: _____

City_____State_____Zip_____

Email Address: _____

Phone Number: _____

Engineer of Work: _____

Engineer's Phone Number: _____

Responsible Party for Ongoing Maintenance

Owner's Name(s)*_____

Address: _____

City_____State_____Zip_____

Email Address: _____

Phone Number: _____

* Note: If a corporation or LLC, provide information for principal partner or Agent for Service of Process. If an HOA, provide information for the Board or property manager at time of project closeout.

Treatment Control BMPs (TCBMPs)[1,2]

(List all from SWMP)

Lot Number Or Location	Description/Type	Sheet

[1] All Priority Development Projects (PDPs) require a TCBMP.
[2] BMPs designed to treat stormwater shall be considered TCBMPs.

(Add sheet for all additional BMPs)

For Applicant to submit to PDCI:

- ☐ Copy of the final accepted SWMP and any accepted addendum.
- ☐ Copy of the most current plan showing the Stormwater TCBMP Table, plans/cross-section sheets of the TCBMPs and the location of each verified as-built TCBMP.
- ☐ Photograph of each TCBMP.
- ☐ Copy of the approved TCBMP maintenance agreement and associated security

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

Please sign your name and seal.

[SEAL]

Professional Engineer's Printed Name:

_____

Professional Engineer's Signed Name:

_____

Date: _____

COUNTY - OFFICIAL USE ONLY:

For PDCI:

PDCI Inspector: _____

Date Project has/expects to close: _____

Date Certification received from EOW: _____

By signing below, PDCI Inspector concurs that every noted TCBMP has been installed per plan.

PDCI Inspector's Signature:_____Date: _____

FOR WPP:

Date Received from PDCI: _____

WPP Submittal Reviewer:_____

WPP Reviewer concurs that the information provided for the following TCBMPs is acceptable to enter into the TCBMP Maintenance verification inventory:

List **acceptable** TCBMPs:

WPP Reviewer's Signature:_____Date: _____

☐ Provide a copy of the certification sheet to DPLU.

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM

BIORETENTION FACILITIES, VEGETATED SWALES & HIGHER RATE BIOFILTERS

1. Transcribe the following information from your notification letter and make corrections as necessary:

Permit No.: _____

BMP Location: _____

Responsible Party: _____

Phone Number: ( ) **Email:** _____

Responsible Party Address: _____

Number Street Name & Suffix City/Zip

☐ *Check here for Address or phone number change*

2. Using the Table below, please describe the inspections and maintenance activities that have been conducted during the fiscal year (July 1 – June 30), and date(s) maintenance was performed. Under "Results of Inspection," indicate whether maintenance was required based on each inspection, and if so, what type of maintenance. If maintenance was required, provide the date maintenance was conducted and a description of the maintenance. ***REFER TO THE BACK OF THIS SHEET FOR MORE INFORMATION DESCRIBING TYPICAL MAINTENANCE INDICATORS AND MAINTENANCE ACTIVITIES.*** *If no maintenance was required based on the inspection results, state "no maintenance required."*

What To Look For?	Date Inspected	Results of Inspection: Work needed? (Yes/No)	Date Maintenance Completed and Description of Maintenance Conducted
Accumulation of Sediment, Litter, Grease			
Standing Water Erosion Overgrown Vegetation Poor Vegetation Establishment Structural Damage			

3. Attach copies of available supporting documents (photographs, copies of maintenance contracts, and/or maintenance records).

4. Sign the bottom of the form and return to:

County of San Diego Watershed Protection Program
Treatment Control BMP Tracking
5201 Ruffin Road, Suite P, MS 0326
San Diego, CA 92123 ***OR***
Email: Watersheds@sdcounty.ca.gov

_____

Signature of Responsible Party **Print Name** **Date**

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM

BIORETENTION FACILITIES, VEGETATED SWALES & HIGHER RATE BIOFILTERS-SIDE 2

This guide sheet provides general indicators for maintenance only and for a wide array of treatment control BMPs. Your developer prepared maintenance plans specifically for your treatment control BMP as an appendix to the Stormwater Management Plan. Also, if you have a manufactured structure, please refer to the manufacturer's maintenance instructions.

Biofilters include the following :

☐ **Vegetated Filter Strip/Swale** ☐ **Bioswale** ☐ **Bioretention Facility** ☐ **Planter Boxes**
☐ **Manufactered Higher-Flow-Rate Biofilters, such as Tree-Pit-Style Units.**

Routine maintenance is needed to ensure that flow is unobstructed, that erosion is prevented, and that soils are held together by plant roots and are biologically active. Typical maintenance consists of the following:

Bioretention BMPs Inspection and Maintenance Checklist	
Typical Maintenance Indicators	**Typical Maintenance Actions**
Accumulation of sediment (over 2 inches deep or covers vegetation), litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation. Confirm that soil is not clogging and that the area drains after a storm event. Till or replace soil as necessary.
Poor vegetation establishment	Ensure vegetation is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary (if less than 3 inches deep), remove fallen leaves and debris, prune large shrubs or trees, and mow turf areas.
Overgrown vegetation—woody vegetation not part of design is present and grass excessively tall (greater than 10 inches)	Mow or trim as appropriate, but not less than the design height of the vegetation (typically 4-6 inches for grass). Confirm that irrigation is adequate and not excessive and that sprays do not directly enter overflow grates. Replace dead plants and remove noxious and invasive weeds.
Erosion due to concentrated irrigation flow	Repair/re-seed eroded areas and adjust the irrigation.
Erosion due to concentrated stormwater runoff flow	Repair/re-seed eroded areas and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or re-grading where necessary.Remove obstructions and sediment accumulations so water disperses.
Standing water (BMP not draining) . If mosquito larvae are present and persistent, contact the San Diego County Vector Control Program at (858) 694-2888. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.	Where there is an underdrain, such as in planter boxes and manufactured biofilters, check the underdrain piping to make sure it is intact and unobstructed. Abate any potential vectors by filling holes in the ground in and around the biofilter facility and by insuring that there are no areas where water stands longer than 96 hours following a storm .
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet, or outlet structures	Repair or replace as applicable.
Before the wet season and after rain events: remove sediment and debris from screens and overflow drains and downspouts; ensure pumps are functioning, where applicable; check integrity of mosquito screens; and; check that covers are properly seated and locked.	Where cisterns are part of the system
For manufactured high-flow-rate biofilters, see manufacturer's maintenance guidelines	

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM

BIORETENTION FACILITIES, VEGETATED SWALES & HIGHER RATE BIOFILTERS

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BMP Location: _____

Responsible Party: _____

Phone Number: ( ) **Email:** _____

Responsible Party Address: _____

Number Street Name & Suffix City/Zip

☐ *Check here for Address or phone number change*

2. Using the Table below, please describe the inspections and maintenance activities that have been conducted during the fiscal year (July 1 – June 30), and date(s) maintenance was performed. Under "Results of Inspection," indicate whether maintenance was required based on each inspection, and if so, what type of maintenance. If maintenance was required, provide the date maintenance was conducted and a description of the maintenance. ***REFER TO THE BACK OF THIS SHEET FOR MORE INFORMATION DESCRIBING TYPICAL MAINTENANCE INDICATORS AND MAINTENANCE ACTIVITIES.*** *If no maintenance was required based on the inspection results, state "no maintenance required."*

What To Look For?	Date Inspected	Results of Inspection: Work needed? (Yes/No)	Date Maintenance Completed and Description of Maintenance Conducted
Accumulation of Sediment, Litter, Grease			
Standing Water Erosion Overgrown Vegetation Poor Vegetation Establishment Structural Damage			

3. Attach copies of available supporting documents (photographs, copies of maintenance contracts, and/or maintenance records).

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San Diego, CA 92123 ***OR***
Email: Watersheds@sdcounty.ca.gov

_____

Signature of Responsible Party **Print Name** **Date**

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM

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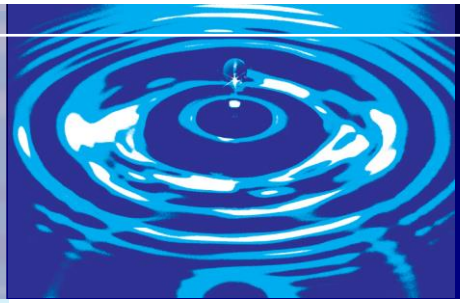
Overgrown vegetation—woody vegetation not part of design is present and grass excessively tall (greater than 10 inches)	Mow or trim as appropriate, but not less than the design height of the vegetation (typically 4-6 inches for grass). Confirm that irrigation is adequate and not excessive and that sprays do not directly enter overflow grates. Replace dead plants and remove noxious and invasive weeds.
Erosion due to concentrated irrigation flow	Repair/re-seed eroded areas and adjust the irrigation.
Erosion due to concentrated stormwater runoff flow	Repair/re-seed eroded areas and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or re-grading where necessary.Remove obstructions and sediment accumulations so water disperses.
Standing water (BMP not draining) . If mosquito larvae are present and persistent, contact the San Diego County Vector Control Program at (858) 694-2888. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.	Where there is an underdrain, such as in planter boxes and manufactured biofilters, check the underdrain piping to make sure it is intact and unobstructed. Abate any potential vectors by filling holes in the ground in and around the biofilter facility and by insuring that there are no areas where water stands longer than 96 hours following a storm .
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet, or outlet structures	Repair or replace as applicable.
Before the wet season and after rain events: remove sediment and debris from screens and overflow drains and downspouts; ensure pumps are functioning, where applicable; check integrity of mosquito screens; and; check that covers are properly seated and locked.	Where cisterns are part of the system
For manufactured high-flow-rate biofilters, see manufacturer's maintenance guidelines	

ATTACHMENT H

HMP Study

(Contact County staff to determine if this should be a separate report from the Major SWMP)



Hydromodification Mitigation Study

Sweetwater Place
San Diego, California

June 2014
January 2015
March 2015

PDS2014-TM-5588 RPL-1; STP-14-015 RPL-1;
GPA-14-003; REZ-14-003; ER-14-19-005

Prepared for:

Prepared by:

RBF CONSULTING
9755 Clairemont Mesa Blvd. Suite 100
San Diego, California 92124-1324
858.614.5000 telephone
858.614.5001 fax

RBF Contact Person:

Jay Sullivan, R.C.E. 77445

RBF JN 134978

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Table of Contents

List of Tables

Table of Appendices

Section 1. Integrated Management Practices

Refer to the project specific Preliminary Drainage Study and Storm Water Management Plan (SWMP), found under separate cover, for additional project site information pertaining to 100-year peak flows, water quality treatment, and

1.1. Bioretention

Bioretention basins will be strategically located along the southerly and westerly project boundary. The only portion of the project site not draining to proposed bioretention areas drains to permeable pavement. As such, all project site runoff is disconnected prior to discharge from the site.

All proposed bioretention basins will consist of a 12-inch rock section (33-percent voids), an 18-inch soil matrix layer (38-percent voids), and 12 inches of available surface ponding (100-percent voids). Passive infiltration at a conservative rate of 0.1 inches per hour has been accounted for in the San Diego Hydrology Model (SDHM). The basins will be fitted with perforated sub-drains and impermeable side-wall liners will be extended into the sub-grade to prevent the potential for lateral migration of flow.

The bioretention basins located along the southerly project boundary (Jamacha Blvd.) will utilize a cascading grading plan such that weir flow occurs from one basin to the next should the rainfall intensity exceed the hydraulic conductivity of the soil and rock matrices. These bioretention areas are on the order of 15 feet below the adjacent homes; as such, potential residential flooding is not anticipated.

The bioretention area located along the westerly project boundary (Sweetwater Springs Blvd.) will utilize weir flow discharge as the secondary mechanism; however discharge will convey directly to Sweetwater Springs Blvd., as opposed to a downstream bioretention area. This bioretention area will be fitted with a sub-drain that discharges to the curb and gutter of Sweetwater Springs Boulevard.

1.1.1 Bioretention Maintenance

Maintenance Program for Bioretention Area

Inspection Frequency/Indications:	Regular Inspections ❑ Before wet season begins (September); ❑ Every 60 days during wet season (September-April); ❑ After wet season (April). Performance Inspections ❑ After rainfall events greater than 0.5 inch
Maintenance Indications Connections	**Maintenance Activities Connections**
❑ Damage to inlet/outlet, sideslopes, headwall, or other structures	❑ Repair inlet/outlet structures, side slopes, fences, or other structural elements as needed to maintain performance of the facility.
❑ Over-grown vegetation, emergent woody vegetation and/or weeds	❑ Trim vegetation to average height of 12 inches and remove trimmings. ❑ Remove emergent trees and other vegetation that are not part of bioretention basin plan and weeds ❑ Re-seed and re-plan barren areas prior to rainy season ❑ Install erosion blanket on barrent spots if re-vegetation is not successful
❑ Sediment accumulation over 3 inches	❑ Remove sediment accumulation at or near plant height
❑ Trash, debris, and vegetative litter	❑ Remove trash, debris, and vegetative litter
❑ Rodents or other vectors	❑ Abate and control rodents as necessary to maintain performance of the facility ❑ Drain standing water
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.

1.2. Permeable Pavement

The north-south drive aisles located in the northwesterly corner of the project site will be constructed with permeable pavers. A six-inch sand layer will be included for water quality benefits.

The permeable pavement sections will consist of a 12-inch rock section (33-percent voids), a 6-inch sand layer, and the permeable pavers themselves. The permeable pavement sections will be fitted with perforated sub-drains and impermeable side-wall liners will be extended into the sub-grade to prevent the potential for lateral migration of flow.

1.2.1 Permeable Pavement Maintenance

Maintenance Program for Permeable Pavement

Inspection Frequency/Indications:	Regular Inspections ❑ Before wet season begins (September); ❑ After wet season (April). Performance Inspections ❑ After rainfall events greater than 0.5 inches, or any rainfall that fills the basin.
Activity	**Schedule**
❑ Keep landscaped areas well maintained	❑ Ongoing
❑ Prevent soil from being washed onto pavement	
❑ Vacuum clean surface using commercially available sweeping machines	❑ 2 – 3 times per year, preferably before and after rainy season, and once mid-summer.
❑ Pressure wash or power blow surface to restore porosity.	❑ Annually
❑ If routine cleaning does not restore infiltration rates, then reconstruction of part of the whole of a pervious surface may be required.	❑ As needed (max every 15 – 20 years).
❑ The surface area affected by hydraulic failure should be lifted for inspection of the internal materials to identify the location and extent of the blockage.	
❑ Surface materials should be lifted and replaced after brush cleaning. Geotextiles may need complete replacement.	
❑ Sub-surface layers may need cleaning and replacing.	
❑ Removed silts may need to be disposed of as controlled waste.	
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.

Section 2. Hydromodification Study Methods

To determine the impact of hydromodification and to provide a design that fully mitigates potential hydromodification impacts, calculations were performed using the Hydrologic Simulation Program Fortran (HSPF). HSPF has been the state-of-the-art program for long-term continuous simulation calculations since its inception over 30 years ago.

The model uses hourly rainfall data collected at the Bonita rain gage. The loss rates applied to the precipitation data are provided in Appendix F of the Final Hydromodification Management Plan for the County of San Diego.

2.1. Typical Case

One point of compliance has been modeled based on the project site's discharge comingling just off-site, prior to reaching any type of conveyance mechanism that might be adversely impacted by hydromodification (i.e. natural channels).

2.2. Modeled BMPs

The proposed permeable pavement sections are not required for mitigated hydromodification. As such, they are not included in the SDHM analysis. The permeable pavement sections (with 6-inch sand layer) are included for water quality treatment.

The project site mitigates the potential impacts of hydromodification with 48,813 square feet of bioretention; approximately 6-percent of the project site.

Section 3. Conclusions

The site is currently steep agriculture land. To mitigate potential hydromodification impacts from development, bioretention areas and level grading have been proposed. They collectively serve a number of important purposes:

- The bioretention areas provide runoff storage and attenuation of peak flow discharge rates and flow duration to pre-project levels.
- The use of select import in IMPs will provide increased infiltration rate and flow retention, which will result in increased initial abstraction (the minimum precipitation required to cause runoff).
- The bioretention areas provide a means to disconnect impervious area runoff prior to discharge from the project site. In that regard, they serve as a Low Impact Development (LID) IMP.
- The soil filtration and biological uptake of the plant life within the bioretention areas will provide water quality treatment from the pollutants typically associated with residential rooftop runoff and roadways, respectively.

Table 3-1 presents the hydrologic soil type, land cover/use and slope for areas that drain to each point of compliance. The pre- and post-project areas analyzed for this study are equal and total 17.9 acres.

Table 3-2 provides a summary of the volume and area necessary to meet hydromodification and water quality requirements. The "proposed plan" volume and area represent the maximum of volume and area, respectively, necessary to provide both hydromodification mitigation and water quality treatment.

Table 3-3 shows that the mitigated post-development 2-, 5-, 10-, and 25-year peak runoff rates are less than or equal to the predevelopment runoff rates at each of the two POC's. Each point of compliance mitigates hydromodification at the project boundary.

Complete results of the SDHM analysis are included in Attachment A, and clearly show that mitigation of both peak flow and flow duration are accomplished for the statistical range of events between 10% of Q2 and Q10 (hydromodification zone). This result is in compliance with the latest standards of the County of San Diego SUSMP.

Table 3-1 Summary of Pre- and Post-Project SDHM Land Characteristics

Hydrologic Soil Type	Cover	Slope	POC #1 (acres)
Existing Condition			
D	Grass	Flat (0-5%)	13.4
D	Impervious	Flat	4.5
Proposed Condition			
D	Grass	Flat (0-5%)	7.0
D	Impervious	Flat (0-5%)	10.9
A conservative amount of impervious area under proposed conditions has been intentionally modeled as a factor of safety against potential changes, due to the preliminary nature of the design.			

Table 3-2: Hydromodification Mitigation Requirements

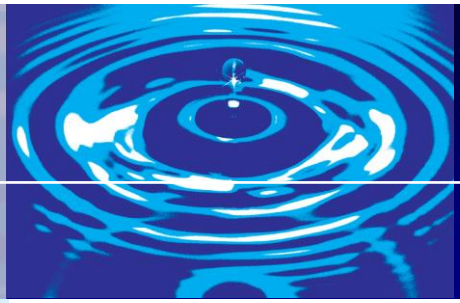
P.O.C.	Post Development Drainage Area	Hydromodification Mitigation Requirements		Water Quality Treatment Requirements		Proposed Plan		
		HM_V	HM_{SF}	WQ_V	WQ_{SF}	Bioretention Storage Volume	Bioretention Surface Area	Permeable Pavement Surface Area
	(ac)	(ac-ft)	(ac)	(ac-ft)	(SF)	(ac-ft)	(SF)	(SF)
1	17.9	0.54	0.36	0.54	15,837	2.00	60,714	15,580

Table 3-3: Pre- and Mitigated Post-Development 2-, 5-, 10-, and 25-Year Peak Flows

P.O.C.	2-Year		5-Year		10-Year		25-Year	
	Pre-Project	Mitigated Post-Project	Pre-Project	Mitigated Post-Project	Pre-Project	Mitigated Post-Project	Pre-Project	Mitigated Post-Project
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	2.27	0.09	3.08	0.09	4.37	0.53	5.68	0.82

Section 4. References

Brown and Caldwell, 2011. Brown and Caldwell. (March 2011). Final Hydromodification Management Plan, prepared for the County of San Diego



Appendix A: IMP Design Calculations

SDHM

PROJECT REPORT

General Model Information

Project Name:	Sweetwater1
Site Name:	Sweetwater Town Center
Site Address:	
City:	
Report Date:	6/4/2014
Gage:	BONITA
Data Start:	10/01/1971
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.00
Version:	2014/05/21

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data
Predeveloped Land Use

Pre Development

Bypass: No

GroundWater: No

Pervious Land Use	Acres
D,Grass,FLAT(0-5%)	13.4
Pervious Total	13.4

Impervious Land Use	Acres
IMPERVIOUS-FLAT	4.5
Impervious Total	4.5
Basin Total	17.9

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Street Direct Runoff

Bypass:	Yes
GroundWater:	No

Pervious Land Use	Acres
D,Grass,FLAT(0-5%)	0.2
Pervious Total	0.2

Impervious Land Use	Acres
IMPERVIOUS-FLAT	3
Impervious Total	3
Basin Total	3.2

Element Flows To:

Surface	Interflow	Groundwater
Surface Bioretention	Surface Bioretention	

Lot Impervious

Bypass:	No
Impervious Land Use	Acres
IMPERVIOUS-FLAT LAT	7.9

Element Flows To:

Outlet 1	Outlet 2
2.8Lateral Basin 1	

2.8Lateral Basin 1

Bypass: No

GroundWater: No

Pervious Land Use	Acres
D,Grass,FLAT(0-5%)	6.8

Element Flows To:

Surface	Interflow	Groundwater
Surface Bioretention		

Routing Elements
Predeveloped Routing

Mitigated Routing

Bioretention

Bottom Length:	207.00 ft.
Bottom Width:	207.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	Amended 5 in/hr
Material thickness of second layer:	1
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.1
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	76.117
Total Volume Through Riser (ac-ft):	15.119
Total Volume Through Facility (ac-ft):	91.236
Percent Infiltrated:	83.43
Underdrain used	
Underdrain Diameter (ft):	0.5
Orifice Diameter (in):	2
Offset (in):	6
Flow Through Underdrain (ac-ft):	13.656
Total Outflow (ac-ft):	91.236
Percent Through Underdrain:	14.97
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	12 in.
Notch Type:	Rectangular
Notch Width:	0.000 ft.
Notch Height:	0.000 ft.
Element Flows To:	
Outlet 1	Outlet 2

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	1.0810	0.0000	0.0000	0.0000
0.0495	1.0799	0.0204	0.0000	0.0000
0.0989	1.0780	0.0409	0.0000	0.0000
0.1484	1.0760	0.0615	0.0000	0.0000
0.1978	1.0740	0.0820	0.0992	0.0992
0.2473	1.0721	0.1026	0.0992	0.0992
0.2967	1.0701	0.1233	0.0992	0.0992
0.3462	1.0681	0.1440	0.0992	0.0992
0.3956	1.0662	0.1647	0.0992	0.0992
0.4451	1.0642	0.1855	0.0992	0.0992
0.4945	1.0623	0.2063	0.0992	0.0992
0.5440	1.0603	0.2271	0.0992	0.0992
0.5934	1.0584	0.2480	0.0992	0.0992
0.6429	1.0564	0.2689	0.0992	0.0992
0.6923	1.0545	0.2899	0.0992	0.0992
0.7418	1.0525	0.3109	0.0992	0.0992
0.7912	1.0506	0.3319	0.0992	0.0992
0.8407	1.0486	0.3530	0.0992	0.0992
0.8901	1.0467	0.3741	0.0992	0.0992

0.9396	1.0448	0.3953	0.0992	0.0992
0.9890	1.0428	0.4165	0.0992	0.0992
1.0385	1.0409	0.4377	0.0992	0.0992
1.0879	1.0390	0.4590	0.0992	0.0992
1.1374	1.0370	0.4803	0.0992	0.0992
1.1868	1.0351	0.5017	0.0992	0.0992
1.2363	1.0332	0.5231	0.0992	0.0992
1.2857	1.0312	0.5445	0.0992	0.0992
1.3352	1.0293	0.5660	0.0992	0.0992
1.3846	1.0274	0.5875	0.0992	0.0992
1.4341	1.0255	0.6090	0.0992	0.0992
1.4835	1.0236	0.6306	0.0992	0.0992
1.5330	1.0216	0.6520	0.0992	0.0992
1.5824	1.0197	0.6734	0.0992	0.0992
1.6319	1.0178	0.6949	0.0992	0.0992
1.6813	1.0159	0.7164	0.0992	0.0992
1.7308	1.0140	0.7379	0.0992	0.0992
1.7802	1.0121	0.7595	0.0992	0.0992
1.8297	1.0102	0.7811	0.0992	0.0992
1.8791	1.0083	0.8028	0.0992	0.0992
1.9286	1.0064	0.8245	0.0992	0.0992
1.9780	1.0045	0.8462	0.0992	0.0992
2.0275	1.0026	0.8680	0.0992	0.0992
2.0769	1.0007	0.8898	0.0992	0.0992
2.1264	0.9988	0.9117	0.0992	0.0992
2.1758	0.9969	0.9336	0.0992	0.0992
2.2253	0.9950	0.9555	0.0992	0.0992
2.2747	0.9931	0.9775	0.0992	0.0992
2.3242	0.9912	0.9995	0.0992	0.0992
2.3736	0.9893	1.0216	0.0992	0.0992
2.4231	0.9874	1.0437	0.0992	0.0992
2.4725	0.9856	1.0659	0.0992	0.0992
2.5000	0.9837	1.0782	0.0992	0.0992

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended()cfs)	Infilt(cfs)
2.5000	1.0810	1.0782	0.0000	5.2439	0.0000
2.5495	1.0830	1.1317	0.0000	5.2439	0.0000
2.5989	1.0850	1.1853	0.0000	5.4112	0.0000
2.6484	1.0869	1.2390	0.0000	5.5786	0.0000
2.6978	1.0889	1.2928	0.0000	5.7460	0.0000
2.7473	1.0909	1.3467	0.0000	5.9133	0.0000
2.7967	1.0929	1.4007	0.0000	6.0807	0.0000
2.8462	1.0949	1.4548	0.0000	6.2480	0.0000
2.8956	1.0968	1.5090	0.0000	6.4154	0.0000
2.9451	1.0988	1.5632	0.0000	6.5828	0.0000
2.9945	1.1008	1.6176	0.0000	6.7501	0.0000
3.0440	1.1028	1.6721	0.0000	6.9175	0.0000
3.0934	1.1048	1.7267	0.0000	7.0848	0.0000
3.1429	1.1068	1.7814	0.0000	7.2522	0.0000
3.1923	1.1088	1.8362	0.0000	7.4195	0.0000
3.2418	1.1108	1.8910	0.0000	7.5869	0.0000
3.2912	1.1128	1.9460	0.0000	7.7543	0.0000
3.3407	1.1148	2.0011	0.0000	7.9216	0.0000
3.3901	1.1168	2.0563	0.0000	8.0890	0.0000
3.4396	1.1188	2.1115	0.0000	8.2563	0.0000
3.4890	1.1208	2.1669	0.0000	8.4237	0.0000
3.5385	1.1228	2.2224	0.0000	8.5911	0.0000

3.5879	1.1248	2.2780	0.0058	8.7584	0.0000
3.6374	1.1268	2.3336	0.0177	8.9258	0.0000
3.6868	1.1288	2.3894	0.0243	9.0931	0.0000
3.7363	1.1308	2.4453	0.0294	9.2605	0.0000
3.7857	1.1329	2.5012	0.0338	9.4278	0.0000
3.8352	1.1349	2.5573	0.0377	9.5952	0.0000
3.8846	1.1369	2.6135	0.0412	9.7626	0.0000
3.9341	1.1389	2.6698	0.0445	9.9299	0.0000
3.9835	1.1409	2.7261	0.0475	10.097	0.0000
4.0330	1.1430	2.7826	0.0503	10.265	0.0000
4.0824	1.1450	2.8392	0.0530	10.432	0.0000
4.1319	1.1470	2.8958	0.0556	10.599	0.0000
4.1813	1.1491	2.9526	0.0581	10.767	0.0000
4.2308	1.1511	3.0095	0.0604	10.934	0.0000
4.2802	1.1531	3.0665	0.0627	11.101	0.0000
4.3297	1.1552	3.1235	0.0649	11.269	0.0000
4.3791	1.1572	3.1807	0.0671	11.436	0.0000
4.4286	1.1592	3.2380	0.0692	11.603	0.0000
4.4780	1.1613	3.2954	0.0715	11.771	0.0000
4.5000	1.1622	3.3209	0.0753	11.845	0.0000

Surface Bioretention

Element Flows To:

Outlet 1	Outlet 2
	Bioretention

Permeable Pavement

Pavement Area:0.3587 ac.Pavement Length: 125.00 ft.
Pavement Width: 125.00 ft.
Pavement slope 1:0.0001 To 1
Pavement thickness: 0.5
Pour Space of Pavement: 0.33
Material thickness of second layer: 1.5
Pour Space of material for second layer: 0.33
Material thickness of third layer: 0
Pour Space of material for third layer: 0
Infiltration On
Infiltration rate: 0.1
Infiltration safety factor: 1
Total Volume Infiltrated (ac-ft): 8.088
Total Volume Through Riser (ac-ft): 0
Total Volume Through Facility (ac-ft): 8.088
Percent Infiltrated: 100
Element Flows To:
Outlet 1 Outlet 2

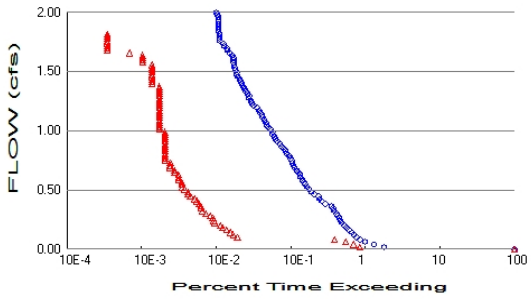
Porous Pavement Hydraulic Table

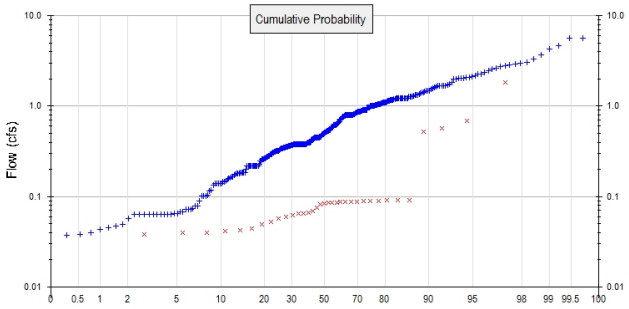
Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.358	0.000	0.000	0.000
0.0222	0.358	0.002	0.000	0.036
0.0444	0.358	0.005	0.000	0.036
0.0667	0.358	0.007	0.000	0.036
0.0889	0.358	0.010	0.000	0.036
0.1111	0.358	0.013	0.000	0.036
0.1333	0.358	0.015	0.000	0.036
0.1556	0.358	0.018	0.000	0.036
0.1778	0.358	0.021	0.000	0.036
0.2000	0.358	0.023	0.000	0.036
0.2222	0.358	0.026	0.000	0.036
0.2444	0.358	0.028	0.000	0.036
0.2667	0.359	0.031	0.000	0.036
0.2889	0.359	0.034	0.000	0.036
0.3111	0.359	0.036	0.000	0.036
0.3333	0.359	0.039	0.000	0.036
0.3556	0.359	0.042	0.000	0.036
0.3778	0.359	0.044	0.000	0.036
0.4000	0.359	0.047	0.000	0.036
0.4222	0.359	0.050	0.000	0.036
0.4444	0.359	0.052	0.000	0.036
0.4667	0.359	0.055	0.000	0.036
0.4889	0.359	0.057	0.000	0.036
0.5111	0.359	0.060	0.099	0.036
0.5333	0.359	0.063	0.172	0.036
0.5556	0.359	0.065	0.222	0.036
0.5778	0.359	0.068	0.263	0.036
0.6000	0.359	0.071	0.299	0.036
0.6222	0.359	0.073	0.330	0.036
0.6444	0.359	0.076	0.359	0.036
0.6667	0.359	0.079	0.386	0.036
0.6889	0.359	0.081	0.410	0.036
0.7111	0.359	0.084	0.434	0.036

0.7333	0.359	0.086	0.456	0.036
0.7556	0.359	0.089	0.478	0.036
0.7778	0.359	0.092	0.498	0.036
0.8000	0.359	0.094	0.517	0.036
0.8222	0.359	0.097	0.536	0.036
0.8444	0.359	0.100	0.554	0.036
0.8667	0.359	0.102	0.572	0.036
0.8889	0.359	0.105	0.589	0.036
0.9111	0.359	0.108	0.606	0.036
0.9333	0.359	0.110	0.622	0.036
0.9556	0.359	0.113	0.638	0.036
0.9778	0.359	0.115	0.653	0.036
1.0000	0.359	0.118	0.668	0.036
1.0222	0.359	0.121	0.683	0.036
1.0444	0.359	0.123	0.697	0.036
1.0667	0.359	0.126	0.711	0.036
1.0889	0.359	0.129	0.725	0.036
1.1111	0.359	0.131	0.739	0.036
1.1333	0.359	0.134	0.752	0.036
1.1556	0.359	0.137	0.765	0.036
1.1778	0.359	0.139	0.778	0.036
1.2000	0.359	0.142	0.791	0.036
1.2222	0.359	0.144	0.803	0.036
1.2444	0.359	0.147	0.815	0.036
1.2667	0.359	0.150	0.827	0.036
1.2889	0.359	0.152	0.839	0.036
1.3111	0.359	0.155	0.851	0.036
1.3333	0.360	0.158	0.863	0.036
1.3556	0.360	0.160	0.874	0.036
1.3778	0.360	0.163	0.885	0.036
1.4000	0.360	0.166	0.897	0.036
1.4222	0.360	0.168	0.908	0.036
1.4444	0.360	0.171	0.918	0.036
1.4667	0.360	0.173	0.929	0.036
1.4889	0.360	0.176	0.940	0.036
1.5111	0.360	0.179	0.950	0.036
1.5333	0.360	0.181	0.961	0.036
1.5556	0.360	0.184	0.971	0.036
1.5778	0.360	0.187	0.981	0.036
1.6000	0.360	0.189	0.991	0.036
1.6222	0.360	0.192	1.001	0.036
1.6444	0.360	0.195	1.011	0.036
1.6667	0.360	0.197	1.021	0.036
1.6889	0.360	0.200	1.030	0.036
1.7111	0.360	0.203	1.040	0.036
1.7333	0.360	0.205	1.050	0.036
1.7556	0.360	0.208	1.059	0.036
1.7778	0.360	0.210	1.068	0.036
1.8000	0.360	0.213	1.078	0.036
1.8222	0.360	0.216	1.087	0.036
1.8444	0.360	0.218	1.096	0.036
1.8667	0.360	0.221	1.105	0.036
1.8889	0.360	0.224	1.114	0.036
1.9111	0.360	0.226	1.123	0.036
1.9333	0.360	0.229	1.132	0.036
1.9556	0.360	0.232	1.140	0.036
1.9778	0.360	0.234	1.149	0.036
2.0000	0.360	0.237	1.158	0.036

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 13.4
Total Impervious Area: 4.5

Mitigated Landuse Totals for POC #1
Total Pervious Area: 7
Total Impervious Area: 10.9

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	2.265914
5 year	3.077074
10 year	4.374617
25 year	5.684761

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.085457
5 year	0.090167
10 year	0.528409
25 year	0.823622

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2266	289296	289296	100	Pass
0.2685	5118	2432	47	Pass
0.3104	3772	2024	53	Pass
0.3523	2857	1578	55	Pass
0.3942	2459	1114	45	Pass
0.4361	2188	56	2	Pass
0.4780	2025	49	2	Pass
0.5199	1905	45	2	Pass
0.5618	1735	40	2	Pass
0.6037	1622	35	2	Pass
0.6456	1511	33	2	Pass
0.6875	1412	28	1	Pass
0.7294	1345	27	2	Pass
0.7713	1287	26	2	Pass
0.8132	1233	24	1	Pass
0.8551	1173	21	1	Pass
0.8970	1113	19	1	Pass
0.9389	1062	18	1	Pass
0.9808	1009	18	1	Pass
1.0227	845	17	2	Pass
1.0646	759	16	2	Pass
1.1065	713	15	2	Pass
1.1484	680	13	1	Pass
1.1903	592	12	2	Pass
1.2322	546	12	2	Pass
1.2741	506	11	2	Pass
1.3160	479	10	2	Pass
1.3579	451	10	2	Pass
1.3998	435	10	2	Pass
1.4417	413	9	2	Pass
1.4836	396	9	2	Pass
1.5255	384	9	2	Pass
1.5674	364	8	2	Pass
1.6093	348	8	2	Pass
1.6512	326	7	2	Pass
1.6931	313	7	2	Pass
1.7350	304	7	2	Pass
1.7769	297	6	2	Pass
1.8188	287	6	2	Pass
1.8607	278	6	2	Pass
1.9026	254	6	2	Pass
1.9445	245	6	2	Pass
1.9864	234	6	2	Pass
2.0283	219	6	2	Pass
2.0702	207	6	2	Pass
2.1121	192	6	3	Pass
2.1540	181	6	3	Pass
2.1959	175	6	3	Pass
2.2378	166	6	3	Pass
2.2797	165	6	3	Pass
2.3216	154	5	3	Pass
2.3635	144	5	3	Pass
2.4054	137	5	3	Pass

2.4473	133	5	3	Pass
2.4892	128	5	3	Pass
2.5311	122	5	4	Pass
2.5729	119	5	4	Pass
2.6148	113	5	4	Pass
2.6567	110	5	4	Pass
2.6986	103	5	4	Pass
2.7405	93	5	5	Pass
2.7824	87	5	5	Pass
2.8243	84	5	5	Pass
2.8662	81	5	6	Pass
2.9081	80	5	6	Pass
2.9500	76	5	6	Pass
2.9919	73	5	6	Pass
3.0338	70	5	7	Pass
3.0757	67	5	7	Pass
3.1176	64	4	6	Pass
3.1595	62	4	6	Pass
3.2014	60	4	6	Pass
3.2433	57	4	7	Pass
3.2852	55	4	7	Pass
3.3271	55	4	7	Pass
3.3690	52	4	7	Pass
3.4109	51	4	7	Pass
3.4528	50	4	8	Pass
3.4947	49	3	6	Pass
3.5366	49	3	6	Pass
3.5785	49	3	6	Pass
3.6204	48	3	6	Pass
3.6623	44	2	4	Pass
3.7042	41	1	2	Pass
3.7461	40	1	2	Pass
3.7880	37	1	2	Pass
3.8299	36	1	2	Pass
3.8718	33	1	3	Pass
3.9137	32	1	3	Pass
3.9556	32	1	3	Pass
3.9975	32	1	3	Pass
4.0394	31	0	0	Pass
4.0813	31	0	0	Pass
4.1232	31	0	0	Pass
4.1651	31	0	0	Pass
4.2070	31	0	0	Pass
4.2489	31	0	0	Pass
4.2908	31	0	0	Pass
4.3327	30	0	0	Pass
4.3746	29	0	0	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

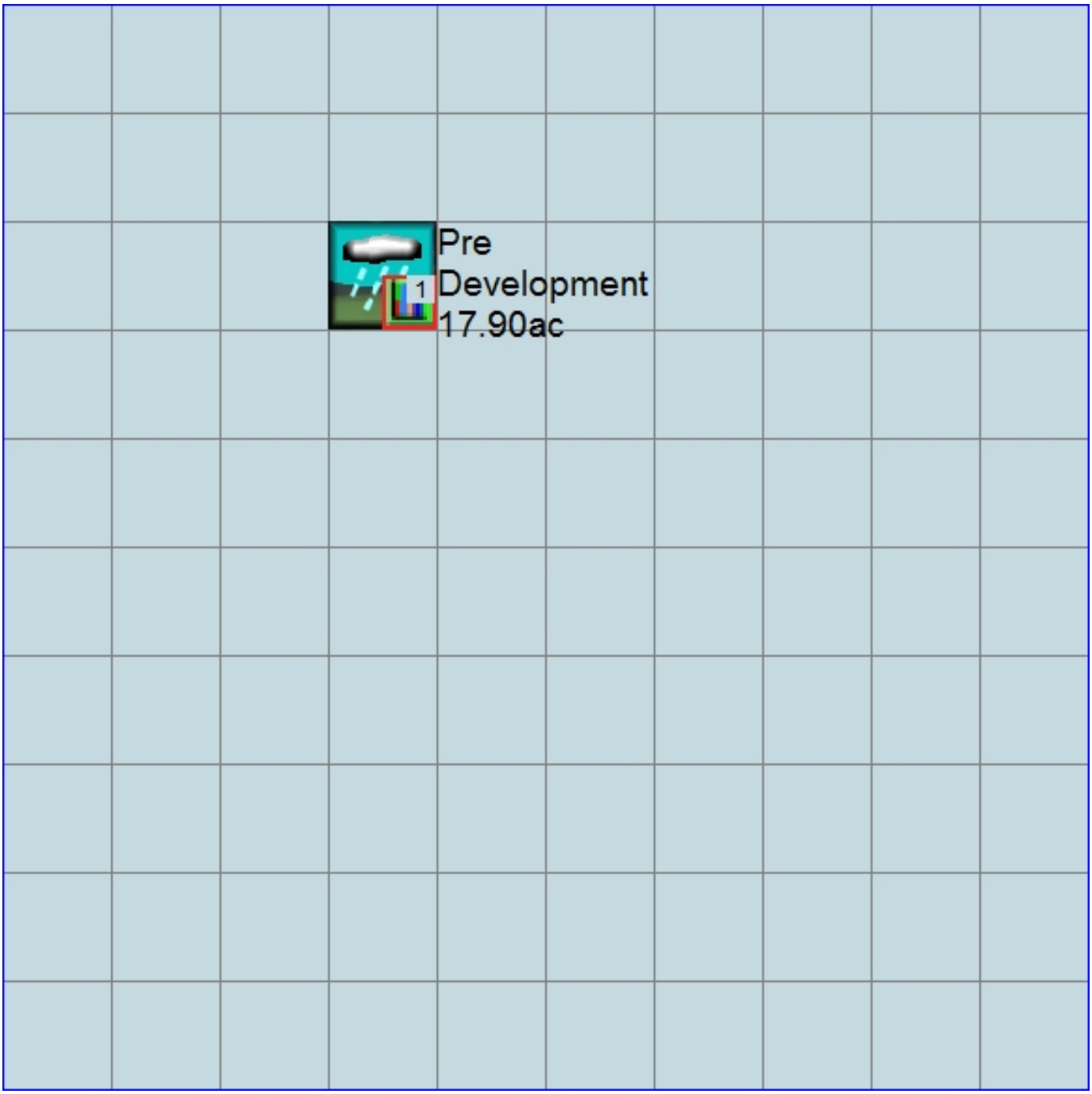
PERLND Changes

No PERLND changes have been made.

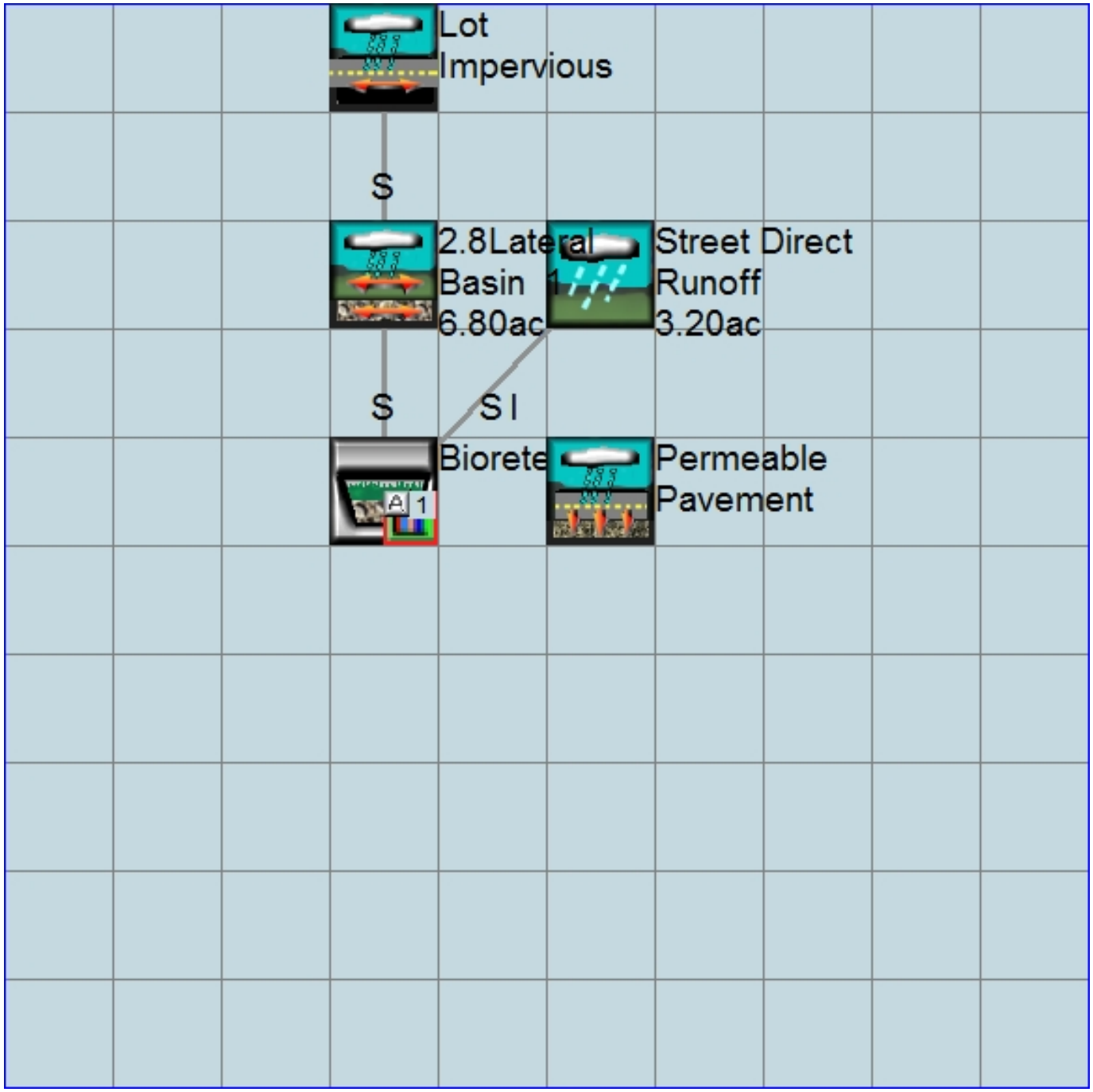
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1971 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Sweetwater1.wdm
MESSU       25   PreSweetwater1.MES
            27   PreSweetwater1.L61
            28   PreSweetwater1.L62
            30   POCSweetwater11.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:60
      PERLND      28
      IMPLND       1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Pre Development            MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
   28      D,Grass,FLAT(0-5%)     1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   28         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   28         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   28         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   28             0       4.8      0.04       200      0.05         3      0.92
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   28            35        30         2         2       0.4      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   28          0.08       0.6       0.2       1.5       0.7       0.5
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   28       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   28       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
   28             0         0      0.15          0         4      0.05         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                  in  out           ***
    1      IMPERVIOUS-FLAT        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL     *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    1
  END IWAT-PARM1
```

```
  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100     0.035      0.05       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Pre Development***
PERLND  28                       13.4     COPY   501     12
PERLND  28                       13.4     COPY   501     13
IMPLND   1                        4.5     COPY   501     15

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                      in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                 ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
    <------><--------><--------><--------><--------><--------><-------->      ***
```

```
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                    ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <--><--><--><--><---> *** <--><--><--><--><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     12.1     WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1971 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Sweetwater1.wdm
MESSU       25   MitSweetwater1.MES
            27   MitSweetwater1.L61
            28   MitSweetwater1.L62
            30   POCSweetwater11.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:60
      PERLND      28
      IMPLND       1
      IMPLND       4
      IMPLND       5
      RCHRES       1
      PERLND      42
      GENER        3
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      COPY       601
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Surface Bioretention        MAX                   1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  601         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    3        24
  END OPCODE
  PARM
    #    #         K ***
    3             0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
   28      D,Grass,FLAT(0-5%)     1    1    1    1   27    0
   42     D,Grass,FLAT(0-5%)      1    1    1    1   27    0
  END GEN-INFO
```

```
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   28         0    0    1    0    0    0    0    0    0    0    0    0
   42         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   28         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   42         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   28         0    1    1    1    0    0    0    0    1    1    0
   42         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2          ***
    # -   # ***FOREST      LZSN    INFILT      LSUR     SLSUR      KVARY      AGWRC
   28              0       4.8      0.04       200      0.05          3       0.92
   42              0       4.8      0.04       200      0.05          3       0.92
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -   # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   28             35        30         2         2       0.4      0.05      0.05
   42             35        30         2         2       0.4      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -   #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   28           0.08       0.6       0.2       1.5       0.7       0.5
   42           0.08       0.6       0.2       1.5       0.7       0.5
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3          ***
    # -   #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   28       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
   42       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3          ***
    # -   #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   28       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
   42       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -   # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   28              0         0      0.15         0         4      0.05         0
   42              0         0      0.15         0         4      0.05         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -   #                     User  t-series Engl Metr ***
                                      in  out           ***
```

```
    1      IMPERVIOUS-FLAT        1    1    1   27    0
    4     IMPERVIOUS-FLAT LAT     1    1    1   27    0
    5      Porous Pavement        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
    5         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
    5         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    1
    4         0    0    0    0    1
    5         0    0    0    0    1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR     NSUR     RETSC
    1           100     0.035     0.05       0.1
    4           100     0.035     0.05       0.1
    5           100      0.01      0.1         0
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1             0         0
    4             0         0
    5             0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1             0         0
    4             0         0
    5             0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Street Direct Runoff***
PERLND  28                       0.2     RCHRES   2      2
PERLND  28                       0.2     RCHRES   2      3
IMPLND   1                         3     RCHRES   2      5
Lot Impervious***
IMPLND   4                    1.1618     PERLND  42     50
2.8Lateral Basin  1***
PERLND  42                       6.8     RCHRES   2      2
IMPLND   5                    0.3587     RCHRES   1      5

******Routing******
```

```
PERLND  28                          0.2     COPY     1     12
IMPLND   1                            3     COPY     1     15
PERLND  28                          0.2     COPY     1     13
PERLND  42                          6.8     COPY     1     12
RCHRES   2                            1     RCHRES   3      8
RCHRES   3                            1     COPY   501     17
RCHRES   2                            1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1
GENER    3 OUTPUT TIMSER       .0002778     RCHRES   2     EXTNL  OUTDGT 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     Permeable Paveme-025    2     1    1    1   28    0    1
    2     Surface Bioreten-024    3     1    1    1   28    0    1
    3     Bioretention            2     1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
    1        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    2        0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    3        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------->      ***
    1              1      0.02       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.04       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
```

```
    1           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2           0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol3   RCHRES   3 VOL              4
  UVQUAN v2m3   GLOBAL     WORKSP  2        3
  UVQUAN vpo3   GLOBAL     WORKSP  3        3
  UVQUAN v2d3   GENER    3 K       1        3
*** User-Defined Target Variable Names
***                  addr or                       addr or
***                 <------>                      <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m3    1 WORKSP  2         1.0 QUAN
  UVNAME  vpo3    1 WORKSP  3         1.0 QUAN
  UVNAME  v2d3    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   3                               v2m3            =  44107.
*** Compute remaining available pore space
  GENER   3                               vpo3            =  v2m3
  GENER   3                               vpo3           -=  vol3
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo3 < 0.0) THEN
  GENER   3                               vpo3            =  0.0
END IF
*** Infiltration volume
  GENER   3                               v2d3            =  vpo3
END SPEC-ACTIONS
FTABLES
  FTABLE      3
   52    5
      Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
       (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  1.081015  0.000000  0.000000  0.000000
  0.049451  1.079920  0.020450  0.000000  0.000000
  0.098901  1.077951  0.040939  0.000000  0.000000
  0.148352  1.075984  0.061467  0.000000  0.000000
  0.197802  1.074019  0.082034  0.000000  0.099188
  0.247253  1.072055  0.102640  0.000000  0.099188
  0.296703  1.070094  0.123286  0.000000  0.099188
  0.346154  1.068134  0.143970  0.000000  0.099188
  0.395604  1.066176  0.164694  0.000000  0.099188
  0.445055  1.064220  0.185458  0.000000  0.099188
  0.494505  1.062265  0.206261  0.000000  0.099188
  0.543956  1.060312  0.227103  0.000000  0.099188
  0.593407  1.058361  0.247985  0.000000  0.099188
  0.642857  1.056412  0.268906  0.000000  0.099188
  0.692308  1.054465  0.289867  0.000000  0.099188
  0.741758  1.052520  0.310867  0.000000  0.099188
  0.791209  1.050576  0.331907  0.000000  0.099188
  0.840659  1.048634  0.352986  0.000000  0.099188
  0.890110  1.046694  0.374106  0.000000  0.099188
  0.939560  1.044755  0.395265  0.000000  0.099188
  0.989011  1.042819  0.416463  0.000000  0.099188
  1.038462  1.040884  0.437702  0.000000  0.099188
  1.087912  1.038951  0.458980  0.005833  0.099188
  1.137363  1.037020  0.480298  0.017650  0.099188
  1.186813  1.035091  0.501656  0.024271  0.099188
  1.236264  1.033163  0.523054  0.029438  0.099188
  1.285714  1.031238  0.544492  0.033826  0.099188
  1.335165  1.029314  0.565971  0.037708  0.099188
```

```
  1.384615  1.027391  0.587489  0.041228  0.099188
  1.434066  1.025471  0.609047  0.044471  0.099188
  1.483516  1.023552  0.630645  0.047496  0.099188
  1.532967  1.021636  0.652026  0.050342  0.099188
  1.582418  1.019721  0.673446  0.053038  0.099188
  1.631868  1.017808  0.694907  0.055608  0.099188
  1.681319  1.015896  0.716407  0.058069  0.099188
  1.730769  1.013987  0.737947  0.060436  0.099188
  1.780220  1.012079  0.759527  0.062723  0.099188
  1.829670  1.010173  0.781147  0.064942  0.099188
  1.879121  1.008269  0.802806  0.067108  0.099188
  1.928571  1.006366  0.824506  0.069247  0.099188
  1.978022  1.004466  0.846246  0.071452  0.099188
  2.027473  1.002567  0.868025  0.075299  0.099188
  2.076923  1.000670  0.889845  0.077090  0.099188
  2.126374  0.998775  0.911705  0.078840  0.099188
  2.175824  0.996881  0.933605  0.080552  0.099188
  2.225275  0.994990  0.955546  0.082228  0.099188
  2.274725  0.993100  0.977526  0.083871  0.099188
  2.324176  0.991212  0.999547  0.085482  0.099188
  2.373626  0.989326  1.021608  0.087064  0.099188
  2.423077  0.987441  1.043710  0.088617  0.099188
  2.472527  0.985559  1.065852  0.090144  0.099188
  2.500000  0.983678  2.264157  0.090981  0.099188
  END FTABLE  3
  FTABLE      2
   42    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.983678  0.000000  0.000000  0.090981  0.000000
  0.049451  1.082986  0.053506  0.000000  5.243888  0.000000
  0.098901  1.084960  0.107109  0.000000  5.411246  0.000000
  0.148352  1.086935  0.160809  0.000000  5.578604  0.000000
  0.197802  1.088912  0.214608  0.000000  5.745962  0.000000
  0.247253  1.090891  0.268504  0.000000  5.913320  0.000000
  0.296703  1.092872  0.322498  0.000000  6.080678  0.000000
  0.346154  1.094854  0.376590  0.000000  6.248036  0.000000
  0.395604  1.096838  0.430780  0.000000  6.415395  0.000000
  0.445055  1.098824  0.485069  0.000000  6.582753  0.000000
  0.494505  1.100812  0.539455  0.000000  6.750111  0.000000
  0.543956  1.102802  0.593940  0.000000  6.917469  0.000000
  0.593407  1.104793  0.648524  0.000000  7.084827  0.000000
  0.642857  1.106786  0.703206  0.000000  7.252185  0.000000
  0.692308  1.108781  0.757986  0.000000  7.419543  0.000000
  0.741758  1.110778  0.812865  0.000000  7.586901  0.000000
  0.791209  1.112777  0.867843  0.000000  7.754260  0.000000
  0.840659  1.114777  0.922920  0.000000  7.921618  0.000000
  0.890110  1.116779  0.978096  0.000000  8.088976  0.000000
  0.939560  1.118783  1.033371  0.000000  8.256334  0.000000
  0.989011  1.120789  1.088745  0.000000  8.423692  0.000000
  1.038462  1.122797  1.144218  0.073461  8.591050  0.000000
  1.087912  1.124806  1.199791  0.253856  8.758408  0.000000
  1.137363  1.126817  1.255463  0.495812  8.925766  0.000000
  1.186813  1.128830  1.311234  0.786368  9.093125  0.000000
  1.236264  1.130845  1.367105  1.118433  9.260483  0.000000
  1.285714  1.132862  1.423076  1.487347  9.427841  0.000000
  1.335165  1.134880  1.479147  1.889740  9.595199  0.000000
  1.384615  1.136900  1.535317  2.323027  9.762557  0.000000
  1.434066  1.138922  1.591587  2.785146  9.929915  0.000000
  1.483516  1.140946  1.647958  3.274397  10.09727  0.000000
  1.532967  1.142971  1.704428  3.789351  10.26463  0.000000
  1.582418  1.144999  1.760999  4.328786  10.43199  0.000000
  1.631868  1.147028  1.817670  4.891635  10.59935  0.000000
  1.681319  1.149059  1.874441  5.476963  10.76671  0.000000
  1.730769  1.151091  1.931313  6.083938  10.93406  0.000000
  1.780220  1.153126  1.988286  6.711812  11.10142  0.000000
  1.829670  1.155162  2.045359  7.359913  11.26878  0.000000
  1.879121  1.157200  2.102532  8.027628  11.43614  0.000000
```

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1.928571  1.159240  2.159807  8.714397  11.60350  0.000000
1.978022  1.161282  2.217183  9.419705  11.77085  0.000000
2.000000  1.162190  2.242715  10.14308  11.84524  0.000000
END FTABLE  2
FTABLE      1
 92    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
0.000000  0.358701  0.000000  0.000000  0.000000
0.021978  0.358721  0.002602  0.000000  0.036169
0.043956  0.358742  0.005203  0.000000  0.036169
0.065934  0.358763  0.007805  0.000000  0.036169
0.087912  0.358784  0.010407  0.000000  0.036169
0.109890  0.358805  0.013010  0.000000  0.036169
0.131868  0.358826  0.015612  0.000000  0.036169
0.153846  0.358846  0.018215  0.000000  0.036169
0.175824  0.358867  0.020817  0.000000  0.036169
0.197802  0.358888  0.023420  0.000000  0.036169
0.219780  0.358909  0.026023  0.000000  0.036169
0.241758  0.358930  0.028626  0.000000  0.036169
0.263736  0.358951  0.031230  0.000000  0.036169
0.285714  0.358971  0.033833  0.000000  0.036169
0.307692  0.358992  0.036437  0.000000  0.036169
0.329670  0.359013  0.039040  0.000000  0.036169
0.351648  0.359034  0.041644  0.000000  0.036169
0.373626  0.359055  0.044248  0.000000  0.036169
0.395604  0.359075  0.046853  0.000000  0.036169
0.417582  0.359096  0.049457  0.000000  0.036169
0.439560  0.359117  0.052062  0.000000  0.036169
0.461538  0.359138  0.054666  0.000000  0.036169
0.483516  0.359159  0.057271  0.000000  0.036169
0.505495  0.359180  0.059876  0.070085  0.036169
0.527473  0.359200  0.062481  0.156715  0.036169
0.549451  0.359221  0.065086  0.210255  0.036169
0.571429  0.359242  0.067692  0.252696  0.036169
0.593407  0.359263  0.070297  0.288968  0.036169
0.615385  0.359284  0.072903  0.321170  0.036169
0.637363  0.359305  0.075509  0.350426  0.036169
0.659341  0.359325  0.078115  0.377420  0.036169
0.681319  0.359346  0.080721  0.402608  0.036169
0.703297  0.359367  0.083327  0.426311  0.036169
0.725275  0.359388  0.085934  0.448764  0.036169
0.747253  0.359409  0.088541  0.470145  0.036169
0.769231  0.359430  0.091147  0.490596  0.036169
0.791209  0.359450  0.093754  0.510227  0.036169
0.813187  0.359471  0.096361  0.529131  0.036169
0.835165  0.359492  0.098969  0.547382  0.036169
0.857143  0.359513  0.101576  0.565044  0.036169
0.879121  0.359534  0.104183  0.582171  0.036169
0.901099  0.359554  0.106791  0.598808  0.036169
0.923077  0.359575  0.109399  0.614994  0.036169
0.945055  0.359596  0.112007  0.630766  0.036169
0.967033  0.359617  0.114615  0.646153  0.036169
0.989011  0.359638  0.117223  0.661182  0.036169
1.010989  0.359659  0.119832  0.675876  0.036169
1.032967  0.359679  0.122440  0.690258  0.036169
1.054945  0.359700  0.125049  0.704347  0.036169
1.076923  0.359721  0.127658  0.718159  0.036169
1.098901  0.359742  0.130267  0.731710  0.036169
1.120879  0.359763  0.132876  0.745015  0.036169
1.142857  0.359784  0.135486  0.758087  0.036169
1.164835  0.359804  0.138095  0.770936  0.036169
1.186813  0.359825  0.140705  0.783575  0.036169
1.208791  0.359846  0.143315  0.796014  0.036169
1.230769  0.359867  0.145924  0.808261  0.036169
1.252747  0.359888  0.148535  0.820325  0.036169
1.274725  0.359909  0.151145  0.832215  0.036169
1.296703  0.359929  0.153755  0.843937  0.036169
1.318681  0.359950  0.156366  0.855498  0.036169
1.340659  0.359971  0.158976  0.866905  0.036169
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  1.362637  0.359992  0.161587  0.878164  0.036169
  1.384615  0.360013  0.164198  0.889281  0.036169
  1.406593  0.360033  0.166809  0.900260  0.036169
  1.428571  0.360054  0.169421  0.911107  0.036169
  1.450549  0.360075  0.172032  0.921826  0.036169
  1.472527  0.360096  0.174644  0.932422  0.036169
  1.494505  0.360117  0.177256  0.942899  0.036169
  1.516484  0.360138  0.179868  0.953261  0.036169
  1.538462  0.360158  0.182480  0.963511  0.036169
  1.560440  0.360179  0.185092  0.973654  0.036169
  1.582418  0.360200  0.187704  0.983692  0.036169
  1.604396  0.360221  0.190317  0.993628  0.036169
  1.626374  0.360242  0.192929  1.003466  0.036169
  1.648352  0.360263  0.195542  1.013209  0.036169
  1.670330  0.360283  0.198155  1.022859  0.036169
  1.692308  0.360304  0.200768  1.032418  0.036169
  1.714286  0.360325  0.203382  1.041890  0.036169
  1.736264  0.360346  0.205995  1.051277  0.036169
  1.758242  0.360367  0.208609  1.060580  0.036169
  1.780220  0.360387  0.211222  1.069803  0.036169
  1.802198  0.360408  0.213836  1.078947  0.036169
  1.824176  0.360429  0.216450  1.088014  0.036169
  1.846154  0.360450  0.219064  1.097006  0.036169
  1.868132  0.360471  0.221679  1.105925  0.036169
  1.890110  0.360492  0.224293  1.114772  0.036169
  1.912088  0.360512  0.226908  1.123550  0.036169
  1.934066  0.360533  0.229523  1.132260  0.036169
  1.956044  0.360554  0.232137  1.140903  0.036169
  1.978022  0.360575  0.234753  1.149481  0.036169
  2.000000  0.360596  0.237368  1.157996  0.036169
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1             RCHRES   2     EXTNL  PREC
WDM      1 EVAP     ENGL    1             RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5           RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7           RCHRES   3     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   3 HYDR   RO     1 1        1      WDM   1035 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1039 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1040 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1036 STAG     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1037 STAG     ENGL      REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1038 FLOW     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     12.1      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    801 FLOW     ENGL      REPL
COPY   601 OUTPUT MEAN   1 1     12.1      WDM    901 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
```

```
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17

  MASS-LINK       50
IMPLND     IWATER SURO                     PERLND         EXTNL  SURLI
  END MASS-LINK   50


END MASS-LINK

END RUN
```

Disclaimer

Legal Notice

Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

Appendix B: IMP Site Map

PUBLIC IMPROVEMENTS:	SWEETWATER SPRINGS BLVD	JAMACHA BLVD.	TOTAL
NEW PAVEMENT	0.06 AC	0.33 AC	0.39 AC
NEW SIDEWALK	0.04 AC	0.19 AC	0.23 AC
	0.10 AC	0.52 AC	0.62 AC

DRAINAGE MANAGEMENT AREA

				WQ. VOLUME FT³		WQ. SURFACE AREA FT²	
DMA	AREA AC	IMP (AC)	PER (AC)	REQUIRED	PROVIDED	REQUIRED	PROVIDED
DMA-1	2.10	1.76	0.34	2,744	4,910	3,188	14,880
DMA-2*	2.61	0.90*	1.71	3,068	4,176	1,924	2,962
DMA-3*	6.78	6.08*	0.70	8,860	18,661	10,717	11,848
DMA-4	7.03	6.59	0.44	9,187	30,119	11,559	19,123
TOTAL	18.52*	14.75	3.15	23,859	57,377	26,308	48,813

*ON-SITE BIORETENTION HAS BEEN SIZED TO TREAT AND ATTENUATION AN ADDITIONAL AREA EQUIVALENT TO THE MINOR OFF-SITE IMPROVEMENTS ASSOCIATED WITH JAMACHA BLVD. AND SWEETWATER SPRINGS BLVD.

BMP DETAILS

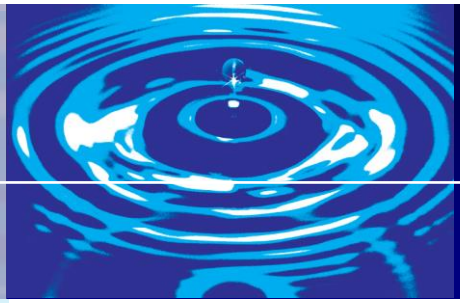
DMA	DMA 1		DMA 2		DMA 3		DMA 4	
BMP TYPE	POROUS PAVEMENT		BIORETENTION		BIORETENTION		BIORETENTION	
AREA	14,880 FT²		2,962 FT²		11,848 FT²		19,123 FT²	
VOLUME	4,910 FT³		4,176 FT³		18,661 FT³		30,119 FT³	
DETAILS	DEPTH	VOID	DEPTH	VOID	DEPTH	VOID	DEPTH	VOID
PLANTS/ TREES	–	–	0.75	100%	0.75	100%	0.75	100%
SOIL	–	–	1.5	33%	1.5	33%	1.5	33%
ROCK	1.0	33%	0.5	33%	1.0	33%	1.0	33%
NOTES	IMPERVIOUS LINER ALONG SIDES		IMPERVIOUS LINER ALONG SIDES		IMPERVIOUS LINER ALONG SIDES		IMPERVIOUS LINER ALONG SIDES	
	PERFORATED SUB-DRAIN		PERFORATED SUB-DRAIN		PERFORATED SUB-DRAIN		PERFORATED SUB-DRAIN	

LEGEND:

- PERVIOUS PAVEMENT
- BIORETENTION
- PUBLIC PARK
- EX. CONCRETE CHANNEL
- DRAINAGE MANAGEMENT AREA (DMA1)
- PUBLIC IMPROVEMENT PAVEMENT
- PUBLIC IMPROVEMENT SIDEWALK
- FLOW PATH

SWEETWATER PLACE POST DEVELOPMENT DMA LOCATION MAP

RBF CONSULTING
A Baker Company
5050 AVENIDA ENCINAS, SUITE 260
CARLSBAD, CALIFORNIA 92008-4386
760.476.9193 ▪ FAX 760.476.9198 ▪ www.RBF.com



Appendix C: Digital SDHM Files

ATTACHMENT I

Geomorphic Assessment

(Contact County staff immediately if you are planning to conduct a Geomorphic Assessment. A Geomorphic Assessment must be performed if the project is using a "Medium" low flow threshold of $0.3Q_2$ or a "High" low flow threshold of $0.5Q_2$.)

ATTACHMENT J

HMP Exemption Documentation

(if applicable)

ATTACHMENT K

Addendum