The Junipers Project
Environmental Impact Report

SCH No. 2018041032 - Project No. 586670

Appendix G2

Storm Water Quality Management Plan

February 2020

The City of San Diego

PRIORITY DEVELOPMENT PROJECT (PDP) STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) FOR

THE JUNIPERS
PTS# _____
DRAWING NO. _____

ENGINEER OF WORK:

Alisa S. Vialpando RCE #47945
Provide Wet Signature and Stamp Above Line

PREPARED FOR:
Lennar
16465 Via Esprillo, Suite 150
San Diego, CA
(310) 933-6351

PREPARED BY:

HUNSAKER & ASSOCIATES SAN DIEGO, INC

Hunsaker & Associates - San Diego, Inc.
9707 Waples Street
San Diego, CA 92121
(858) 558-4500

DATE:
May 16, 2019

Approved by: City of San Diego Date

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

TABLE OF CONTENTS

- Acronyms
- Certification Page
- Submittal Record
- Project Vicinity Map
- FORM DS-560: Storm Water Applicability Checklist
- FORM I-1: Applicability of Permanent, Post-Construction Storm Water BMP Requirements
- FORM I-3B: Site Information Checklist for PDPs
- FORM I-4: Source Control BMP Checklist for All Development Projects
- FORM I-5: Site Design BMP Checklist for All Development Projects
- FORM I-6: Summary of PDP Structural BMPs
- FORM DS-563: Permanent BMP Construction, Self Certification Form
- Attachment 1: Backup for PDP Pollutant Control BMPs
    - Attachment 1a: DMA Exhibit
    - Attachment 1b: Tabular Summary of DMAs and Design Capture Volume Calculations
    - Attachment 1c: Harvest and Use Feasibility Screening (when applicable)
    - Attachment 1d: Categorization of Infiltration Feasibility Condition (when applicable)
    - Attachment 1e: Pollutant Control BMP Design Worksheets / Calculations
- Attachment 2: Backup for PDP Hydromodification Control Measures
    - Attachment 2a: Hydromodification Management Exhibit
    - Attachment 2b: Management of Critical Coarse Sediment Yield Areas
    - Attachment 2c: Geomorphic Assessment of Receiving Channels
    - Attachment 2d: Flow Control Facility Design
- Attachment 3: Structural BMP Maintenance Plan
    - Attachment 3a: Structural BMP Maintenance Thresholds and Actions
    - Attachment 3b: Draft Maintenance Agreement (when applicable)
- Attachment 4: Copy of Plan Sheets Showing Permanent Storm Water BMPs
- Attachment 5: Project's Drainage Report
- Attachment 6: Project's Geotechnical and Groundwater Investigation Report

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

ACRONYMS

APN	Assessor's Parcel Number
ASBS	Area of Special Biological Significance
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
DCV	Design Capture Volume
DMA	Drainage Management Areas
ESA	Environmentally Sensitive Area
GLU	Geomorphic Landscape Unit
GW	Ground Water
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
HU	Harvest and Use
INF	Infiltration
LID	Low Impact Development
LUP	Linear Underground/Overhead Projects
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
POC	Pollutant of Concern
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollutant Protection Plan
SWQMP	Storm Water Quality Management Plan
TMDL	Total Maximum Daily Load
WMAA	Watershed Management Area Analysis
WPCP	Water Pollution Control Program
WQIP	Water Quality Improvement Plan

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

CERTIFICATION PAGE

Project Name: The Junipers
Permit Application Number: _____

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the Storm Water Standards, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit).

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

Alisa S. Vialpando 47945 12/31/19
Engineer of Work's Signature, PE Number & Expiration Date

Alisa S. Vialpando
Print Name

Hunsaker & Associates - San Diego, Inc.
Company

May 16, 2019
Date



Engineer's Stamp

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: The Junipers

SUBMITTAL RECORD

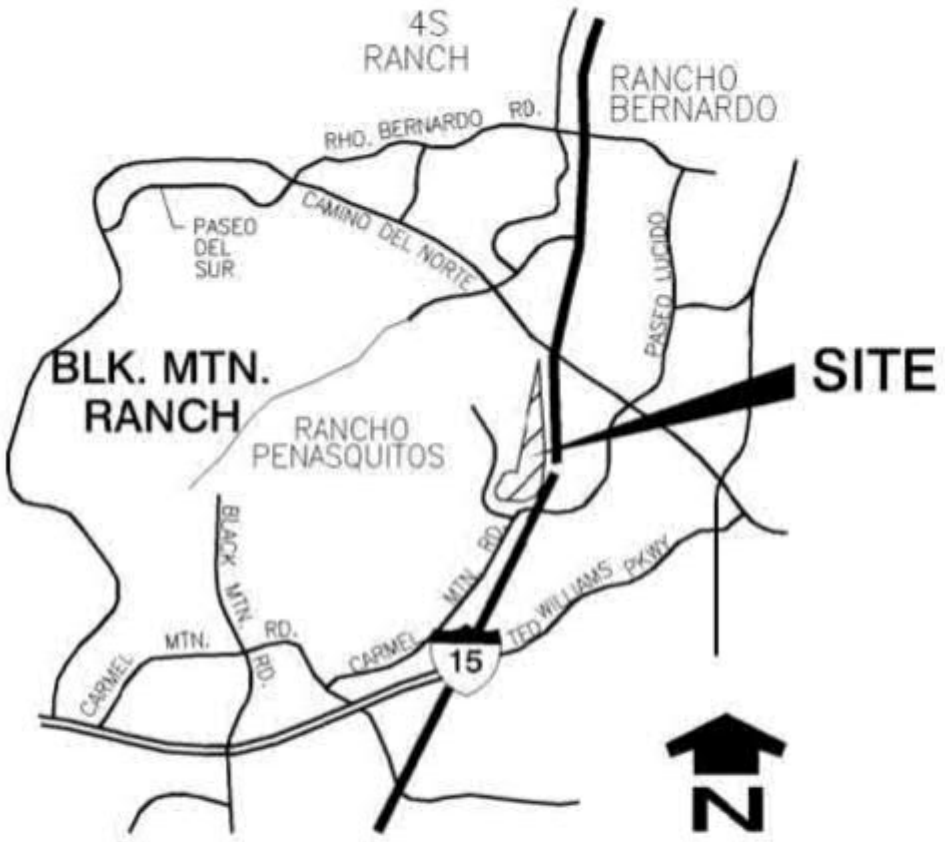
Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck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

Submittal Number	Date	Project Status	Changes
1	11/21/17	◉ Preliminary Design/Planning/CEQA ○ Final Design	Initial Submittal
2	4/25/18	◉ Preliminary Design/Planning/CEQA ○ Final Design	Revised per Comments and Updates
3	7/11/18	◉ Preliminary Design/Planning/CEQA ○ Final Design	Revised per Comments and Updates
4	12/6/18	◉ Preliminary Design/Planning/CEQA ○ Final Design	Revised per Comments and Updates
5	2/28/2019	Preliminary Design/Planning/CEQA	Revised per Comments and Updates
6	5/16/2019	Preliminary Design/Planning/CEQA	Revised per Comments and Updates

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

PROJECT VICINITY MAP

Project Name: The Junipers
Permit Application Number: _____



VICINITY MAP

NOT TO SCALE

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

THE CITY OF SAN DIEGO	City of San Diego **Development Services** 1222 First Ave., MD-302 San Diego, CA 92101 (619) 446-5000	**Storm Water Requirements Applicability Checklist**	FORM **DS-560** February 2016

Project Address:	Project Number (for the City Use Only):
0 Carmel Mountain, San Diego, 92129	Click here to enter project number

SECTION 1. Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the Storm Water Standards Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP)[1], which is administrated by the State Water Resources Control Board.

For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.

PART A: Determine Construction Phase Storm Water Requirements.

1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with construction activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.)

   ◉ Yes; SWPPP required, skip questions 2-4 ○ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing, grading, grubbing, excavation, or any other activity that results in ground disturbance and contact with storm water runoff?

   ◉ Yes; WPCP required, skip questions 3-4 ○ No; next question

3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (projects such as pipeline/utility replacement)

   ◉ Yes; WPCP required, skip questions 4 ○ No; next question

4. Does the project only include the following Permit types listed below?
   - Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
   - Individual Right of Way Permits that exclusively include one of the following activities and associated curb/ sidewalk repair: water services, sewer lateral, storm drain lateral, or dry utility service.
   - Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, curb and gutter replacement, and retaining wall encroachments.

   ☐ Yes; no document required

Check one of the boxes to the right, and continue to PART B:

☒ If you checked "Yes" for question 1,
a SWPPP is REQUIRED. Continue to PART B

☐ If you checked "No" for question 1, and checked "Yes" for question 2 or 3,
a WPCP is REQUIRED. If the project processes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. Continue to PART B.

☐ If you checked "No" for all question 1-3, and checked "Yes" for question 4
PART B does not apply and no document is required. Continue to Section 2.

More information on the City's construction BMP requirements as well as CGP requirements can be found at:
www.sandiego.gov/stormwater/regulations/swguide/constructing.shtml

PART B: Determine Construction Site Priority.

This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk. Determination approach of the Stat e Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. NOTE: The construction priority does NOT change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.

Complete PART B and continued to Section 2

1. ☐ ASBS
   a. Projects located in the ASBS watershed. A map of the ASBS watershed can he found here <placeholder for ASBS map link>

2. ☒ High Priority
   a. Projects 1 acre or more determined to be Risk Level 2 or Risk Level 3 per the Construction General Permit and not located in the ASBS watershed.
   b. Projects 1 acre or more determined to be LUP Type 2 or LUP Type 3 per the Construction General Permit and not located in the ASBS watershed.

3. ☐ Medium Priority
   a. Projects 1 acre or more but not subject to an ASBS or high priority designation.
   b. Projects determined to be Risk Level 1 or LUP Type 1 per the Construction General Permit and not located in the ASBS watershed.

4. ☐ Low Priority
   a. Projects not subject to ASBS, high or medium priority designation.

SECTION 2. Permanent Storm Water BMP Requirements.

Additional information for determining the requirements is found in the Storm Water Standards Manual.

PART C: Determine if Not Subject to Permanent Storm Water Requirements.

Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.

If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".

If "no" is checked for all of the numbers in Part C continue to Part D.

1.	Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	○ Yes ◉ No
2.	Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	○ Yes ◉ No
3.	Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	○ Yes ◉ No

PART D: PDP Exempt Requirements.

PDP Exempt projects are required to implement site design and source control BMPs.

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."
If "no" was checked for all questions in Part D, continue to Part E.

1. Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:

   • Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;
   • Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or;
   • Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?

   ○ Yes; PDP exempt requirements apply ◉ No; next question

2. Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual?

   ○ Yes; PDP exempt requirements apply ◉ No; PDP not exempt. PDP requirements apply.

PART E: Determine if Project is a Priority Development Project (PDP). Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

If "yes" is checked for any number in PART E, continue to PART F and check the box labeled "Priority Development Project".
If "no" is checked for every number in PART E, continue to PART F and check the box labeled "Standard Project".

1.	New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site. This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	◉ Yes ○ No
2.	Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces. This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	○ Yes ◉ No
3.	New development or redevelopment of a restaurant. Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	○ Yes ◉ No
4.	New development or redevelopment on a hillside. The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	○ Yes ◉ No

Page 4 of 4 City of San Diego • Development Services Department • Storm Water Requirements Applicability Checklist	
5. New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	◉ Yes ○ No
6. New development or redevelopment of streets, roads, highways, freeways, and driveways. The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	◉ Yes ○ No
7. New development or redevelopment discharging directly to an Environmentally Sensitive Area. The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging- directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).	○ Yes ◉ No
8. New development or redevelopment projects of a retail gasoline outlet that creates and/or replaces 5,000 square feet of impervious surface. The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic of 100 or more vehicles per day.	○ Yes ◉ No
9. New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces. Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	○ Yes ◉ No
10. Other Pollutant Generating Project. The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces.	○ Yes ◉ No
PART F: Select the appropriate category based on the outcomes of PART C through PART E.	
1. The project is NOT SUBJECT TO STORM WATER REQUIREMENTS.	☐
2. The project is a STANDARD PROJECT. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
3. The project is PDP EXEMPT. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
4. The project is a PRIORITY DEVELOPMENT PROJECT. Site design, source control, and structural pollutant control BMP requirements apply. See the Storm Water Standards Manual for guidance on determining if project requires hydromodification management.	☐
Name of Owner or Agent (Please Print): Ryan Green	Title: The Junipers
Signature:	Date: December 6, 2018

Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)	Form I-1

Project Identification

Project Name: The Junipers

Permit Application Number: _____ | Date: May 16, 2018

Determination of Requirements

The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.

Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop".
Refer to Part 1 of Storm Water Standards sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Yes	Go to Step 2.
	○ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is not a "development project" (e.g., the project includes only interior remodels within an existing building): Click or tap here to enter text.		
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual (Part 1 of Storm Water Standards) in its entirety for guidance, AND complete Storm Water Requirements Applicability Checklist.	○ Standard Project	Stop. Standard Project requirements apply.
	◉ PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.
	○ PDP Exempt	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below.

Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:
Click or tap here to enter text.

Form I-1 Page 2		
Step	Answer	Progression
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	○ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	◉ No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (not required if prior lawful approval does not apply): Click or tap here to enter text.		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	○ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do not apply: Click or tap here to enter text.		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	○ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	◉ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does not apply: Acording to mapping of potential critical coarse sediment yeild areas there are no such areas present within the project site boundarys.		

Project Name: The Junipers

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	The Junipers
Project Address	0 Carmel Mountain, San Diego, CA 92129
Assessor's Parcel Number(s) (APN(s))	313-011-10-00
Permit Application Number	XXXXXX
Project Watershed	Select One: ○ San Dieguito River ◉ Penasquitos ○ Mission Bay ○ San Diego River ○ San Diego Bay ○ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal paces (9XX.XX)	906.1
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	112.3 Acres ([SQFT] Square Feet)
Area to be disturbed by the project (Project Footprint)	102.8 Acres (4,476,136 Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	38.4 Acres (1,670,349 Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	73.9 Acres (3,220,133 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Project Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition.	45 %

Form I-3B Page 2 of 11

Description of Existing Site Condition and Drainage Patterns

Current Status of the Site (select all that apply):
☐ Existing development
☐ Previously graded but not built out
☒ Agricultural or other non-impervious use
☐ Vacant, undeveloped/natural
Description / Additional Information:
This site is the location of the former Carmel Highland Golf Course.

Existing Land Cover Includes (select all that apply):
☒ Vegetative Cover
☒ Non-Vegetated Pervious Areas
☒ Impervious Areas
Description / Additional Information:
This site is currently a golf course with a grass & tree coverage, a maintance building, paved golf cart paths and a water feature.

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):
☐ NRCS Type A
☐ NRCS Type B
☒ NRCS Type C
☒ NRCS Type D

Approximate Depth to Groundwater (GW):
○ GW Depth < 5 feet
○ 5 feet < GW Depth < 10 feet
◉ 10 feet < GW Depth < 20 feet
○ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):
☐ Watercourses
☐ Seeps
☐ Springs
☐ Wetlands
☒ None
Description / Additional Information:
There are no natural hydrologic features, however one manmade pond.

Form I-3B Page 3 of 11

Description of Existing Site Topography and Drainage:

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

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

Description / Additional Information:

The existing drainage on this site is not natural because of the golf course development.

Runoff from offsite is conveyed through this project's boundary. Runoff from the neighborhood to the west of the northen portion of the site flows onto Andorra Way where is routed to the drainage ditch that runs through the site. The drainage ditch runs southward and eventually connects to a concrete lined channel. This channel finally discharges into a detention area on the eastern boundary of the site.

Flows from the south east area of the site area concentrate and collect in swales where they are routed to drainage pipes.

Flow from the south west area of the site is collects and is then discharged to the south of the site.

Table 2.1 Summary of Existing Conditions

Existing			
Drainage Basin	Node	Area	Q 100yr (cfs)
Offsite			
Offsite 1	Connects to 2	51.9	-
Onsite			
West	1	33.34	44.6
East	2	79.08	270.23
TOTAL	-	164.32	314.83

Form I-3B Page 4 of 11

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The Junipers is a 112 acre site, located in the City of San Diego, California. The property abuts the Escondido Freeway on much of its eastern boundary. There is a proposed residential development with 128 single family lots, 180 clusted units, and 172 duplex units. There are also bioretention basins, Modular Wetland Unit, roads, sidewalks, driveways and a park proposed in this project

The project also includes offsite Public frontage improvements to Penasquitos Drive and Carmel Mountain Road, consisting of proposed widening, medians, roundabouts and landscape features. A green street exemption is being proposed for these offsite frontage improvements and the applicable Green Street Exemption form 'J-1' is included at the end of this section.

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

The project will consist of residential buildings, driveways, roads, and sidewalks.

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

The project will also include landscaping, bioretention basins, modular wetland unit, graded slopes and a park.

Does the project include grading and changes to site topography?

- (●) Yes
- ( ) No

Description / Additional Information:

Grading and alterations to the current site topography will be required for the proposed features in this project.

Form I-3B Page 5 of 11

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

- (●) Yes
- ( ) No

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

Description / Additional Information:

A new onsite storm drainage system with pipes and inlets is proposed to convey the storm water created on site to the existing offsite connectoins.

Form I-3B Page 6 of 11

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

- ☒ On-site storm drain inlets
- ☒ Interior floor drains and elevator shaft sump pumps
- ☒ Interior parking garages
- ☐ Need for future indoor & structural pest control
- ☒ Landscape/Outdoor Pesticide Use
- ☐ Pools, spas, ponds, decorative fountains, and other water features
- ☐ Food service
- ☒ Refuse areas
- ☐ Industrial processes
- ☐ Outdoor storage of equipment or materials
- ☐ Vehicle and Equipment Cleaning
- ☐ Vehicle/Equipment Repair and Maintenance
- ☐ Fuel Dispensing Areas
- ☐ Loading Docks
- ☐ Fire Sprinkler Test Water
- ☐ Miscellaneous Drain or Wash Water
- ☒ Plazas, sidewalks, and parking lots
- ☐ Large Trash Generating Facilities
- ☐ Animal Facilities
- ☐ Plant Nurseries and Garden Centers
- ☐ Automotive-related Uses

Description / Additional Information:

Click or tap here to enter text.

Form I-3B Page 7 of 11
Identification and Narrative of Receiving Water
Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable) Drainage from the porposed site will be conveyed to the existing outlet locations. As in the existing conditions the drainage will outlet in the Penasquitos Creek.
Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations. Flow downstream will be less due to the attenuation happening at the bioretention basins.
Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations. N/A
Provide distance from project outfall location to impaired or sensitive receiving waters. N/A
Sumarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands N/A

Form I-3B Page 8 of 11

Identification of Receiving Water Pollutants of Concern

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

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs/ WQIP Highest Priority Pollutant
Los Penasquitos Creek	Benthic Community Effects	Indicator Bacteria
""	Bifenthrin	""
""	Chlorpyrifos	""
""	Indicator Bacteria	""
""	Nitrogen	""
""	Phosphate	""
""	Total Dissolved Solids	""
""	Toxicity	""

Identification of Project Site Pollutants*

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

Identify pollutants anticipated from the project site based on all proposed use(s) of the site (see BMP Design Manual (Part 1 of Storm Water Standards) Appendix B.6):

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	○	◉	○
Nutrients	○	◉	○
Heavy Metals	○	◉	○
Organic Compounds	○	◉	○
Trash & Debris	○	◉	○
Oxygen Demanding Substances	○	◉	○
Oil & Grease	○	◉	○
Bacteria & Viruses	○	◉	○
Pesticides	○	◉	○

Form I-3B Page 9 of 11

Hydromodification Management Requirements

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

- (●) Yes, hydromodification management flow control structural BMPs required.
- ( ) No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- ( ) No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- ( ) No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

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

Click or tap here to enter text.

Critical Coarse Sediment Yield Areas*

*This Section only required if hydromodification management requirements apply

Based on Section 6.2 and Appendix H does CCSYA exist on the project footprint or in the upstream area draining through the project footprint?

- ( ) Yes
- (●) No, No critical coarse sediment yield areas to be protected based on WMAA maps

Discussion / Additional Information:

Form I-3B Page 10 of 11

Flow Control for Post-Project Runoff*
*This Section only required if hydromodification management requirements apply

List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.

There are two POCs for this project, POC 1 and POC 2. Their locations can be located on the attached HMP Exhibit.

Has a geomorphic assessment been performed for the receiving channel(s)?

- (●) No, the low flow threshold is 0.1Q2 (default low flow threshold)
- ( ) Yes, the result is the low flow threshold is 0.1Q2
- ( ) Yes, the result is the low flow threshold is 0.3Q2
- ( ) Yes, the result is the low flow threshold is 0.5Q2

If a geomorphic assessment has been performed, provide title, date, and preparer:

Click or tap here to enter text.

Discussion / Additional Information: (optional)

Click or tap here to enter text.

Form I-3B Page 11 of 11

Other Site Requirements and Constraints

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

Click or tap here to enter text.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

Click or tap here to enter text.

BMP Applicability and Selection for Green Street Exemption	Form J-1
Project Identification	
Project Name: Junipers	
Permit Application Number: L64A-003B	Date: April 15, 2019

Project Characterization and Selection Synopsis

The purpose of this form is to guide the selection of BMPs, given project specific constraints to meet the Green Streets exemption as defined in Appendix J.2 of the BMP Design Manual. In order to qualify for a PDP exemption, the project must incorporate all applicable Green Street BMP elements described in Appendix J.2, based on the applicability guidance provided in Appendix J.2.

Complete the sections below providing detailed justification for each selection.

Step 1: Does this project include retrofitting or redevelopment of an existing alley, street, or roadway criteria? Exemptions do not apply for projects that construct new alleys, streets, or roadways. See Appendix J for additional guidance on distinguishing between redevelopment of a street and new development.

☑ Yes ☐ No (if No is selected, the Green Street exemption is not applicable)

Provide a brief overview of the project, key details, and site-specific opportunities and constraints:

Carmel Mountain Road and Penasquitos Drive are adjacent to Junipers Project and these off site roads will be widened/improved, including addition of two traffic circles and medians/splitter islands. The new medians and traffic circles will include trees and shrubs/ground cover. These landscape areas will serve as self-mitigating areas, but will not accept drainage from adjacent impervious areas.

Step 2: Complete the BMP-specific applicability checklists on the following pages and attach them to this form. Complete forms for all BMPs, including those that were used and those that were not used.

Step 3: Summarize the BMP(s) that were selected through the guidance process (Select all that apply):

BMP Type	Applicable?	Used?	Summary of justification for Inclusion or Finding of Non-applicability
Vegetated Swales	☐	☐	Not enough width/length to allow for swales.
Sidewalk Planters	☐	☐	Not enough width for sidewalk planters.
Curb Extensions	☐	☐	Not enough area for curb extensions.
Permeable Surfaces	☐	☐	Geotechnical infiltration concerns for roadways.
Green Gutters	☐	☐	Geotechnical infiltration concerns for roadways.
Rain Gardens	☐	☐	Not enough area for rain gardens.
Trees	☑	☑	Trees in LS areas where feasible.
Other Landscape ROW	☑	☑	Shurbs/Groundcover in LS areas where feasible.

Form J-1 Page 2 of 8: Vegetated Swale

Brief Description: Vegetated Swales are shallow, open channels that are designed to remove storm water pollutants by physically straining/filtering runoff through vegetation in the channel.

Site Type (Check all that apply):	Street Type	Rating[1]	Present in Project?
	Residential Streets	◉	☐
	Commercial Street/ Business District	○	☐
	Collector Street	◉	☑
	Arterial and Boulevard	◉	☑
	Alleys	○	☐
	Parking Areas	◉	☐
Key Opportunities for Vegetated Swales (Check all that apply):	Parkway strips		☑
	Medians		☑
	Long, mostly continuous space		☐
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	**Favorable Conditions for Vegetated Swales**		
	Slope > 1% and <3%		☑
	Conveying run-on to a site		☐
	Infiltration is partially feasible or not feasible		☑
	Long continuous segments available		☑
	More parkway width		☐
	Unfavorable Conditions for Vegetated Swales		
	Available width is < 8 feet		☑
	Frequent driveway interruption		☐
	ROW width too limited		☑

Summary of Findings:

Were Vegetated Swales determined to be applicable as part of the Green Streets BMP plan? ☐ Yes ☑ No	If yes, were they used? ☐ Yes ☑ No

Provide discussion/justifications for selections and decisions above:

Carmel Mountain Road is an existing road with a lane widening and addition of median proposed. The median is being planted with trees and shrubs/groundcover to provide LID aspects. However, it has been deemed impractical to accept the flows from the adjacent impervious roadway and provide a continuous vegetated swale due to constricted areas.
Penasquitos Drivew is an existing road with addition of medians and traffic circles proposed. The adjacent landscape areas will be planted with trees and shrubs/ground cover to provide LID aspects. However, the resultant areas are either too short/narrow to provide a vegetated swale and/or impractical to direct/accept runoff from impervious areas.

[1] ● High applicability within this category, however may still be limited by site-specific factors
◉ Generally applicable in this category; largely dependent on site-specific factors
○ Limited applicability within this category; may still be applicable in some cases; should be considered

Form J-1 Page 3 of 8: Sidewalk Planters			
Brief Description: A planter imbedded in the sidewalk designed to manage storm water runoff from the adjacent roadway and sidewalk.			
Site Type (Check all that apply):	Street Type	Rating[2]	Present in Project?
	Residential Streets	◉	☐
	Commercial Street/ Business District	◉	☐
	Collector Street	●	☑
	Arterial and Boulevard	●	☑
	Alleys	○	☐
	Parking Areas	◉	☐
Key Opportunities for Sidewalk Planters (Check all that apply):	Parkway strips		☑
	Medians		☐
	Between driveways		☐
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Sidewalk Planters		
	Slope <4%		☑
	Wide sidewalks		☐
	More parkway width		☐
	Unfavorable Conditions for Sidewalk Planters		
	Conflicts with car egress		☐
	ROW width too limited		☑

Summary of Findings:

Were Sidewalk Planters determined to be applicable as part of the Green Streets BMP plan?	If yes, were they used?
☐ Yes ☑ No	☐ Yes ☑ No

Provide discussion/justifications for selections and decisions above:

The parkways and sidewalk widths along Carmel Mountain Road and Penasquitos Drive are limited and deemed impractical to accommodate sidewalk planters.

[2] ● High applicability within this category, however may still be limited by site-specific factors
◉ Generally applicable in this category; largely dependent on site-specific factors
○ Limited applicability within this category; may still be applicable in some cases; should be considered

Form J-1 Page 4 of 8: Curb Extensions

Brief Description: Curb extensions expand the edge of the sidewalk into the roadway or parking area and allow storm water runoff to collect and infiltrate through a detention area of porous media.

Site Type (Check all that apply):	Street Type	Rating[3]	Present in Project?
	Residential Streets	●	☐
	Commercial Street/ Business District	●	☐
	Collector Street	◉	☑
	Arterial and Boulevard	◉	☑
	Alleys	○	☐
	Parking Areas	◉	☐
Key Opportunities for Curb Extensions (Check all that apply):	Intersections		☐
	Parking area		☐
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	**Favorable Conditions for Curb Extensions**		
	Slope <4%		☐
	Traffic calming needed		☐
	Unfavorable Conditions for Curb Extensions		
	Conflicts with bike lanes		☐
	Site distance issues at intersection		☐

Summary of Findings:

Were Curb Extensions determined to be applicable as part of the Green Streets BMP plan?	If yes, were they used?
☐ Yes ☑ No	☐ Yes ☑ No

Provide discussion/justifications for selections and decisions above:

Carmel Mountain Road and Penasquitos Drivew improvements include sidewalk and landscaped areas but are not wide enough to incorporate curb extensions. Curb geometry along Penasquitos Drive is very specific for the traffic circles and are dictated by Traffic requirements.

[3] ● High applicability within this category, however may still be limited by site-specific factors
◉ Generally applicable in this category; largely dependent on site-specific factors
○ Limited applicability within this category; may still be applicable in some cases; should be considered

Form J-1 Page 5 of 8: Permeable Surfaces

Brief Description: Permeable surfaces are pavement that allows for percolation through void spaces into subsurface layers.

	Street Type	Rating[4]	Present in Project?
Site Type (Check all that apply):	Residential Streets	●	☐
	Commercial Street/ Business District	●	☐
	Collector Street	◉	☑
	Arterial and Boulevard	◉	☑
	Alleys	●	☐
	Parking Areas	◉	☐
Key Opportunities for Permeable Surfaces (Check all that apply):	Sidewalks		☑
	Parking strips		☐
	Shoulders		☑
	Low traffic roadways		☐
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	**Favorable Conditions for Permeable Surfaces**		
	Slope < 2-3%		☑
	Conveying limited run-on to a site		☐
	Low traffic area		☐
	Unfavorable Conditions for Permeable Surfaces		
	High traffic area		☑
	Run-on has high sediment load		☐

Summary of Findings:

Were Permeable Surfaces determined to be applicable as part of the Green Streets BMP plan?	If yes, were they used?
☐ Yes ☑ No	☐ Yes ☑ No

Provide discussion/justifications for selections and decisions above:

Permeable pavements can not be implemented due to high traffic on Carmel Mountain Road and Penasquitos Drive. Permeable sidewalk can not be implemented due to City of San Diego requirement for concrete for public sidewalk.

[4] ● High applicability within this category, however may still be limited by site-specific factors
◉ Generally applicable in this category; largely dependent on site-specific factors
○ Limited applicability within this category; may still be applicable in some cases; should be considered

Form J-1 Page 6 of 8: Green Gutters

Brief Description: Green Gutters are shallow and narrow strips of landscaping in a typical curb and gutter location with a lower elevation than the street gutter elevation to allow capture of storm water from the sidewalk and street.

Site Type (Check all that apply):	Street Type	Rating[5]	Present in Project?
	Residential Streets	○	☐
	Commercial Street/ Business District	◉	☐
	Collector Street	●	☑
	Arterial and Boulevard	●	☑
	Alleys	◉	☐
	Parking Areas	○	☐
Key Opportunities for Green Gutters (Check all that apply):	Parkway strips		☑
	Medians		☐
	Long, mostly continuous space		☑
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Green Gutters		
	Slope > 1% and <3%		☑
	Conveying run-on to a site		☐
	Infiltration is partially feasible or not feasible		☐
	Long continuous segments available		☑
	Narrower spaces (as little as 2 to 3 feet)		☐
	Unfavorable Conditions for Green Gutters		
	Frequent driveway interruption		☐
	ROW width too limited		☑

Summary of Findings:

Were Green Gutters determined to be applicable as part of the Green Streets BMP plan? ☐ Yes ☑ No	If yes, were they used? ☐ Yes ☑ No

Provide discussion/justifications for selections and decisions above:

Green gutters are not selected in favor of more effective landscaped ROW.

[5] ● High applicability within this category, however may still be limited by site-specific factors
◉ Generally applicable in this category; largely dependent on site-specific factors
○ Limited applicability within this category; may still be applicable in some cases; should be considered

Form J-1 Page 7 of 8: Rain Gardens

Brief Description: Rain Gardens are shallow detention basins with vegetation that temporarily store water to allow for infiltration of the stored volume. Rain Gardens could be bioretention or biofiltration with partial retention or a biofiltration BMP.

Site Type (Check all that apply):	Street Type	Rating[6]	Present in Project?
	Residential Streets	◉	☐
	Commercial Street/ Business District	◉	☐
	Collector Street	◉	☑
	Arterial and Boulevard	◉	☑
	Alleys	○	☐
	Parking Areas	●	☐
Key Opportunities for Rain Gardens (Check all that apply):	Irregularly shaped areas in ROW		☐
	Broad and flat areas		☐
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Rain Gardens		
	Slope <2%		☑
	Infiltration is partially feasible or not feasible		☑
	Large area available		
	Unfavorable Conditions for Rain Gardens		
	Slope > 2%		☐
	ROW too limited		☑

Summary of Findings:

Were Rain Gardens determined to be applicable as part of the Green Streets BMP plan? ☐ Yes ☑ No	If yes, were they used? ☐ Yes ☑ No

Provide discussion/justifications for selections and decisions above:

Inadequate space/slope for the use of a rain garden.

[6] ● High applicability within this category, however may still be limited by site-specific factors
◉ Generally applicable in this category; largely dependent on site-specific factors
○ Limited applicability within this category; may still be applicable in some cases; should be considered

Form J-1 Page 8 of 8: Trees

Brief Description: Trees planted in the sidewalk right-of-way provide rainfall interception and infiltration benefits and typically supplement other storm water management tools.

Site Type (Check all that apply):	Street Type	Rating[7]	Present in Project?
	Residential Streets	●	☐
	Commercial Street/ Business District	◉	☐
	Collector Street	◉	☑
	Arterial and Boulevard	◉	☑
	Alleys	◉	☐
	Parking Areas	●	☐
Key Opportunities for Trees (Check all that apply):	Parkway strips		☑
	Medians		☑
	Irregularly shaped areas		☑
	Extra ROW on back side of sidewalk		☑
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Trees		
	Located outside of clear zone		☑
	Infiltration is feasible		☑
	ROW not limiting		
	Unfavorable Conditions for Trees		
	Limited space for root growth		☑
	Clear zone issues		☑

Summary of Findings:

Were Trees determined to be applicable as part of the Green Streets BMP plan? ☑ Yes ☐ No	If yes, were they used? ☑ Yes ☐ No

Provide discussion/justifications for selections and decisions above:

Trees and shrubs/groundcover are provided in the parkway, between sidewalk and curb, and medians. Trees are to be located where deemed appropriate and/or feasible while taking into consideration constraints for root growth and clear zones.

[7] ● High applicability within this category, however may still be limited by site-specific factors
◉ Generally applicable in this category; largely dependent on site-specific factors
○ Limited applicability within this category; may still be applicable in some cases; should be considered

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Source Control BMP Checklist for All Development Projects	Form I-4		
Source Control BMPs			
All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of the Storm Water Standards) for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.			
Source Control Requirement	**Applied?**		
SC-1 Prevention of Illicit Discharges into the MS4	◉ Yes	○ No	○ N/A
Discussion / justification if SC-1 not implemented: Click or tap here to enter text.			
SC-2 Storm Drain Stenciling or Signage	◉ Yes	○ No	○ N/A
Discussion / justification if SC-2 not implemented: Click or tap here to enter text.			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	◉ Yes	○ No	○ N/A
Discussion / justification if SC-3 not implemented: Click or tap here to enter text.			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	◉ Yes	○ No	○ N/A
Discussion / justification if SC-4 not implemented: Click or tap here to enter text.			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	◉ Yes	○ No	○ N/A

Discussion / justification if SC-5 not implemented:
Click or tap here to enter text.

Form I-4 Page 2 of 2			
Source Control Requirement	Applied?		
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
On-site storm drain inlets	◉ Yes	○ No	○ N/A
Interior floor drains and elevator shaft sump pumps	◉ Yes	○ No	○ N/A
Interior parking garages	◉ Yes	○ No	○ N/A
Need for future indoor & structural pest control	○ Yes	○ No	◉ N/A
Landscape/Outdoor Pesticide Use	◉ Yes	○ No	○ N/A
Pools, spas, ponds, decorative fountains, and other water features	○ Yes	○ No	◉ N/A
Food service	○ Yes	○ No	◉ N/A
Refuse areas	◉ Yes	○ No	○ N/A
Industrial processes	○ Yes	○ No	◉ N/A
Outdoor storage of equipment or materials	○ Yes	○ No	◉ N/A
Vehicle/Equipment Repair and Maintenance	○ Yes	○ No	◉ N/A
Fuel Dispensing Areas	○ Yes	○ No	◉ N/A
Loading Docks	○ Yes	○ No	◉ N/A
Fire Sprinkler Test Water	○ Yes	○ No	◉ N/A
Miscellaneous Drain or Wash Water	○ Yes	○ No	◉ N/A
Plazas, sidewalks, and parking lots	◉ Yes	○ No	○ N/A
SC-6A: Large Trash Generating Facilities	○ Yes	○ No	◉ N/A
SC-6B: Animal Facilities	○ Yes	○ No	◉ N/A
SC-6C: Plant Nurseries and Garden Centers	○ Yes	○ No	◉ N/A
SC-6D: Automotive-related Uses	○ Yes	○ No	◉ N/A

Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.

Click or tap here to enter text.

Project Name: The Junipers

Site Design BMP Checklist for All Development Projects	Form I-5

Site Design BMPs

All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.

A site map with implemented site design BMPs must be included at the end of this checklist.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Draiange Pathways and Hydrologic Features	○ Yes	◉ No	○ N/A
Discussion / justification if SD-1 not implemented: No natural water bodies or hydrologic features near site.			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	○ Yes	◉ No	○ N/A
1-2 Are street trees implemented? If yes, are they shown on the site map?	○ Yes	○ No	◉ N/A
1-3 Implemented street trees meet the design criteria in SD-1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	○ Yes	○ No	◉ N/A
1-4 Is street tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	○ Yes	○ No	◉ N/A
SD-2 Have natural areas, soils and vegetation been conserved?	○ Yes	○ No	◉ N/A
Discussion / justification if SD-2 not implemented:			

Form I-5 Page 2 of 4			
Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	◉ Yes	○ No	○ N/A
Discussion / justification if SD-3 not implemented: Minimal roads and walkways proposed as well as parks and landscaped areas.			
SD-4 Minimize Soil Compaction	◉ Yes	○ No	○ N/A
Discussion / justification if SD-4 not implemented: Soil compaction only used where required.			
SD-5 Impervious Area Dispersion	◉ Yes	○ No	○ N/A
Discussion / justification if SD-5 not implemented: Impervious areas distributed throughout project site.			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	○ Yes	◉ No	
5-2 Does the pervious area satisfy the design criteria in SD-5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	○ Yes	◉ No	
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and SD-5 Fact Sheet in Appendix E?	○ Yes	◉ No	

Form I-5 Page 3 of 4			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	◉ Yes	○ No	○ N/A
Discussion / justification if SD-6 not implemented: Runoff collected and directed into 3 separate basins and one Modular Wetland Unit.			
6a-1 Are green roofs implemented in accordance with design criteria in SD-6A Fact Sheet? If yes, are they shown on the site map?	○ Yes	◉ No	○ N/A
6a-2 Is green roof credit volume calculated using Appendix B.2.1.2 and SD-6A Fact Sheet in Appendix E?	○ Yes	◉ No	○ N/A
6b-1 Are permeable pavements implemented in accordance with design criteria in SD-6B Fact Sheet? If yes, are they shown on the site map?	○ Yes	◉ No	○ N/A
6b-2 Is permeable pavement credit volume calculated using Appendix B.2.1.3 and SD-6B Fact Sheet in Appendix E?	○ Yes	◉ No	○ N/A
SD-7 Landscaping with Native or Drought Tolerant Species	◉ Yes	○ No	○ N/A
Discussion / justification if SD-7 not implemented: Click or tap here to enter text.			
SD-8 Harvesting and Using Precipitation	○ Yes	◉ No	○ N/A
Discussion / justification if SD-8 not implemented: Infeasible to use, see Worksheet I-7 in Attachment 1			
8-1 Are rain barrels implemented in accordance with design criteria in SD-8 Fact Sheet? If yes, are they shown on the site map?	○ Yes	○ No	◉ N/A
8-2 Is rain barrel credit volume calculated using Appendix B.2.2.2 and SD-8 Fact Sheet in Appendix E?	○ Yes	○ No	◉ N/A

Form I-5 Page 4 of 4
Insert Site Map with all site design BMPs identified:
See DMA Map attached below

Summary of PDP Structural BMPs	Form I-6

PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual, Part 1 of Storm Water Standards). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual).

Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan was done based on the County of San Deigo BMP Design Manual and the requirements of the San Diego Regional Water Quality Control Board Order R9-2013-0001. Three biofiltration basins, and one modular wetland unit, were designed to meet the Water Quality and Hydromodification Requirements. The existing soil on the site is classified as Hydrologic soil group C and Hydrologic soil group D so full infiltration was not considered effective. The basins were designed to capture 1.5 times the 85th percentile design capture volume (DCV). The calculations are included in Attachment 1.

(Continue on page 2 as necessary.)

Form I-6 Page 2 of X
(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)
(Continued from page 1) Click or tap here to enter text.

Form I-6 Page 3 of X (Copy as many as needed)
Structural BMP Summary Information
Structural BMP ID No. BF-1-1, BF-1-2, BF-2-3 & BF-2-4
Construction Plan Sheet No. XXXX
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ◉ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)
Purpose: ○ Pollutant control only ○ Hydromodification control only ◉ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Lennar Homes
Who will be the final owner of this BMP?	TBD
Who will maintain this BMP into perpetuity?	TBD
What is the funding mechanism for maintenance?	TBD

Form I-6 Page 4 of X (Copy as many as needed)
Structural BMP ID No. BF-1-1, BF-1-2, BF-2-3 & BF-2-4
Construction Plan Sheet No. XXXXXX
Discussion (as needed): Click or tap here to enter text.

THE CITY OF SAN DIEGO	City of San Diego **Development Services** 1222 First Ave., MD-302 San Diego, CA 92101 (619) 446-5000	**Permenant BMP Construction** **Self Certification Form**	FORM DS-563 January 2016

Date Prepared: TBDpl	Project No.: XXXXX
Project Applicant: Lennar Homes	Phone: (xxx)-xxx-xxxx
Project Address: Carmel Mountain, San Diego, 92129	
Project Engineer: Alisa S. Vialpando	Phone: (858) 558-4500

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Storm Water Quality Management Plan (SWQMP) documents and drawings.

This form must be completed by the engineer and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of San Diego.

CERTIFICATION:

As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and structural BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 of the San Diego Regional Water Quality Control Board.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: _____

Date of Signature: _ -__

Printed Name: _____

Title: _._

_____

Phone No.

Engineer's Stamp

DS-563 (12-15)

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

ATTACHMENT 1
BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: The Junipers

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☒ Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	○ Included on DMA Exhibit in Attachment 1a ◉ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	◉ Included ○ Not included because the entire project will use infiltration BMPs
Attachment 1d	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	◉ Included ○ Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines and site design credit calculations	☒ Included

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

The DMA Exhibit must identify:

☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☒ Critical coarse sediment yield areas to be protected
☒ Existing topography and impervious areas
☒ Existing and proposed site drainage network and connections to drainage offsite
☒ Proposed grading
☒ Proposed impervious features
☒ Proposed design features and surface treatments used to minimize imperviousness
☒ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
☒ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
☒ Structural BMPs (identify location, type of BMP, and size/detail)

Attachment 1a:
DMA Exhibit

LEGEND

- PROJECT BOUNDARY
- DMA BOUNDARY
- XX.XX ACRES — SUBAREA ACREAGE
- DMA 1 — DMA ICON
- IMPERVIOUS - ROAD/SIDEWALK/ DRIVEWAY
- IMPERVIOUS- ROOF/BUILDING
- PERVIOUS - LANDSCAPE / SELF TREATING AREAS
- D — HYDROLOGIC SOIL TYPE
- X — POINT OF COMPLIANCE
- STRUCTURAL BMPS
  BIOFILTRATION BASIN

SOURCE CONTROL BMPS SEE FORM I-4 IN SWQMP

- PREVENTION OF ILLICIT DISCHARGE TO THE MS4

NOTES

- GROUNDWATER DEPTH > 20 FEET

SITE DESIGN BMPS SEE FORM I-5 IN SWQMP

- MAINTAIN NATURAL DRAINAGE PATHWAYS AND HYDROLOGIC FEATURES
- CONSERVE NATURAL AREAS, SOILS, AND VEGETATION
- MINIMIZE SOIL COMPACTION
- LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT PLANTS
- NO CCSYAS PRESENT ONSITE OR DRAINING THROUGH THE PROJECT BOUNDARY PER WMAA MAP

PENASQUITOS DRIVE
DEL DIABLO ST.
DEL DIABLO ST.
ANDORRA WAY
CAMINITO ORENSE ESTE
CARMEL MOUNTAIN ROAD
I-15 (AVOCADO HIGHWAY)
DMA 1
0.93 ACRES
1.34 ACRES
BASIN BF-1-1
29.75 ACRES
1.65 ACRES
DMA 4
60.29 ACRES
0.90 ACRES
DMA 3
9.34 ACRES
DMA 2
3.55 ACRES
9.76 ACRES
MWS BF-1-2
0.79 ACRES
BASIN BF-2-3
BASIN BF-2-4

0 150 300 450
SCALE 1" = 150'

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

DMA MAP
THE JUNIPERS
CITY OF SAN DIEGO, CALIFORNIA

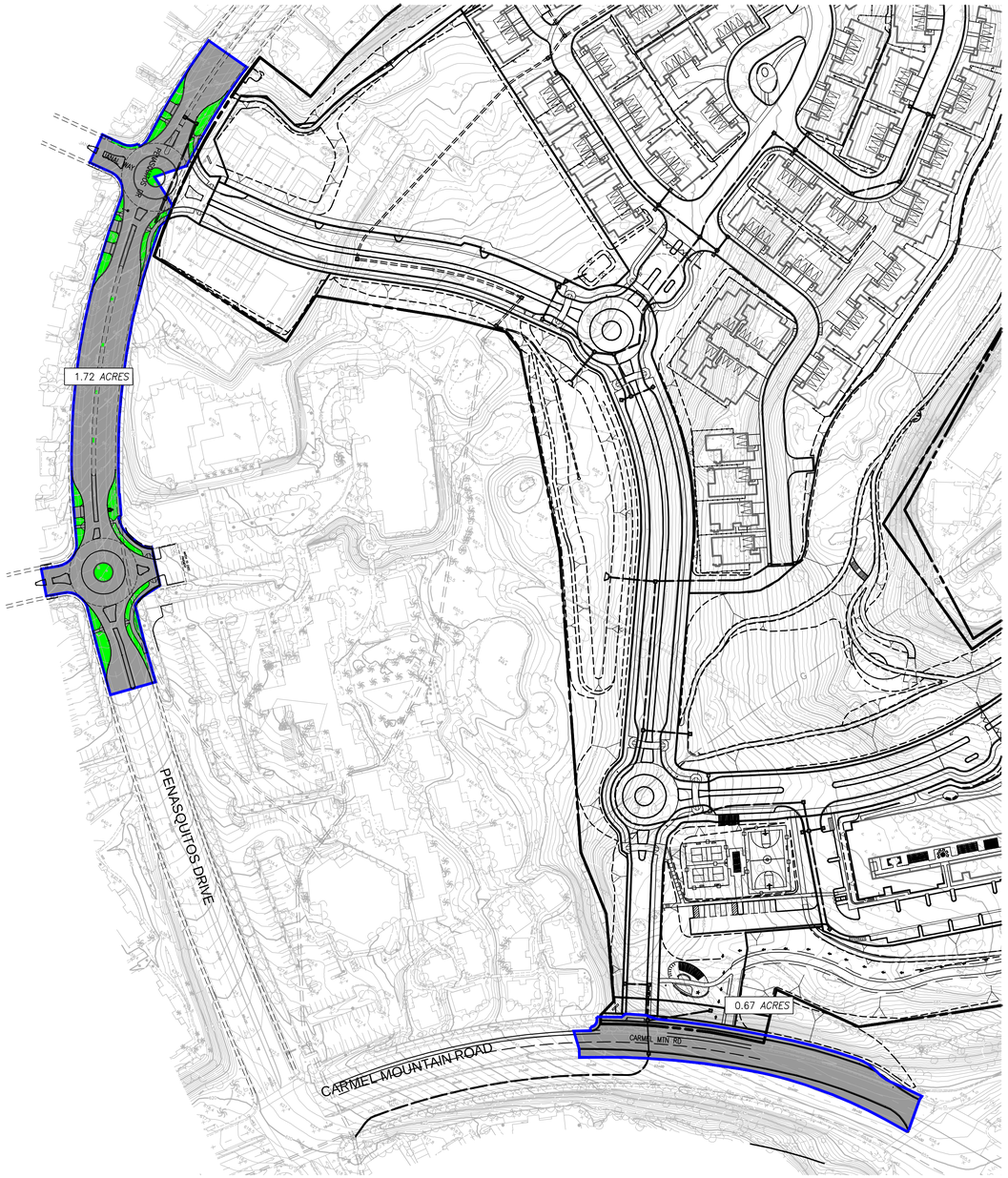
MAP 1 OF 1

W.O.# 3356-0002

R:\1286\Hyd\ACAD\1286$HYD_SWQMP.dwg[]May-16-2019:09:16



EXISTING



PROPOSED

LEGEND

- PROJECT BOUNDARY
- DMA BOUNDARY
- XX.XX ACRES — SUBAREA ACREAGE
- IMPERVIOUS - ROAD/SIDEWALK
- PERVIOUS - LANDSCAPE / SELF TREATING AREAS

STREET	EXISTING		PROPOSED	
	IMPERVIOUS (ac.)	PERVIOUS (ac.)	IMPERVIOUS (ac.)	PERVIOUS (ac.)
PENASQUITOS DRIVE	1.68	0.04	1.50	0.22
CARMEL MOUNTAIN ROAD	0.51	0.16	0.67	0.00

NOTE: Penasquitos Drive and Carmel Mountain Road provide a net increase in pervious area, therefore no additional BMPs are required.

0 100 200 300
SCALE 1" = 100'

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

DMA MAP - OFFSITE
THE JUNIPERS
CITY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 3356-0002

R:\1286\Hyd\ACAD\1286$HYD_SWQMP.dwg[]May-15-2019:13:27

Attachment 1b
Tabular Summary of DMA's

Structural BMPS

DMA ID	DMA AREA (SQFT)	DMA TYPE	BMP	BMP ID	BASIN AREA BOTTOM (SQFT)*	BASIN DEPTH (FT)
DMA 1	1,296,205	DRAINS TO BMP	BIOFILTRATION	BF-1-1	17,995	6
DMA 2	39,200	DRAINS TO BMP	MWS	BF-1-2	N/A	N/A
DMA 3	472,636	DRAINS TO BMP	BIOFILTRATION	BF-2-3	8,675	5
DMA 4	2,626,595	DRAINS TO BMP	BIOFILTRATION	BF-2-4	36,395	5
*BASIN AREA AT 6" PONDING						

Attachment 1c:

Harvest and Use Feasibility Screening Checklist

Harvest and Use Feasibility Checklist	Worksheet I-7

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?

☒ Toilet and urinal flushing

☒ Landscape irrigation

☐ Other:

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.

Land use: Residential. 36 hr: 14GAL/Resident *3Resident/Unit *480units=20160 gal =>2695 cubic feet

General Landscape: Moderate plant use. 1470gal/ac *50.6ac= 74427 gal => 9949 cubic feet

3. Calculate the DCV using worksheet B-2.1.

DCV = 82458 (cubic feet)

0.25DCV=20614 cubic feet

3a. Is the 36 hour demand greater than or equal to the DCV?	3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?	3c. Is the 36 hour demand less than 0.25DCV?
☐ Yes / ☒ No ⇨ ⇩	☐ Yes / ☒ No ⇨ ⇩	☒ Yes ⇩
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.

Attachment 1d:
Form I-8, Categorization of Infiltration Feasibility Condition

DMA 1/BF-1-1

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

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

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Soil Type D and Soil Type C have infiltration rates at or lower than 0.5 inches/hour.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable. Per Section C.4.4 of the BMP Design Manual, final determination should be made by the project design engineer. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2	☐Full Infiltration ☒No	

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Soil Type D and Soil Type C infiltration rates do not allow for infiltration in any appreciable rate or volume.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Form I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	☐Partial Infiltration ☒No Infiltration	

DMA 2/MWS-1-2

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

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

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Soil Type D and Soil Type C have infiltration rates at or lower than 0.5 inches/hour.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable. Per Section C.4.4 of the BMP Design Manual, final determination should be made by the project design engineer. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2	☐Full Infiltration ☒No	

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Soil Type D and Soil Type C infiltration rates do not allow for infiltration in any appreciable rate or volume.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Form I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	☐Partial Infiltration ☒No Infiltration	

DMA 3/BF-2-3

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

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

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Soil Type D and Soil Type C have infiltration rates at or lower than 0.5 inches/hour.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable. Per Section C.4.4 of the BMP Design Manual, final determination should be made by the project design engineer. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2	☐Full Infiltration ☒No	

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Soil Type D and Soil Type C infiltration rates do not allow for infiltration in any appreciable rate or volume.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Form I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	☐Partial Infiltration ☒No Infiltration	

DMA 4/BF-2-4

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

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

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Soil Type D and Soil Type C have infiltration rates at or lower than 0.5 inches/hour.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Infiltration at a rate greater than 0.5 inches/hour is not feasible for this project. As such, this screening question does not control the feasibility of infiltration at the project site and is not applicable. Per Section C.4.4 of the BMP Design Manual, final determination should be made by the project design engineer. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2	☐Full Infiltration ☒No	

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Soil Type D and Soil Type C infiltration rates do not allow for infiltration in any appreciable rate or volume.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Form I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	☐Partial Infiltration ☒No Infiltration	

Attachment 1e:
Pollutant Control BMP Design Worksheets

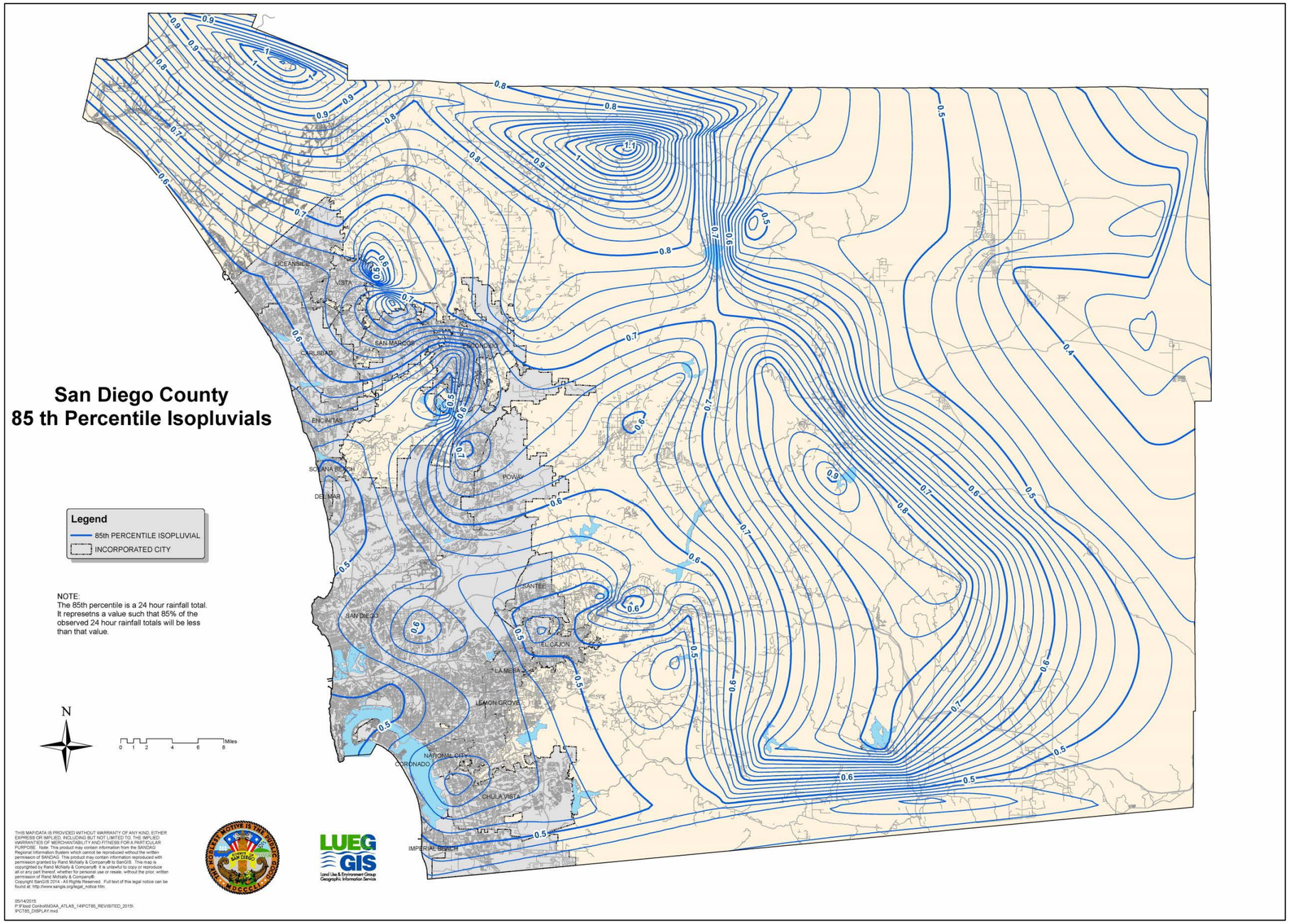


Figure B.1-1: 85th Percentile 24-hour Isopluvial Map

The Junipers

Biofiltration BMP DMA Calculations

	Imp. RF	Pervious RF	% Imp	DMA 1 BASIN BF-1-1	Fraction of Total	Imp Area	Pervious Area	Summation RF x A	DMA 2 BASIN BF-1-2	Fraction of Total	Imp Area	Pervious Area	Summation RF x A	POC-1
				(ac.)		(ac.)	(ac.)		(ac.)		(ac.)	(ac.)		
BASIN	0.90	0.10	0	0.40	0.00	0.00	0.40	0.04	0.02	0.01	0.00	0.02	0.00	
MULTIUSE/COMMERCIAL	0.90	0.10	80	0.71	0.04	0.56	0.14	0.52	0.00	0.00	0.00	0.00	0.00	
PARK	0.90	0.10	10	3.71	0.05	0.37	3.34	0.67	0.00	0.00	0.00	0.00	0.00	
RESIDENTIAL/PATIOS	0.90	0.10	100	4.85	0.32	4.85	0.00	4.36	0.00	0.00	0.00	0.00	0.00	
ROAD/SW/DRIVEWAY	0.90	0.10	100	7.71	0.50	7.71	0.00	6.93	0.30	0.82	0.30	0.00	0.27	
SLOPES	0.90	0.10	0	12.39	0.09	0.00	12.39	1.24	0.58	0.18	0.00	0.58	0.06	
Bypass POC-1	0.90	0.10	0	2.27	0.02	0.00	2.27	0.23	3.55	1.08	0.00	3.55	0.36	
				29.76	1.00	13.49	16.27	13.77	0.90	1.00	0.30	0.60	0.33	36.48
						Weighted C =		0.46			Weighted C =		0.37	

	Imp. RF	Pervious RF	% Imp	DMA 3 BASIN BF-2-3	Fraction of Total	Imp Area	Pervious Area	Summation RF x A	DMA 4 BASIN BF-2-4	Fraction of Total	Imp Area	Pervious Area	Summation RF x A	POC-2
				(ac.)		(ac.)	(ac.)		(ac.)		(ac.)	(ac.)		
BASIN	0.90	0.10	0	0.19	0.00	0.00	0.19	0.02	0.81	0.00	0.00	0.81	0.08	
PARK	0.90	0.10	10	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.03	0.27	0.05	
RESIDENTIAL/PATIOS	0.90	0.10	100	3.75	0.51	3.75	0.00	3.37	13.85	0.45	13.85	0.00	12.47	
ROAD/SW/DRIVEWAY	0.90	0.10	100	3.19	0.43	3.19	0.00	2.87	13.39	0.43	13.39	0.00	12.05	
SLOPES	0.90	0.10	0	3.72	0.06	0.00	3.72	0.37	31.95	0.11	0.00	31.95	3.20	
Bypass POC-2	0.90	0.10	0	0.00	0.00	0.00	0.00	0.00	11.41	2.47	0.00	11.41	1.14	
				10.85	1.00	6.94	3.91	6.64	60.30	1.00	27.27	33.02	27.85	82.56
						Weighted C =		0.61			Weighted C =		0.46	

Tributary to Basin

Tributary to POC

The City of SAN DIEGO	Project Name	The Junipers	
	BMP ID	BF-1-1	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	1296205.00	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.46	
3	85th percentile 24-hour rainfall depth	0.67	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	33486	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	50228	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	13218	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	25114	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	19319	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	17992	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	17992	sq. ft.
23	Provided BMP Footprint	17995	sq. ft.
24	Is Line 23 ≥ Line 22?	**Yes, Performance Standard is Met**	

Description	Units	Modular Wetland
Drainage Basin ID or Name	unitless	BF-1-2
Total Tributary Area	ac	0.299
Total Tributary Area	sq ft	13025
Final Adjusted Runoff Factor	unitless	0.90
85th Percentile Design Rainfall Depth	inches	0.67
85th Percentile Design Rainfall Intensity	in/hr	0.2
WQ Flow Rate	CFS	0.054
Flow Rate Safety Factor	unitless	1.5
Design Flow Rate	CFS	0.081
Modular Wetland Model	unitless	L-4-8
Modular Wetland Treatment Flow Rate	CFS	0.115
Is Flow-Thru BMP Adequately Sized?	unitless	Yes

The City of SAN DIEGO	Project Name	The Junipers	
	BMP ID	BF-2-3	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	472636.00	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.61	
3	85th percentile 24-hour rainfall depth	0.67	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	16144	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	24215	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	6372	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	12108	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	9314	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	8674	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	8674	sq. ft.
23	Provided BMP Footprint	8675	sq. ft.
24	Is Line 23 ≥ Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO	Project Name	The Junipers	
	BMP ID	BF-2-4	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	2626595.00	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.46	
3	85th percentile 24-hour rainfall depth	0.67	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	67733	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	15.6	inches
15	Total Depth Treated [Line 13 + Line 14]	45.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	101600	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	26737	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	50800	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	39077	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	36394	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	36394	sq. ft.
23	Provided BMP Footprint	36395	sq. ft.
24	Is Line 23 ≥ Line 22?	**Yes, Performance Standard is Met**	

Bio Clean

A Forterra Company

Modular Wetlands® System Linear

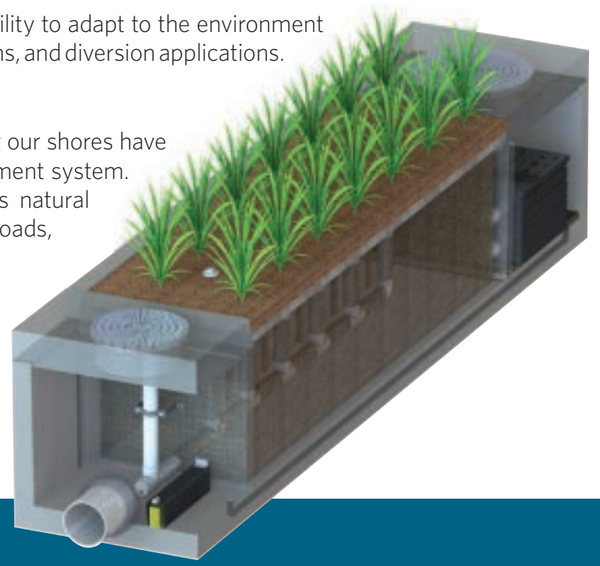
A Stormwater Biofiltration Solution



OVERVIEW

The Bio Clean Modular Wetlands® System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint, higher treatment capacity, and a wide range of versatility. While most biofilters use little or no pretreatment, the Modular Wetlands® incorporates an advanced pretreatment chamber that includes separation and pre-filter cartridges. In this chamber, sediment and hydrocarbons are removed from runoff before entering the biofiltration chamber, reducing maintenance costs and improving performance.

Horizontal flow also gives the system the unique ability to adapt to the environment through a variety of configurations, bypass orientations, and diversion applications.



The Urban Impact

For hundreds of years, natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as cities grow and develop, our environment's natural filtration systems are blanketed with impervious roads, rooftops, and parking lots.

Bio Clean understands this loss and has spent years re-establishing nature's presence in urban areas, and rejuvenating waterways with the Modular Wetlands® System Linear.

PERFORMANCE

The Modular Wetlands® continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons, and bacteria. Since 2007 the Modular Wetlands® has been field tested on numerous sites across the country and is proven to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. In fact, the Modular Wetlands® harnesses some of the same biological processes found in natural wetlands in order to collect, transform, and remove even the most harmful pollutants.

66% REMOVAL OF DISSOLVED ZINC	**69%** REMOVAL OF TOTAL ZINC	**38%** REMOVAL OF DISSOLVED COPPER	**64%** REMOVAL OF TOTAL PHOSPHORUS	
45% REMOVAL OF NITROGEN	**50%** REMOVAL OF TOTAL COPPER	**95%** REMOVAL OF MOTOR OIL	**67%** REMOVAL OF ORTHO PHOSPHORUS	**85%** REMOVAL OF TSS

APPROVALS

The Modular Wetlands® System Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation and perhaps the world. Here is a list of some of the most high-profile approvals, certifications, and verifications from around the country.

Washington State Department of Ecology TAPE Approved
The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft² loading rate. The highest performing BMP on the market for all main pollutant categories.

California Water Resources Control Board, Full Capture Certification
The Modular Wetlands® System is the first biofiltration system to receive certification as a full capture trash treatment control device.

Virginia Department of Environmental Quality, Assignment
The Virginia Department of Environmental Quality assigned the MWS Linear the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) regulation technical criteria.

Maryland Department of the Environment, Approved ESD
Granted Environmental Site Design (ESD) status for new construction, redevelopment, and retrofitting when designed in accordance with the design manual.

MASTEP Evaluation
The University of Massachusetts at Amherst – Water Resources Research Center issued a technical evaluation report noting removal rates up to 84% TSS, 70% total phosphorus, 68.5% total zinc, and more.

Rhode Island Department of Environmental Management, Approved BMP
Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% pathogens, 30% total phosphorus, and 30% total nitrogen.

ADVANTAGES

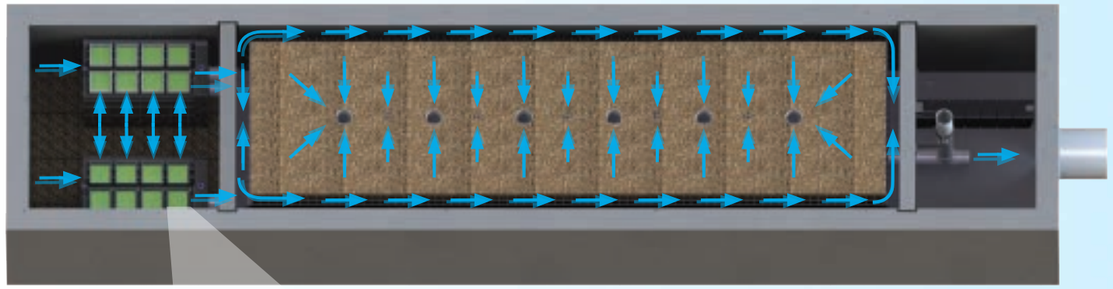
- HORIZONTAL FLOW BIOFILTRATION
- GREATER FILTER SURFACE AREA
- PRETREATMENT CHAMBER
- PATENTED PERIMETER VOID AREA
- FLOW CONTROL
- NO DEPRESSED PLANTER AREA
- AUTO DRAINDOWN MEANS NO MOSQUITO VECTOR

OPERATION

The Modular Wetlands® System Linear is the most efficient and versatile biofiltration system on the market, and it is the only system with horizontal flow which:

- Improves performance
- Reduces footprint
- Minimizes maintenance

Figure 1 & Figure 2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.



2x to 3x more surface area than traditional downward flow bioretention systems.

Figure 2, Top View



1 PRETREATMENT

SEPARATION

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

PRE-FILTER CARTRIDGES

- Over 25 sq. ft. of surface area per cartridge
- Utilizes BioMediaGREEN™ filter material
- Removes over 80% of TSS and 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber

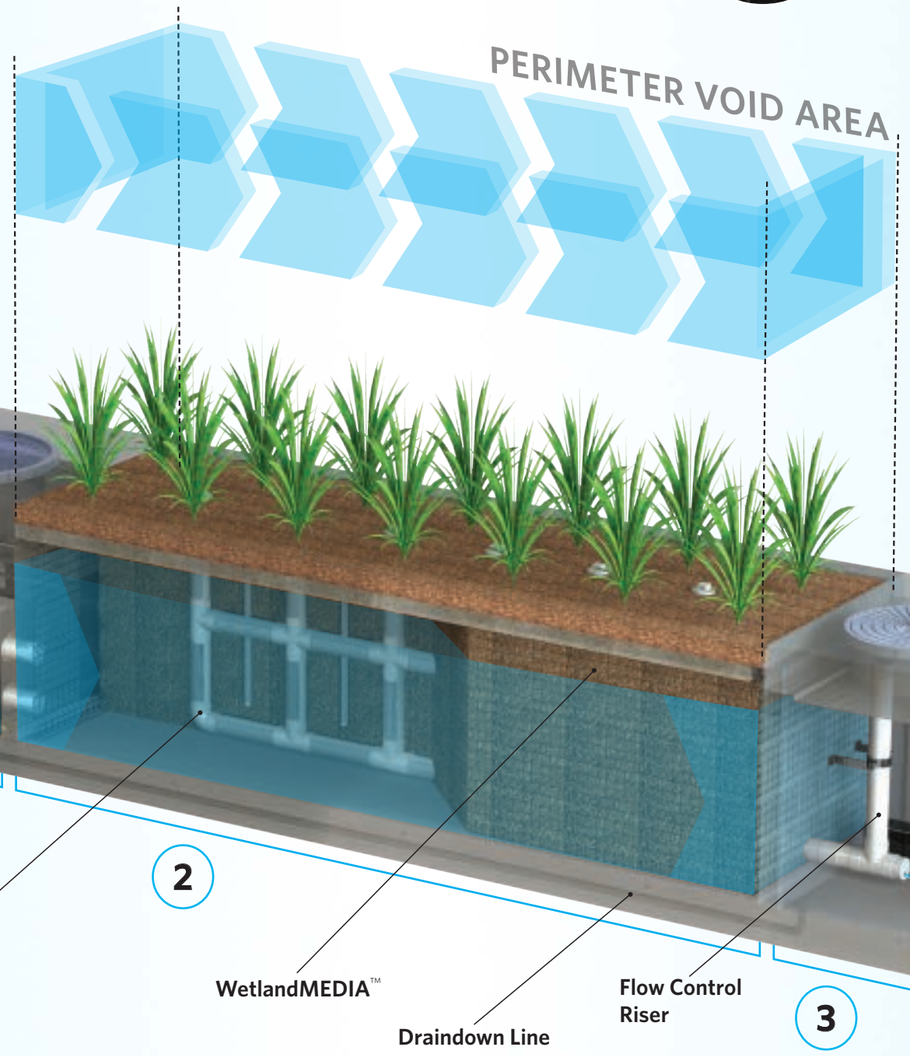


Figure 1

2 BIOFILTRATION

HORIZONTAL FLOW

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

PATENTED PERIMETER VOID AREA

- Vertically extends void area between the walls and the WetlandMEDIA™ on all four sides
- Maximizes surface area of the media for higher treatment capacity

WETLANDMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and lightweight

3 DISCHARGE

FLOW CONTROL

- Orifice plate controls flow of water through WetlandMEDIA™ to a level lower than the media's capacity
- Extends the life of the media and improves performance

DRAINDOWN FILTER

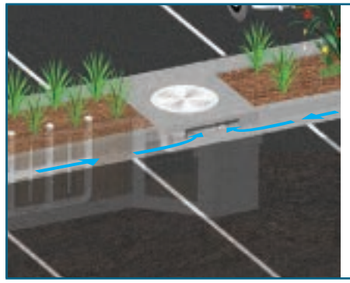
- The draindown is an optional feature that completely drains the pretreatment chamber
- Water that drains from the pretreatment chamber between storm events will be treated





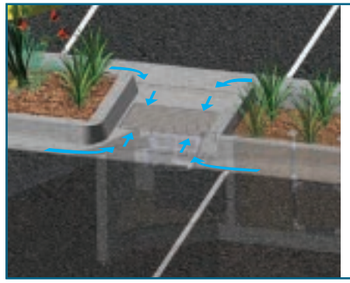
CONFIGURATIONS

The Modular Wetlands® System Linear is the preferred biofiltration system of civil engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your storm drain design.



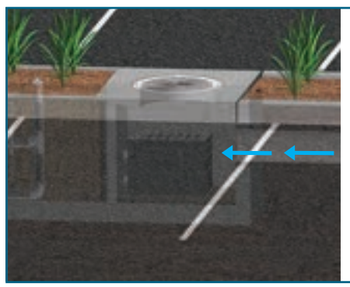
CURB TYPE

The Curb Type configuration accepts sheet flow through a curb opening and is commonly used along roadways and parking lots. It can be used in sump or flow-by conditions. Length of curb opening varies based on model and size.



GRATE TYPE

The Grate Type configuration offers the same features and benefits as the Curb Type but with a grated/drop inlet above the systems pretreatment chamber. It has the added benefit of allowing pedestrian access over the inlet. ADA-compliant grates are available to assure easy and safe access. The Grate Type can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



VAULT TYPE

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pretreatment chamber, meaning the Modular Wetlands® can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/ bioretention systems. Another benefit of the "pipe-in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.

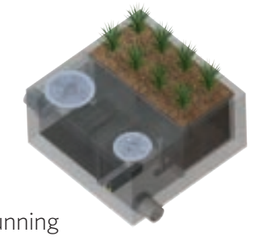


DOWNSPOUT TYPE

The Downspout Type is a variation of the Vault Type and is designed to accept a vertical downspout pipe from rooftop and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter, and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

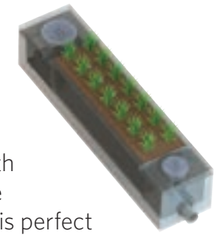
ORIENTATIONS

SIDE-BY-SIDE



The Side-By-Side orientation places the pretreatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.

END-TO-END



The End-To-End orientation places the pretreatment and discharge chambers on opposite ends of the biofiltration chamber, therefore minimizing the width of the system to 5 ft. (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is that bypass must be external.

BYPASS

INTERNAL BYPASS WEIR (SIDE-BY-SIDE ONLY)

The Side-By-Side orientation places the pretreatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pretreatment chamber directly to the discharge chamber.

EXTERNAL DIVERSION WEIR STRUCTURE

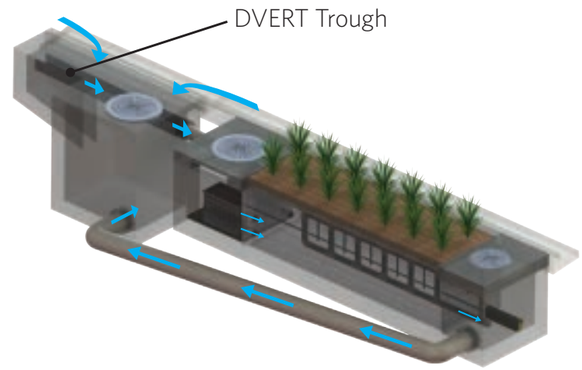
This traditional offline diversion method can be used with the Modular Wetlands® in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the Modular Wetlands® for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

FLOW-BY-DESIGN

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the Modular Wetlands® and into the standard inlet downstream.

DVERT LOW FLOW DIVERSION

This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the Modular Wetlands® via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over



to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allow the Modular Wetlands® to be installed anywhere space is available.

SPECIFICATIONS

FLOW-BASED DESIGNS

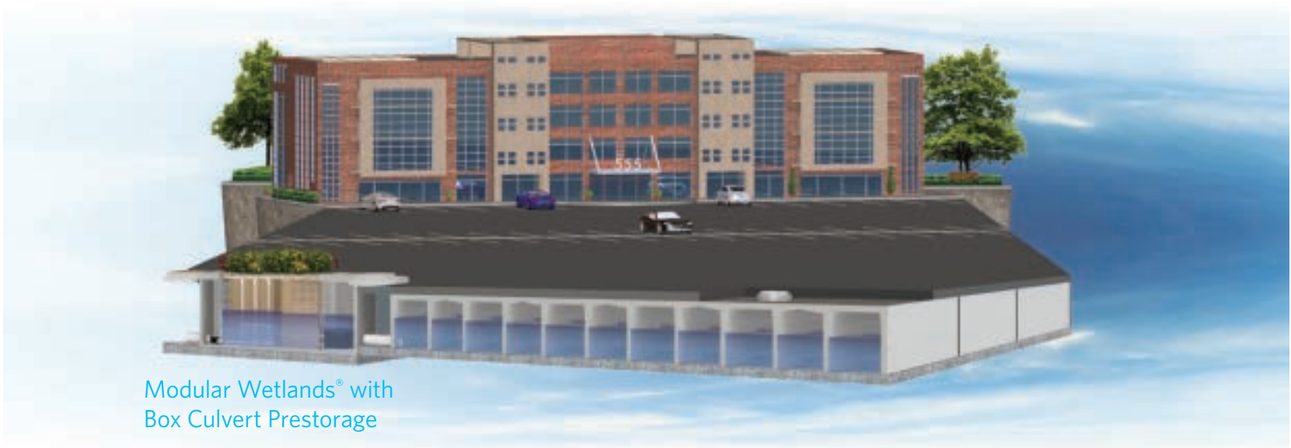
The Modular Wetlands® System Linear can be used in stand-alone applications to meet treatment flow requirements. Since the Modular Wetlands® is the only biofiltration system that can accept inflow pipes several feet below the surface, it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

MODEL #	DIMENSIONS	WETLANDMEDIA SURFACE AREA (sq. ft.)	TREATMENT FLOW RATE (cfs)
MWS-L-4-4	4′ x 4′	23	0.052
MWS-L-4-6	4′ x 6′	32	0.073
MWS-L-4-8	4′ x 8′	50	0.115
MWS-L-4-13	4′ x 13′	63	0.144
MWS-L-4-15	4′ x 15′	76	0.175
MWS-L-4-17	4′ x 17′	90	0.206
MWS-L-4-19	4′ x 19′	103	0.237
MWS-L-4-21	4′ x 21′	117	0.268
MWS-L-6-8	7′ x 9′	64	0.147
MWS-L-8-8	8′ x 8′	100	0.230
MWS-L-8-12	8′ x 12′	151	0.346
MWS-L-8-16	8′ x 16′	201	0.462
MWS-L-8-20	9′ x 21′	252	0.577
MWS-L-8-24	9′ x 25′	302	0.693
MWS-L-10-20	10' x 20'	302	0.693

MWS L-4-8 SELECTED FOR MWS BF-1-2

VOLUME-BASED DESIGNS

HORIZONTAL FLOW BIOFILTRATION ADVANTAGE



Modular Wetlands® with Box Culvert Prestorage

The Modular Wetlands® System Linear offers a unique advantage in the world of biofiltration due to its exclusive horizontal flow design: Volume-Based Design. No other biofilter has the ability to be placed downstream of detention ponds, extended dry detention basins, underground storage systems and permeable paver reservoirs. The systems horizontal flow configuration and built-in orifice control allows it to be installed with just 6″ of fall between inlet and outlet pipe for a simple connection to projects with shallow downstream tie-in points. In the example above, the Modular Wetlands® is installed downstream of underground box culvert storage. Designed for the water quality volume, the Modular Wetlands® will treat and discharge the required volume within local draindown time requirements.



Modular Wetlands® with Arch Plastic Chambers

DESIGN SUPPORT

Bio Clean engineers are trained to provide you with superior support for all volume sizing configurations throughout the country. Our vast knowledge of state and local regulations allow us to quickly and efficiently size a system to maximize feasibility. Volume control and hydromodification regulations are expanding the need to decrease the cost and size of your biofiltration system. Bio Clean will help you realize these cost savings with the Modular Wetlands®, the only biofilter than can be used downstream of storage BMPs.

ADVANTAGES

- LOWER COST THAN FLOW-BASED DESIGN
- MEETS LID REQUIREMENTS
- BUILT-IN ORIFICE CONTROL STRUCTURE
- WORKS WITH DEEP INSTALLATIONS

APPLICATIONS

The Modular Wetlands® System Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.



INDUSTRIAL

Many states enforce strict regulations for discharges from industrial sites. The Modular Wetlands® has helped various sites meet difficult EPA-mandated effluent limits for dissolved metals and other pollutants.



RESIDENTIAL

Low to high density developments can benefit from the versatile design of the Modular Wetlands®. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.



STREETS

Street applications can be challenging due to limited space. The Modular Wetlands® is very adaptable, and it offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.



PARKING LOTS

Parking lots are designed to maximize space and the Modular Wetlands'® 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.



COMMERCIAL

Compared to bioretention systems, the Modular Wetlands® can treat far more area in less space, meeting treatment and volume control requirements.



MIXED USE

The Modular Wetlands® can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications include:

• Agriculture • Reuse • Low Impact Development • Waste Water

PLANT SELECTION



Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the Modular Wetlands® System Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade, the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the Modular Wetlands®, giving the plants more contact time so that pollutants are more successfully decomposed, volatilized, and incorporated into the biomass of the Modular Wetlands'® micro/macro flora and fauna.

A wide range of plants are suitable for use in the Modular Wetlands®, but selections vary by location and climate. View suitable plants by visiting biocleanenvironmental.com/plants.

INSTALLATION



The Modular Wetlands® is simple, easy to install, and has a space-efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles precast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians is available to supervise installations and provide technical support.

MAINTENANCE



Reduce your maintenance costs, man hours, and materials with the Modular Wetlands®. Unlike other biofiltration systems that provide no pretreatment, the Modular Wetlands® is a self-contained treatment train which incorporates simple and effective pretreatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pretreatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pretreatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long-term operation, and there is absolutely no need to replace expensive biofiltration media.



Bio Clean
A Forterra Company

5796 Armada Drive Suite 250
Carlsbad, CA 92008
855.566.3938
stormwater@forterrabp.com
biocleanenvironmental.com

122018R1A

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

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

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: The Junipers

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☒ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	◉ Not Performed ○ Included ○ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required)	◉ Included ○ Submitted as separate stand-alone document

	Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	○ Included ◉ Not required because BMPs will drain in less than 96 hours

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

The Hydromodification Management Exhibit must identify:

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

Attachment 2a

LEGEND

- PROJECT BOUNDARY
- DMA 1 BOUNDARY
- XX.XX ACRES — SUBAREA ACREAGE
- DMA 1-4 — DMA ICON
- PERVIOUS - LANDSCAPE / SELF TREATING AREAS
- D — HYDROLOGIC SOIL TYPE
- X — POINT OF COMPLIANCE

PENASQUITOS DRIVE

DEL DIABLO ST.

DEL DIABLO ST.

ANDORRA WAY

CAMINITO ORENSE ESTE

DMA 1
31.18 ACRES
C

DMA 2
2.16 ACRES
C

DMA 3
15.86 ACRES
D

DMA 4
63.22 ACRES
D

INTERSTATE I-15 (AVOCADO HIGHWAY)

1

2

0 150 300 450
SCALE 1" = 150'

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

PREDEVELOPED CONDITION
HYDROMODIFICATION MAP

THE JUNIPERS

CITY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 3356-0002

R:\1286\Hyd\ACAD\1286$HYD_SWQMP.dwg[]Dec-06-2018:20:26

LEGEND

- PROJECT BOUNDARY
- DMA BOUNDARY
- XX.XX ACRES — SUBAREA ACREAGE
- DMA 1 — DMA ICON
- D — HYDROLOGIC SOIL TYPE
- X — POINT OF COMPLIANCE
- DMA 1
- DMA 2
- DMA 3
- DMA 4
- DMA 1 BYPASS
- DMA 4 BYPASS
- BASIN BF-1-2
- BASIN BF-2-3
- STRUCTURAL BMPS
  BIOFILTRATION BASIN

PENASQUITOS DRIVE
DEL DIABLO ST.
DEL DIABLO ST.
ANDORRA WAY
CAMINITO ORENSE ESTE
CARMEL MOUNTAIN ROAD
I-15 (AVOCADO HIGHWAY)
INTERSTATE HWY 15
CARMEL MTN RD
ANDORRA WAY

0.93 ACRES
1.34 ACRES
DMA 1
C
BASIN
BF-1-1
29.75 ACRES
1.65 ACRES
0.90 ACRES
DMA 3
9.34 ACRES
D
DMA 4
60.29 ACRES
D
DMA 2
3.55 ACRES
C
9.76 ACRES
MWS
BF-1-2
0.79 ACRES
BASIN
BF-2-3
BASIN
BF-2-4
1
2

H&A

0 150 300 450
SCALE 1" = 150'

PREPARED BY:

HUNSAKER & ASSOCIATES
SAN DIEGO, INC

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

DEVELOPED CONDITION
HYDROMODIFICATION MAP

THE JUNIPERS

CITY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 3356-0002

R:\1286\Hyd\ACAD\1286$HYD_SWQMP.dwg[]May-16-2019:09:17

Verification of GLUs		Worksheet H.6-1
Detailed project-level review of GLUs may be performed to verify the presence or absence of potential critical coarse sediment yield areas within the project site and/or upstream areas. Use this form to document the evaluation of slope, geology, and land cover combined to determine the site-specific GLUs. Complete all sections of this form.		
Project Name:		
Project Tracking Number / Permit Application Number:		
1	What are the pre-project slopes?	☒ 0% to 10% (1) ☒ 10% to 20% (2) ☒ 20% to 40% (3) ☒ >40% (4)
2	What is the underlying geology? Refer to Appendix H.6 to classify geologic categories into a geology grouping. Note: site-specific geology may be determined in the field by a qualified geologist.	☐ Coarse bedrock (CB) ☐ Coarse sedimentary impermeable (CSI) ☐ Coarse sedimentary permeable (CSP) ☐ Fine bedrock (FB) ☐ Fine sedimentary impermeable (FSI) ☐ Fine sedimentary permeable (FSP) ☒ Other (O) (Undocumented Fill on site)
3	What is the pre-project land cover? Refer to Appendix H.6 for land cover category definitions. Note: Land cover shall be determined from aerial photography and/or field visit.	☐ Agriculture/grass ☐ Forest ☐ Developed ☐ Scrub/shrub ☐ Other ☐ Unknown
4	List the GLU(s) within the project site and/or upstream areas. Note the GLU nomenclature format is as follows: Geology – Land Cover – Slope Category (e.g. "CB-Agricultural/Grass-3" for a GLU consisting of coarse bedrock geology, agricultural/grass land cover, and 20% to 40% slope).	O-Unknown-1 O-Unknown-2 O-Unknown-3 O-Unknown-4 The there are no qualifying GLUs for potential CCSYA based on site specific analysis.

Worksheet H.6-1; Page 2 of 2			
5	Photo(s) Insert photos representative of the slopes, land cover, and geology. Exhibits showing Aerial Photos and Geology are attached.		
6	Are any of the GLUs found within the project boundary and/or upstream areas (listed in row 4) also listed in Table H.6-1?	☐ Yes	Go to 7
		☒ No	Go to 8
7	End – Provide management measures for preservation of coarse sediment supply as described in this guidance document, or the project applicant may elect to determine whether downstream systems would be sensitive to reduction of coarse sediment yield from the project site and/or perform site-specific method for mapping critical coarse sediment yield areas.		
8	End – Site-specific GLUs do not warrant preservation of coarse sediment supply, no measures for protection of critical coarse sediment yield areas onsite are necessary. Optional: use the note section below to provide justification for these findings.		
9	Notes The there are no qualifying GLUs with potential CCSYA based on site specific analysis.		

THE JUNIPERS

CRITICAL COARSE SEDIMENT YIELD AREAS

Legend

- CCSYA*
- PROJECT SITE

Black Mountain 4
Lananova St
Linares St
Nawa Ct
Mekness St
Paseo Nanta
Socotro St
Carlota St
Raul St
Amalia St
Susie St
Segovia Ct
Andorra Way
Calle Juanito
Via Abajo
Del Diablo Way
Del Diablo Ln
Salanas St
Del Diablo St
Penasquitos Ct
Escondido Fwy
Rancho Carmel Dr
Woodrush Ln
Avenue of Science
Innovation Dr
Via Firul
Avenida Venusto
Alta Carmel Ct
Camino Del Norte
World Trade Dr
Stoney Peak Dr
Seabridge Ln
Breezeway Pl
Montfort Ct
Lewiston St
Tivoli Park Row
Carmel Mountain Ranch
Carmel Ridge Rd
Via Milano
Cypress Greens
Werris Creek Ln
Cable Ridge Rd
Summerbreeze Way
Ted Williams
15

Google Earth
© 2017 Google
© 2017 INEGI

N

3000 ft

Attachment 2d
Hydromodification Management Plan

Hydromodification Management Plan

INTRODUCTION

This report summarizes the approach used to model the proposed The Junipers project site within San Diego County, CA using the Environmental Protection Agency (EPA) Storm Water Management Model 5.0 (SWMM). SWMM models were prepared for the pre and post developed conditions at the site in order to determine if the proposed bioretention and detention basin facility has sufficient footprint to meet the current Hydromodification Management Plan (HMP) requirements from the Regional Water Quality Control Board (RWQCB).

SWMM MODEL DEVELOPMENT

Four (4) SWMM models were prepared for this study, one for the points of compliance (POCs) in existing conditions and one for POCs in the proposed condition. For all SWMM models, flow duration curves were prepared to demonstrate that the proposed bioretention & detention basin footprint will be sufficient to meet the current HMP requirements.

The inputs required to develop SWMM models include rainfall, watershed characteristics, and BMP configurations. The Oceanside Rain Gage from the Project Clean Water website was used for this study, since it is the most representative of the project site precipitation.

Evaporation for the site was modeled using average monthly values from the San Diego County hourly dataset. The site was modeled with hydrologic soil group C and D soils as determined from both the San Diego County Hydrology Manual soil map and the USGS Survey web-based Soil Survey Map. Other SWMM inputs for the subareas are discussed in the attachment to this document where the selection of the parameters is explained in detail.

BIORETENTION MODELING

Developed storm water runoff is routed through three (3) bioretention basins, locations of basins can be found on the Proposed Hydromodification Map. The basin was modeled using the bioretention LID module within SWMM. The bioretention module can model the underground gravel storage layer, underdrain with an orifice plate, amended soil layer, and a surface storage pond up to the elevation of the invert of the bottom orifice. A separate diversion and detention basin were used to model the portion of the storage pond between the base orifice invert elevations and the spillway elevation from the bioretention basin, according to the assumptions explained in the appendix. Once runoff has been routed through the respective basin outlet structure, it is conveyed via a storm drain pipe to each POC.

Basin Discussion:

Flow control in the basin is achieved using multiple orifices on a concrete riser box. The size, number and location of the orifices are presented in the Basin Table below. The basin also contains an emergency overflow riser that is only utilized in storm events equal to or larger than the 100 year storm. Sizing and further peak flow discussion is in the Drainage Study The Junipers.

Basin Table

	BF-1-1	BF-2-3	BF-2-4
Weir Height (ft)*	3.5	3.0	2.6
Weir Length (ft)	10	4	32
Amended Soil Depth (in)	18	18	18
Class 2 Perm. Depth (in)	12	12	12
Approx. Dimensions (LxW)	2'x3'	1'x1'	8'x8'
Top Orifice			
No. of Orifices	1	6	6
Diameter (in)	3	4	12
Invert Height (ft)*	2.5	1.7	2.0
Middle Orifice			
No. of Orifices	1	6	6
Diameter (in)	2	3	8
Invert Height (ft)*	1.5	1.1	1.25
Bottom Orifice			
No. of Orifices	1	6	6
Diameter (in)	1	2	4
Invert Height (ft)*	0.5	0.5	0.5
Sub-Drain Orifice			
No. of Orifices	1	1	1
Diameter (in)	3.5	3	5

*From finish grade

FLOW DURATION CURVE COMPARISON

The Flow Duration Curves (FDC) for the site were compared at POCs by exporting the hourly runoff time series results from SWMM to a spreadsheet. The FDC was compared between 10% of the existing condition Q_2 (based on accepting an assumption of high susceptibility for downstream channel erosion as required if no soils tests are completed) up to the existing condition Q_{10}. The Q_2 and Q_{10} were determined using a partial duration statistical analysis of the runoff time series in an Excel spreadsheet using the Cunnane plotting position method (which is the preferred plotting methodology in the HMP Permit). As the SWMM Model is a statistical analysis based on the Weibull Plotting Position Method, the Weibull Method was also used within the spreadsheet to ensure that the results were similar to those obtained by the SWMM Model.

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

The FDC comparison at the POC s is illustrated in Figure 1 in both normal and logarithmic scale. POC 1 corresponds with the point located downstream of the discharge of Basin 1. POC 2 corresponds with the point located downstream of the discharge of Basin 2 and Basin 3. Attachment 10 of this HMP Study provides detailed drainage exhibit for the post-developed condition.

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

SUMMARY & CONCLUSION

A summary of existing and proposed areas draining to the point of compliance (POC) is shown in the table below. The increase in area draining to the POC is attributed to grading and development of the property. The bioretention basin is proposed to mitigate increased flow frequencies as a result of development.

Area Summary

	Existing (AC)	Proposed (AC)
POC 1	33.21	36.48
POC 2	85.82	82.56
TOTAL	119.03	119.03

This study has demonstrated that the proposed bioretention footprint at the Junipers site is sufficient to meet the current HMP criteria if the bioretention cross-section area and volume recommended within this attachment are incorporated within the proposed project site.

KEY ASSUMPTIONS

1. D Soils are representative of the existing conditions for the site.

ATTACHMENTS

1. Flow Duration Curve Analysis
2. Elevation vs. Area Curves vs. Discharge Curves to be used in SWMM
3. Bioretention Details
4. SWMM Input Data (Existing and Proposed Models)
5. SWMM Screens and Explanation of Significant Variables
6. Drying Time of the Surface Layer of Bio-retention cells
7. Hydromodification Watershed Maps

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

The figure on the following page illustrates that the flow duration curve in post-development conditions after the proposed BMPs is below the existing flow duration curve. The flow duration curve table following the curve shows that if the interval 0.10Q 2 – Q 10 is divided in 100 sub-intervals, then a) the post development divided by pre-development durations are never larger than 110% (the permit allows up to 110%); and b) there are no more than 10 intervals in the range 101%-110% which would imply an excess over 10% of the length of the curve (the permit allows less than 10% of excesses measured as 101-110%).

Consequently, the design passes the hydromodification test.

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

In terms of the "y" axis, the peak flow value is the variable of choice. As an additional analysis performed by H&A, not only the range of analysis is clearly depicted (10% of Q 2 to Q 10) but also all intermediate flows are shown (30% of Q 2 , 50% of Q 2 , Q 2 , Q 3 , Q 4 , Q 5 , Q 6 , Q 7 , Q 8 and Q 9) in order to demonstrate compliance at any range Q x – Q x+1 . It must be pointed out that one of the limitations of both the SWMM and SDHM models is that the intermediate analysis is not performed (to obtain Q i from i = 2 to 10).

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

ATTACHMENT 1 - Flow Duration Curve Analysis, Plot & Table

Figures 1a, 1b, 1c, 1d. – Flow Duration Curve Comparison & Peak Flow Frequency Curves Comparison

JUNIPERS POC-1

Pre-project Flow Frequency - Long-term Simulation

Statistics - Node POC1Ex Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1	1/29/1980	42	10.7	0.74	47
2	12/29/1978	4	9.972	1.47	23.5
3	3/24/1983	4	9.528	2.21	15.67
4	2/19/1980	33	9.308	2.94	11.75
5	1/9/1978	12	9.045	3.68	9.4
6	3/1/1983	33	8.835	4.41	7.83
7	1/25/1995	4	7.57	5.15	6.71
8	4/18/1995	6	7.351	5.88	5.88
9	3/17/1982	10	7.343	6.62	5.22
10	1/4/1995	8	6.895	7.35	4.7
11	12/18/1978	5	6.7	8.09	4.27
13	2/3/1998	4	6.523	9.56	3.62
13	2/8/1998	4	6.523	9.56	3.62
14	1/6/1979	5	6.451	10.29	3.36
15	12/28/2004	20	6.063	11.03	3.13
16	2/28/1970	3	5.371	11.76	2.94
17	2/14/1998	4	5.071	12.5	2.76
18	2/8/1983	3	4.898	13.24	2.61
19	11/22/1965	9	4.838	13.97	2.47
20	12/5/1966	12	4.838	14.71	2.35
21	11/12/1976	2	4.749	15.44	2.24
22	11/30/2007	4	4.636	16.18	2.14
23	2/16/1980	5	4.566	16.91	2.04
24	1/9/2005	5	4.164	17.65	1.96
25	11/5/1987	2	4.153	18.38	1.88
26	1/6/1974	28	4.103	19.12	1.81
27	2/21/2005	9	4.009	19.85	1.74
28	1/25/1969	5	3.494	20.59	1.68
29	4/21/1988	4	3.359	21.32	1.62
30	2/8/1976	10	3.312	22.06	1.57
31	11/29/1982	22	3.222	22.79	1.52
32	2/8/1993	3	3.16	23.53	1.47
33	1/14/1978	12	3.061	24.26	1.42
34	4/8/1975	8	2.926	25	1.38
35	9/10/1976	2	2.901	25.74	1.34
36	3/1/1978	19	2.838	26.47	1.31
38	2/27/2001	3	2.767	27.94	1.24
38	2/12/2003	3	2.767	27.94	1.24
39	2/6/1976	3	2.702	28.68	1.21
40	2/21/2000	3	2.61	29.41	1.17
41	1/11/2005	7	2.542	30.15	1.15
42	1/16/1978	8	2.51	30.88	1.12
43	4/1/1982	3	2.467	31.62	1.09
44	2/17/1998	3	2.304	32.35	1.07
45	3/8/1974	3	2.272	33.09	1.04
46	1/18/1993	2	2.207	33.82	1.02
47	10/17/1971	2	2.135	34.56	1
48	1/13/1993	10	2.122	35.29	0.98
49	11/16/1972	3	1.934	36.03	0.96
50	10/20/2004	7	1.684	36.76	0.94
51	12/31/1976	4	1.638	37.5	0.92
52	12/6/1966	3	1.595	38.24	0.9
53	3/17/1963	1	1.541	38.97	0.89
54	1/9/1998	25	1.527	39.71	0.87
55	2/27/1983	3	1.511	40.44	0.85
56	4/14/2003	2	1.49	41.18	0.84
57	11/16/1965	6	1.444	41.91	0.82
58	3/5/1995	5	1.424	42.65	0.81
59	1/11/1980	3	1.418	43.38	0.8
60	2/18/1980	3	1.398	44.12	0.78
61	2/6/1998	2	1.389	44.85	0.77
62	10/27/2004	11	1.316	45.59	0.76
63	12/4/1974	2	1.249	46.32	0.75
64	2/15/1992	2	1.219	47.06	0.73
65	12/16/2002	2	1.149	47.79	0.72
66	3/20/1991	9	1.11	48.53	0.71
67	1/5/1992	6	1.052	49.26	0.7
68	11/21/1967	1	1.024	50	0.69
69	1/31/1996	1	0.975	50.74	0.68
70	2/22/2004	15	0.967	51.47	0.67
71	11/22/1996	1	0.954	52.21	0.66
72	3/4/1978	16	0.943	52.94	0.65
73	3/27/1991	4	0.938	53.68	0.64
74	3/15/1986	2	0.901	54.41	0.64
75	12/18/1967	5	0.852	55.15	0.63
76	4/26/1994	3	0.831	55.88	0.62
77	10/29/1974	6	0.819	56.62	0.61
78	3/15/2003	25	0.794	57.35	0.6
79	3/17/1983	1	0.765	58.09	0.59
80	1/6/1993	27	0.758	58.82	0.59
83	1/4/1974	2	0.707	61.03	0.57
83	1/9/1980	1	0.707	61.03	0.57
83	1/29/1981	2	0.707	61.03	0.57
84	3/3/1976	1	0.704	61.76	0.56
85	2/6/1969	1	0.702	62.5	0.55
86	3/28/1979	2	0.669	63.24	0.55
87	2/19/2007	1	0.636	63.97	0.54
88	2/15/1986	3	0.629	64.71	0.53
89	2/23/1998	25	0.604	65.44	0.53
90	3/28/1993	1	0.599	66.18	0.52
91	11/29/1985	1	0.539	66.91	0.52
92	3/1/1981	1	0.535	67.65	0.51
93	1/22/1964	1	0.494	68.38	0.51
94	4/3/1965	1	0.493	69.12	0.5
95	2/14/1995	3	0.489	69.85	0.49
96	11/14/1972	1	0.478	70.59	0.49
97	1/11/2001	3	0.464	71.32	0.48
98	1/17/1990	1	0.432	72.06	0.48

10-year Q: 9.112 cfs (Adjust Column "I" to interpolate from Table)
5-year Q: 7.153 cfs
2-year Q: 4.365 cfs

Lower Flow Threshold: 10%

0.1xQ2 (Pre): 0.437 cfs

JUNIPERS POC-1

Post-project (Mitigated) Flow Frequency - Long-term Simulation

Statistics - Node POC-1 Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1	1/29/1980	91	11.25	0.44	47
2	1/4/1995	84	8.274	0.88	23.5
3	2/16/1980	177	8.202	1.33	15.67
4	11/22/1965	81	6.437	1.77	11.75
5	12/5/1966	102	5.713	2.21	9.4
6	12/28/1978	107	4.641	2.65	7.83
7	1/14/1978	134	4.316	3.1	6.71
8	1/9/2005	106	3.208	3.54	5.88
9	12/28/2004	95	3.071	3.98	5.22
10	3/17/1982	79	2.979	4.42	4.7
11	11/30/2007	85	2.97	4.87	4.27
12	3/1/1983	114	2.302	5.31	3.92
13	1/9/1978	87	2.034	5.75	3.62
14	3/24/1983	62	2.014	6.19	3.36
15	1/5/1979	105	1.854	6.64	3.13
16	1/25/1995	48	1.625	7.08	2.94
17	12/18/1978	73	1.585	7.52	2.76
18	4/18/1995	60	1.537	7.96	2.61
19	2/3/1998	193	1.513	8.41	2.47
20	2/28/1970	66	1.302	8.85	2.35
21	11/29/1982	88	1.265	9.29	2.24
22	2/14/1998	146	1.192	9.73	2.14
23	11/12/1976	55	1.172	10.18	2.04
24	2/8/1983	30	1.07	10.62	1.96
25	2/21/2005	85	0.986	11.06	1.88
26	11/5/1987	2	0.969	11.5	1.81
27	3/1/1978	149	0.937	11.95	1.74
28	1/6/1974	71	0.926	12.39	1.68
29	2/8/1976	78	0.824	12.83	1.62
30	1/25/1969	50	0.822	13.27	1.57
31	2/8/1993	59	0.796	13.72	1.52
32	4/8/1975	73	0.723	14.16	1.47
33	4/20/1988	58	0.721	14.6	1.42
34	9/10/1976	13	0.657	15.04	1.38
35	2/12/2003	12	0.65	15.49	1.34
36	2/27/2001	3	0.648	15.93	1.31
37	10/27/2004	80	0.632	16.37	1.27
38	2/6/1976	2	0.625	16.81	1.24
39	1/12/1993	201	0.618	17.26	1.21
40	2/21/2000	3	0.617	17.7	1.17
41	4/1/1982	23	0.595	18.14	1.15
42	3/8/1974	3	0.543	18.58	1.12
43	10/17/1971	1	0.521	19.03	1.09
44	3/5/1995	72	0.509	19.47	1.07
45	11/16/1972	3	0.497	19.91	1.04
46	3/17/1963	2	0.448	20.35	1.02
47	10/20/2004	26	0.437	20.8	1
48	12/4/1974	46	0.431	21.24	0.98
49	11/21/1996	62	0.425	21.68	0.96
50	12/31/1976	4	0.415	22.12	0.94
51	1/6/1993	93	0.407	22.57	0.92
52	1/9/1998	25	0.388	23.01	0.9
53	4/14/2003	2	0.378	23.45	0.89
54	1/9/1980	109	0.351	23.89	0.87
55	2/27/1983	2	0.345	24.34	0.85
56	11/16/1965	35	0.344	24.78	0.84
57	3/19/1991	57	0.336	25.22	0.82
58	2/22/2004	60	0.328	25.66	0.81
59	12/9/1965	79	0.323	26.11	0.8
60	2/15/1992	18	0.319	26.55	0.78
61	2/15/1986	63	0.317	26.99	0.77
62	12/16/2002	2	0.307	27.43	0.76
63	2/6/1969	7	0.283	27.88	0.75
64	11/21/1967	1	0.281	28.32	0.73
65	1/31/1996	1	0.28	28.76	0.72
66	3/17/1983	29	0.273	29.2	0.71
67	1/5/1992	15	0.266	29.65	0.7
68	3/11/1995	65	0.264	30.09	0.69
69	3/25/1991	54	0.258	30.53	0.68
70	3/15/1986	18	0.258	30.97	0.67
71	10/29/1974	6	0.238	31.42	0.66
72	3/15/2003	25	0.232	31.86	0.65
73	12/18/1967	17	0.228	32.3	0.64
74	1/29/1981	2	0.226	32.74	0.64
75	3/28/1979	12	0.222	33.19	0.63
76	1/4/1974	1	0.214	33.63	0.62
77	2/23/1998	25	0.214	34.07	0.61
78	3/7/1994	15	0.212	34.51	0.6
79	3/3/1976	1	0.207	34.96	0.59
80	2/19/2007	6	0.207	35.4	0.59
81	1/11/2001	48	0.203	35.84	0.58
82	4/26/1994	2	0.202	36.28	0.57
83	3/28/1993	1	0.2	36.73	0.57
84	11/29/1985	12	0.192	37.17	0.56
85	3/4/1970	16	0.186	37.61	0.55
86	2/28/1991	57	0.178	38.05	0.55
87	11/25/1985	36	0.178	38.5	0.54
88	2/9/1963	55	0.177	38.94	0.53
89	4/3/1965	1	0.172	39.38	0.53
90	3/1/1981	6	0.171	39.82	0.52
91	2/14/1995	3	0.17	40.27	0.52
92	1/17/1990	1	0.169	40.71	0.51
93	11/14/1972	1	0.169	41.15	0.51
94	11/17/1986	26	0.169	41.59	0.5
95	1/20/1982	58	0.169	42.04	0.49
96	1/22/1964	1	0.168	42.48	0.49
97	2/14/2008	1	0.168	42.92	0.48
98	3/13/1996	1	0.162	43.36	0.48

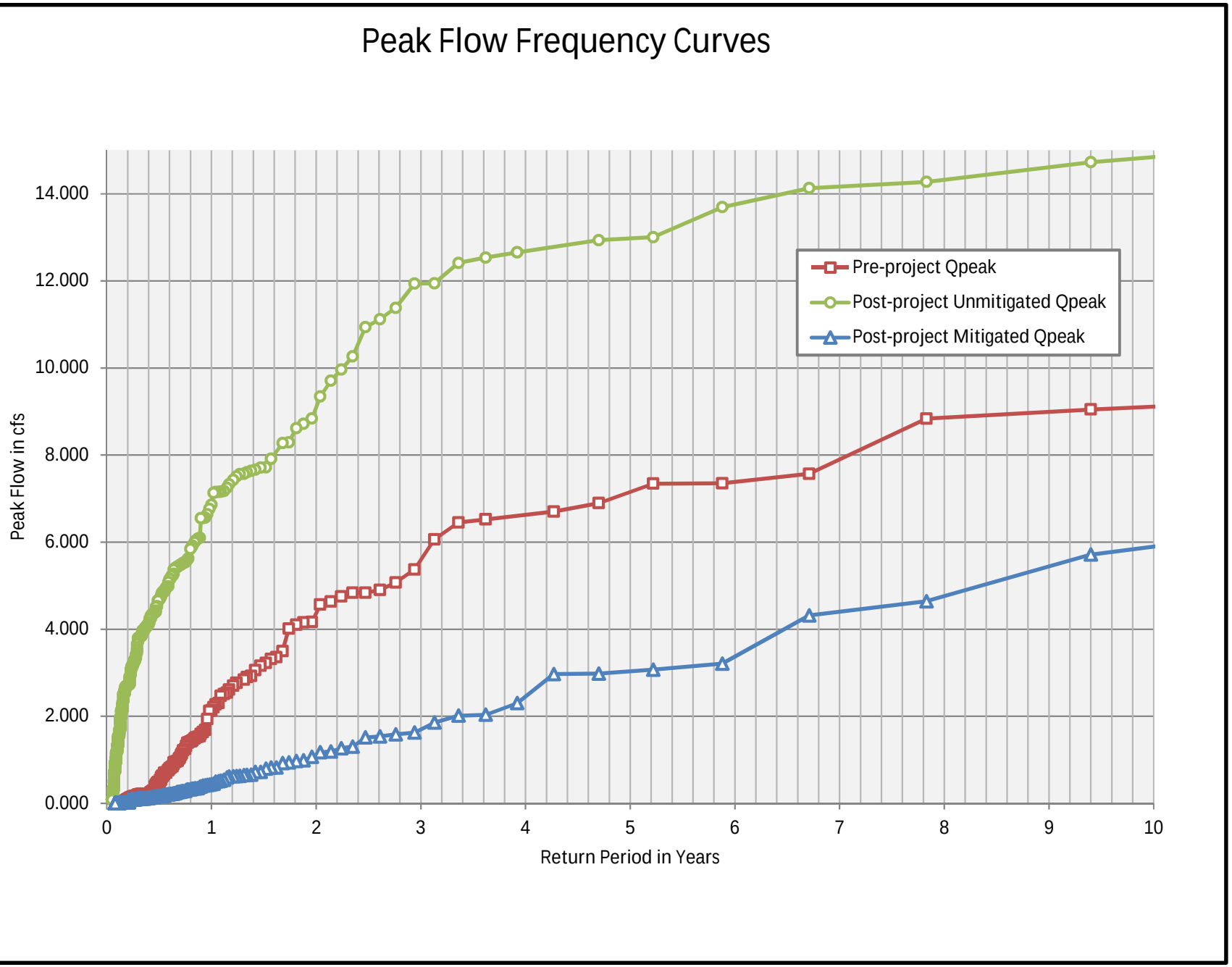
10-year Q:	5.898	cfs	(Adjust Column "I" to interpolate from Table)
5-year Q:	3.032	cfs	
2-year Q:	1.121	cfs	
Lower Flow Threshold:	10%		
0.1xQ2 (Post Mit):	0.112	cfs	

JUNIPERS POC-1

Peak Flow Frequency Summary

Return Period	Pre-project Qpeak (cfs)	Post-project - Unmitigated Q (cfs)	Post-project - Unmitigated Increase Q (cfs)	Post-project - Mitigated Q (cfs)
LF = 0.1xQ2	0.437	0.909	0.473	0.112
2-year	4.365	9.093	4.728	1.121
5-year	7.153	12.975	5.822	3.032
10-year	9.112	14.844	5.732	5.898

JUNIPERS POC-1



JUNIPERS POC-1

Low-flow Threshold:	10%	
0.1xQ2 (Pre):	0.437	cfs
Q10 (Pre):	9.112	cfs
Ordinate #:	100	
Incremental Q (Pre):	0.08676	cfs
Total Hourly Data:	400032	hours

The proposed BMP: PASSED

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
0	0.437	280	7.00E-04	219	5.47E-04	78%	Pass
1	0.523	259	6.47E-04	170	4.25E-04	66%	Pass
2	0.610	233	5.82E-04	146	3.65E-04	63%	Pass
3	0.697	223	5.57E-04	126	3.15E-04	57%	Pass
4	0.784	208	5.20E-04	106	2.65E-04	51%	Pass
5	0.870	194	4.85E-04	91	2.27E-04	47%	Pass
6	0.957	178	4.45E-04	84	2.10E-04	47%	Pass
7	1.044	168	4.20E-04	75	1.87E-04	45%	Pass
8	1.131	163	4.07E-04	71	1.77E-04	44%	Pass
9	1.217	158	3.95E-04	62	1.55E-04	39%	Pass
10	1.304	150	3.75E-04	59	1.47E-04	39%	Pass
11	1.391	141	3.52E-04	55	1.37E-04	39%	Pass
12	1.478	129	3.22E-04	50	1.25E-04	39%	Pass
13	1.564	123	3.07E-04	46	1.15E-04	37%	Pass
14	1.651	120	3.00E-04	38	9.50E-05	32%	Pass
15	1.738	115	2.87E-04	37	9.25E-05	32%	Pass
16	1.825	112	2.80E-04	36	9.00E-05	32%	Pass
17	1.911	109	2.72E-04	32	8.00E-05	29%	Pass
18	1.998	103	2.57E-04	32	8.00E-05	31%	Pass
19	2.085	99	2.47E-04	29	7.25E-05	29%	Pass
20	2.172	94	2.35E-04	28	7.00E-05	30%	Pass
21	2.258	90	2.25E-04	26	6.50E-05	29%	Pass
22	2.345	81	2.02E-04	24	6.00E-05	30%	Pass
23	2.432	79	1.97E-04	24	6.00E-05	30%	Pass
24	2.519	73	1.82E-04	24	6.00E-05	33%	Pass
25	2.605	71	1.77E-04	24	6.00E-05	34%	Pass
26	2.692	67	1.67E-04	23	5.75E-05	34%	Pass
27	2.779	64	1.60E-04	23	5.75E-05	36%	Pass
28	2.866	63	1.57E-04	21	5.25E-05	33%	Pass
29	2.952	60	1.50E-04	20	5.00E-05	33%	Pass
30	3.039	58	1.45E-04	17	4.25E-05	29%	Pass
31	3.126	56	1.40E-04	15	3.75E-05	27%	Pass
32	3.213	54	1.35E-04	13	3.25E-05	24%	Pass
33	3.299	51	1.27E-04	12	3.00E-05	24%	Pass
34	3.386	49	1.22E-04	12	3.00E-05	24%	Pass
35	3.473	49	1.22E-04	12	3.00E-05	24%	Pass
36	3.560	47	1.17E-04	12	3.00E-05	26%	Pass
37	3.646	47	1.17E-04	12	3.00E-05	26%	Pass
38	3.733	47	1.17E-04	12	3.00E-05	26%	Pass
39	3.820	47	1.17E-04	12	3.00E-05	26%	Pass
40	3.907	46	1.15E-04	12	3.00E-05	26%	Pass
41	3.994	43	1.07E-04	11	2.75E-05	26%	Pass
42	4.080	41	1.02E-04	11	2.75E-05	27%	Pass
43	4.167	36	9.00E-05	10	2.50E-05	28%	Pass
44	4.254	35	8.75E-05	10	2.50E-05	29%	Pass
45	4.341	35	8.75E-05	9	2.25E-05	26%	Pass
46	4.427	32	8.00E-05	9	2.25E-05	28%	Pass
47	4.514	32	8.00E-05	9	2.25E-05	28%	Pass
48	4.601	30	7.50E-05	9	2.25E-05	30%	Pass
49	4.688	29	7.25E-05	8	2.00E-05	28%	Pass
50	4.774	27	6.75E-05	8	2.00E-05	30%	Pass
51	4.861	25	6.25E-05	8	2.00E-05	32%	Pass
52	4.948	23	5.75E-05	8	2.00E-05	35%	Pass
53	5.035	23	5.75E-05	8	2.00E-05	35%	Pass
54	5.121	21	5.25E-05	8	2.00E-05	38%	Pass

JUNIPERS POC-1

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
55	5.208	21	5.25E-05	7	1.75E-05	33%	Pass
56	5.295	21	5.25E-05	7	1.75E-05	33%	Pass
57	5.382	19	4.75E-05	7	1.75E-05	37%	Pass
58	5.468	19	4.75E-05	7	1.75E-05	37%	Pass
59	5.555	19	4.75E-05	7	1.75E-05	37%	Pass
60	5.642	19	4.75E-05	7	1.75E-05	37%	Pass
61	5.729	19	4.75E-05	6	1.50E-05	32%	Pass
62	5.815	19	4.75E-05	6	1.50E-05	32%	Pass
63	5.902	19	4.75E-05	6	1.50E-05	32%	Pass
64	5.989	19	4.75E-05	6	1.50E-05	32%	Pass
65	6.076	18	4.50E-05	6	1.50E-05	33%	Pass
66	6.162	18	4.50E-05	5	1.25E-05	28%	Pass
67	6.249	17	4.25E-05	5	1.25E-05	29%	Pass
68	6.336	15	3.75E-05	5	1.25E-05	33%	Pass
69	6.423	15	3.75E-05	5	1.25E-05	33%	Pass
70	6.509	14	3.50E-05	4	1.00E-05	29%	Pass
71	6.596	12	3.00E-05	4	1.00E-05	33%	Pass
72	6.683	12	3.00E-05	4	1.00E-05	33%	Pass
73	6.770	10	2.50E-05	4	1.00E-05	40%	Pass
74	6.856	10	2.50E-05	4	1.00E-05	40%	Pass
75	6.943	9	2.25E-05	4	1.00E-05	44%	Pass
76	7.030	9	2.25E-05	4	1.00E-05	44%	Pass
77	7.117	9	2.25E-05	4	1.00E-05	44%	Pass
78	7.204	9	2.25E-05	4	1.00E-05	44%	Pass
79	7.290	9	2.25E-05	4	1.00E-05	44%	Pass
80	7.377	7	1.75E-05	4	1.00E-05	57%	Pass
81	7.464	7	1.75E-05	4	1.00E-05	57%	Pass
82	7.551	7	1.75E-05	4	1.00E-05	57%	Pass
83	7.637	6	1.50E-05	4	1.00E-05	67%	Pass
84	7.724	6	1.50E-05	4	1.00E-05	67%	Pass
85	7.811	6	1.50E-05	4	1.00E-05	67%	Pass
86	7.898	6	1.50E-05	4	1.00E-05	67%	Pass
87	7.984	6	1.50E-05	4	1.00E-05	67%	Pass
88	8.071	6	1.50E-05	3	7.50E-06	50%	Pass
89	8.158	6	1.50E-05	3	7.50E-06	50%	Pass
90	8.245	6	1.50E-05	2	5.00E-06	33%	Pass
91	8.331	6	1.50E-05	1	2.50E-06	17%	Pass
92	8.418	6	1.50E-05	1	2.50E-06	17%	Pass
93	8.505	6	1.50E-05	1	2.50E-06	17%	Pass
94	8.592	6	1.50E-05	1	2.50E-06	17%	Pass
95	8.678	6	1.50E-05	1	2.50E-06	17%	Pass
96	8.765	6	1.50E-05	1	2.50E-06	17%	Pass
97	8.852	5	1.25E-05	1	2.50E-06	20%	Pass
98	8.939	5	1.25E-05	1	2.50E-06	20%	Pass
99	9.025	5	1.25E-05	1	2.50E-06	20%	Pass
100	9.112	4	1.00E-05	1	2.50E-06	25%	Pass

JUNIPERS POC-2

Pre-project Flow Frequency - Long-term Simulation

Statistics - Node POC2-EX Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1	2/16/1980	119	24.355	0.35	47
2	1/28/1980	48	23.453	0.7	23.5
3	1/9/1978	36	19.425	1.05	15.67
4	2/8/1998	23	18.662	1.4	11.75
5	12/28/1978	51	18.095	1.75	9.4
6	11/22/1965	28	17.837	2.1	7.83
7	1/4/1995	18	17.779	2.45	6.71
8	3/1/1983	69	17.705	2.8	5.88
9	2/28/1970	10	17.119	3.15	5.22
10	3/24/1983	18	16.455	3.5	4.7
11	11/12/1976	6	15.899	3.85	4.27
12	1/5/1979	31	15.236	4.2	3.92
13	1/6/1974	42	14.997	4.55	3.62
14	12/18/1978	12	14.243	4.9	3.36
15	3/5/1995	26	14.068	5.24	3.13
16	3/17/1982	30	13.889	5.59	2.94
17	2/3/1998	27	13.753	5.94	2.76
18	1/25/1995	19	13.66	6.29	2.61
19	2/21/2005	56	13.577	6.64	2.47
20	11/30/2007	18	13.388	6.99	2.35
21	4/18/1995	13	12.759	7.34	2.24
22	2/8/1983	13	12.324	7.69	2.14
23	1/24/1969	56	11.924	8.04	2.04
24	2/8/1993	13	11.904	8.39	1.96
25	1/14/1978	24	11.86	8.74	1.88
26	12/5/1966	49	11.855	9.09	1.81
27	1/9/2005	65	11.788	9.44	1.74
28	10/27/2004	17	11.549	9.79	1.68
29	4/8/1975	30	11.113	10.14	1.62
30	12/28/2004	25	10.609	10.49	1.57
31	2/27/2001	18	10.384	10.84	1.52
32	2/14/1998	13	10.374	11.19	1.47
33	11/29/1982	28	10.072	11.54	1.42
34	4/1/1982	13	9.952	11.89	1.38
35	11/5/1987	10	9.751	12.24	1.34
36	2/15/1986	14	9.731	12.59	1.31
37	1/16/1978	21	9.321	12.94	1.27
38	2/28/1978	46	9.131	13.29	1.24
39	2/17/1998	16	8.825	13.64	1.21
40	2/8/1976	20	8.62	13.99	1.17
41	2/12/2003	15	8.574	14.34	1.15
42	3/8/1974	16	8.498	14.69	1.12
43	1/9/1980	81	8.053	15.03	1.09
44	2/21/2000	13	7.806	15.38	1.07
45	1/6/1993	55	7.529	15.73	1.04
46	4/20/1988	49	7.466	16.08	1.02
47	1/12/1993	157	7.434	16.43	1
48	11/16/1972	25	7.344	16.78	0.98
49	12/9/1965	30	7.258	17.13	0.96
50	12/4/1974	7	7.196	17.48	0.94
51	2/22/2004	25	7.087	17.83	0.92
52	1/9/1998	37	6.951	18.18	0.9
53	10/28/1974	34	6.741	18.53	0.89
54	3/11/1995	26	6.555	18.88	0.87
55	2/6/1998	17	6.482	19.23	0.85
56	3/19/1991	61	6.112	19.58	0.84
57	11/21/1996	13	6.069	19.93	0.82
58	2/15/1992	9	6.042	20.28	0.81
59	3/4/1978	27	5.98	20.63	0.8
60	10/20/2004	11	5.858	20.98	0.78
61	12/18/1967	25	5.841	21.33	0.77
62	1/11/2001	38	5.733	21.68	0.76
63	3/17/1983	32	5.713	22.03	0.75
64	12/16/1987	19	5.624	22.38	0.73
65	3/17/1963	4	5.545	22.73	0.72
66	11/11/1972	17	5.138	23.08	0.71
67	2/27/1983	16	5.016	23.43	0.7
68	2/28/1981	51	4.914	23.78	0.69
69	11/25/1985	12	4.767	24.13	0.68
70	3/13/1996	6	4.752	24.48	0.67
71	2/6/1976	29	4.626	24.83	0.66
72	2/28/1991	23	4.433	25.17	0.65
73	2/6/1969	12	4.379	25.52	0.64
74	3/4/2005	9	4.361	25.87	0.64
75	12/19/1970	16	4.187	26.22	0.63
76	4/8/1965	34	4.181	26.57	0.62
77	3/15/2003	37	4.09	26.92	0.61
78	1/5/1992	18	4.058	27.27	0.6
79	1/20/1982	29	3.945	27.62	0.59
80	10/30/2000	6	3.929	27.97	0.59
81	1/25/1997	16	3.926	28.32	0.58
82	1/29/1983	10	3.855	28.67	0.57
83	3/4/1970	20	3.849	29.02	0.57
84	3/25/1991	55	3.758	29.37	0.56
85	3/11/1978	19	3.714	29.72	0.55
86	12/21/1970	17	3.606	30.07	0.55
87	3/7/1994	6	3.605	30.42	0.54
88	1/4/1974	12	3.574	30.77	0.53
89	1/24/1967	12	3.571	31.12	0.53
90	11/16/1965	9	3.538	31.47	0.52
91	11/17/1986	7	3.493	31.82	0.52
92	2/23/1998	34	3.472	32.17	0.51
93	2/22/1969	13	3.306	32.52	0.51
94	12/7/1992	13	3.275	32.87	0.5
95	4/26/1994	10	3.215	33.22	0.49
96	9/10/1976	15	3.175	33.57	0.49
97	3/5/2000	10	2.989	33.92	0.48
98	2/25/1969	16	2.973	34.27	0.48

10-year Q: 18.240 cfs (Adjust Column "I" to interpolate from Table)
5-year Q: 16.838 cfs
2-year Q: 11.914 cfs

Lower Flow Threshold: 10%

0.1xQ2 (Pre): 1.191 cfs

JUNIPERS POC-2

Post-project (Mitigated) Flow Frequency - Long-term Simulation

Statistics - Node POC-2 Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1	1/28/1980	47	26.684	0.39	47
2	2/16/1980	123	22.175	0.78	23.5
3	1/5/1979	36	19.052	1.18	15.67
4	1/9/1978	40	18.444	1.57	11.75
5	1/4/1995	21	18.027	1.96	9.4
6	2/8/1998	22	16.578	2.35	7.83
7	2/28/1970	42	16.135	2.75	6.71
8	11/30/2007	27	15.588	3.14	5.88
9	12/5/1966	56	15.315	3.53	5.22
10	11/22/1965	30	14.882	3.92	4.7
11	12/28/1978	52	14.871	4.31	4.27
12	3/17/1982	31	13.763	4.71	3.92
13	11/12/1976	16	13.475	5.1	3.62
14	10/27/2004	24	13.355	5.49	3.36
15	3/5/1995	29	13.337	5.88	3.13
16	2/21/2005	60	13.147	6.27	2.94
17	1/14/1978	74	12.526	6.67	2.76
18	2/27/1983	113	12.38	7.06	2.61
19	12/28/2004	33	11.777	7.45	2.47
20	12/17/1978	51	11.454	7.84	2.35
21	2/15/1986	21	11.403	8.24	2.24
22	3/1/1978	38	11.11	8.63	2.14
23	1/25/1969	40	11.086	9.02	2.04
24	4/8/1975	32	11.071	9.41	1.96
25	2/14/1998	20	10.943	9.8	1.88
26	2/8/1993	19	10.644	10.2	1.81
27	1/6/1974	43	10.319	10.59	1.74
28	1/9/2005	51	10.293	10.98	1.68
29	2/3/1998	28	10.282	11.37	1.62
30	12/9/1965	32	10.034	11.76	1.57
31	1/11/2001	37	8.732	12.16	1.52
32	11/29/1982	36	8.711	12.55	1.47
33	1/25/1995	17	8.672	12.94	1.42
34	2/8/1976	24	8.645	13.33	1.38
35	3/24/1983	20	8.566	13.73	1.34
36	11/21/1996	23	8.485	14.12	1.31
37	2/22/2004	29	8.031	14.51	1.27
38	2/8/1983	18	7.223	14.9	1.24
39	12/4/1974	17	7.106	15.29	1.21
40	1/9/1980	70	7.085	15.69	1.17
41	4/18/1995	18	7.043	16.08	1.15
42	1/6/1993	57	6.582	16.47	1.12
43	1/13/1993	153	6.218	16.86	1.09
44	12/16/1987	21	6.201	17.25	1.07
45	11/25/1985	21	5.829	17.65	1.04
46	2/27/2001	19	5.641	18.04	1.02
47	3/11/1995	29	5.589	18.43	1
48	2/27/1991	50	5.557	18.82	0.98
49	4/1/1982	17	4.897	19.22	0.96
50	10/20/2004	19	4.853	19.61	0.94
51	10/29/1974	18	4.666	20	0.92
52	1/20/1982	36	4.594	20.39	0.9
53	3/8/1974	19	4.562	20.78	0.89
54	2/21/2000	19	4.556	21.18	0.87
55	2/17/1998	19	3.682	21.57	0.85
56	3/5/2005	17	3.639	21.96	0.84
57	4/20/1988	51	3.509	22.35	0.82
58	3/19/1991	66	3.475	22.75	0.81
59	3/4/1978	30	3.467	23.14	0.8
60	11/5/1987	14	3.058	23.53	0.78
61	2/15/1992	14	2.989	23.92	0.77
62	2/28/1981	35	2.918	24.31	0.76
63	3/2/1992	22	2.788	24.71	0.75
64	2/12/2003	16	2.771	25.1	0.73
65	11/17/1986	17	2.743	25.49	0.72
66	1/5/1992	21	2.706	25.88	0.71
67	3/7/1994	16	2.695	26.27	0.7
68	11/16/1972	15	2.449	26.67	0.69
69	5/8/1977	18	2.41	27.06	0.68
70	3/13/1996	14	2.4	27.45	0.67
71	2/9/1963	43	2.396	27.84	0.66
72	12/18/1967	24	2.376	28.24	0.65
73	1/26/1997	21	2.334	28.63	0.64
74	11/15/1965	41	2.328	29.02	0.64
75	12/7/1992	18	2.308	29.41	0.63
76	3/17/1963	13	2.286	29.8	0.62
77	2/6/1976	14	2.216	30.2	0.61
78	3/27/1979	31	2.188	30.59	0.6
79	2/6/1998	17	2.166	30.98	0.59
80	3/14/1982	19	2.135	31.37	0.59
81	3/25/1991	58	2.114	31.76	0.58
82	2/18/1993	41	1.887	32.16	0.57
83	1/14/1969	17	1.822	32.55	0.57
84	2/6/1969	20	1.681	32.94	0.56
85	1/31/1979	21	1.676	33.33	0.55
86	1/9/1998	36	1.603	33.73	0.55
87	3/17/1983	35	1.435	34.12	0.54
88	2/14/1980	19	1.424	34.51	0.53
89	12/4/1972	14	1.408	34.9	0.53
90	3/6/1975	16	1.391	35.29	0.52
91	2/12/1978	39	1.335	35.69	0.52
92	1/22/1967	14	1.237	36.08	0.51
93	12/23/1982	14	1.12	36.47	0.51
94	2/14/1995	15	1.104	36.86	0.5
95	10/30/2000	12	1.101	37.25	0.49
96	2/17/1994	11	1.084	37.65	0.49
97	2/19/2007	17	1.077	38.04	0.48
98	2/12/1992	22	1.076	38.43	0.48

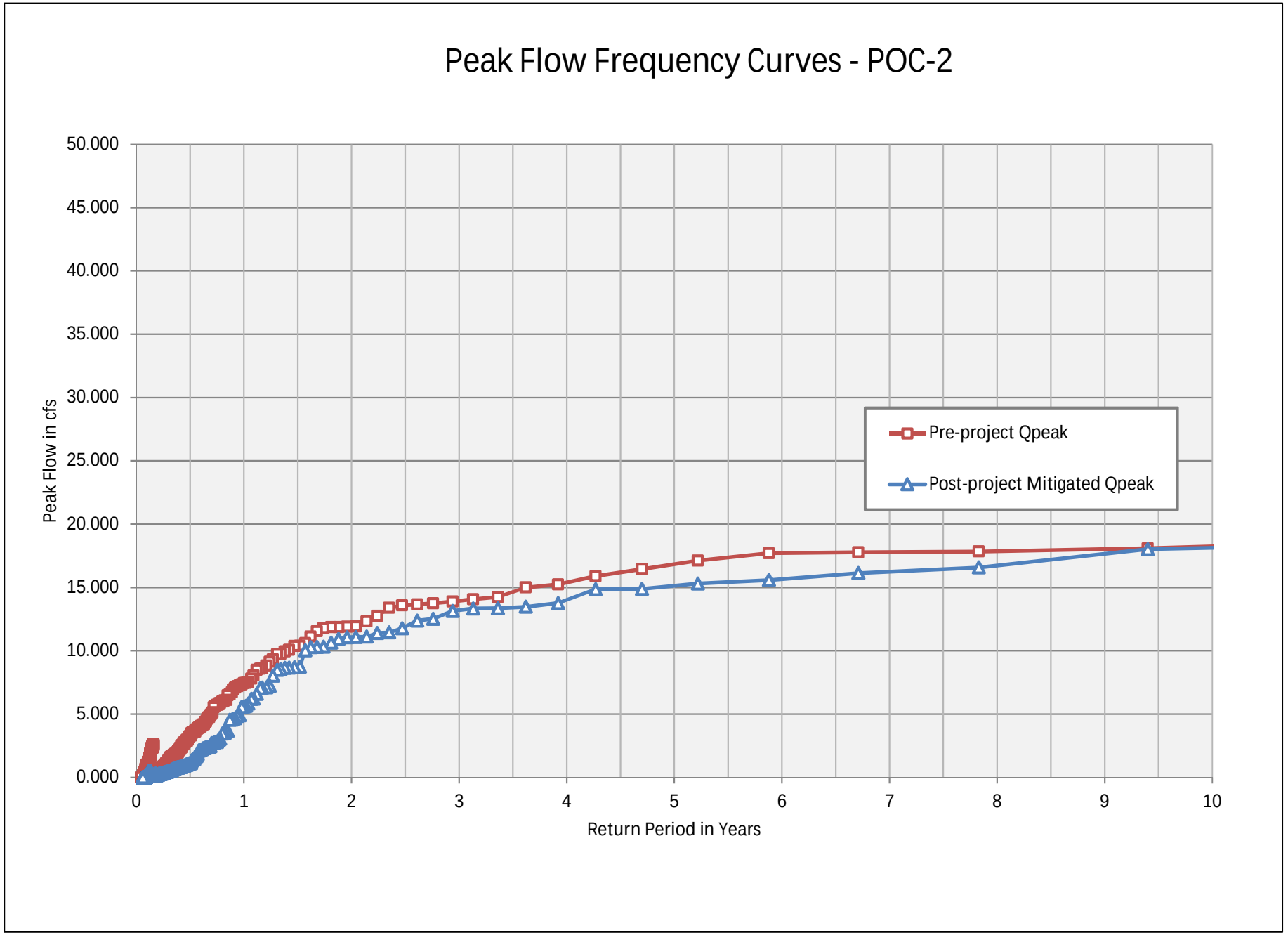
10-year Q:	18.133	cfs	(Adjust Column "I" to interpolate from Table)
5-year Q:	15.132	cfs	
2-year Q:	11.079	cfs	
Lower Flow Threshold:	10%		
0.1xQ2 (Post Mit):	1.108	cfs	

JUNIPERS POC-2

Peak Flow Frequency Summary

Return Period	Pre-project Qpeak (cfs)	Post-project - Mitigated Q (cfs)	Post-project - Mitigated Q (cfs)
LF = 0.1xQ2	1.19	1.11	0.084
2-year	11.91	11.08	0.836
5-year	16.84	15.13	1.706
10-year	18.24	18.13	0.106

JUNIPERS POC-2



JUNIPERS POC-2

Junipers	POC-2

Low-flow Threshold: 10%
0.1xQ2 (Pre): 1.191 cfs
Q10 (Pre): 18.240 cfs
Ordinate #: 100
Incremental Q (Pre): 0.17048 cfs
Total Hourly Data: 399983 hours

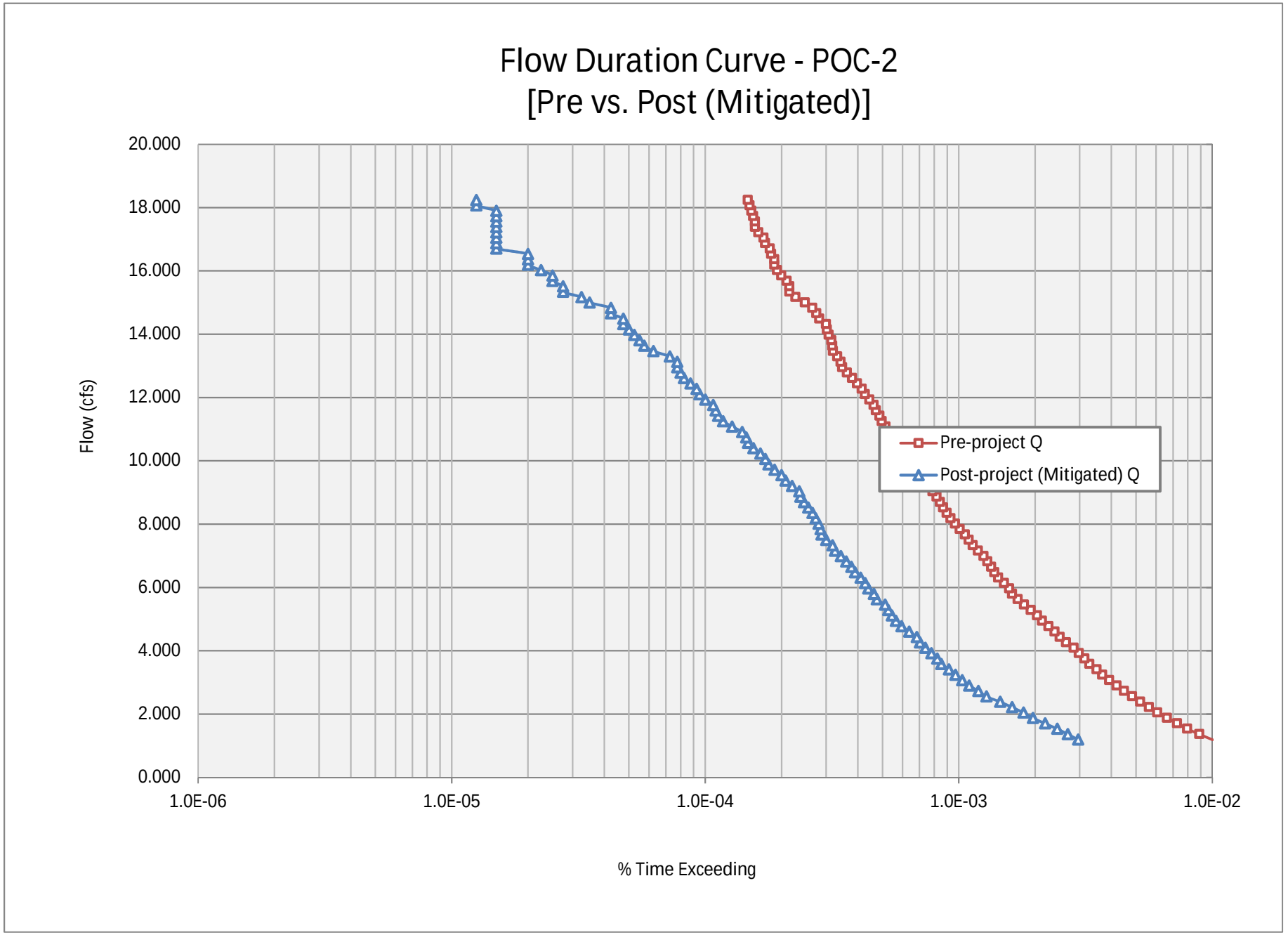
The proposed BMP: PASSED

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
0	1.191	4005	1.00E-02	1182	2.96E-03	30%	Pass
1	1.362	3562	8.91E-03	1077	2.69E-03	30%	Pass
2	1.532	3193	7.98E-03	978	2.45E-03	31%	Pass
3	1.703	2907	7.27E-03	877	2.19E-03	30%	Pass
4	1.873	2654	6.64E-03	785	1.96E-03	30%	Pass
5	2.044	2430	6.08E-03	721	1.80E-03	30%	Pass
6	2.214	2253	5.63E-03	649	1.62E-03	29%	Pass
7	2.385	2084	5.21E-03	583	1.46E-03	28%	Pass
8	2.555	1935	4.84E-03	514	1.29E-03	27%	Pass
9	2.726	1799	4.50E-03	478	1.20E-03	27%	Pass
10	2.896	1679	4.20E-03	440	1.10E-03	26%	Pass
11	3.067	1570	3.93E-03	413	1.03E-03	26%	Pass
12	3.237	1476	3.69E-03	388	9.70E-04	26%	Pass
13	3.408	1402	3.51E-03	366	9.15E-04	26%	Pass
14	3.578	1312	3.28E-03	341	8.53E-04	26%	Pass
15	3.749	1255	3.14E-03	329	8.23E-04	26%	Pass
16	3.919	1193	2.98E-03	312	7.80E-04	26%	Pass
17	4.090	1137	2.84E-03	295	7.38E-04	26%	Pass
18	4.260	1062	2.66E-03	281	7.03E-04	26%	Pass
19	4.431	1002	2.51E-03	273	6.83E-04	27%	Pass
20	4.601	956	2.39E-03	255	6.38E-04	27%	Pass
21	4.772	906	2.27E-03	238	5.95E-04	26%	Pass
22	4.942	853	2.13E-03	226	5.65E-04	26%	Pass
23	5.113	816	2.04E-03	218	5.45E-04	27%	Pass
24	5.283	771	1.93E-03	211	5.28E-04	27%	Pass
25	5.453	725	1.81E-03	205	5.13E-04	28%	Pass
26	5.624	685	1.71E-03	190	4.75E-04	28%	Pass
27	5.794	651	1.63E-03	185	4.63E-04	28%	Pass
28	5.965	633	1.58E-03	176	4.40E-04	28%	Pass
29	6.135	604	1.51E-03	171	4.28E-04	28%	Pass
30	6.306	573	1.43E-03	164	4.10E-04	29%	Pass
31	6.476	554	1.39E-03	156	3.90E-04	28%	Pass
32	6.647	538	1.35E-03	151	3.78E-04	28%	Pass
33	6.817	520	1.30E-03	144	3.60E-04	28%	Pass
34	6.988	502	1.26E-03	137	3.43E-04	27%	Pass
35	7.158	477	1.19E-03	130	3.25E-04	27%	Pass
36	7.329	455	1.14E-03	127	3.18E-04	28%	Pass
37	7.499	439	1.10E-03	120	3.00E-04	27%	Pass
38	7.670	424	1.06E-03	115	2.88E-04	27%	Pass
39	7.840	404	1.01E-03	114	2.85E-04	28%	Pass
40	8.011	387	9.68E-04	112	2.80E-04	29%	Pass
41	8.181	372	9.30E-04	109	2.73E-04	29%	Pass
42	8.352	359	8.98E-04	106	2.65E-04	30%	Pass
43	8.522	348	8.70E-04	102	2.55E-04	29%	Pass
44	8.693	338	8.45E-04	98	2.45E-04	29%	Pass
45	8.863	328	8.20E-04	95	2.38E-04	29%	Pass
46	9.034	316	7.90E-04	94	2.35E-04	30%	Pass
47	9.204	304	7.60E-04	88	2.20E-04	29%	Pass
48	9.375	284	7.10E-04	83	2.08E-04	29%	Pass
49	9.545	278	6.95E-04	80	2.00E-04	29%	Pass
50	9.716	266	6.65E-04	75	1.88E-04	28%	Pass
51	9.886	259	6.48E-04	71	1.78E-04	27%	Pass
52	10.057	250	6.25E-04	69	1.73E-04	28%	Pass

JUNIPERS POC-2

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
53	10.227	241	6.03E-04	66	1.65E-04	27%	Pass
54	10.398	234	5.85E-04	62	1.55E-04	26%	Pass
55	10.568	226	5.65E-04	59	1.48E-04	26%	Pass
56	10.738	221	5.53E-04	58	1.45E-04	26%	Pass
57	10.909	216	5.40E-04	56	1.40E-04	26%	Pass
58	11.079	206	5.15E-04	51	1.28E-04	25%	Pass
59	11.250	199	4.98E-04	47	1.18E-04	24%	Pass
60	11.420	195	4.88E-04	45	1.13E-04	23%	Pass
61	11.591	189	4.73E-04	44	1.10E-04	23%	Pass
62	11.761	185	4.63E-04	43	1.08E-04	23%	Pass
63	11.932	178	4.45E-04	40	1.00E-04	22%	Pass
64	12.102	171	4.28E-04	38	9.50E-05	22%	Pass
65	12.273	166	4.15E-04	37	9.25E-05	22%	Pass
66	12.443	159	3.98E-04	35	8.75E-05	22%	Pass
67	12.614	152	3.80E-04	33	8.25E-05	22%	Pass
68	12.784	145	3.63E-04	32	8.00E-05	22%	Pass
69	12.955	139	3.48E-04	31	7.75E-05	22%	Pass
70	13.125	137	3.43E-04	31	7.75E-05	23%	Pass
71	13.296	133	3.33E-04	29	7.25E-05	22%	Pass
72	13.466	128	3.20E-04	25	6.25E-05	20%	Pass
73	13.637	127	3.18E-04	23	5.75E-05	18%	Pass
74	13.807	126	3.15E-04	22	5.50E-05	17%	Pass
75	13.978	123	3.08E-04	21	5.25E-05	17%	Pass
76	14.148	121	3.03E-04	20	5.00E-05	17%	Pass
77	14.319	120	3.00E-04	19	4.75E-05	16%	Pass
78	14.489	113	2.83E-04	19	4.75E-05	17%	Pass
79	14.660	110	2.75E-04	17	4.25E-05	15%	Pass
80	14.830	106	2.65E-04	17	4.25E-05	16%	Pass
81	15.001	99	2.48E-04	14	3.50E-05	14%	Pass
82	15.171	91	2.28E-04	13	3.25E-05	14%	Pass
83	15.342	86	2.15E-04	11	2.75E-05	13%	Pass
84	15.512	86	2.15E-04	11	2.75E-05	13%	Pass
85	15.683	84	2.10E-04	10	2.50E-05	12%	Pass
86	15.853	80	2.00E-04	10	2.50E-05	13%	Pass
87	16.023	77	1.93E-04	9	2.25E-05	12%	Pass
88	16.194	75	1.88E-04	8	2.00E-05	11%	Pass
89	16.364	75	1.88E-04	8	2.00E-05	11%	Pass
90	16.535	73	1.83E-04	8	2.00E-05	11%	Pass
91	16.705	72	1.80E-04	6	1.50E-05	8%	Pass
92	16.876	69	1.73E-04	6	1.50E-05	9%	Pass
93	17.046	68	1.70E-04	6	1.50E-05	9%	Pass
94	17.217	65	1.63E-04	6	1.50E-05	9%	Pass
95	17.387	63	1.58E-04	6	1.50E-05	10%	Pass
96	17.558	63	1.58E-04	6	1.50E-05	10%	Pass
97	17.728	62	1.55E-04	6	1.50E-05	10%	Pass
98	17.899	61	1.53E-04	6	1.50E-05	10%	Pass
99	18.069	60	1.50E-04	5	1.25E-05	8%	Pass
100	18.240	59	1.48E-04	5	1.25E-05	8%	Pass

JUNIPERS POC-2



ATTACHMENT 2 - Elevation vs. Area Curves vs. Discharge Curves to be used in SWMM

Elevation vs. Area

For the portion of the flow diverted in the LID Control to the receiving detention basin, a pond is used to route the hydrographs. The elevation vs area curve in the model is calculated in Excel and imported into the model at a 0.1 ft interval range.

Elevation vs Discharge

The total discharge peak flow is imported from an Excel spreadsheet that calculated the elevation vs discharge of the multiple outlet system.

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

In order to prevent blockage of the orifices, a debris screen will be fitted to the base invert of the lower orifices located within the detention basin. Regular maintenance of the riser and orifices will be performed to ensure potential blockages are minimized. A detail of the orifice and riser structure is provided in Attachment 5 of this attachment. The stage-storage and stage-discharge calculations have been provided on the following pages.

THE JUNIPERS - BASIN BF-1-1

Discharge vs Elevation Table

Bottom orifice diameter:	1 "	Top orifice diameter:	3 "
Number:	1	Number:	1
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	2.50 ft
Middle orifice diameter:	2 "	Emergency weir:	
number of orif:	1	Invert:	3.50 ft
Cg-middle:	0.61	Weir Length (ft)	10.00 ft
invert elev:	1.50 ft	Riser Box LxW	2x3

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)	Qtot w UD (cfs)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.401
0.55	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.002	0.403
0.60	1.20	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.006	0.407
0.65	1.80	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.009	0.410
0.70	2.40	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.011	0.411
0.75	3.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.012	0.413
0.80	3.60	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.014	0.414
0.85	4.20	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.015	0.416
0.90	4.80	0.00	0.00	0.00	0.02	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.016	0.417
0.95	5.40	0.00	0.00	0.00	0.02	0.16	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.017	0.418
1.00	6.00	0.00	0.00	0.00	0.02	0.34	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.018	0.419
1.05	6.60	0.00	0.00	0.00	0.02	0.65	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.019	0.420
1.10	7.20	0.00	0.00	0.00	0.02	1.15	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.020	0.421
1.15	7.80	0.00	0.00	0.00	0.02	1.92	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.021	0.422
1.20	8.40	0.00	0.00	0.00	0.02	3.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.022	0.422
1.25	9.00	0.00	0.00	0.00	0.02	4.60	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.022	0.423
1.30	9.60	0.00	0.00	0.00	0.02	6.74	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.023	0.424
1.35	10.20	0.00	0.00	0.00	0.02	9.61	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.024	0.425
1.40	10.80	0.00	0.00	0.00	0.02	13.38	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.025	0.425
1.45	11.40	0.00	0.00	0.00	0.03	18.22	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.025	0.426
1.50	12.00	0.00	0.00	0.00	0.03	24.36	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.026	0.427
1.55	12.60	0.30	0.00	0.00	0.03	32.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.030	0.431
1.60	13.20	0.60	0.00	0.00	0.03	41.50	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.040	0.440
1.65	13.80	0.90	0.00	0.00	0.03	53.07	0.03	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.053	0.454
1.70	14.40	1.20	0.00	0.00	0.03	67.08	0.03	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.065	0.466
1.75	15.00	1.50	0.00	0.00	0.03	83.87	0.03	0.04	0.05	0.04	0.00	0.00	0.00	0.00	0.073	0.474
1.80	15.60	1.80	0.00	0.00	0.03	103.84	0.03	0.05	0.06	0.05	0.00	0.00	0.00	0.00	0.080	0.480
1.85	16.20	2.10	0.00	0.00	0.03	127.43	0.03	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.086	0.486
1.90	16.80	2.40	0.00	0.00	0.03	155.09	0.03	0.06	0.08	0.06	0.00	0.00	0.00	0.00	0.091	0.492
1.95	17.40	2.70	0.00	0.00	0.03	187.34	0.03	0.06	0.08	0.06	0.00	0.00	0.00	0.00	0.096	0.497
2.00	18.00	3.00	0.00	0.00	0.03	224.72	0.03	0.07	0.08	0.07	0.00	0.00	0.00	0.00	0.101	0.502
2.05	18.60	3.30	0.00	0.00	0.03	267.80	0.03	0.07	0.08	0.07	0.00	0.00	0.00	0.00	0.106	0.507
2.10	19.20	3.60	0.00	0.00	0.03	317.23	0.03	0.08	0.09	0.08	0.00	0.00	0.00	0.00	0.110	0.511
2.15	19.80	3.90	0.00	0.00	0.03	373.67	0.03	0.08	0.12	0.08	0.00	0.00	0.00	0.00	0.114	0.515
2.20	20.40	4.20	0.00	0.00	0.03	437.84	0.03	0.08	0.17	0.08	0.00	0.00	0.00	0.00	0.118	0.519
2.25	21.00	4.50	0.00	0.00	0.03	510.51	0.03	0.09	0.26	0.09	0.00	0.00	0.00	0.00	0.122	0.523
2.30	21.60	4.80	0.00	0.00	0.04	592.48	0.04	0.09	0.41	0.09	0.00	0.00	0.00	0.00	0.126	0.527
2.35	22.20	5.10	0.00	0.00	0.04	684.63	0.04	0.09	0.62	0.09	0.00	0.00	0.00	0.00	0.129	0.530
2.40	22.80	5.40	0.00	0.00	0.04	787.87	0.04	0.10	0.93	0.10	0.00	0.00	0.00	0.00	0.133	0.534
2.45	23.40	5.70	0.00	0.00	0.04	903.17	0.04	0.10	1.36	0.10	0.00	0.00	0.00	0.00	0.136	0.537
2.50	24.00	6.00	0.00	0.00	0.04	1031.55	0.04	0.10	1.94	0.10	0.00	0.00	0.00	0.00	0.140	0.540
2.55	24.60	6.30	0.20	0.00	0.04	1174.09	0.04	0.11	2.71	0.11	0.00	0.00	0.00	0.00	0.147	0.548
2.60	25.20	6.60	0.40	0.00	0.04	1331.93	0.04	0.11	3.70	0.11	0.00	0.02	0.02	0.00	0.162	0.563
2.65	25.80	6.90	0.60	0.00	0.04	1506.26	0.04	0.11	4.96	0.11	0.04	0.03	0.03	0.00	0.183	0.583
2.70	26.40	7.20	0.80	0.00	0.04	1698.35	0.04	0.11	6.53	0.11	0.07	0.06	0.06	0.00	0.208	0.609
2.75	27.00	7.50	1.00	0.00	0.04	1909.52	0.04	0.12	8.47	0.12	0.08	0.08	0.08	0.00	0.236	0.637
2.80	27.60	7.80	1.20	0.00	0.04	2141.14	0.04	0.12	10.84	0.12	0.10	0.11	0.10	0.00	0.258	0.659
2.85	28.20	8.10	1.40	0.00	0.04	2394.66	0.04	0.12	13.70	0.12	0.11	0.13	0.11	0.00	0.275	0.676
2.90	28.80	8.40	1.60	0.00	0.04	2671.61	0.04	0.12	17.13	0.12	0.13	0.16	0.13	0.00	0.290	0.690
2.95	29.40	8.70	1.80	0.00	0.04	2973.56	0.04	0.12	21.20	0.12	0.14	0.18	0.14	0.00	0.303	0.704
3.00	30.00	9.00	2.00	0.00	0.04	3302.17	0.04	0.13	26.00	0.13	0.15	0.20	0.15	0.00	0.316	0.717
3.05	30.60	9.30	2.20	0.00	0.04	3659.16	0.04	0.13	31.61	0.13	0.16	0.21	0.16	0.00	0.328	0.729
3.10	31.20	9.60	2.40	0.00	0.04	4046.33	0.04	0.13	38.14	0.13	0.17	0.22	0.17	0.00	0.340	0.741
3.15	31.80	9.90	2.60	0.00	0.04	4465.55	0.04	0.13	45.70	0.13	0.17	0.22	0.17	0.00	0.351	0.752
3.20	32.40	10.20	2.80	0.00	0.04	4918.76	0.04	0.14	54.39	0.14	0.18	0.22	0.18	0.00	0.362	0.762
3.25	33.00	10.50	3.00	0.00	0.04	5408.00	0.04	0.14	64.34	0.14	0.19	0.22	0.19	0.00	0.372	0.773
3.30	33.60	10.80	3.20	0.00	0.04	5935.36	0.04	0.14	75.67	0.14	0.20	0.22	0.20	0.00	0.382	0.782
3.35	34.20	11.10	3.40	0.00	0.04	6503.02	0.04	0.14	88.53	0.14	0.20	0.24	0.20	0.00	0.391	0.792
3.40	34.80	11.40	3.60	0.00	0.05	7113.25	0.05	0.14	103.06	0.14	0.21	0.26	0.21	0.00	0.401	0.801
3.45	35.40	11.70	3.80	0.00	0.05	7768.41	0.05	0.15	119.42	0.15	0.22	0.30	0.22	0.00	0.410	0.810
3.50	36.00	12.00	4.00	0.00	0.05	8470.91	0.05	0.15	137.77	0.15	0.22	0.37	0.22	0.00	0.419	0.819
3.55	36.60	12.30	4.20	0.06	0.05	9223.28	0.05	0.15	158.29	0.15	0.23	0.47	0.23	0.37	0.799	1.200
3.60	37.20	12.60	4.40	0.12	0.05	10028.13	0.05	0.15	181.17	0.15	0.24	0.62	0.24	1.05	1.489	1.889
3.65	37.80	12.90	4.60	0.18	0.05	10888.14	0.05	0.15	206.59	0.15	0.24	0.83	0.24	1.93	2.378	2.779
3.70	38.40	13.20	4.80	0.24	0.05	11806.11	0.05	0.16	234.76	0.16	0.25	1.12	0.25	2.98	3.430	3.831
3.75	39.00	13.50	5.00	0.30	0.05	12784.92	0.05	0.16	265.90	0.16	0.25	1.49	0.25	4.16	4.622	5.023
3.80	39.60	13.80	5.20	0.36	0.05	13827.53	0.05	0.16	300.23	0.16	0.26	1.96	0.26	5.47	5.939	6.340
3.85	40.20	14.10	5.40	0.42	0.05	14937.02	0.05	0.16	337.99	0.16	0.27	2.57	0.27	6.90	7.370	7.771
3.90	40.80	14.40	5.60	0.48	0.05	16116.54	0.05	0.16	379.44	0.16	0.27	3.32	0.27	8.42	8.907	9.308
3.95	41.40	14.70	5.80	0.54	0.05	17369.36	0.05	0.16	424.82	0.16	0.28	4.24	0.28	10.05	10.542	10.943
4.00	42.00	15.00	6.00	0.60	0.05	18698.83	0.05	0.17	474.42	0.17	0.28	5.36	0.28	11.77	12.271	12.672
4.05	42.60	15.30	6.20	0.66	0.05	20108.43	0.05	0.17	528.52	0.17	0.29	6.70	0.29	13.58	14.087	14.488
4.10	43.20	15.60	6.40	0.72	0.05	21601.72	0.05	0.17	587.42	0.17	0.29	8.31	0.29	15.48	15.988	16.389
4.15	43.80	15.90	6.60	0.78	0.05	23182.36	0.05	0.17	651.41	0.17	0.30	10.20	0.30	17.45	17.969	18.370
4.20	44.40	16.20	6.80	0.84	0.05	24854.13	0.05	0.17	720.84	0.17	0.30	12.42	0.30	19.50	20.028	20.429
4.25	45.00	16.50	7.00	0.90	0.05	26620.91	0.05	0.17	796.03	0.17	0.31	15.00	0.31	21.63	22.161	22.562
4.30	45.60	16.80	7.20	0.96	0.05	28486.69	0.05	0.18	877.34	0.18	0.31	17.99	0.31	23.83	24.366	24.767
4.35	46.20	17.10	7.40	1.02	0.05	30455.58	0.05	0.18	965.12	0.18	0.32	21.43	0.32	26.10	26.641	27.042
4.40	46.80	17.40	7.60	1.08	0.05	32531.79	0.05	0.18	1059.76	0.18	0.32	25.37	0.32	28.43	28.984	29.385
4.45	47.40	17.70	7.80	1.14	0.05	34719.63	0.05	0.18	1161.65	0.18	0.32	29.87	0.32	30.83	31.392	31.793

4.50	48.00	18.00	8.00	1.20	0.05	37023.56	0.05	0.18	1271.19	0.18	0.33	34.96	0.33	33.30	33.865	34.265
4.55	48.60	18.30	8.20	1.26	0.05	39448.12	0.05	0.18	1388.80	0.18	0.33	40.72	0.33	35.83	36.399	36.800
4.60	49.20	18.60	8.40	1.32	0.05	41997.99	0.05	0.19	1514.93	0.19	0.34	47.20	0.34	38.42	38.995	39.396
4.65	49.80	18.90	8.60	1.38	0.05	44677.97	0.05	0.19	1650.01	0.19	0.34	54.47	0.34	41.07	41.650	42.051
4.70	50.40	19.20	8.80	1.44	0.05	47492.96	0.05	0.19	1794.53	0.19	0.35	62.59	0.35	43.77	44.363	44.764
4.75	51.00	19.50	9.00	1.50	0.05	50448.01	0.05	0.19	1948.96	0.19	0.35	71.64	0.35	46.54	47.133	47.534
4.80	51.60	19.80	9.20	1.56	0.06	53548.26	0.06	0.19	2113.80	0.19	0.35	81.69	0.35	49.36	49.959	50.360
4.85	52.20	20.10	9.40	1.62	0.06	56799.02	0.06	0.19	2289.57	0.19	0.36	92.82	0.36	52.23	52.840	53.241
4.90	52.80	20.40	9.60	1.68	0.06	60205.68	0.06	0.19	2476.80	0.19	0.36	105.11	0.36	55.16	55.774	56.175
4.95	53.40	20.70	9.80	1.74	0.06	63773.78	0.06	0.20	2676.05	0.20	0.37	118.66	0.37	58.14	58.761	59.162
5.00	54.00	21.00	10.00	1.80	0.06	67509.00	0.06	0.20	2887.86	0.20	0.37	133.55	0.37	61.18	61.800	62.201
5.05	54.60	21.30	10.20	1.86	0.06	71417.13	0.06	0.20	3112.84	0.20	0.37	149.88	0.37	64.26	64.890	65.291
5.10	55.20	21.60	10.40	1.92	0.06	75504.11	0.06	0.20	3351.59	0.20	0.38	167.75	0.38	67.39	68.030	68.431
5.15	55.80	21.90	10.60	1.98	0.06	79776.00	0.06	0.20	3604.71	0.20	0.38	187.26	0.38	70.58	71.219	71.620
5.20	56.40	22.20	10.80	2.04	0.06	84239.00	0.06	0.20	3872.86	0.20	0.39	208.52	0.39	73.81	74.457	74.857
5.25	57.00	22.50	11.00	2.10	0.06	88899.46	0.06	0.20	4156.69	0.20	0.39	231.66	0.39	77.09	77.742	78.143
5.30	57.60	22.80	11.20	2.16	0.06	93763.84	0.06	0.21	4456.87	0.21	0.39	256.77	0.39	80.42	81.075	81.476
5.35	58.20	23.10	11.40	2.22	0.06	98838.78	0.06	0.21	4774.09	0.21	0.40	284.00	0.40	83.79	84.454	84.855
5.40	58.80	23.40	11.60	2.28	0.06	104131.02	0.06	0.21	5109.08	0.21	0.40	313.47	0.40	87.21	87.879	88.280
5.45	59.40	23.70	11.80	2.34	0.06	109647.47	0.06	0.21	5462.57	0.21	0.40	345.31	0.40	90.68	91.350	91.751
5.50	60.00	24.00	12.00	2.40	0.06	115395.17	0.06	0.21	5835.30	0.21	0.41	379.66	0.41	94.19	94.865	95.266
5.55	60.60	24.30	12.20	2.46	0.06	121381.33	0.06	0.21	6228.06	0.21	0.41	416.66	0.41	97.74	98.424	98.825
5.60	61.20	24.60	12.40	2.52	0.06	127613.27	0.06	0.21	6641.63	0.21	0.41	456.47	0.41	101.34	102.027	102.428
5.65	61.80	24.90	12.60	2.58	0.06	134098.49	0.06	0.22	7076.84	0.22	0.42	499.23	0.42	104.98	105.673	106.073
5.70	62.40	25.20	12.80	2.64	0.06	140844.63	0.06	0.22	7534.51	0.22	0.42	545.12	0.42	108.66	109.361	109.762
5.75	63.00	25.50	13.00	2.70	0.06	147859.48	0.06	0.22	8015.51	0.22	0.42	594.29	0.42	112.39	113.091	113.492
5.80	63.60	25.80	13.20	2.76	0.06	155150.98	0.06	0.22	8520.71	0.22	0.43	646.91	0.43	116.15	116.863	117.264
5.85	64.20	26.10	13.40	2.82	0.06	162727.25	0.06	0.22	9051.01	0.22	0.43	703.17	0.43	119.96	120.676	121.077
5.90	64.80	26.40	13.60	2.88	0.06	170596.52	0.06	0.22	9607.34	0.22	0.43	763.25	0.43	123.81	124.530	124.931
5.95	65.40	26.70	13.80	2.94	0.06	178767.23	0.06	0.22	10190.63	0.22	0.44	827.33	0.44	127.70	128.424	128.825
6.00	66.00	27.00	14.00	3.00	0.06	187247.94	0.06	0.22	10801.86	0.22	0.44	895.62	0.44	131.63	132.358	132.759

THE JUNIPERS - BASIN BF-2-3

Discharge vs Elevation Table

Bottom orifice diameter:	2 "	Top orifice diameter:	4 "
Number:	6	Number:	6
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	1.70 ft
Middle orifice diameter:	3 "	Emergency weir:	
number of orif:	6	Invert:	3.00 ft
Cg-middle:	0.61	Weir Length (	4.00 ft
invert elev:	1.10 ft	Riser Box LxW	1x1

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.55	0.30	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.020
0.60	0.60	0.00	0.00	0.00	0.08	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.073
0.65	0.90	0.00	0.00	0.00	0.17	0.15	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.149
0.70	1.20	0.00	0.00	0.00	0.22	0.23	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.219
0.75	1.50	0.00	0.00	0.00	0.26	0.32	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.262
0.80	1.80	0.00	0.00	0.00	0.30	0.39	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.298
0.85	2.10	0.00	0.00	0.00	0.33	0.44	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.331
0.90	2.40	0.00	0.00	0.00	0.36	0.47	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.361
0.95	2.70	0.00	0.00	0.00	0.39	0.48	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.388
1.00	3.00	0.00	0.00	0.00	0.41	0.48	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.414
1.05	3.30	0.00	0.00	0.00	0.44	0.50	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.438
1.10	3.60	0.00	0.00	0.00	0.46	0.56	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.461
1.15	3.90	0.20	0.00	0.00	0.48	0.72	0.48	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.507
1.20	4.20	0.40	0.00	0.00	0.50	1.03	0.50	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.598
1.25	4.50	0.60	0.00	0.00	0.52	1.57	0.52	0.23	0.20	0.20	0.00	0.00	0.00	0.00	0.724
1.30	4.80	0.80	0.00	0.00	0.54	2.43	0.54	0.39	0.34	0.34	0.00	0.00	0.00	0.00	0.878
1.35	5.10	1.00	0.00	0.00	0.56	3.73	0.56	0.51	0.49	0.49	0.00	0.00	0.00	0.00	1.048
1.40	5.40	1.20	0.00	0.00	0.58	5.59	0.58	0.60	0.65	0.60	0.00	0.00	0.00	0.00	1.182
1.45	5.70	1.40	0.00	0.00	0.60	8.18	0.60	0.68	0.80	0.68	0.00	0.00	0.00	0.00	1.280
1.50	6.00	1.60	0.00	0.00	0.61	11.67	0.61	0.76	0.95	0.76	0.00	0.00	0.00	0.00	1.370
1.55	6.30	1.80	0.00	0.00	0.63	16.27	0.63	0.82	1.07	0.82	0.00	0.00	0.00	0.00	1.452
1.60	6.60	2.00	0.00	0.00	0.65	22.20	0.65	0.88	1.17	0.88	0.00	0.00	0.00	0.00	1.529
1.65	6.90	2.20	0.00	0.00	0.66	29.74	0.66	0.94	1.25	0.94	0.00	0.00	0.00	0.00	1.602
1.70	7.20	2.40	0.00	0.00	0.68	39.17	0.68	0.99	1.29	0.99	0.00	0.00	0.00	0.00	1.671
1.75	7.50	2.60	0.15	0.00	0.69	50.81	0.69	1.04	1.31	1.04	0.00	0.03	0.03	0.00	1.766
1.80	7.80	2.80	0.30	0.00	0.71	65.03	0.71	1.09	1.32	1.09	0.00	0.11	0.11	0.00	1.912
1.85	8.10	3.00	0.45	0.00	0.72	82.21	0.72	1.14	1.32	1.14	0.00	0.24	0.24	0.00	2.103
1.90	8.40	3.20	0.60	0.00	0.74	102.77	0.74	1.18	1.35	1.18	0.47	0.41	0.41	0.00	2.333
1.95	8.70	3.40	0.75	0.00	0.75	127.19	0.75	1.23	1.41	1.23	0.74	0.62	0.62	0.00	2.592
2.00	9.00	3.60	0.90	0.00	0.76	155.98	0.76	1.27	1.55	1.27	0.94	0.84	0.84	0.00	2.873
2.05	9.30	3.80	1.05	0.00	0.78	189.67	0.78	1.31	1.80	1.31	1.10	1.08	1.08	0.00	3.166
2.10	9.60	4.00	1.20	0.00	0.79	228.86	0.79	1.35	2.21	1.35	1.24	1.33	1.24	0.00	3.376
2.15	9.90	4.20	1.35	0.00	0.80	274.19	0.80	1.39	2.84	1.39	1.36	1.57	1.36	0.00	3.553
2.20	10.20	4.40	1.50	0.00	0.81	326.33	0.81	1.42	3.75	1.42	1.48	1.80	1.48	0.00	3.718
2.25	10.50	4.60	1.65	0.00	0.83	386.02	0.83	1.46	5.00	1.46	1.59	2.01	1.59	0.00	3.874
2.30	10.80	4.80	1.80	0.00	0.84	454.02	0.84	1.49	6.70	1.49	1.69	2.20	1.69	0.00	4.022
2.35	11.10	5.00	1.95	0.00	0.85	531.18	0.85	1.53	8.93	1.53	1.78	2.36	1.78	0.00	4.163
2.40	11.40	5.20	2.10	0.00	0.86	618.37	0.86	1.56	11.79	1.56	1.87	2.49	1.87	0.00	4.298
2.45	11.70	5.40	2.25	0.00	0.88	716.52	0.88	1.60	15.41	1.60	1.96	2.58	1.96	0.00	4.429
2.50	12.00	5.60	2.40	0.00	0.89	826.64	0.89	1.63	19.91	1.63	2.04	2.65	2.04	0.00	4.555
2.55	12.30	5.80	2.55	0.00	0.90	949.76	0.90	1.66	25.44	1.66	2.12	2.69	2.12	0.00	4.677
2.60	12.60	6.00	2.70	0.00	0.91	1087.00	0.91	1.69	32.15	1.69	2.19	2.70	2.19	0.00	4.796
2.65	12.90	6.20	2.85	0.00	0.92	1239.51	0.92	1.72	40.22	1.72	2.27	2.71	2.27	0.00	4.911
2.70	13.20	6.40	3.00	0.00	0.93	1408.54	0.93	1.75	49.83	1.75	2.34	2.72	2.34	0.00	5.023
2.75	13.50	6.60	3.15	0.00	0.94	1595.38	0.94	1.78	61.18	1.78	2.41	2.75	2.41	0.00	5.133
2.80	13.80	6.80	3.30	0.00	0.95	1801.37	0.95	1.81	74.49	1.81	2.48	2.82	2.48	0.00	5.240
2.85	14.10	7.00	3.45	0.00	0.96	2027.96	0.96	1.84	90.00	1.84	2.54	2.95	2.54	0.00	5.344
2.90	14.40	7.20	3.60	0.00	0.98	2276.63	0.98	1.87	107.94	1.87	2.61	3.18	2.61	0.00	5.447
2.95	14.70	7.40	3.75	0.00	0.99	2548.95	0.99	1.89	128.60	1.89	2.67	3.54	2.67	0.00	5.547
3.00	15.00	7.60	3.90	0.00	1.00	2846.54	1.00	1.92	152.25	1.92	2.73	4.07	2.73	0.00	5.646
3.05	15.30	7.80	4.05	0.15	1.01	3171.13	1.01	1.95	179.20	1.95	2.79	4.82	2.79	0.15	5.891
3.10	15.60	8.00	4.20	0.30	1.02	3524.49	1.02	1.97	209.78	1.97	2.85	5.83	2.85	0.42	6.258
3.15	15.90	8.20	4.35	0.45	1.03	3908.49	1.03	2.00	244.32	2.00	2.90	7.16	2.90	0.77	6.704
3.20	16.20	8.40	4.50	0.60	1.04	4325.05	1.04	2.03	283.21	2.03	2.96	8.88	2.96	1.19	7.214
3.25	16.50	8.60	4.65	0.75	1.05	4776.20	1.05	2.05	326.81	2.05	3.01	11.05	3.01	1.66	7.778
3.30	16.80	8.80	4.80	0.90	1.06	5264.04	1.06	2.08	375.54	2.08	3.07	13.75	3.07	2.19	8.390
3.35	17.10	9.00	4.95	1.05	1.07	5790.74	1.07	2.10	429.83	2.10	3.12	17.07	3.12	2.76	9.047
3.40	17.40	9.20	5.10	1.20	1.08	6358.57	1.08	2.13	490.12	2.13	3.17	21.08	3.17	3.37	9.745
3.45	17.70	9.40	5.25	1.35	1.08	6969.89	1.08	2.15	556.91	2.15	3.23	25.90	3.23	4.02	10.482
3.50	18.00	9.60	5.40	1.50	1.09	7627.12	1.09	2.17	630.67	2.17	3.28	31.63	3.28	4.71	11.254
3.55	18.30	9.80	5.55	1.65	1.10	8332.80	1.10	2.20	711.95	2.20	3.33	38.37	3.33	5.43	12.061
3.60	18.60	10.00	5.70	1.80	1.11	9089.55	1.11	2.22	801.29	2.22	3.37	46.26	3.37	6.19	12.900
3.65	18.90	10.20	5.85	1.95	1.12	9900.07	1.12	2.25	899.26	2.25	3.42	55.42	3.42	6.98	13.770
3.70	19.20	10.40	6.00	2.10	1.13	10767.17	1.13	2.27	1006.47	2.27	3.47	66.00	3.47	7.80	14.671
3.75	19.50	10.60	6.15	2.25	1.14	11693.75	1.14	2.29	1123.54	2.29	3.52	78.14	3.52	8.65	15.600

3.80	19.80	10.80	6.30	2.40	1.15	12682.81	1.15	2.31	1251.14	2.31	3.56	92.01	3.56	9.53	16.558
3.85	20.10	11.00	6.45	2.55	1.16	13737.43	1.16	2.34	1389.94	2.34	3.61	107.77	3.61	10.44	17.542
3.90	20.40	11.20	6.60	2.70	1.17	14860.82	1.17	2.36	1540.65	2.36	3.65	125.60	3.65	11.37	18.553
3.95	20.70	11.40	6.75	2.85	1.18	16056.27	1.18	2.38	1704.02	2.38	3.70	145.69	3.70	12.33	19.589
4.00	21.00	11.60	6.90	3.00	1.18	17327.19	1.18	2.40	1880.82	2.40	3.74	168.24	3.74	13.32	20.650
4.05	21.30	11.80	7.05	3.15	1.19	18677.07	1.19	2.42	2071.85	2.42	3.79	193.46	3.79	14.33	21.735
4.10	21.60	12.00	7.20	3.30	1.20	20109.53	1.20	2.44	2277.95	2.44	3.83	221.58	3.83	15.37	22.844
4.15	21.90	12.20	7.35	3.45	1.21	21628.28	1.21	2.47	2499.97	2.47	3.87	252.83	3.87	16.43	23.976
4.20	22.20	12.40	7.50	3.60	1.22	23237.17	1.22	2.49	2738.81	2.49	3.92	287.45	3.92	17.51	25.130
4.25	22.50	12.60	7.65	3.75	1.23	24940.12	1.23	2.51	2995.41	2.51	3.96	325.70	3.96	18.62	26.307
4.30	22.80	12.80	7.80	3.90	1.24	26741.19	1.24	2.53	3270.72	2.53	4.00	367.86	4.00	19.74	27.505
4.35	23.10	13.00	7.95	4.05	1.24	28644.55	1.24	2.55	3565.73	2.55	4.04	414.20	4.04	20.89	28.725
4.40	23.40	13.20	8.10	4.20	1.25	30654.49	1.25	2.57	3881.49	2.57	4.08	465.03	4.08	22.06	29.965
4.45	23.70	13.40	8.25	4.35	1.26	32775.40	1.26	2.59	4219.05	2.59	4.12	520.64	4.12	23.26	31.226
4.50	24.00	13.60	8.40	4.50	1.27	35011.81	1.27	2.61	4579.51	2.61	4.16	581.37	4.16	24.47	32.507
4.55	24.30	13.80	8.55	4.65	1.28	37368.35	1.28	2.63	4964.01	2.63	4.20	647.54	4.20	25.70	33.808
4.60	24.60	14.00	8.70	4.80	1.28	39849.80	1.28	2.65	5373.72	2.65	4.24	719.52	4.24	26.96	35.128
4.65	24.90	14.20	8.85	4.95	1.29	42461.04	1.29	2.67	5809.85	2.67	4.28	797.66	4.28	28.23	36.468
4.70	25.20	14.40	9.00	5.10	1.30	45207.08	1.30	2.69	6273.66	2.69	4.31	882.35	4.31	29.52	37.826
4.75	25.50	14.60	9.15	5.25	1.31	48093.06	1.31	2.71	6766.42	2.71	4.35	973.97	4.35	30.84	39.203
4.80	25.80	14.80	9.30	5.40	1.32	51124.26	1.32	2.73	7289.46	2.73	4.39	1072.94	4.39	32.17	40.599
4.85	26.10	15.00	9.45	5.55	1.32	54306.07	1.32	2.75	7844.15	2.75	4.43	1179.69	4.43	33.52	42.013
4.90	26.40	15.20	9.60	5.70	1.33	57644.02	1.33	2.76	8431.90	2.76	4.46	1294.65	4.46	34.88	43.444
4.95	26.70	15.40	9.75	5.85	1.34	61143.79	1.34	2.78	9054.14	2.78	4.50	1418.28	4.50	36.27	44.893
5.00	27.00	15.60	9.90	6.00	1.35	64811.17	1.35	2.80	9712.36	2.80	4.54	1551.05	4.54	37.67	46.360
5.05	27.30	15.80	10.05	6.15	1.35	68652.09	1.35	2.82	10408.10	2.82	4.57	1693.46	4.57	39.10	47.843
5.10	27.60	16.00	10.20	6.30	1.36	72672.64	1.36	2.84	11142.92	2.84	4.61	1846.01	4.61	40.54	49.344
5.15	27.90	16.20	10.35	6.45	1.37	76879.03	1.37	2.86	11918.44	2.86	4.64	2009.22	4.64	41.99	50.862
5.20	28.20	16.40	10.50	6.60	1.38	81277.61	1.38	2.87	12736.31	2.87	4.68	2183.64	4.68	43.46	52.396
5.25	28.50	16.60	10.65	6.75	1.38	85874.89	1.38	2.89	13598.25	2.89	4.71	2369.82	4.71	44.95	53.946
5.30	28.80	16.80	10.80	6.90	1.39	90677.50	1.39	2.91	14505.98	2.91	4.75	2568.34	4.75	46.46	55.513
5.35	29.10	17.00	10.95	7.05	1.40	95692.25	1.40	2.93	15461.32	2.93	4.78	2779.80	4.78	47.99	57.096
5.40	29.40	17.20	11.10	7.20	1.41	100926.07	1.41	2.95	16466.08	2.95	4.82	3004.80	4.82	49.52	58.695
5.45	29.70	17.40	11.25	7.35	1.41	106386.04	1.41	2.96	17522.17	2.96	4.85	3243.99	4.85	51.08	60.309
5.50	30.00	17.60	11.40	7.50	1.42	112079.41	1.42	2.98	18631.50	2.98	4.89	3498.02	4.89	52.65	61.939
5.55	30.30	17.80	11.55	7.65	1.43	118013.56	1.43	3.00	19796.06	3.00	4.92	3767.55	4.92	54.24	63.585
5.60	30.60	18.00	11.70	7.80	1.44	124196.05	1.44	3.02	21017.88	3.02	4.95	4053.27	4.95	55.84	65.246
5.65	30.90	18.20	11.85	7.95	1.44	130634.57	1.44	3.03	22299.02	3.03	4.99	4355.90	4.99	57.46	66.922
5.70	31.20	18.40	12.00	8.10	1.45	137336.98	1.45	3.05	23641.62	3.05	5.02	4676.17	5.02	59.09	68.613
5.75	31.50	18.60	12.15	8.25	1.46	144311.31	1.46	3.07	25047.86	3.07	5.05	5014.83	5.05	60.74	70.318
5.80	31.80	18.80	12.30	8.40	1.46	151565.72	1.46	3.08	26519.94	3.08	5.08	5372.66	5.08	62.41	72.039
5.85	32.10	19.00	12.45	8.55	1.47	159108.56	1.47	3.10	28060.16	3.10	5.12	5750.43	5.12	64.09	73.774
5.90	32.40	19.20	12.60	8.70	1.48	166948.33	1.48	3.12	29670.84	3.12	5.15	6148.98	5.15	65.78	75.524
5.95	32.70	19.40	12.75	8.85	1.48	175093.71	1.48	3.13	31354.36	3.13	5.18	6569.13	5.18	67.49	77.287
6.00	33.00	19.60	12.90	9.00	1.49	183553.52	1.49	3.15	33113.16	3.15	5.21	7011.75	5.21	69.21	79.066

THE JUNIPERS - BASIN BF-2-4

Discharge vs Elevation Table

Bottom orifice diameter:	4 "	Top orifice diameter:	12 "
Number:	6	Number:	6
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	2.00 ft
Middle orifice diameter:	8 "	Emergency weir:	
number of orif:	6	Invert:	4.00 ft
Cg-middle:	0.61	Weir Length (ft)	32.00 ft
invert elev:	1.25 ft	Riser Box LxW	8x8

h	H/D-low	H/D-mid	H/D-top	H/D-peak	Qlow-orif	Qlow-weir	Qtot-low	Qmid-orif	Qmid-weir	Qtot-med	Qtop-orif	Qtop-weir	Qtot-top	Qpeak-top	Qtot
(ft)	-	-	-	-	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.55	0.15	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.029
0.60	0.30	0.00	0.00	0.00	0.00	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.112
0.65	0.45	0.00	0.00	0.00	0.00	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.242
0.70	0.60	0.00	0.00	0.00	0.47	0.41	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.413
0.75	0.75	0.00	0.00	0.00	0.74	0.62	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.615
0.80	0.90	0.00	0.00	0.00	0.94	0.84	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.841
0.85	1.05	0.00	0.00	0.00	1.10	1.08	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.081
0.90	1.20	0.00	0.00	0.00	1.24	1.33	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.238
0.95	1.35	0.00	0.00	0.00	1.36	1.57	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.364
1.00	1.50	0.00	0.00	0.00	1.48	1.80	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.480
1.05	1.65	0.00	0.00	0.00	1.59	2.01	1.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.587
1.10	1.80	0.00	0.00	0.00	1.69	2.20	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.687
1.15	1.95	0.00	0.00	0.00	1.78	2.36	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.782
1.20	2.10	0.00	0.00	0.00	1.87	2.49	1.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.872
1.25	2.25	0.00	0.00	0.00	1.96	2.58	1.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.958
1.30	2.40	0.08	0.00	0.00	2.04	2.65	2.04	0.00	0.04	0.04	0.00	0.00	0.00	0.00	2.082
1.35	2.55	0.15	0.00	0.00	2.12	2.69	2.12	0.00	0.16	0.16	0.00	0.00	0.00	0.00	2.284
1.40	2.70	0.23	0.00	0.00	2.19	2.70	2.19	0.00	0.36	0.36	0.00	0.00	0.00	0.00	2.558
1.45	2.85	0.30	0.00	0.00	2.27	2.71	2.27	0.00	0.63	0.63	0.00	0.00	0.00	0.00	2.902
1.50	3.00	0.38	0.00	0.00	2.34	2.72	2.34	0.00	0.97	0.97	0.00	0.00	0.00	0.00	3.311
1.55	3.15	0.45	0.00	0.00	2.41	2.75	2.41	0.00	1.37	1.37	0.00	0.00	0.00	0.00	3.780
1.60	3.30	0.53	0.00	0.00	2.48	2.82	2.48	1.32	1.83	1.83	0.00	0.00	0.00	0.00	4.303
1.65	3.45	0.60	0.00	0.00	2.54	2.95	2.54	2.65	2.33	2.33	0.00	0.00	0.00	0.00	4.876
1.70	3.60	0.68	0.00	0.00	2.61	3.18	2.61	3.50	2.89	2.89	0.00	0.00	0.00	0.00	5.493
1.75	3.75	0.75	0.00	0.00	2.67	3.54	2.67	4.19	3.48	3.48	0.00	0.00	0.00	0.00	6.147
1.80	3.90	0.83	0.00	0.00	2.73	4.07	2.73	4.77	4.10	4.10	0.00	0.00	0.00	0.00	6.833
1.85	4.05	0.90	0.00	0.00	2.79	4.82	2.79	5.29	4.76	4.76	0.00	0.00	0.00	0.00	7.544
1.90	4.20	0.98	0.00	0.00	2.85	5.83	2.85	5.77	5.43	5.43	0.00	0.00	0.00	0.00	8.274
1.95	4.35	1.05	0.00	0.00	2.90	7.16	2.90	6.21	6.11	6.11	0.00	0.00	0.00	0.00	9.017
2.00	4.50	1.13	0.00	0.00	2.96	8.88	2.96	6.62	6.81	6.62	0.00	0.00	0.00	0.00	9.578
2.05	4.65	1.20	0.05	0.00	3.01	11.05	3.01	7.00	7.50	7.00	0.00	0.05	0.05	0.00	10.072
2.10	4.80	1.28	0.10	0.00	3.07	13.75	3.07	7.37	8.19	7.37	0.00	0.21	0.21	0.00	10.644
2.15	4.95	1.35	0.15	0.00	3.12	17.07	3.12	7.72	8.87	7.72	0.00	0.45	0.45	0.00	11.294
2.20	5.10	1.43	0.20	0.00	3.17	21.08	3.17	8.05	9.54	8.05	0.00	0.80	0.80	0.00	12.021
2.25	5.25	1.50	0.25	0.00	3.23	25.90	3.23	8.37	10.18	8.37	0.00	1.23	1.23	0.00	12.825
2.30	5.40	1.58	0.30	0.00	3.28	31.63	3.28	8.68	10.80	8.68	0.00	1.75	1.75	0.00	13.701
2.35	5.55	1.65	0.35	0.00	3.33	38.37	3.33	8.98	11.38	8.98	0.00	2.35	2.35	0.00	14.649
2.40	5.70	1.73	0.40	0.00	3.37	46.26	3.37	9.27	11.94	9.27	0.00	3.02	3.02	0.00	15.664
2.45	5.85	1.80	0.45	0.00	3.42	55.42	3.42	9.54	12.45	9.54	0.00	3.78	3.78	0.00	16.744
2.50	6.00	1.88	0.50	0.00	3.47	66.00	3.47	9.82	12.92	9.82	0.00	4.60	4.60	0.00	17.886
2.55	6.15	1.95	0.55	0.00	3.52	78.14	3.52	10.08	13.35	10.08	5.16	5.49	5.49	0.00	19.084
2.60	6.30	2.03	0.60	0.00	3.56	92.01	3.56	10.34	13.74	10.34	7.29	6.43	6.43	0.00	20.335
2.65	6.45	2.10	0.65	0.00	3.61	107.77	3.61	10.59	14.08	10.59	8.93	7.44	7.44	0.00	21.635
2.70	6.60	2.18	0.70	0.00	3.65	125.60	3.65	10.83	14.37	10.83	10.32	8.49	8.49	0.00	22.978
2.75	6.75	2.25	0.75	0.00	3.70	145.69	3.70	11.07	14.62	11.07	11.53	9.59	9.59	0.00	24.362
2.80	6.90	2.33	0.80	0.00	3.74	168.24	3.74	11.31	14.82	11.31	12.63	10.73	10.73	0.00	25.780
2.85	7.05	2.40	0.85	0.00	3.79	193.46	3.79	11.54	14.98	11.54	13.65	11.90	11.90	0.00	27.228
2.90	7.20	2.48	0.90	0.00	3.83	221.58	3.83	11.76	15.10	11.76	14.59	13.11	13.11	0.00	28.701
2.95	7.35	2.55	0.95	0.00	3.87	252.83	3.87	11.99	15.19	11.99	15.47	14.34	14.34	0.00	30.194
3.00	7.50	2.63	1.00	0.00	3.92	287.45	3.92	12.20	15.25	12.20	16.31	15.58	15.58	0.00	31.703
3.05	7.65	2.70	1.05	0.00	3.96	325.70	3.96	12.42	15.28	12.42	17.11	16.85	16.85	0.00	33.221
3.10	7.80	2.78	1.10	0.00	4.00	367.86	4.00	12.63	15.30	12.63	17.87	18.12	17.87	0.00	34.493
3.15	7.95	2.85	1.15	0.00	4.04	414.20	4.04	12.83	15.32	12.83	18.60	19.40	18.60	0.00	35.470
3.20	8.10	2.92	1.20	0.00	4.08	465.03	4.08	13.04	15.34	13.04	19.30	20.67	19.30	0.00	36.416
3.25	8.25	3.00	1.25	0.00	4.12	520.64	4.12	13.24	15.37	13.24	19.98	21.95	19.98	0.00	37.333
3.30	8.40	3.07	1.30	0.00	4.16	581.37	4.16	13.43	15.43	13.43	20.63	23.21	20.63	0.00	38.225
3.35	8.55	3.15	1.35	0.00	4.20	647.54	4.20	13.63	15.53	13.63	21.27	24.45	21.27	0.00	39.094
3.40	8.70	3.22	1.40	0.00	4.24	719.52	4.24	13.82	15.69	13.82	21.88	25.68	21.88	0.00	39.941
3.45	8.85	3.30	1.45	0.00	4.28	797.66	4.28	14.01	15.93	14.01	22.48	26.88	22.48	0.00	40.768
3.50	9.00	3.37	1.50	0.00	4.31	882.35	4.31	14.19	16.25	14.19	23.07	28.06	23.07	0.00	41.577
3.55	9.15	3.45	1.55	0.00	4.35	973.97	4.35	14.38	16.69	14.38	23.64	29.20	23.64	0.00	42.368
3.60	9.30	3.52	1.60	0.00	4.39	1072.94	4.39	14.56	17.27	14.56	24.19	30.31	24.19	0.00	43.144
3.65	9.45	3.60	1.65	0.00	4.43	1179.69	4.43	14.74	18.00	14.74	24.74	31.37	24.74	0.00	43.904
3.70	9.60	3.67	1.70	0.00	4.46	1294.65	4.46	14.92	18.92	14.92	25.27	32.40	25.27	0.00	44.650
3.75	9.75	3.75	1.75	0.00	4.50	1418.28	4.50	15.09	20.04	15.09	25.79	33.38	25.79	0.00	45.383
3.80	9.90	3.82	1.80	0.00	4.54	1551.05	4.54	15.26	21.41	15.26	26.30	34.31	26.30	0.00	46.103
3.85	10.05	3.90	1.85	0.00	4.57	1693.46	4.57	15.44	23.05	15.44	26.80	35.19	26.80	0.00	46.812

3.90	10.20	3.97	1.90	0.00	4.61	1846.01	4.61	15.60	24.99	15.60	27.29	36.03	27.29	0.00	47.509
3.95	10.35	4.05	1.95	0.00	4.64	2009.22	4.64	15.77	27.26	15.77	27.78	36.80	27.78	0.00	48.195
4.00	10.50	4.12	2.00	0.00	4.68	2183.64	4.68	15.94	29.92	15.94	28.25	37.52	28.25	0.00	48.871
4.05	10.65	4.20	2.05	0.02	4.71	2369.82	4.71	16.10	32.98	16.10	28.72	38.19	28.72	1.19	50.728
4.10	10.80	4.27	2.10	0.04	4.75	2568.34	4.75	16.26	36.51	16.26	29.18	38.80	29.18	3.37	53.563
4.15	10.95	4.35	2.15	0.06	4.78	2779.80	4.78	16.43	40.52	16.43	29.63	39.35	29.63	6.19	57.031
4.20	11.10	4.42	2.20	0.07	4.82	3004.80	4.82	16.58	45.09	16.58	30.08	39.84	30.08	9.53	61.011
4.25	11.25	4.50	2.25	0.09	4.85	3243.99	4.85	16.74	50.24	16.74	30.52	40.28	30.52	13.32	65.431
4.30	11.40	4.57	2.30	0.11	4.89	3498.02	4.89	16.90	56.03	16.90	30.95	40.67	30.95	17.51	70.243
4.35	11.55	4.65	2.35	0.13	4.92	3767.55	4.92	17.05	62.52	17.05	31.38	41.00	31.38	22.06	75.413
4.40	11.70	4.72	2.40	0.15	4.95	4053.27	4.95	17.21	69.76	17.21	31.80	41.28	31.80	26.96	80.914
4.45	11.85	4.80	2.45	0.17	4.99	4355.90	4.99	17.36	77.80	17.36	32.21	41.52	32.21	32.17	86.724
4.50	12.00	4.87	2.50	0.19	5.02	4676.17	5.02	17.51	86.71	17.51	32.62	41.71	32.62	37.67	92.826
4.55	12.15	4.95	2.55	0.21	5.05	5014.83	5.05	17.66	96.54	17.66	33.03	41.86	33.03	43.46	99.203
4.60	12.30	5.02	2.60	0.22	5.08	5372.66	5.08	17.81	107.37	17.81	33.43	41.97	33.43	49.52	105.844
4.65	12.45	5.10	2.65	0.24	5.12	5750.43	5.12	17.95	119.26	17.95	33.82	42.06	33.82	55.84	112.737
4.70	12.60	5.17	2.70	0.26	5.15	6148.98	5.15	18.10	132.29	18.10	34.22	42.12	34.22	62.41	119.871
4.75	12.75	5.25	2.75	0.28	5.18	6569.13	5.18	18.24	146.52	18.24	34.60	42.16	34.60	69.21	127.239
4.80	12.90	5.32	2.80	0.30	5.21	7011.75	5.21	18.39	162.03	18.39	34.98	42.19	34.98	76.25	134.832
4.85	13.05	5.40	2.85	0.32	5.24	7477.71	5.24	18.53	178.90	18.53	35.36	42.21	35.36	83.51	142.643
4.90	13.20	5.47	2.90	0.34	5.27	7967.92	5.27	18.67	197.22	18.67	35.74	42.24	35.74	90.98	150.665
4.95	13.35	5.55	2.95	0.36	5.30	8483.31	5.30	18.81	217.06	18.81	36.11	42.29	36.11	98.67	158.893
5.00	13.50	5.62	3.00	0.37	5.34	9024.82	5.34	18.95	238.52	18.95	36.47	42.35	36.47	106.56	167.321
5.05	13.65	5.70	3.05	0.39	5.37	9593.42	5.37	19.09	261.69	19.09	36.84	42.45	36.84	114.65	175.944
5.10	13.80	5.77	3.10	0.41	5.40	10190.12	5.40	19.23	286.65	19.23	37.20	42.60	37.20	122.94	184.757
5.15	13.95	5.85	3.15	0.43	5.43	10815.92	5.43	19.36	313.52	19.36	37.55	42.80	37.55	131.41	193.756
5.20	14.10	5.92	3.20	0.45	5.46	11471.88	5.46	19.50	342.39	19.50	37.90	43.07	37.90	140.08	202.937
5.25	14.25	6.00	3.25	0.47	5.49	12159.07	5.49	19.63	373.36	19.63	38.25	43.43	38.25	148.92	212.296
5.30	14.40	6.07	3.30	0.49	5.52	12878.57	5.52	19.77	406.54	19.77	38.60	43.88	38.60	157.95	221.829
5.35	14.55	6.15	3.35	0.51	5.55	13631.51	5.55	19.90	442.05	19.90	38.94	44.45	38.94	167.15	231.534
5.40	14.70	6.22	3.40	0.52	5.58	14419.02	5.58	20.03	479.99	20.03	39.28	45.15	39.28	176.52	241.407
5.45	14.85	6.30	3.45	0.54	5.61	15242.28	5.61	20.16	520.49	20.16	39.62	46.00	39.62	186.06	251.444
5.50	15.00	6.37	3.50	0.56	5.64	16102.49	5.64	20.29	563.66	20.29	39.96	47.01	39.96	195.76	261.644
5.55	15.15	6.45	3.55	0.58	5.66	17000.85	5.66	20.42	609.63	20.42	40.29	48.20	40.29	205.63	272.003
5.60	15.30	6.52	3.60	0.60	5.69	17938.63	5.69	20.55	658.53	20.55	40.62	49.60	40.62	215.66	282.519
5.65	15.45	6.60	3.65	0.62	5.72	18917.09	5.72	20.68	710.49	20.68	40.94	51.22	40.94	225.85	293.189
5.70	15.60	6.67	3.70	0.64	5.75	19937.54	5.75	20.80	765.65	20.80	41.27	53.09	41.27	236.19	304.011
5.75	15.75	6.75	3.75	0.66	5.78	21001.31	5.78	20.93	824.14	20.93	41.59	55.23	41.59	246.69	314.983
5.80	15.90	6.82	3.80	0.67	5.81	22109.74	5.81	21.05	886.11	21.05	41.91	57.66	41.91	257.34	326.103
5.85	16.05	6.90	3.85	0.69	5.84	23264.23	5.84	21.18	951.71	21.18	42.22	60.41	42.22	268.13	337.369
5.90	16.20	6.97	3.90	0.71	5.86	24466.18	5.86	21.30	1021.09	21.30	42.54	63.51	42.54	279.08	348.778
5.95	16.35	7.05	3.95	0.73	5.89	25717.04	5.89	21.42	1094.40	21.42	42.85	66.97	42.85	290.17	360.329
6.00	16.50	7.12	4.00	0.75	5.92	27018.28	5.92	21.55	1171.80	21.55	43.16	70.84	43.16	301.40	372.020

SWMM Model Flow Coefficient Calculation

BF-1-1

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	6	in
Bioretention Soil Layer	S	18	in
Gravel Layer	G	12	in
TOTAL		3.0	ft
		36	in
Orifice Coefficient	c_g	0.6	--
Low Flow Orifice Diameter	D	3.5	in
Drain exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.543	cfs
Ponding Depth Surface Area	A_{PD}	18606	ft^2
Bioretention Surface Area	A_S, A_G	17216	ft^2
	A_S, A_G	0.3952	ac
Porosity of Bioretention Soil	n	0.40	-
Flow Rate (per unit area)	q	3.409	in/hr
Effective Ponding Depth	PD_{eff}	6.24	in
Flow Coefficient	C	0.5826	--

SWMM Model Flow Coefficient Calculation

Basin BF-2-3

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	6	in
Bioretention Soil Layer	S	18	in
Gravel Layer	G	12	in
TOTAL		3.0	ft
		36	in
Orifice Coefficient	c_g	0.6	--
Low Flow Orifice Diameter	D	3	in
Drain (Flow) exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.401	cfs
Ponding Depth Surface Area	A_{PD}	9152	ft^2
Bioretention Surface Area	A_S, A_G	8350	ft^2
	A_S, A_G	0.1917	ac
Porosity of Bioretention Soil	n	0.40	-
Flow Rate (per unit area)	q	5.183	in/hr
Effective Ponding Depth	PD_{eff}	6.29	in
Flow Coefficient	C	0.8825	--

SWMM Model Flow Coefficient Calculation

Basin BF-2-4

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	6	in
Bioretention Soil Layer	S	18	in
Gravel Layer	G	12	in
TOTAL		3.0	ft
		36	in
Orifice Coefficient	c_g	0.6	--
Low Flow Orifice Diameter	D	5	in
Drain (Flow) exponent	n	0.5	--
Flow Rate (volumetric)	Q	1.097	cfs
Ponding Depth Surface Area	A_{PD}	36559	ft^2
Bioretention Surface Area	A_S, A_G	35080	ft^2
	A_S, A_G	0.8053	ac
Porosity of Bioretention Soil	n	0.40	-
Flow Rate (per unit area)	q	3.377	in/hr
Effective Ponding Depth	PD_{eff}	6.13	in
Flow Coefficient	C	0.5835	--

Junipers Stage Storage	
BF-1-1	
depth	area
0.00	17216
0.05	17355
0.10	17494
0.15	17633
0.20	17772
0.25	17911
0.30	18050
0.35	18189
0.40	18328
0.45	18467
0.50	18606
0.55	18745
0.60	18884
0.65	19023
0.70	19162
0.75	19301
0.80	19440
0.85	19579
0.90	19718
0.95	19857
1.00	19996
1.05	20139
1.10	20281
1.15	20423
1.20	20565
1.25	20707
1.30	20849
1.35	20991
1.40	21133
1.45	21275
1.50	21417
1.55	21559
1.60	21701
1.65	21843
1.70	21986
1.75	22128
1.80	22270
1.85	22412
1.90	22554
1.95	22696
2.00	22838
2.05	22983
2.10	23128
2.15	23273
2.20	23419
2.25	23564
2.30	23709
2.35	23854
2.40	23999
2.45	24144
2.50	24290
2.55	24435
2.60	24580
2.65	24725
2.70	24870
2.75	25015
2.80	25160
2.85	25306
2.90	25451
2.95	25596
3.00	25741
3.05	25889

3.10	26037
3.15	26186
3.20	26334
3.25	26482
3.30	26630
3.35	26778
3.40	26927
3.45	27075
3.50	27223
3.55	27371
3.60	27519
3.65	27668
3.70	27816
3.75	27964
3.80	28112
3.85	28260
3.90	28409
3.95	28557
4.00	28705
4.05	28856
4.10	29008
4.15	29159
4.20	29310
4.25	29461
4.30	29613
4.35	29764
4.40	29915
4.45	30066
4.50	30218
4.55	30369
4.60	30520
4.65	30671
4.70	30823
4.75	30974
4.80	31125
4.85	31276
4.90	31428
4.95	31579
5.00	31730
5.05	31884
5.10	32039
5.15	32193
5.20	32347
5.25	32502
5.30	32656
5.35	32810
5.40	32965
5.45	33119
5.50	33274
5.55	33428
5.60	33582
5.65	33737
5.70	33891
5.75	34045
5.80	34200
5.85	34354
5.90	34508
5.95	34663
6.00	34817

Junipers Stage Storage	
BF-2-3	
depth	area
0.0	8372
0.0	8450
0.1	8528
0.1	8606
0.2	8684
0.2	8762
0.3	8840
0.3	8918
0.4	8996
0.4	9074
0.5	9152
0.5	9230
0.6	9308
0.6	9386
0.7	9463
0.7	9541
0.8	9619
0.8	9697
0.9	9775
0.9	9853
1.0	9931
1.0	10012
1.1	10093
1.1	10173
1.2	10254
1.2	10335
1.3	10416
1.3	10497
1.4	10577
1.4	10658
1.5	10739
1.5	10820
1.6	10900
1.6	10981
1.7	11062
1.7	11143
1.8	11224
1.8	11304
1.9	11385
1.9	11466
2.0	11547
2.0	11630
2.1	11714
2.1	11798
2.2	11881
2.2	11965
2.3	12049
2.3	12132
2.4	12216
2.4	12300
2.5	12383
2.5	12467
2.6	12551
2.6	12634
2.7	12718
2.7	12802
2.8	12885
2.8	12969
2.9	13053
2.9	13136

3.0	13220
3.0	13306
3.1	13393
3.1	13479
3.2	13566
3.2	13652
3.3	13739
3.3	13825
3.4	13912
3.4	13998
3.5	14085
3.5	14171
3.6	14258
3.6	14345
3.7	14431
3.7	14518
3.8	14604
3.8	14691
3.9	14777
3.9	14864
4.0	14950
4.0	15039
4.1	15129
4.1	15218
4.2	15308
4.2	15397
4.3	15486
4.3	15576
4.4	15665
4.4	15755
4.5	15844
4.5	15933
4.6	16023
4.6	16112
4.7	16201
4.7	16291
4.8	16380
4.8	16470
4.9	16559
4.9	16648
5.0	16738
5.1	16830
5.1	16922
5.2	17014
5.2	17107
5.3	17199
5.3	17291
5.4	17383
5.4	17476
5.5	17568
5.5	17660
5.6	17752
5.6	17845
5.7	17937
5.7	18029
5.8	18121
5.8	18214
5.9	18306
5.9	18398
6.0	18490
6.0	18583

S

Junipers Stage Storage	
BF-2-4	
depth	area
0.00	35291
0.05	35418
0.10	35544
0.15	35671
0.20	35798
0.25	35925
0.30	36052
0.35	36179
0.40	36306
0.45	36432
0.50	36559
0.55	36686
0.60	36813
0.65	36940
0.70	37067
0.75	37194
0.80	37320
0.85	37447
0.90	37574
0.95	37701
1.00	37828
1.05	37957
1.10	38087
1.15	38217
1.20	38346
1.25	38476
1.30	38606
1.35	38735
1.40	38865
1.45	38995
1.50	39125
1.55	39254
1.60	39384
1.65	39514
1.70	39643
1.75	39773
1.80	39903
1.85	40032
1.90	40162
1.95	40292
2.00	40421
2.05	40554
2.10	40686
2.15	40819
2.20	40951
2.25	41084
2.30	41216
2.35	41349
2.40	41481
2.45	41614
2.50	41746

2.55	41879
2.60	42011
2.65	42144
2.70	42276
2.75	42409
2.80	42541
2.85	42674
2.90	42806
2.95	42939
3.00	43071
3.05	43207
3.10	43342
3.15	43477
3.20	43613
3.25	43748
3.30	43883
3.35	44019
3.40	44154
3.45	44289
3.50	44425
3.55	44560
3.60	44695
3.65	44831
3.70	44966
3.75	45101
3.80	45237
3.85	45372
3.90	45507
3.95	45643
4.00	45778
4.05	45916
4.10	46054
4.15	46192
4.20	46331
4.25	46469
4.30	46607
4.35	46745
4.40	46883
4.45	47021
4.50	47160
4.55	47298
4.60	47436
4.65	47574
4.70	47712
4.75	47850
4.80	47989
4.85	48127
4.90	48265
4.95	48403
5.00	48541
5.05	48682
5.10	48823
5.15	48964
5.20	49105
5.25	49246
5.30	49387
5.35	49528
5.40	49669

5.45	49810
5.50	49951
5.55	50092
5.60	50233
5.65	50374
5.70	50515
5.75	50656
5.80	50797
5.85	50938
5.90	51079
5.95	51220
6.00	51361

BF-1-1		$Q_{Sub\ Drain}$=	0.401	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
0.00	0.401	864.3	0.599	44.30
0.05	0.401	871.2	0.604	43.70
0.10	0.401	878.2	0.609	43.10
0.15	0.401	885.1	0.613	42.49
0.20	0.401	892.1	0.618	41.87
0.25	0.401	899.0	0.623	41.26
0.30	0.401	906.0	0.628	40.63
0.35	0.401	912.9	0.633	40.00
0.40	0.401	919.9	0.638	39.37
0.45	0.401	926.8	0.642	38.73
0.50	0.401	933.8	0.645	38.09
0.55	0.403	940.7	0.645	37.45
0.60	0.407	947.7	0.645	36.80
0.65	0.410	954.6	0.646	36.16
0.70	0.411	961.6	0.648	35.51
0.75	0.413	968.5	0.650	34.86
0.80	0.414	975.5	0.653	34.21
0.85	0.416	982.4	0.656	33.56
0.90	0.417	989.4	0.659	32.90
0.95	0.418	996.3	0.662	32.24
1.00	0.419	1003.4	0.665	31.58
1.05	0.420	1010.5	0.668	30.92
1.10	0.421	1017.6	0.671	30.25
1.15	0.422	1024.7	0.674	29.58
1.20	0.422	1031.8	0.678	28.90
1.25	0.423	1038.9	0.681	28.23
1.30	0.424	1046.0	0.685	27.55
1.35	0.425	1053.1	0.688	26.86
1.40	0.425	1060.2	0.692	26.17
1.45	0.426	1067.3	0.695	25.48
1.50	0.427	1074.4	0.696	24.79
1.55	0.431	1081.5	0.690	24.09
1.60	0.440	1088.6	0.676	23.40
1.65	0.454	1095.7	0.662	22.72
1.70	0.466	1102.8	0.652	22.06
1.75	0.474	1109.9	0.646	21.41
1.80	0.480	1117.0	0.642	20.76
1.85	0.486	1124.1	0.638	20.12
1.90	0.492	1131.2	0.635	19.48
1.95	0.497	1138.3	0.633	18.85
2.00	0.502	1145.5	0.631	18.22
2.05	0.507	1152.8	0.630	17.58
2.10	0.511	1160.0	0.628	16.96
2.15	0.515	1167.3	0.627	16.33
2.20	0.519	1174.6	0.626	15.70
2.25	0.523	1181.8	0.626	15.07
2.30	0.527	1189.1	0.625	14.45
2.35	0.530	1196.3	0.625	13.82
2.40	0.534	1203.6	0.624	13.20
2.45	0.537	1210.8	0.624	12.57
2.50	0.540	1218.1	0.622	11.95

2.55	0.548	1225.4	0.613	11.33
2.60	0.563	1232.6	0.598	10.71
2.65	0.583	1239.9	0.578	10.12
2.70	0.609	1247.1	0.556	9.54
2.75	0.637	1254.4	0.538	8.98
2.80	0.659	1261.6	0.525	8.44
2.85	0.676	1268.9	0.516	7.92
2.90	0.690	1276.2	0.508	7.40
2.95	0.704	1283.4	0.502	6.89
3.00	0.717	1290.8	0.496	6.39
3.05	0.729	1298.2	0.491	5.90
3.10	0.741	1305.6	0.486	5.41
3.15	0.752	1313.0	0.482	4.92
3.20	0.762	1320.4	0.478	4.44
3.25	0.773	1327.8	0.474	3.96
3.30	0.782	1335.2	0.471	3.49
3.35	0.792	1342.6	0.468	3.02
3.40	0.801	1350.0	0.465	2.55
3.45	0.810	1357.4	0.463	2.08
3.50	0.819	1364.9	0.375	1.62
3.55	1.200	1372.3	0.247	1.24
3.60	1.889	1379.7	0.164	1.00
3.65	2.779	1387.1	0.117	0.83
3.70	3.831	1394.5	0.087	0.72
3.75	5.023	1401.9	0.069	0.63
3.80	6.340	1409.3	0.055	0.56
3.85	7.771	1416.7	0.046	0.50
3.90	9.308	1424.1	0.039	0.46
3.95	10.943	1431.5	0.034	0.42
4.00	12.672	1439.0	0.029	0.39
4.05	14.488	1446.6	0.026	0.36
4.10	16.389	1454.2	0.023	0.33
4.15	18.370	1461.7	0.021	0.31
4.20	20.429	1469.3	0.019	0.29
4.25	22.562	1476.8	0.017	0.27
4.30	24.767	1484.4	0.016	0.25
4.35	27.042	1492.0	0.015	0.23
4.40	29.385	1499.5	0.014	0.22
4.45	31.793	1507.1	0.013	0.21
4.50	34.265	1514.7	0.012	0.19
4.55	36.800	1522.2	0.011	0.18
4.60	39.396	1529.8	0.010	0.17
4.65	42.051	1537.3	0.010	0.16
4.70	44.764	1544.9	0.009	0.15
4.75	47.534	1552.5	0.009	0.14
4.80	50.360	1560.0	0.008	0.13
4.85	53.241	1567.6	0.008	0.12
4.90	56.175	1575.2	0.008	0.12
4.95	59.162	1582.7	0.007	0.11
5.00	62.201	1590.4	0.007	0.10
5.05	65.291	1598.1	0.007	0.09
5.10	68.431	1605.8	0.006	0.09
5.15	71.620	1613.5	0.006	0.08
5.20	74.857	1621.2	0.006	0.07

5.25	78.143	1628.9	0.006	0.07
5.30	81.476	1636.7	0.005	0.06
5.35	84.855	1644.4	0.005	0.06
5.40	88.280	1652.1	0.005	0.05
5.45	91.751	1659.8	0.005	0.05
5.50	95.266	1667.5	0.005	0.04
5.55	98.825	1675.3	0.005	0.04
5.60	102.428	1683.0	0.004	0.03
5.65	106.073	1690.7	0.004	0.03
5.70	109.762	1698.4	0.004	0.02
5.75	113.492	1706.1	0.004	0.02
5.80	117.264	1713.8	0.004	0.02
5.85	121.077	1721.6	0.004	0.01
5.90	124.931	1729.3	0.004	0.01
5.95	128.825	1737.0	0.004	0.00
6.00	132.759			

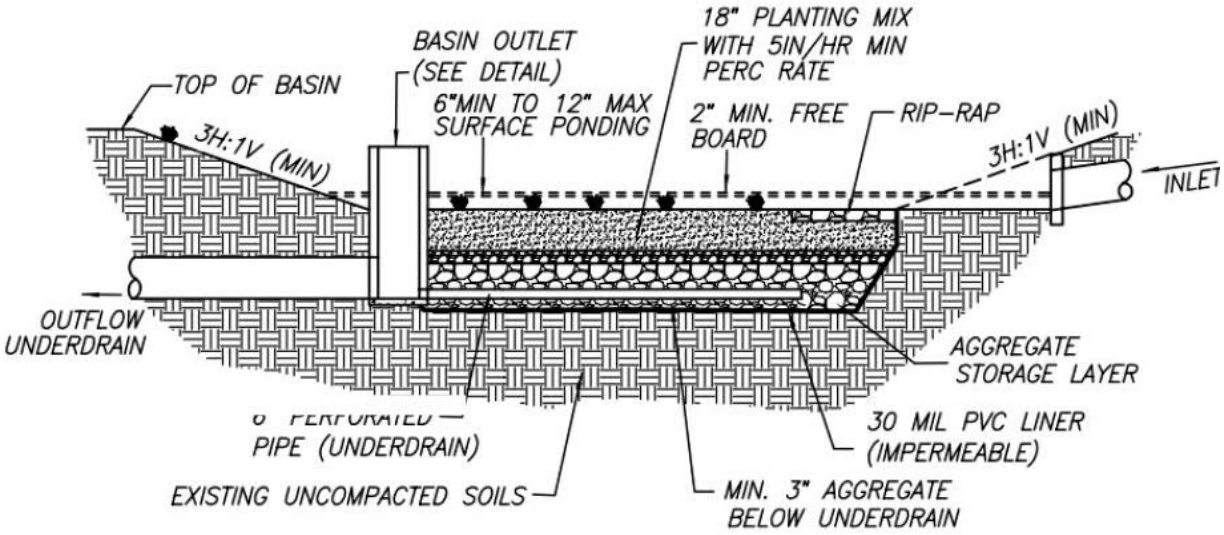
Basin BF-2-3		$Q_{Sub\ Drain}$=	0.101	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
0.00	0.101	420.6	1.16	21.77
0.05	0.101	424.5	1.17	20.61
0.10	0.101	428.4	1.18	19.44
0.15	0.101	432.3	1.19	18.27
0.20	0.101	436.2	1.20	17.08
0.25	0.101	440.1	1.21	15.88
0.30	0.101	443.9	1.22	14.67
0.35	0.101	447.8	1.23	13.45
0.40	0.101	451.7	1.24	12.21
0.45	0.101	455.6	1.25	10.97
0.50	0.101	459.5	1.26	9.72
0.55	0.121	463.4	1.07	8.45
0.60	0.174	467.3	0.75	7.39
0.65	0.250	471.2	0.52	6.64
0.70	0.320	475.1	0.41	6.12
0.75	0.363	479.0	0.37	5.71
0.80	0.399	482.9	0.34	5.34
0.85	0.432	486.8	0.31	5.00
0.90	0.462	490.7	0.30	4.69
0.95	0.489	494.6	0.28	4.39
1.00	0.515	498.6	0.27	4.11
1.05	0.539	502.6	0.26	3.84
1.10	0.562	506.6	0.25	3.59
1.15	0.608	510.7	0.23	3.33
1.20	0.699	514.7	0.20	3.10
1.25	0.825	518.8	0.17	2.90
1.30	0.979	522.8	0.15	2.72
1.35	1.149	526.8	0.13	2.57
1.40	1.283	530.9	0.11	2.45
1.45	1.381	534.9	0.11	2.33
1.50	1.471	539.0	0.10	2.22
1.55	1.553	543.0	0.10	2.12
1.60	1.630	547.0	0.09	2.03
1.65	1.703	551.1	0.09	1.93
1.70	1.772	555.1	0.09	1.84
1.75	1.867	559.2	0.08	1.76
1.80	2.013	563.2	0.08	1.67
1.85	2.204	567.2	0.07	1.59
1.90	2.434	571.3	0.07	1.52
1.95	2.693	575.3	0.06	1.46
2.00	2.974	579.4	0.05	1.40
2.05	3.267	583.6	0.05	1.34
2.10	3.477	587.8	0.05	1.29
2.15	3.654	592.0	0.05	1.25
2.20	3.819	596.2	0.04	1.20
2.25	3.975	600.3	0.04	1.16
2.30	4.123	604.5	0.04	1.12
2.35	4.264	608.7	0.04	1.08
2.40	4.399	612.9	0.04	1.04
2.45	4.530	617.1	0.04	1.00
2.50	4.656	621.3	0.04	0.96
2.55	4.778	625.4	0.04	0.92
2.60	4.897	629.6	0.04	0.89
2.65	5.012	633.8	0.04	0.85
2.70	5.124	638.0	0.03	0.82
2.75	5.234	642.2	0.03	0.78
2.80	5.341	646.4	0.03	0.75
2.85	5.445	650.5	0.03	0.71
2.90	5.548	654.7	0.03	0.68
2.95	5.648	658.9	0.03	0.65

3.00	5.747	663.2	0.03	0.62
3.05	5.992	667.5	0.03	0.58
3.10	6.359	671.8	0.03	0.55
3.15	6.805	676.1	0.03	0.52
3.20	7.315	680.5	0.03	0.50
3.25	7.879	684.8	0.02	0.47
3.30	8.491	689.1	0.02	0.45
3.35	9.148	693.4	0.02	0.42
3.40	9.846	697.8	0.02	0.40
3.45	10.583	702.1	0.02	0.38
3.50	11.355	706.4	0.02	0.36
3.55	12.162	710.7	0.02	0.35
3.60	13.001	715.1	0.02	0.33
3.65	13.871	719.4	0.01	0.31
3.70	14.772	723.7	0.01	0.30
3.75	15.701	728.0	0.01	0.29
3.80	16.659	732.4	0.01	0.27
3.85	17.643	736.7	0.01	0.26
3.90	18.654	741.0	0.01	0.25
3.95	19.690	745.3	0.01	0.24
4.00	20.751	749.7	0.01	0.23
4.05	21.836	754.2	0.01	0.22
4.10	22.945	758.7	0.01	0.21
4.15	24.077	763.1	0.01	0.20
4.20	25.231	767.6	0.01	0.19
4.25	26.408	772.1	0.01	0.18
4.30	27.606	776.6	0.01	0.17
4.35	28.826	781.0	0.01	0.17
4.40	30.066	785.5	0.01	0.16
4.45	31.327	790.0	0.01	0.15
4.50	32.608	794.4	0.01	0.14
4.55	33.909	798.9	0.01	0.14
4.60	35.229	803.4	0.01	0.13
4.65	36.569	807.8	0.01	0.13
4.70	37.927	812.3	0.01	0.12
4.75	39.304	816.8	0.01	0.11
4.80	40.700	821.2	0.01	0.11
4.85	42.114	825.7	0.01	0.10
4.90	43.545	830.2	0.01	0.10
4.95	44.994	834.6	0.01	0.09
5.00	46.461	840.5	0.01	0.09
5.05	47.944	846.4	0.00	0.08
5.10	49.445	852.3	0.00	0.08
5.15	50.963	858.2	0.00	0.07
5.20	52.497	864.1	0.00	0.07
5.25	54.047	870.0	0.00	0.06
5.30	55.614	875.9	0.00	0.06
5.35	57.197	881.8	0.00	0.05
5.40	58.796	887.7	0.00	0.05
5.45	60.410	893.6	0.00	0.04
5.50	62.040	899.5	0.00	0.04
5.55	63.686	905.4	0.00	0.04
5.60	65.347	911.3	0.00	0.03
5.65	67.023	917.2	0.00	0.03
5.70	68.714	923.1	0.00	0.02
5.75	70.419	929.0	0.00	0.02
5.80	72.140	934.9	0.00	0.02
5.85	73.875	940.8	0.00	0.01
5.90	75.625	946.7	0.00	0.01
5.95	77.388	952.6	0.00	0.01
6.00	79.167	958.5	0.00	0.00

BF-2-4		$Q_{Sub\ Drain}$=	1.097	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
0.00	1.097	1767.7	0.448	11.13
0.05	1.097	1774.1	0.449	10.69
0.10	1.097	1780.4	0.451	10.24
0.15	1.097	1786.7	0.452	9.79
0.20	1.097	1793.1	0.454	9.33
0.25	1.097	1799.4	0.456	8.88
0.30	1.097	1805.8	0.457	8.42
0.35	1.097	1812.1	0.459	7.97
0.40	1.097	1818.4	0.460	7.51
0.45	1.097	1824.8	0.462	7.05
0.50	1.097	1831.1	0.452	6.59
0.55	1.126	1837.5	0.422	6.13
0.60	1.209	1843.8	0.382	5.71
0.65	1.339	1850.2	0.340	5.33
0.70	1.510	1856.5	0.301	4.99
0.75	1.712	1862.8	0.267	4.69
0.80	1.938	1869.2	0.238	4.42
0.85	2.178	1875.5	0.223	4.18
0.90	2.335	1881.9	0.212	3.96
0.95	2.461	1888.2	0.204	3.75
1.00	2.577	1894.6	0.196	3.54
1.05	2.684	1901.1	0.190	3.35
1.10	2.784	1907.6	0.184	3.16
1.15	2.879	1914.1	0.179	2.97
1.20	2.969	1920.6	0.175	2.79
1.25	3.055	1927.0	0.168	2.62
1.30	3.179	1933.5	0.159	2.45
1.35	3.381	1940.0	0.147	2.29
1.40	3.655	1946.5	0.135	2.14
1.45	3.999	1953.0	0.123	2.01
1.50	4.408	1959.5	0.112	1.89
1.55	4.877	1966.0	0.101	1.77
1.60	5.400	1972.4	0.092	1.67
1.65	5.973	1978.9	0.083	1.58
1.70	6.590	1985.4	0.076	1.50
1.75	7.244	1991.9	0.070	1.42
1.80	7.930	1998.4	0.064	1.35
1.85	8.641	2004.9	0.059	1.29
1.90	9.371	2011.3	0.055	1.23
1.95	10.114	2017.8	0.053	1.17
2.00	10.675	2024.4	0.050	1.12
2.05	11.169	2031.0	0.048	1.07
2.10	11.741	2037.6	0.046	1.02
2.15	12.391	2044.3	0.043	0.98
2.20	13.118	2050.9	0.041	0.93
2.25	13.922	2057.5	0.039	0.89
2.30	14.798	2064.1	0.036	0.85
2.35	15.746	2070.8	0.034	0.82
2.40	16.761	2077.4	0.032	0.78
2.45	17.841	2084.0	0.030	0.75
2.50	18.983	2090.6	0.029	0.72
2.55	20.181	2097.3	0.027	0.69
2.60	21.432	2103.9	0.026	0.66
2.65	22.732	2110.5	0.024	0.64
2.70	24.075	2117.1	0.023	0.61
2.75	25.459	2123.8	0.022	0.59
2.80	26.877	2130.4	0.021	0.57
2.85	28.325	2137.0	0.020	0.55
2.90	29.798	2143.6	0.019	0.53
2.95	31.291	2150.3	0.018	0.51

3.00	32.800	2157.0	0.017	0.49
3.05	34.318	2163.7	0.017	0.47
3.10	35.590	2170.5	0.016	0.46
3.15	36.567	2177.3	0.016	0.44
3.20	37.513	2184.0	0.016	0.42
3.25	38.430	2190.8	0.015	0.41
3.30	39.322	2197.6	0.015	0.39
3.35	40.191	2204.3	0.015	0.38
3.40	41.038	2211.1	0.015	0.36
3.45	41.865	2217.9	0.014	0.35
3.50	42.674	2224.6	0.014	0.33
3.55	43.465	2231.4	0.014	0.32
3.60	44.241	2238.2	0.014	0.31
3.65	45.001	2244.9	0.014	0.29
3.70	45.747	2251.7	0.013	0.28
3.75	46.480	2258.5	0.013	0.26
3.80	47.200	2265.2	0.013	0.25
3.85	47.909	2272.0	0.013	0.24
3.90	48.606	2278.8	0.013	0.23
3.95	49.292	2285.5	0.013	0.21
4.00	49.968	2292.4	0.012	0.20
4.05	51.825	2299.3	0.012	0.19
4.10	54.660	2306.2	0.011	0.18
4.15	58.128	2313.1	0.010	0.16
4.20	62.108	2320.0	0.010	0.15
4.25	66.528	2326.9	0.009	0.14
4.30	71.340	2333.8	0.008	0.14
4.35	76.510	2340.7	0.008	0.13
4.40	82.011	2347.6	0.007	0.12
4.45	87.821	2354.5	0.007	0.11
4.50	93.923	2361.4	0.007	0.11
4.55	100.300	2368.3	0.006	0.10
4.60	106.941	2375.2	0.006	0.09
4.65	113.834	2382.2	0.005	0.09
4.70	120.968	2389.1	0.005	0.08
4.75	128.336	2396.0	0.005	0.08
4.80	135.929	2402.9	0.005	0.07
4.85	143.740	2409.8	0.004	0.07
4.90	151.762	2416.7	0.004	0.06
4.95	159.990	2423.6	0.004	0.06
5.00	168.418	2430.6	0.004	0.05
5.05	177.041	2437.6	0.004	0.05
5.10	185.854	2444.7	0.003	0.05
5.15	194.853	2451.7	0.003	0.04
5.20	204.034	2458.8	0.003	0.04
5.25	213.393	2465.8	0.003	0.04
5.30	222.926	2472.9	0.003	0.03
5.35	232.631	2479.9	0.003	0.03
5.40	242.504	2487.0	0.003	0.03
5.45	252.541	2494.0	0.003	0.02
5.50	262.741	2501.1	0.003	0.02
5.55	273.100	2508.1	0.002	0.02
5.60	283.616	2515.2	0.002	0.02
5.65	294.286	2522.2	0.002	0.01
5.70	305.108	2529.3	0.002	0.01
5.75	316.080	2536.3	0.002	0.01
5.80	327.200	2543.4	0.002	0.01
5.85	338.466	2550.4	0.002	0.01
5.90	349.875	2557.5	0.002	0.00
5.95	361.426	2564.5	0.002	0.00
6.00	373.117			

ATTACHMENT 3 – Bioretention Details

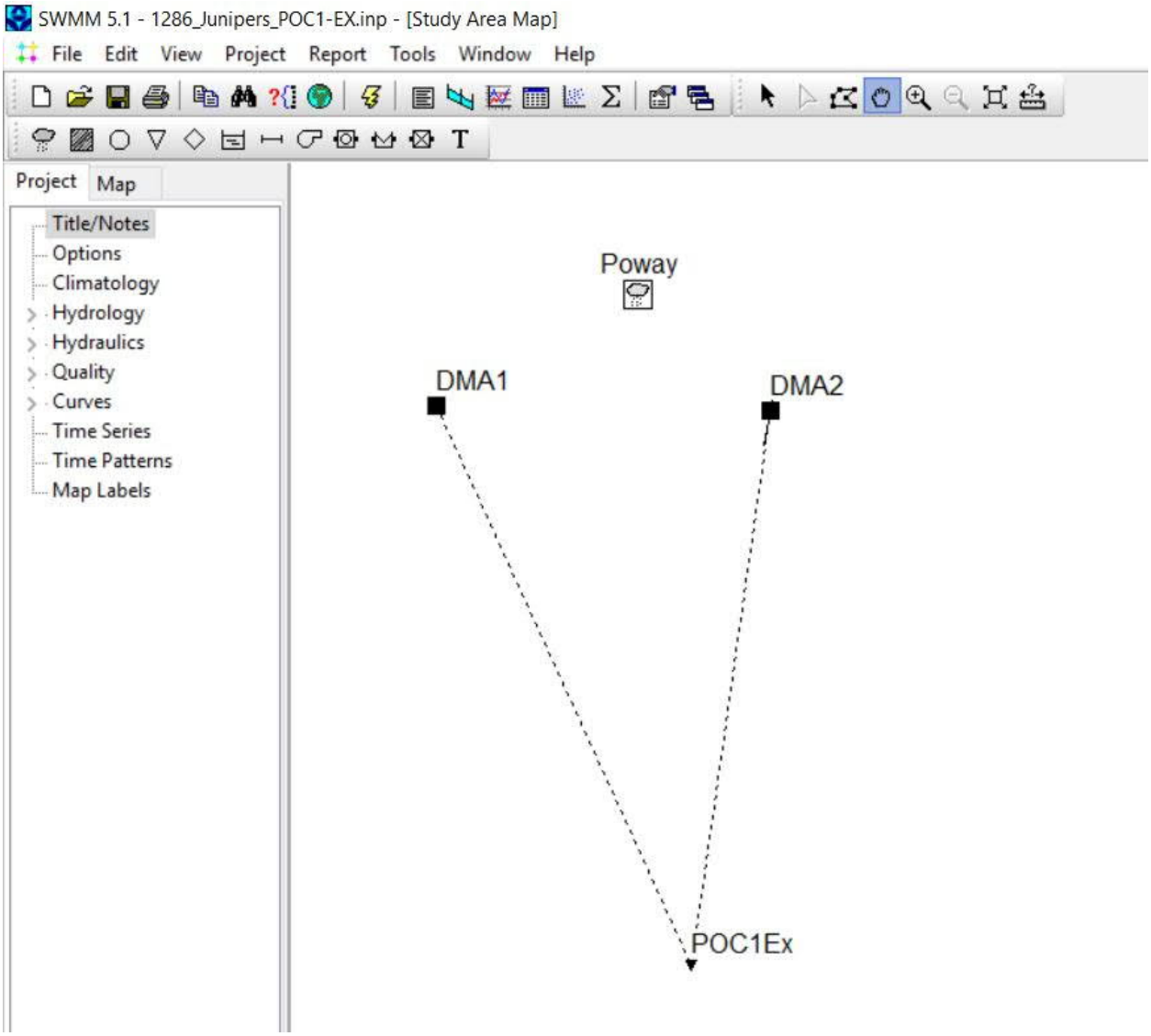


TYPICAL BIORETENTION BASIN DETAIL

NOT TO SCALE

ATTACHMENT 4 - SWMM Input Data (Existing and Proposed Models)

POC 1 – Pre-Developed Condition



```
Junipers
POC-1-EX

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           10/05/1962
START_TIME           00:00:00
REPORT_START_DATE    10/05/1962
REPORT_START_TIME    00:00:00
END_DATE             05/21/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .15    .17    .19    .19    .18    .15    .11
  .08    .06
DRY_ONLY         NO

[RAINGAGES]
```

```
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Poway            INTENSITY 1:00     1.0      TIMESERIES Poway

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope
  CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- --------
-------- -------- ----------------
;Existing Area
DMA1             Poway            POC1Ex           31.09    0        968      3.3
  0
DMA2             Poway            POC1Ex           2.12     0        100      7.6
  0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo
PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ----------
----------
DMA1             .012       0.15       .05        .1         25         OUTLET
DMA2             0.012      0.15       0.05       0.01       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA1             6          .1         .32
DMA2             6          .1         .32

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC1Ex           0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Poway            FILE "R:\1286\Hyd\CALCS\SWMM\POWAY.prn"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 798.851 3861.367 2824.444 6414.111
```

```
Units      None

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

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA1             1336.416           4861.170
DMA2             1852.901           4799.961
DMA2             1868.927           4880.089
DMA2             1868.927           4880.089

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Poway            1658.431           5032.565
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

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

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Starting Date 10/05/1962 00:00:00
Ending Date 05/21/2008 23:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 00:15:00
Dry Time Step 04:00:00

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	1544.486	558.080
Evaporation Loss	14.831	5.359
Infiltration Loss	1487.044	537.324
Surface Runoff	47.458	17.148
Final Storage	0.000	0.000
Continuity Error (%)	-0.314	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	47.458	15.465
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000

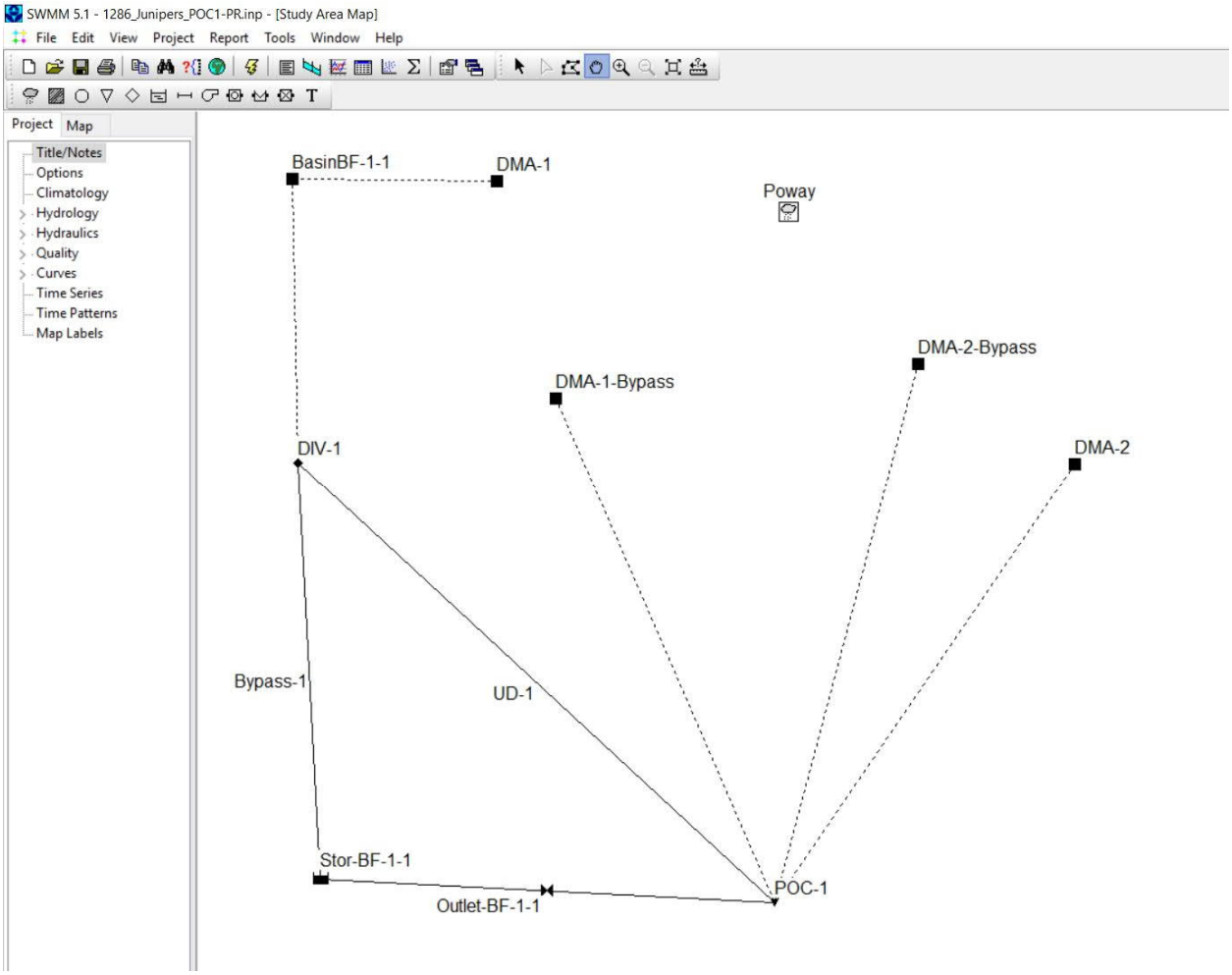
External Inflow	0.000	0.000
External Outflow	47.458	15.465
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff 10^6 gal	Total Runoff CFS	Peak Runoff	Runoff Coeff
DMA1	558.08	0.00	5.47	538.36	0.00	16.06	16.06	13.56	9.96	0.029
DMA2	558.08	0.00	3.79	522.18	0.00	33.04	33.04	1.90	1.09	0.059

Analysis begun on: Thu May 16 10:37:55 2019
Analysis ended on: Thu May 16 10:38:03 2019
Total elapsed time: 00:00:08

POC 1 – Developed Condition



```
Junipers
POC-1-PR

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           10/05/1962
START_TIME           00:00:00
REPORT_START_DATE    10/05/1962
REPORT_START_TIME    00:00:00
END_DATE             05/21/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .15    .17    .19    .19    .18    .15    .11
  .08    .06
DRY_ONLY         NO

[RAINGAGES]
```

```
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Poway            INTENSITY 1:00     1.0      TIMESERIES Poway

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope
  CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- --------
-------- ----------------
DMA-2            Poway            POC-1            0.90     33.2     70       1.5
  0
BasinBF-1-1      Poway            DIV-1            .395     0        39       .01
  0
DMA-1            Poway            BasinBF-1-1      29.36    45.9     962      1.20
  0
DMA-1-Bypass     Poway            POC-1            2.27     0        100      2.5
  0
DMA-2-Bypass     Poway            POC-1            3.55     0        100      2
  0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo
PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ----------
----------
DMA-2            0.012      0.15       0.05       0.1        25         OUTLET
BasinBF-1-1      0.012      0.15       0.05       0.1        25         OUTLET
DMA-1            0.012      0.15       0.05       0.1        25         OUTLET
DMA-1-Bypass     0.012      0.15       0.05       0.1        25         OUTLET
DMA-2-Bypass     0.012      0.15       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA-2            6          0.1        .32
BasinBF-1-1      1.5        .3         .3
DMA-1            6          0.1        .32
DMA-1-Bypass     6          0.1        0.32
DMA-2-Bypass     6          0.1        0.32

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BF-1-1           BC
BF-1-1           SURFACE    6          0          0          0          5
BF-1-1           SOIL       18         0.4        0.2        0.1        5          5
         1.5
BF-1-1           STORAGE    12         .67        0          0
BF-1-1           DRAIN      0.2972     0.5        0          6          0          0
```

```
[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp
 ToPerv     RptFile                  DrainTo          FromPerv
;;-------------- ---------------- ------- ---------- ---------- ----------
---------- ---------- ------------------------ ---------------- ----------
BasinBF-1-1      BF-1-1           1       17210      50         0          100
 0          *                        *                0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-1            0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DIV-1            0          Bypass-1         CUTOFF     0.543      0          0
    0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params
   N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ----------- ----------
---------------------------- -------- --------           -------- --------
;Basin BF-1-1
Stor-BF-1-1      0        5.5        0          TABULAR    StorageBF-1-1
   14290    1

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset
OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ----------
---------- ---------- ----------
Bypass-1         DIV-1            Stor-BF-1-1      400        0.01       0
0          0          0
UD-1             DIV-1            POC-1            400        0.01       0
0          0          0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type
QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- ---------------
---------------- ---------- --------
Outlet-BF-1-1    Stor-BF-1-1      POC-1            0          TABULAR/DEPTH
Outlet-BF-1-1                NO

[XSECTIONS]
```

```
;;Link           Shape        Geom1            Geom2      Geom3      Geom4
Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ----------
---------- ----------
Bypass-1         DUMMY        0                0          0          0          1

UD-1             CIRCULAR     0.5              0          0          0          1


[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
Outlet-BF-1-1    Rating     0.00       0.000
Outlet-BF-1-1               0.05       0.002
Outlet-BF-1-1               0.10       0.006
Outlet-BF-1-1               0.15       0.009
Outlet-BF-1-1               0.20       0.011
Outlet-BF-1-1               0.25       0.012
Outlet-BF-1-1               0.30       0.014
Outlet-BF-1-1               0.35       0.015
Outlet-BF-1-1               0.40       0.016
Outlet-BF-1-1               0.45       0.017
Outlet-BF-1-1               0.50       0.018
Outlet-BF-1-1               0.55       0.019
Outlet-BF-1-1               0.60       0.020
Outlet-BF-1-1               0.65       0.021
Outlet-BF-1-1               0.70       0.022
Outlet-BF-1-1               0.75       0.022
Outlet-BF-1-1               0.80       0.023
Outlet-BF-1-1               0.85       0.024
Outlet-BF-1-1               0.90       0.025
Outlet-BF-1-1               0.95       0.025
Outlet-BF-1-1               1.00       0.026
Outlet-BF-1-1               1.05       0.030
Outlet-BF-1-1               1.10       0.040
Outlet-BF-1-1               1.15       0.053
Outlet-BF-1-1               1.20       0.065
Outlet-BF-1-1               1.25       0.073
Outlet-BF-1-1               1.30       0.080
Outlet-BF-1-1               1.35       0.086
Outlet-BF-1-1               1.40       0.091
Outlet-BF-1-1               1.45       0.096
Outlet-BF-1-1               1.50       0.101
Outlet-BF-1-1               1.55       0.106
Outlet-BF-1-1               1.60       0.110
Outlet-BF-1-1               1.65       0.114
Outlet-BF-1-1               1.70       0.118
Outlet-BF-1-1               1.75       0.122
Outlet-BF-1-1               1.80       0.126
```

Outlet-BF-1-1	1.85	0.129
Outlet-BF-1-1	1.90	0.133
Outlet-BF-1-1	1.95	0.136
Outlet-BF-1-1	2.00	0.140
Outlet-BF-1-1	2.05	0.147
Outlet-BF-1-1	2.10	0.162
Outlet-BF-1-1	2.15	0.183
Outlet-BF-1-1	2.20	0.208
Outlet-BF-1-1	2.25	0.236
Outlet-BF-1-1	2.30	0.258
Outlet-BF-1-1	2.35	0.275
Outlet-BF-1-1	2.40	0.290
Outlet-BF-1-1	2.45	0.303
Outlet-BF-1-1	2.50	0.316
Outlet-BF-1-1	2.55	0.328
Outlet-BF-1-1	2.60	0.340
Outlet-BF-1-1	2.65	0.351
Outlet-BF-1-1	2.70	0.362
Outlet-BF-1-1	2.75	0.372
Outlet-BF-1-1	2.80	0.382
Outlet-BF-1-1	2.85	0.391
Outlet-BF-1-1	2.90	0.401
Outlet-BF-1-1	2.95	0.410
Outlet-BF-1-1	3.00	0.419
Outlet-BF-1-1	3.05	0.799
Outlet-BF-1-1	3.10	1.489
Outlet-BF-1-1	3.15	2.378
Outlet-BF-1-1	3.20	3.430
Outlet-BF-1-1	3.25	4.622
Outlet-BF-1-1	3.30	5.939
Outlet-BF-1-1	3.35	7.370
Outlet-BF-1-1	3.40	8.907
Outlet-BF-1-1	3.45	10.542
Outlet-BF-1-1	3.50	12.271
Outlet-BF-1-1	3.55	14.087
Outlet-BF-1-1	3.60	15.988
Outlet-BF-1-1	3.65	17.969
Outlet-BF-1-1	3.70	20.028
Outlet-BF-1-1	3.75	22.161
Outlet-BF-1-1	3.80	24.366
Outlet-BF-1-1	3.85	26.641
Outlet-BF-1-1	3.90	28.984
Outlet-BF-1-1	3.95	31.392
Outlet-BF-1-1	4.00	33.865
Outlet-BF-1-1	4.05	36.399
Outlet-BF-1-1	4.10	38.995
Outlet-BF-1-1	4.15	41.650
Outlet-BF-1-1	4.20	44.363
Outlet-BF-1-1	4.25	47.133

```
Outlet-BF-1-1               4.30       49.959
Outlet-BF-1-1               4.35       52.840
Outlet-BF-1-1               4.40       55.774
Outlet-BF-1-1               4.45       58.761
Outlet-BF-1-1               4.50       61.800
Outlet-BF-1-1               4.55       64.890
Outlet-BF-1-1               4.60       68.030
Outlet-BF-1-1               4.65       71.219
Outlet-BF-1-1               4.70       74.457
Outlet-BF-1-1               4.75       77.742
Outlet-BF-1-1               4.80       81.075
Outlet-BF-1-1               4.85       84.454
Outlet-BF-1-1               4.90       87.879
Outlet-BF-1-1               4.95       91.350
Outlet-BF-1-1               5.00       94.865
Outlet-BF-1-1               5.05       98.424
Outlet-BF-1-1               5.10       102.027
Outlet-BF-1-1               5.15       105.673
Outlet-BF-1-1               5.20       109.361
Outlet-BF-1-1               5.25       113.091
Outlet-BF-1-1               5.30       116.863
Outlet-BF-1-1               5.35       120.676
Outlet-BF-1-1               5.40       124.530
Outlet-BF-1-1               5.45       128.424
Outlet-BF-1-1               5.50       132.358
;
;Basin#2
StorageBF-1-1    Storage    0          18606
StorageBF-1-1               0.1        18884
StorageBF-1-1               0.2        19162
StorageBF-1-1               0.3        19440
StorageBF-1-1               0.4        19718
StorageBF-1-1               0.5        19996
StorageBF-1-1               0.6        20281
StorageBF-1-1               0.7        20565
StorageBF-1-1               0.8        20849
StorageBF-1-1               0.9        21133
StorageBF-1-1               1          21417
StorageBF-1-1               1.1        21701
StorageBF-1-1               1.2        21986
StorageBF-1-1               1.3        22270
StorageBF-1-1               1.4        22554
StorageBF-1-1               1.5        22838
StorageBF-1-1               1.6        23128
StorageBF-1-1               1.7        23419
StorageBF-1-1               1.8        23709
StorageBF-1-1               1.9        23999
StorageBF-1-1               2          24290
StorageBF-1-1               2.1        24580
```

```
StorageBF-1-1              2.2        24870
StorageBF-1-1              2.3        25160
StorageBF-1-1              2.4        25451
StorageBF-1-1              2.5        25741
StorageBF-1-1              2.6        26037
StorageBF-1-1              2.7        26334
StorageBF-1-1              2.8        26630
StorageBF-1-1              2.9        26927
StorageBF-1-1              3          27223
StorageBF-1-1              3.1        27519
StorageBF-1-1              3.2        27816
StorageBF-1-1              3.3        28112
StorageBF-1-1              3.4        28409
StorageBF-1-1              3.5        28705
StorageBF-1-1              3.6        29008
StorageBF-1-1              3.7        29310
StorageBF-1-1              3.8        29613
StorageBF-1-1              3.9        29915
StorageBF-1-1              4          30218
StorageBF-1-1              4.1        30520
StorageBF-1-1              4.2        30823
StorageBF-1-1              4.3        31125
StorageBF-1-1              4.4        31428
StorageBF-1-1              4.5        31730
StorageBF-1-1              4.6        32039
StorageBF-1-1              4.7        32347
StorageBF-1-1              4.8        32656
StorageBF-1-1              4.9        32965
StorageBF-1-1              5          33274
StorageBF-1-1              5.1        33582
StorageBF-1-1              5.2        33891
StorageBF-1-1              5.3        34200
StorageBF-1-1              5.4        34508
StorageBF-1-1              5.5        34817

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Poway Rain Gage
Poway            FILE "R:\1286\Hyd\CALCS\SWMM\POWAY.prn"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]
```

```
[MAP]
DIMENSIONS 370.141 4295.274 847.527 4772.674
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            602.520            4324.899
DIV-1            394.239            4517.096
Stor-BF-1-1      403.883            4335.057

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-2            733.648            4516.733
BasinBF-1-1      391.840            4641.276
BasinBF-1-1      391.840            4641.276
BasinBF-1-1      391.840            4641.251
DMA-1            481.039            4640.063
DMA-1-Bypass     506.846            4545.387
DMA-2-Bypass     665.170            4560.442

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Poway            609.320            4626.006
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)
--------------------------------------------------------------

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

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

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 10/05/1962 00:00:00
Ending Date .............. 05/21/2008 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Initial LID Storage ......         0.059         0.019
Total Precipitation ......      1696.331       558.080
Evaporation Loss .........       148.568        48.878
Infiltration Loss ........       999.176       328.721
Surface Runoff ...........       112.003        36.848
LID Drainage .............       441.974       145.406
Final Storage ............         0.059         0.019
Continuity Error (%) .....        -0.318
```

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	553.977	180.522
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	154.056	50.201
Flooding Loss	391.351	127.527
Evaporation Loss	9.550	3.112
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.177	

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

****
Routing Time Step Summary
****

Minimum Time Step	:	60.00 sec
Average Time Step	:	60.00 sec
Maximum Time Step	:	60.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	1.01
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff 10^6 gal	Total Runoff CFS	Peak Runoff Coeff

```
----------------------------------------
  DMA-2                    558.08       0.00      34.69     356.30     155.68
14.19     169.87        4.15     0.53   0.304
  BasinBF-1-1              558.08   16365.51     711.85       0.00       0.00
0.00   16215.38      173.92    15.69   0.958
  DMA-1                    558.08       0.00      49.23     290.65     210.95
9.23     220.18      175.53    15.75   0.395
  DMA-1-Bypass             558.08       0.00       4.25     537.00       0.00
17.34      17.34        1.07     0.76   0.031
  DMA-2-Bypass             558.08       0.00       4.36     539.96       0.00
14.20      14.20        1.37     1.02   0.025


  **********************
  LID Performance Summary
  **********************


-------------------------------------------------------------------------------
--------------------------------
                                          Total      Evap     Infil   Surface
Drain    Initial     Final  Continuity
                                         Inflow      Loss      Loss   Outflow
Outflow   Storage   Storage       Error
  Subcatchment      LID Control            in        in        in        in
in        in        in           %

-------------------------------------------------------------------------------
--------------------------------
  BasinBF-1-1       BF-1-1           16923.59    711.72      0.00   2787.80
13424.59      1.80      1.80       -0.00

  ******************
  Node Depth Summary
  ******************

  ---------------------------------------------------------------------------
                                Average  Maximum  Maximum  Time of Max    Reported
                                  Depth    Depth      HGL   Occurrence   Max Depth
  Node                 Type        Feet     Feet     Feet  days hr:min        Feet
  ---------------------------------------------------------------------------
  POC-1                OUTFALL     0.02     0.50     0.50    74  08:58        0.50
  DIV-1                DIVIDER     0.02     0.50     0.50    74  08:34        0.50
  Stor-BF-1-1          STORAGE     0.06     3.50     3.50  6348  00:22        3.41


  ******************
  Node Inflow Summary
  ******************
```

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow 10^6 gal	Flow Balance Error Percent
POC-1	OUTFALL	2.16	13.71	6348 00:21	6.59	50.2	0.000
DIV-1	DIVIDER	15.69	15.69	6348 00:16	174	174	0.000
Stor-BF-1-1	STORAGE	0.00	15.15	6348 00:16	0	40.9	0.015

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Volume 1000 ft3
DIV-1	17311.73	0.53	127 18:55	127.518	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days	Maximum Outflow

hr:min CFS

Stor-BF-1-1	1.263	1	8	0	82.718	57	6348	00:21	12.41

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
POC-1	16.52	0.03	13.71	50.198
System	16.52	0.03	13.71	50.198

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
Bypass-1	DUMMY	15.15	6348	00:16			
UD-1	CONDUIT	0.01	7431	23:25	0.16	1.08	1.00
Outlet-BF-1-1	DUMMY	12.41	6348	00:22			

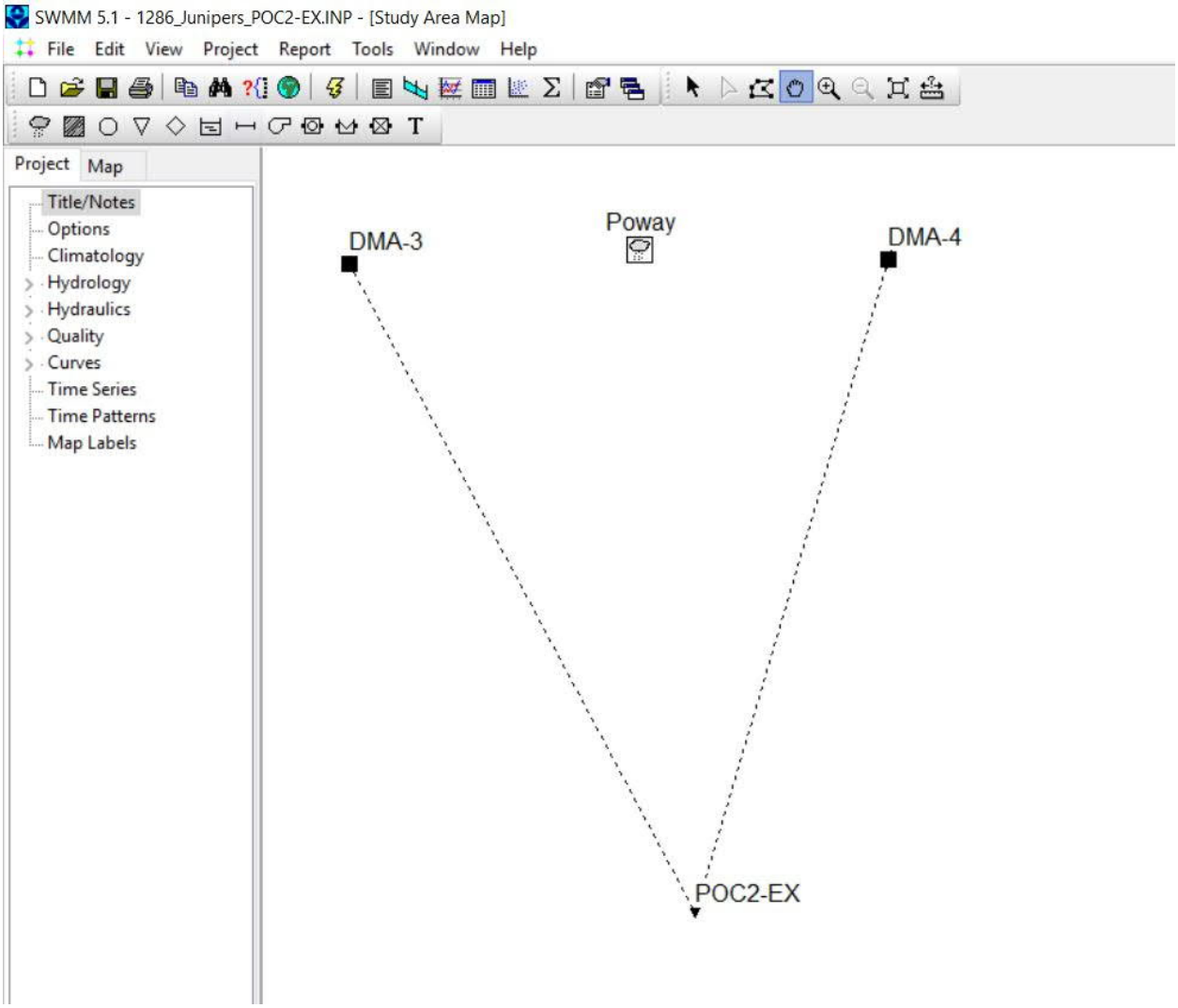
****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
UD-1	17297.90	17297.90	17297.90	17232.00	17297.90

Analysis begun on: Wed May 1 10:49:03 2019

Analysis ended on: Wed May 1 10:49:30 2019
Total elapsed time: 00:00:27

POC 2 – Pre-Developed Condition



```
Junipers
POC-2-EX

[OPTIONS]
;;Option            Value
FLOW_UNITS          CFS
INFILTRATION        GREEN_AMPT
FLOW_ROUTING        KINWAVE
LINK_OFFSETS        DEPTH
MIN_SLOPE           0
ALLOW_PONDING       NO
SKIP_STEADY_STATE   NO

START_DATE          10/05/1962
START_TIME          00:00:00
REPORT_START_DATE   10/05/1962
REPORT_START_TIME   00:00:00
END_DATE            05/21/2008
END_TIME            23:00:00
SWEEP_START         01/01
SWEEP_END           12/31
DRY_DAYS            0
REPORT_STEP         01:00:00
WET_STEP            00:15:00
DRY_STEP            04:00:00
ROUTING_STEP        0:01:00
RULE_STEP           00:00:00

INERTIAL_DAMPING    PARTIAL
NORMAL_FLOW_LIMITED BOTH
FORCE_MAIN_EQUATION H-W
VARIABLE_STEP       0.75
LENGTHENING_STEP    0
MIN_SURFAREA        12.557
MAX_TRIALS          8
HEAD_TOLERANCE      0.005
SYS_FLOW_TOL        5
LAT_FLOW_TOL        5
MINIMUM_STEP        0.5
THREADS             1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .15    .17    .19    .19    .18    .15    .11
  .08    .06
DRY_ONLY         NO

[RAINGAGES]
```

```
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Poway            INTENSITY 1:00     1.0      TIMESERIES Poway

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope
  CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- --------
-------- -------- ----------------
;Existing Area
DMA-3            Poway            POC2-EX          16.78    0        425      11
  0
DMA-4            Poway            POC2-EX          69.04    0        550      4
  0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo
PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ----------
----------
DMA-3            .012       0.15       .05        .1         25         OUTLET
DMA-4            0.012      0.15       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA-3            9          .025       0.33
DMA-4            9          .025       .33

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC2-EX          0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Poway            FILE "R:\1286\Hyd\CALCS\SWMM\POWAY.prn"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 1192.223 4056.735 2047.414 5285.372
```

```
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC2-EX          1522.327           4350.458

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-3            1231.095           4896.819
DMA-4            1683.006           4893.182
DMA-4            1683.006           4893.182
DMA-4            1688.425           4914.858

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Poway            1477.332           4906.657
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

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

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Starting Date 10/05/1962 00:00:00
Ending Date 05/21/2008 23:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 00:15:00
Dry Time Step 04:00:00

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	3991.202	558.080
Evaporation Loss	178.247	24.924
Infiltration Loss	3443.106	481.441
Surface Runoff	426.011	59.568
Final Storage	0.000	0.000
Continuity Error (%)	-1.407	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	426.011	138.822
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000

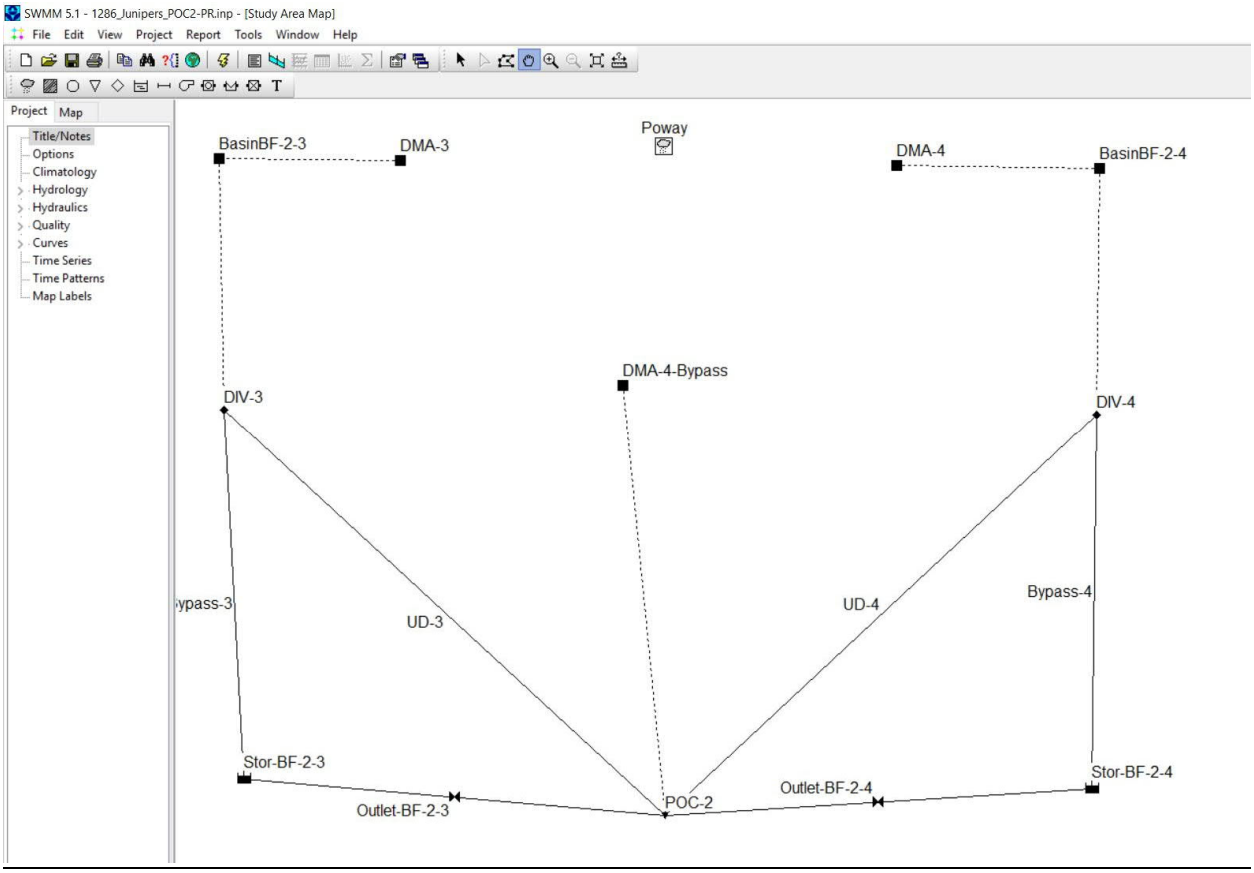
External Inflow	0.000	0.000
External Outflow	426.011	138.822
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff 10^6 gal	Total Runoff CFS	Peak Runoff	Runoff Coeff
DMA-3	558.08	0.00	23.04	463.12	0.00	79.11	79.11	36.04	8.42	0.142
DMA-4	558.08	0.00	25.38	485.89	0.00	54.82	54.82	102.77	16.83	0.098

Analysis begun on: Wed May 15 06:27:22 2019
Analysis ended on: Wed May 15 06:27:32 2019
Total elapsed time: 00:00:10

POC 2 – Developed Condition



```
Junipers
POC-2-PR

[OPTIONS]
;;Option            Value
FLOW_UNITS          CFS
INFILTRATION        GREEN_AMPT
FLOW_ROUTING        KINWAVE
LINK_OFFSETS        DEPTH
MIN_SLOPE           0
ALLOW_PONDING       NO
SKIP_STEADY_STATE   NO

START_DATE          10/05/1962
START_TIME          00:00:00
REPORT_START_DATE   10/05/1962
REPORT_START_TIME   00:00:00
END_DATE            05/21/2008
END_TIME            23:00:00
SWEEP_START         01/01
SWEEP_END           12/31
DRY_DAYS            0
REPORT_STEP         01:00:00
WET_STEP            00:15:00
DRY_STEP            04:00:00
ROUTING_STEP        0:01:00
RULE_STEP           00:00:00

INERTIAL_DAMPING    PARTIAL
NORMAL_FLOW_LIMITED BOTH
FORCE_MAIN_EQUATION H-W
VARIABLE_STEP       0.75
LENGTHENING_STEP    0
MIN_SURFAREA        12.557
MAX_TRIALS          8
HEAD_TOLERANCE      0.005
SYS_FLOW_TOL        5
LAT_FLOW_TOL        5
MINIMUM_STEP        0.5
THREADS             1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .15    .17    .19    .19    .18    .15    .11
  .08    .06
DRY_ONLY         NO

[RAINGAGES]
```

```
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Poway            INTENSITY 1:00     1.0      TIMESERIES Poway

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope
  CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- --------
-------- ----------------
BasinBF-2-4      Poway            DIV-4            .805     0        136      .01
  0
DMA-4            Poway            BasinBF-2-4      59.49    45.8     949      1.9
  0
BasinBF-2-3      Poway            DIV-3            .192     0        67       .01
  0
DMA-3            Poway            BasinBF-2-3      10.66    65.1     500      2.8
  0
DMA-4-Bypass     Poway            POC-2            11.41    0        100      2.5
  0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo
PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ----------
----------
BasinBF-2-4      .012       0.15       .05        0.3        25         OUTLET
DMA-4            0.012      0.15       0.05       0.3        25         PERVIOUS
50
BasinBF-2-3      0.012      0.15       0.05       0.3        25         OUTLET
DMA-3            0.012      0.15       0.05       0.3        25         PERVIOUS
50
DMA-4-Bypass     0.012      0.15       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
BasinBF-2-4      1.5        .3         0.3
DMA-4            9          0.019      .33
BasinBF-2-3      1.5        .3         .3
DMA-3            9          0.019      .33
DMA-4-Bypass     9          .025       .33

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BF-2-3           BC
BF-2-3           SURFACE    6          0          0          0          5
BF-2-3           SOIL       18         0.4        0.2        0.1        5          5
         1.5
```

```
BF-2-3           STORAGE    12         .67        0          0
BF-2-3           DRAIN      0.3922     0.5        0          6          0          0


BF-2-4           BC
BF-2-4           SURFACE    6          0          0          0          5
BF-2-4           SOIL       18         0.4        0.2        0.1        5          5
         1.5
BF-2-4           STORAGE    12         0.67       0          0
BF-2-4           DRAIN      0.2485     0.5        0          6          0          0


[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp
 ToPerv     RptFile                  DrainTo          FromPerv
;;-------------- ---------------- ------- ---------- ---------- ----------
---------- ---------- ----------------------- ---------------- ----------
BasinBF-2-4      BF-2-3           1       35080      100        1          100
 0          *                        *                0
BasinBF-2-3      BF-2-3           1       8350       50         0          100
 0          *                        *                0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-2            0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DIV-3            0          Bypass-3         CUTOFF     0.401      0          0
    0          0
DIV-4            0          Bypass-4         CUTOFF     1.097      0          0
    0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params
   N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ----------- ----------
--------------------------- -------- --------           -------- --------
Stor-BF-2-3      0        5.5        0          TABULAR    Stor-BF-2-3
   14290    1
Stor-BF-2-4      0        5.5        0          TABULAR    Stor-BF-2-4
   0        0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset
OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ----------
```

```
---------- ---------- ----------
Bypass-3         DIV-3            Stor-BF-2-3      400        0.01       0
0          0          0
UD-3             DIV-3            POC-2            400        0.01       0
0          0          0
Bypass-4         DIV-4            Stor-BF-2-4      400        0.01       0
0          0          0
UD-4             DIV-4            POC-2            400        0.01       0
0          0          0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type
QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- ---------------
---------------- ---------- --------
Outlet-BF-2-3    Stor-BF-2-3      POC-2            0          TABULAR/DEPTH
Discharge-BF-2-3            NO
Outlet-BF-2-4    Stor-BF-2-4      POC-2            0          TABULAR/DEPTH
Discharge-BF-2-4            NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4
Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ----------
---------- ----------
Bypass-3         DUMMY        0                0          0          0          1

UD-3             CIRCULAR     0.5              0          0          0          1

Bypass-4         DUMMY        0                0          0          0          1

UD-4             CIRCULAR     0.5              0          0          0          1


[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
Discharge-BF-2-3 Rating     0.00       0.000
Discharge-BF-2-3            0.05       0.020
Discharge-BF-2-3            0.10       0.073
Discharge-BF-2-3            0.15       0.149
Discharge-BF-2-3            0.20       0.219
Discharge-BF-2-3            0.25       0.262
Discharge-BF-2-3            0.30       0.298
Discharge-BF-2-3            0.35       0.331
Discharge-BF-2-3            0.40       0.361
Discharge-BF-2-3            0.45       0.388
Discharge-BF-2-3            0.50       0.414
Discharge-BF-2-3            0.55       0.438
```

Discharge-BF-2-3	0.60	0.461
Discharge-BF-2-3	0.65	0.507
Discharge-BF-2-3	0.70	0.598
Discharge-BF-2-3	0.75	0.724
Discharge-BF-2-3	0.80	0.878
Discharge-BF-2-3	0.85	1.048
Discharge-BF-2-3	0.90	1.182
Discharge-BF-2-3	0.95	1.280
Discharge-BF-2-3	1.00	1.370
Discharge-BF-2-3	1.05	1.452
Discharge-BF-2-3	1.10	1.529
Discharge-BF-2-3	1.15	1.602
Discharge-BF-2-3	1.20	1.671
Discharge-BF-2-3	1.25	1.766
Discharge-BF-2-3	1.30	1.912
Discharge-BF-2-3	1.35	2.103
Discharge-BF-2-3	1.40	2.333
Discharge-BF-2-3	1.45	2.592
Discharge-BF-2-3	1.50	2.873
Discharge-BF-2-3	1.55	3.166
Discharge-BF-2-3	1.60	3.376
Discharge-BF-2-3	1.65	3.553
Discharge-BF-2-3	1.70	3.718
Discharge-BF-2-3	1.75	3.874
Discharge-BF-2-3	1.80	4.022
Discharge-BF-2-3	1.85	4.163
Discharge-BF-2-3	1.90	4.298
Discharge-BF-2-3	1.95	4.429
Discharge-BF-2-3	2.00	4.555
Discharge-BF-2-3	2.05	4.677
Discharge-BF-2-3	2.10	4.796
Discharge-BF-2-3	2.15	4.911
Discharge-BF-2-3	2.20	5.023
Discharge-BF-2-3	2.25	5.133
Discharge-BF-2-3	2.30	5.240
Discharge-BF-2-3	2.35	5.344
Discharge-BF-2-3	2.40	5.447
Discharge-BF-2-3	2.45	5.547
Discharge-BF-2-3	2.50	5.646
Discharge-BF-2-3	2.55	5.891
Discharge-BF-2-3	2.60	6.258
Discharge-BF-2-3	2.65	6.704
Discharge-BF-2-3	2.70	7.214
Discharge-BF-2-3	2.75	7.778
Discharge-BF-2-3	2.80	8.390
Discharge-BF-2-3	2.85	9.047
Discharge-BF-2-3	2.90	9.745
Discharge-BF-2-3	2.95	10.482
Discharge-BF-2-3	3.00	11.254

Discharge-BF-2-3	3.05	12.061
Discharge-BF-2-3	3.10	12.900
Discharge-BF-2-3	3.15	13.770
Discharge-BF-2-3	3.20	14.671
Discharge-BF-2-3	3.25	15.600
Discharge-BF-2-3	3.30	16.558
Discharge-BF-2-3	3.35	17.542
Discharge-BF-2-3	3.40	18.553
Discharge-BF-2-3	3.45	19.589
Discharge-BF-2-3	3.50	20.650
Discharge-BF-2-3	3.55	21.735
Discharge-BF-2-3	3.60	22.844
Discharge-BF-2-3	3.65	23.976
Discharge-BF-2-3	3.70	25.130
Discharge-BF-2-3	3.75	26.307
Discharge-BF-2-3	3.80	27.505
Discharge-BF-2-3	3.85	28.725
Discharge-BF-2-3	3.90	29.965
Discharge-BF-2-3	3.95	31.226
Discharge-BF-2-3	4.00	32.507
Discharge-BF-2-3	4.05	33.808
Discharge-BF-2-3	4.10	35.128
Discharge-BF-2-3	4.15	36.468
Discharge-BF-2-3	4.20	37.826
Discharge-BF-2-3	4.25	39.203
Discharge-BF-2-3	4.30	40.599
Discharge-BF-2-3	4.35	42.013
Discharge-BF-2-3	4.40	43.444
Discharge-BF-2-3	4.45	44.893
Discharge-BF-2-3	4.50	46.360
Discharge-BF-2-3	4.55	47.843
Discharge-BF-2-3	4.60	49.344
Discharge-BF-2-3	4.65	50.862
Discharge-BF-2-3	4.70	52.396
Discharge-BF-2-3	4.75	53.946
Discharge-BF-2-3	4.80	55.513
Discharge-BF-2-3	4.85	57.096
Discharge-BF-2-3	4.90	58.695
Discharge-BF-2-3	4.95	60.309
Discharge-BF-2-3	5.00	61.939
Discharge-BF-2-3	5.05	63.585
Discharge-BF-2-3	5.10	65.246
Discharge-BF-2-3	5.15	66.922
Discharge-BF-2-3	5.20	68.613
Discharge-BF-2-3	5.25	70.318
Discharge-BF-2-3	5.30	72.039
Discharge-BF-2-3	5.35	73.774
Discharge-BF-2-3	5.40	75.524
Discharge-BF-2-3	5.45	77.287

```
Discharge-BF-2-3            5.50       79.066
;
Discharge-BF-2-4 Rating     0.00       0.000
Discharge-BF-2-4            0.05       0.029
Discharge-BF-2-4            0.10       0.112
Discharge-BF-2-4            0.15       0.242
Discharge-BF-2-4            0.20       0.413
Discharge-BF-2-4            0.25       0.615
Discharge-BF-2-4            0.30       0.841
Discharge-BF-2-4            0.35       1.081
Discharge-BF-2-4            0.40       1.238
Discharge-BF-2-4            0.45       1.364
Discharge-BF-2-4            0.50       1.480
Discharge-BF-2-4            0.55       1.587
Discharge-BF-2-4            0.60       1.687
Discharge-BF-2-4            0.65       1.782
Discharge-BF-2-4            0.70       1.872
Discharge-BF-2-4            0.75       1.958
Discharge-BF-2-4            0.80       2.082
Discharge-BF-2-4            0.85       2.284
Discharge-BF-2-4            0.90       2.558
Discharge-BF-2-4            0.95       2.902
Discharge-BF-2-4            1.00       3.311
Discharge-BF-2-4            1.05       3.780
Discharge-BF-2-4            1.10       4.303
Discharge-BF-2-4            1.15       4.876
Discharge-BF-2-4            1.20       5.493
Discharge-BF-2-4            1.25       6.147
Discharge-BF-2-4            1.30       6.833
Discharge-BF-2-4            1.35       7.544
Discharge-BF-2-4            1.40       8.274
Discharge-BF-2-4            1.45       9.017
Discharge-BF-2-4            1.50       9.578
Discharge-BF-2-4            1.55       10.072
Discharge-BF-2-4            1.60       10.644
Discharge-BF-2-4            1.65       11.294
Discharge-BF-2-4            1.70       12.021
Discharge-BF-2-4            1.75       12.825
Discharge-BF-2-4            1.80       13.701
Discharge-BF-2-4            1.85       14.649
Discharge-BF-2-4            1.90       15.664
Discharge-BF-2-4            1.95       16.744
Discharge-BF-2-4            2.00       17.886
Discharge-BF-2-4            2.05       19.084
Discharge-BF-2-4            2.10       20.335
Discharge-BF-2-4            2.15       21.635
Discharge-BF-2-4            2.20       22.978
Discharge-BF-2-4            2.25       24.362
Discharge-BF-2-4            2.30       25.780
```

Discharge-BF-2-4	2.35	27.228
Discharge-BF-2-4	2.40	28.701
Discharge-BF-2-4	2.45	30.194
Discharge-BF-2-4	2.50	31.703
Discharge-BF-2-4	2.55	33.221
Discharge-BF-2-4	2.60	34.493
Discharge-BF-2-4	2.65	35.470
Discharge-BF-2-4	2.70	36.416
Discharge-BF-2-4	2.75	37.333
Discharge-BF-2-4	2.80	38.225
Discharge-BF-2-4	2.85	39.094
Discharge-BF-2-4	2.90	39.941
Discharge-BF-2-4	2.95	40.768
Discharge-BF-2-4	3.00	41.577
Discharge-BF-2-4	3.05	42.368
Discharge-BF-2-4	3.10	43.144
Discharge-BF-2-4	3.15	43.904
Discharge-BF-2-4	3.20	44.650
Discharge-BF-2-4	3.25	45.383
Discharge-BF-2-4	3.30	46.103
Discharge-BF-2-4	3.35	46.812
Discharge-BF-2-4	3.40	47.509
Discharge-BF-2-4	3.45	48.195
Discharge-BF-2-4	3.50	48.871
Discharge-BF-2-4	3.55	50.728
Discharge-BF-2-4	3.60	53.563
Discharge-BF-2-4	3.65	57.031
Discharge-BF-2-4	3.70	61.011
Discharge-BF-2-4	3.75	65.431
Discharge-BF-2-4	3.80	70.243
Discharge-BF-2-4	3.85	75.413
Discharge-BF-2-4	3.90	80.914
Discharge-BF-2-4	3.95	86.724
Discharge-BF-2-4	4.00	92.826
Discharge-BF-2-4	4.05	99.203
Discharge-BF-2-4	4.10	105.844
Discharge-BF-2-4	4.15	112.737
Discharge-BF-2-4	4.20	119.871
Discharge-BF-2-4	4.25	127.239
Discharge-BF-2-4	4.30	134.832
Discharge-BF-2-4	4.35	142.643
Discharge-BF-2-4	4.40	150.665
Discharge-BF-2-4	4.45	158.893
Discharge-BF-2-4	4.50	167.321
Discharge-BF-2-4	4.55	175.944
Discharge-BF-2-4	4.60	184.757
Discharge-BF-2-4	4.65	193.756
Discharge-BF-2-4	4.70	202.937
Discharge-BF-2-4	4.75	212.296

```
Discharge-BF-2-4            4.80       221.829
Discharge-BF-2-4            4.85       231.534
Discharge-BF-2-4            4.90       241.407
Discharge-BF-2-4            4.95       251.444
Discharge-BF-2-4            5.00       261.644
Discharge-BF-2-4            5.05       272.003
Discharge-BF-2-4            5.10       282.519
Discharge-BF-2-4            5.15       293.189
Discharge-BF-2-4            5.20       304.011
Discharge-BF-2-4            5.25       314.983
Discharge-BF-2-4            5.30       326.103
Discharge-BF-2-4            5.35       337.369
Discharge-BF-2-4            5.40       348.778
Discharge-BF-2-4            5.45       360.329
Discharge-BF-2-4            5.50       372.020
;
Stor-BF-2-3      Storage    0          9152
Stor-BF-2-3                 0.1        9308
Stor-BF-2-3                 0.2        9463
Stor-BF-2-3                 0.3        9619
Stor-BF-2-3                 0.4        9775
Stor-BF-2-3                 0.5        9931
Stor-BF-2-3                 0.6        10093
Stor-BF-2-3                 0.7        10254
Stor-BF-2-3                 0.8        10416
Stor-BF-2-3                 0.9        10577
Stor-BF-2-3                 1          10739
Stor-BF-2-3                 1.1        10900
Stor-BF-2-3                 1.2        11062
Stor-BF-2-3                 1.3        11224
Stor-BF-2-3                 1.4        11385
Stor-BF-2-3                 1.5        11547
Stor-BF-2-3                 1.6        11714
Stor-BF-2-3                 1.7        11881
Stor-BF-2-3                 1.8        12049
Stor-BF-2-3                 1.9        12216
Stor-BF-2-3                 2          12383
Stor-BF-2-3                 2.1        12551
Stor-BF-2-3                 2.2        12718
Stor-BF-2-3                 2.3        12885
Stor-BF-2-3                 2.4        13053
Stor-BF-2-3                 2.5        13220
Stor-BF-2-3                 2.6        13393
Stor-BF-2-3                 2.7        13566
Stor-BF-2-3                 2.8        13739
Stor-BF-2-3                 2.9        13912
Stor-BF-2-3                 3          14085
Stor-BF-2-3                 3.1        14258
Stor-BF-2-3                 3.2        14431
```

```
Stor-BF-2-3                 3.3         14604
Stor-BF-2-3                 3.4         14777
Stor-BF-2-3                 3.5         14950
Stor-BF-2-3                 3.6         15129
Stor-BF-2-3                 3.7         15308
Stor-BF-2-3                 3.8         15486
Stor-BF-2-3                 3.9         15665
Stor-BF-2-3                 4           15844
Stor-BF-2-3                 4.1         16023
Stor-BF-2-3                 4.2         16201
Stor-BF-2-3                 4.3         16380
Stor-BF-2-3                 4.4         16559
Stor-BF-2-3                 4.5         16738
Stor-BF-2-3                 4.6         16922
Stor-BF-2-3                 4.7         17107
Stor-BF-2-3                 4.8         17291
Stor-BF-2-3                 4.9         17476
Stor-BF-2-3                 5           17660
Stor-BF-2-3                 5.1         17845
Stor-BF-2-3                 5.2         18029
Stor-BF-2-3                 5.3         18214
Stor-BF-2-3                 5.4         18398
Stor-BF-2-3                 5.5         18583
;
Stor-BF-2-4      Storage    0           36559
Stor-BF-2-4                 0.1         36813
Stor-BF-2-4                 0.2         37067
Stor-BF-2-4                 0.3         37320
Stor-BF-2-4                 0.4         37574
Stor-BF-2-4                 0.5         37828
Stor-BF-2-4                 0.6         38087
Stor-BF-2-4                 0.7         38346
Stor-BF-2-4                 0.8         38606
Stor-BF-2-4                 0.9         38865
Stor-BF-2-4                 1.0         39125
Stor-BF-2-4                 1.1         39384
Stor-BF-2-4                 1.2         39643
Stor-BF-2-4                 1.3         39903
Stor-BF-2-4                 1.4         40162
Stor-BF-2-4                 1.5         40421
Stor-BF-2-4                 1.6         40686
Stor-BF-2-4                 1.7         40951
Stor-BF-2-4                 1.8         41216
Stor-BF-2-4                 1.9         41481
Stor-BF-2-4                 2.0         41746
Stor-BF-2-4                 2.1         42011
Stor-BF-2-4                 2.2         42276
Stor-BF-2-4                 2.3         42541
Stor-BF-2-4                 2.4         42806
```

```
Stor-BF-2-4                2.5        43071
Stor-BF-2-4                2.6        43342
Stor-BF-2-4                2.7        43613
Stor-BF-2-4                2.8        43883
Stor-BF-2-4                2.9        44154
Stor-BF-2-4                3.0        44425
Stor-BF-2-4                3.1        44695
Stor-BF-2-4                3.2        44966
Stor-BF-2-4                3.3        45237
Stor-BF-2-4                3.4        45507
Stor-BF-2-4                3.5        45778
Stor-BF-2-4                3.6        46054
Stor-BF-2-4                3.7        46331
Stor-BF-2-4                3.8        46607
Stor-BF-2-4                3.9        46883
Stor-BF-2-4                4.0        47160
Stor-BF-2-4                4.1        47436
Stor-BF-2-4                4.2        47712
Stor-BF-2-4                4.3        47989
Stor-BF-2-4                4.4        48265
Stor-BF-2-4                4.5        48541
Stor-BF-2-4                4.6        48823
Stor-BF-2-4                4.7        49105
Stor-BF-2-4                4.8        49387
Stor-BF-2-4                4.9        49669
Stor-BF-2-4                5          49951
Stor-BF-2-4                5.1        50233
Stor-BF-2-4                5.2        50515
Stor-BF-2-4                5.3        50797
Stor-BF-2-4                5.4        51079
Stor-BF-2-4                5.5        51361

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Poway Rain Gage
Poway            FILE "R:\1286\Hyd\CALCS\SWMM\POWAY.prn"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 370.141 4295.274 847.527 4772.674
Units      None
```

```
[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-2            611.884            4317.136
DIV-3            394.239            4517.096
DIV-4            824.622            4514.685
Stor-BF-2-3      403.883            4335.057
Stor-BF-2-4      822.211            4330.235

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
BasinBF-2-4      825.828            4636.446
DMA-4            725.766            4637.651
BasinBF-2-3      391.840            4641.276
BasinBF-2-3      391.840            4641.276
BasinBF-2-3      391.840            4641.251
DMA-3            481.039            4640.063
DMA-4-Bypass     590.865            4529.360

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Poway            611.748            4646.403
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)
--------------------------------------------------------------

WARNING 04: minimum elevation drop used for Conduit Bypass-3
WARNING 04: minimum elevation drop used for Conduit UD-3
WARNING 04: minimum elevation drop used for Conduit Bypass-4
WARNING 04: minimum elevation drop used for Conduit UD-4

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

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 10/05/1962 00:00:00
Ending Date .............. 05/21/2008 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Initial LID Storage ......         0.156         0.023
Total Precipitation ......      3839.451       558.080
Evaporation Loss .........       486.464        70.710
Infiltration Loss ........      2183.872       317.435
Surface Runoff ...........       488.694        71.034
LID Drainage .............       694.501       100.949
Final Storage ............         0.150         0.022
Continuity Error (%) .....        -0.367
```

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	1183.195	385.562
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	501.378	163.382
Flooding Loss	683.593	222.759
Evaporation Loss	0.941	0.307
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.230	

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	60.00 sec
Average Time Step	:	60.00 sec
Maximum Time Step	:	60.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	1.02
Percent Not Converging	:	0.00

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff

```
------------------------------------------------------------------------------
----------------------------------------
  BasinBF-2-4              558.08   13466.31     662.36       0.00       0.00
0.00   13367.50      292.19    28.88   0.953
  DMA-4                    558.08       0.00      69.39     308.33     208.55
77.95     182.22      294.35    28.79   0.327
  BasinBF-2-3              558.08   14630.61     396.21      10.03       0.00
14622.45   14783.49       77.07     8.10   0.973
  DMA-3                    558.08       0.00      80.27     218.40     301.41
112.81     263.52       76.28     8.02   0.472
  DMA-4-Bypass             558.08       0.00      21.42     485.02       0.00
52.50      52.50       16.27     2.57   0.094


  ***********************
  LID Performance Summary
  ***********************


------------------------------------------------------------------------------
--------------------------------
                                        Total      Evap     Infil   Surface
Drain    Initial     Final  Continuity
                                       Inflow      Loss      Loss   Outflow
Outflow   Storage   Storage       Error
  Subcatchment      LID Control            in        in        in        in
in        in        in           %

------------------------------------------------------------------------------
--------------------------------
  BasinBF-2-4       BF-2-3            14024.39    662.12      0.00   3051.98
10310.60      1.90      1.80       -0.00
  BasinBF-2-3       BF-2-3              558.08    396.77      0.00      0.00
161.31      1.80      1.80       -0.00

  ******************
  Node Depth Summary
  ******************

  ---------------------------------------------------------------------------
                                Average  Maximum  Maximum  Time of Max    Reported
                                  Depth    Depth      HGL   Occurrence   Max Depth
  Node                 Type        Feet     Feet     Feet  days hr:min        Feet
  ---------------------------------------------------------------------------
  POC-2                OUTFALL     0.02     0.50     0.50     0  00:21        0.50
  DIV-3                DIVIDER     0.01     0.50     0.50    73  09:37        0.50
  DIV-4                DIVIDER     0.02     0.50     0.50     0  00:03        0.50
  Stor-BF-2-3          STORAGE     0.00     1.90     1.90  5152  04:26        1.73
```

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
Stor-BF-2-4	STORAGE	0.00	2.18	2.18 6325 05:24		2.10	

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
POC-2	OUTFALL	2.57	29.10	6325 05:24	16.3	163	0.000
DIV-3	DIVIDER	8.10	8.10	6348 00:16	77.1	77.1	0.000
DIV-4	DIVIDER	28.88	28.88	6348 00:16	292	292	0.000
Stor-BF-2-3	STORAGE	0.00	7.70	6348 00:16	0	33.4	0.055
Stor-BF-2-4	STORAGE	0.00	27.78	6348 00:16	0	105	0.051

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Volume 1000 ft3
DIV-3	9698.33	0.39	163 01:33	40.170	0.000
DIV-4	13084.98	1.09	163 02:50	182.573	0.000

****

Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
Stor-BF-2-3	0.031	0	1	0	20.257	27	5152 04:25	4.30
Stor-BF-2-4	0.137	0	0	0	86.023	36	6325 05:24	22.56

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
POC-2	7.73	0.20	29.10	163.369
System	7.73	0.20	29.10	163.369

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
Bypass-3	DUMMY	7.70	6348 00:16			
UD-3	CONDUIT	0.01	4869 22:29	0.16	1.08	1.00
Bypass-4	DUMMY	27.78	6348 00:16			
UD-4	CONDUIT	0.01	9963 03:08	0.16	1.08	1.00
Outlet-BF-2-3	DUMMY	4.29	5152 04:26			

Outlet-BF-2-4	DUMMY	22.56	6325	05:24

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
UD-3	9684.17	9684.17	9684.17	9961.45	9684.17
UD-4	13073.77	13073.77	13073.77	13317.50	13073.77

Analysis begun on: Thu May 16 10:41:38 2019
Analysis ended on: Thu May 16 10:42:14 2019
Total elapsed time: 00:00:36

ATTACHMENT 5 - SWMM Explanation of Significant Variables

In the prior section the viewer can view the associated input and output parameters within the EPA-SWMM Model in both pre-development and post-development conditions. Each portion, i.e., sub-catchments, outfalls, storage units, LID controls for the bio-retention cells, ponding on top of the bio-retention (modeled as a storage unit), weir as a discharge, and outfalls (point of compliance), are also shown.

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

Soil characteristics of the existing soils were determined from the USGS sources.

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

Description of model parameters and assumptions:

N-Imperv – Manning's N for impervious surfaces
    0.012 (typical)

N-Perv – Manning's N for pervious surfaces
    0.05 (typical)

Dstore-Imperv – Depth of depression storage on impervious area (in)
    0.02 (typical)

Dstore-Perv – Depth of depression storage on pervious area (in)
    0.1 (typical)

%Zero-Imperv – Percentage of impervious area with no depression storage (%)
    25 (typical)

Suction Head – Soil capillary suction head (in)

Conductivity – Soil saturated hydraulic conductivity (in/hr)
    -75% of these values if subcatchment is graded/compacted

Initial Deficit – Initial moisture deficit (fraction)

Soil Type	Suction Head	Conductivity	Initial Deficit
A	1.5	0.3	0.30
B	3	0.2	0.31
C	6	0.1	0.32
D	9	0.025	0.33

NOTE: These values are based on City of Vista's BMP Manual in Appendix G.

EXPLANATION OF SELECTED VARIABLES

Parameters for the pre- and post-developed models include soil types C & D in accordance with the San Diego County Hydrology Manual and the USGS Soil Survey Map (attached at the end of this appendix). Suction head, conductivity and initial deficit corresponds to average values expected for the soil types, according to sources consulted, professional experience, and approximate values obtained by the interim Orange County modeling approach.

H&A selected infiltration values, such that the percentage of total precipitation that becomes runoff, is realistic for soil type C & D and slightly smaller than measured values for Southern California watersheds.

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

Sub-catchments BR-1

The area of Prop-X + BR-X must be equal to the area of the development tributary to that particular bio-retention facility. Five (5) decimal places were given regarding the areas of the bio-retention to insure that the area used by the program for the LID subroutine corresponds exactly with these tributaries.

LID Control Editor: Explanation of Significant Variables

INFILTRATION

Height:

The storage depth variable within the SWMM model is representative of the storage volume provided in the vault.

Seepage Rate:

The seepage rate is directly input from the geotechnical report.

Clogging factor:

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

BIORETENTION

Storage Depth:

The storage depth variable within the SWMM model is representative of the storage volume provided beneath the engineered soil and mulch components of the biofiltration facility. This storage volume is comprised of a gravel located bed beneath a layer of engineered soil and a 0.25 foot (3-inch) layer of landscaping mulch.

Porosity:

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

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

Void Ratio:

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

Clogging factor:

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

Drain (Flow) coefficient:

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

$$q = C(H - H_D)^n \qquad (1)$$

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

The general orifice equation can be expressed as:

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

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

Cutoff Flow:

This is the only significant variable in the diversion, as the type of diversion is defined by this value. Any excess of flow over this value will be diverted into a pond subroutine (the surface stage of the bio-retention basin) and routed there. The determination of this value equates to the value obtained with equation (2) above, plus 1%, when H = depth of gravel layer and H_D=0 (orifice situated at the datum). Thus, once flows exceed the maximum discharge the LID orifice experiences a head of the storage depth, ponding occurs within the bioretention basin, routing these additional flows via the pond riser.

Note:

The complete storage and rating curves and the respective explanation is shown at the end of this appendix. A variable area vs. elevation storage curve was used for the final model, and a discharge that is a function of the outlet structure in the surface was used also.

ATTACHMENT 6 - Drying Time of the Surface Layer of Bio-retention cells

The LID subroutine of the SWMM Model does not increase the discharge of the lower LID orifice once the storage layer is full (in other words, it does not consider the influence of the pressure in the amended soil layer). The discharge of the lower LID orifice when the surface layer is full is considered constant by the model and equal to the discharge of the lower orifice when the storage layer is full (equal to the cutoff flows).

The drying time interval between an elevation yi and another elevation $yi - \Delta y$ can be obtained by:

$$\Delta t_i(hours) = \frac{(Q(yi)+Q(yi-\Delta y))}{7200\ (V(yi)-V(yi-\Delta y))} = \frac{Q_{ave}}{3600\ \Delta V}$$

$$t = \sum_{i=1}^{n} \Delta t_i\ (hours)$$

Q_{ave} represents the average discharge between elevation y_i and y_{i+1} obtained by $\frac{Q(yi)+Q(yi-\Delta y)}{2}$ where ΔV represents the fraction of the volume that must be discharged at a peak flow $Q_{ave}(V(yi) - V(yi - \Delta y))$.

The volume and the discharge change as the elevation changes; the calculation takes into account this change.

ATTACHMENT 7 – Hydromodification Watershed Maps

LEGEND

- PROJECT BOUNDARY
- DMA 1 BOUNDARY
- XX.XX ACRES — SUBAREA ACREAGE
- DMA 1-4 — DMA ICON
- PERVIOUS - LANDSCAPE / SELF TREATING AREAS
- D — HYDROLOGIC SOIL TYPE
- X — POINT OF COMPLIANCE

PENASQUITOS DRIVE

DEL DIABLO ST.

DEL DIABLO ST.

ANDORRA WAY

CAMINITO ORENSE ESTE

DMA 1
31.18 ACRES
C

DMA 2
2.16 ACRES
C

DMA 3
15.86 ACRES
D

DMA 4
63.22 ACRES
D

INTERSTATE I-15 (AVOCADO HIGHWAY)

1

2

0 150 300 450
SCALE 1" = 150'

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

PREDEVELOPED CONDITION
HYDROMODIFICATION MAP

THE JUNIPERS

CITY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 3356-0002

R:\1286\Hyd\ACAD\1286$HYD_SWQMP.dwg[]Dec-06-2018:20:26

LEGEND

- PROJECT BOUNDARY
- DMA BOUNDARY
- XX.XX ACRES — SUBAREA ACREAGE
- DMA 1 — DMA ICON
- D — HYDROLOGIC SOIL TYPE
- X — POINT OF COMPLIANCE
- DMA 1
- DMA 2
- DMA 3
- DMA 4
- DMA 1 BYPASS
- DMA 4 BYPASS
- BASIN BF-1-2
- BASIN BF-2-3
- STRUCTURAL BMPS
  BIOFILTRATION BASIN

PENASQUITOS DRIVE
DEL DIABLO ST.
DEL DIABLO ST.
ANDORRA WAY
CAMINITO ORENSE ESTE
CARMEL MOUNTAIN ROAD
I-15 (AVOCADO HIGHWAY)
INTERSTATE HWY 15
CARMEL MTN RD
ANDORRA WAY

0.93 ACRES
1.34 ACRES
DMA 1
C
BASIN
BF-1-1
29.75 ACRES
1.65 ACRES
0.90 ACRES
DMA 3
9.34 ACRES
D
DMA 4
60.29 ACRES
D
DMA 2
3.55 ACRES
C
9.76 ACRES
MWS
BF-1-2
0.79 ACRES
BASIN
BF-2-3
BASIN
BF-2-4
1
2

H&A

0 150 300 450
SCALE 1" = 150'

PREPARED BY:

HUNSAKER & ASSOCIATES
SAN DIEGO, INC

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

DEVELOPED CONDITION
HYDROMODIFICATION MAP

THE JUNIPERS

CITY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 3356-0002

R:\1286\Hyd\ACAD\1286$HYD_SWQMP.dwg[]May-16-2019:09:17

ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: The Junipers

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒ Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Maintenance Agreement (Form DS-3247) (when applicable)	◉ Included ○ Not Applicable

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

Preliminary Design / Planning / CEQA level submittal:

- Attachment 3a must identify:
  - ☒ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual
- Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

Final Design level submittal:

Attachment 3a must identify:

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

Attachment 3b: For private entity operation and maintenance, Attachment 3b must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

- ☐ Vicinity map
- ☐ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
- ☐ BMP and HMP location and dimensions
- ☐ BMP and HMP specifications/cross section/model
- ☐ Maintenance recommendations and frequency
- ☐ LID features such as (permeable paver and LS location, dim, SF).

THE CITY OF SAN DIEGO
RECORDING REQUESTED BY:
THE CITY OF SAN DIEGO
AND WHEN RECORDED MAIL TO:

Click or tap here to enter text.
Click or tap here to enter text.
Click or tap here to enter text.

(THIS SPACE IS FOR THE RECORDER'S USE ONLY)

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

APPROVAL NUMBER:	ASSESSOR'S PARCEL NUMBER:	PROJECT NUMBER:
	Click or tap here to enter text.	Click or tap here to enter text.

This agreement is made by and between the City of San Diego, a municipal corporation [City] and Click or tap here to enter text.

the owner or duly authorized representative of the owner [Property Owner] of property located at:
Click or tap here to enter text.

(PROPERTY ADDRESS)

and more particularly described as: Click or tap here to enter text.

(LEGAL DESCRIPTION OF PROPERTY)

in the City of San Diego, County of San Diego, State of California.

Property Owner is required pursuant to the City of San Diego Municipal Code, Chapter 4, Article 3, Division 3, Chapter 14, Article 2, Division 2, and the Land Development Manual, Storm Water Standards to enter into a Storm Water Management and Discharge Control Maintenance Agreement [Maintenance Agreement] for the installation and maintenance of Permanent Storm Water Best Management Practices [Permanent Storm Water BMP's] prior to the issuance of construction permits. The Maintenance Agreement is intended to ensure the establishment and maintenance of Permanent Storm Water BMP's onsite, as described in the attached exhibit(s), the project's Storm Water Quality Management Plan [SWQMP] and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s): Click or tap here to enter text.

Property Owner wishes to obtain a building or engineering permit according to the Grading and/or Improvement Plan Drawing No(s) or Building Plan Project No(s): Click or tap here to enter text.

Continued on Page 2

Project Name: The Junipers

NOW, THEREFORE, the parties agree as follows:

1. Property Owner shall have prepared, or if qualified, shall prepare an Operation and Maintenance Procedure [OMP] for Permanent Storm Water BMP's, satisfactory to the City, according to the attached exhibit(s), consistent with the Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s):XXXXXX.

2. Property Owner shall install, maintain and repair or replace all Permanent Storm Water BMP's within their property, according to the OMP guidelines as described in the attached exhibit(s), the project's WQTR and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s)):XXXXXX.

3. Property Owner shall maintain operation and maintenance records for at least five (5) years. These records shall be made available to the City for inspection upon request at any time.

This Maintenance Agreement shall commence upon execution of this document by all parties named hereon, and shall run with the land.

Executed by the City of San Diego and by Property Owner in San Diego, California.

See Attached Exhibits(s):

(Owner Signature)

(Print Name and Title)

Lennar Homes

(Company/Organization Name)

TBD

(Date)

THE CITY OF SAN DIEGO

APPROVED:

(City Control engineer Signature

(Print Name)

(Date)

NOTE: ALL SIGNATURES MUST INCLUDE NOTARY ACKNOWLEDMENTS PER CIVIL CODE SEC. 1180 ET.SEQ

ATTACHMENT 4
COPY OF PLAN SHEETS SHOWING PERMANENT STORM WATER BMPS

This is the cover sheet for Attachment 4.

INSERT RELEVANT TM SHEETS

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

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

The plans must identify:

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

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

ATTACHMENT 5
DRAINAGE REPORT

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

INSERT DRAINAGE STUDY

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

ATTACHMENT 6
GEOTECHNICAL AND GROUNDWATER INVESTIGATION REPORT

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

INSERT GEOTECHNICAL REPORT

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING